WATER GLOBAL PRACTICE

Turbulent Waters

Pursuing Water Security in Fragile Contexts

Claudia W. Sadoff, Edoardo Borgomeo, and Dominick de Waal

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Foreword

Water crises and water-related risks are perceived as the most pressing global concerns of the coming 10 years, according to the World Economic Forum survey of nearly 750 experts. In the nearer term, however, global concerns are dominated by issues relating to fragility and conflict.

This report is about the dynamic between these two sets of very real and very urgent risks—water management and the management of conflict and violence.

In some cases, water can play directly into the dynamic of fragility, acting as a 'risk multiplier' that can compound or trigger simmering tensions. In some cases, the relationship between water and fragility can be less direct but still very powerfully aligned. In many cases, either the interplay between water and fragility can contribute to a vicious cycle that deepens fragility—or to a virtuous cycle that promotes stability.

This report is a first step in informing responses both in times of crisis and in times of development opportunity. It covers a wide range of possible entry points: from water services, infrastructure needed to manage flood and drought and the management of water resources. While in the medium to long-term infrastructure is key to all three types of water intervention an emerging theme in this report is that countries and their development partners need to invest more in the data, information and institutions that manage this infrastructure. Better knowledge and institutional capacity is the first and fastest way of addressing the water-insecurity-fragility cycle.

Today we see an historic number of displaced and conflict-affected people. The United Nations High Commissioner for Refugees reported over 65 million people were displaced at the end of 2015. By 2030, we project that about half of the world's poor will live in fragile or conflict-affected states. In that same timeframe, UNEP projects that almost half of the world's population will face severe water stress. Unfortunately, many of the most fragile countries are also those with the greatest water stress.

In view of these troubling trends, understanding the dynamics between water and fragility is essential. We welcome this report as an important step toward better understanding the increasingly important role of water management in fragile contexts.

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Abbreviations

AfDB	African Development Bank
FY	fiscal year
IOM	International Organization for Migration
OECD	Organisation for Economic Co-operation and Development
UN	United Nations
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Fund
WASH	water, sanitation, and hygiene
WSP	Water and Sanitation Program (World Bank)

All dollar amounts are in U.S. dollars.

Summary

Water insecurity—ranging from chronic water scarcity to lack of access to safe drinking water and sanitation services, to hydrological uncertainty and extremes (floods and droughts)—can cause severe disruptions and compound fragilities in social, economic, and environmental systems. Untangling the role of water insecurity in contributing to fragility is difficult, yet it is becoming a fundamental question for water policy worldwide given the scale of the fragility challenge.

The challenge is made more urgent by the rising proportion of the world's poor living in fragile contexts; by 2030, half of the world's poor are expected to live in fragile conditions, rising from less than 20 percent today. The reality of climate change also aggravates the problem.

This report explores the dynamics between water insecurity and fragility. It suggests that water security is more difficult to achieve in fragile contexts because of a range of factors, including weak institutions and information systems, strained human and financial resources, and degraded infrastructure. At the same time, failure to achieve water security is potentially more damaging in fragile contexts, where populations are particularly vulnerable to the direct impacts of water insecurity, and where water insecurity can intensify perceptions that the government is unwilling to or unable to meet the needs of its citizens—thereby weakening the social compact between the government and citizen groups and acting as a destabilizing force and risk multiplier.

This report focuses on three main mechanisms by which water insecurity and fragility interact: (1) failure to provide citizens with basic water services; (2) failure to protect citizens from water-related disasters; and (3) failure to preserve surface, ground and transboundary water resources. These failures can give rise to a vicious cycle of water insecurity and fragility.

Evidence suggests that carefully designed investments in water security can contribute to reversing the vicious cycle, promoting stability and an escape from fragility. In particular, investments that deliver basic services and preserve access to sustainable water resources are needed for communities in fragile and conflict-affected states - both as an urgent development priority and as a tangible demonstration of governments' ability and willingness to meet the needs of its citizens.

Equally important, investments in water security can provide a measure of resilience against water-related disasters and water crises, mitigating potential trigger events and preventing countries from sliding further into fragility.

This report frames the challenge, draws on a growing body of evidence to explore the dynamics of water insecurity and fragility, and helps to identify and inform responses in times of crisis and shocks, as well as times of development opportunity. It argues that in some cases water management and the delivery of water services can be an integral part of the dynamics of fragility, and should therefore be carefully considered and appropriately prioritized in efforts to strengthen communities, economies and ecosystems in fragile contexts.

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Chapter 1 The Scale of the Water Insecurity and Fragility Challenge

Water challenges—ranging from chronic water scarcity to lack of access to safe drinking water and sanitation services, to hydrological uncertainty and extremes (floods and droughts)—are perceived as some of the greatest threats to global prosperity and stability. Many of these challenges are expected to intensify as climate change unfolds and population continues to grow.

Today, more than 40 percent of the world's population lives in water-scarce areas (UN Water 2014), with roughly one-quarter of global GDP exposed to water scarcity (Veolia Water 2010). Recent estimates suggest that water scarcity induced by climate change, if unmanaged, could lead to a 6-14 percent decline in growth rates in some regions of the world (World Bank 2016a). But physical water scarcity is not the only water-related risk. Inadequate water supply and sanitation services are estimated to have resulted in global economic losses of around $260 billion in 2010 (Hutton 2012). Losses from flood damage, solely from property damage, are estimated at $120 billion per year (Sadoff et al. 2015).

Water crises—from chronic water scarcity to lack of access to adequate water supply and sanitation to hydrological extremes—can aggravate challenges related to fragility and conflict

Recognition is growing of the role that water crises can play in aggravating fragility and conflict. Popular media and scholars have pointed to water challenges, especially in the form of water scarcity and drought, as possible causes of conflicts between countries and territories and large-scale mass migration (Sachs 2007). The World Bank has found that where economic growth is impaired by rainfall, episodes of droughts and floods have generated waves of migration and spikes in violence within countries

(World Bank, 2016a). Water's potential as a source conflict, but also as an instrument of cooperation, has long been recognized by the international community (Subramanian et al. 2012; Sadoff and Grey 2002).

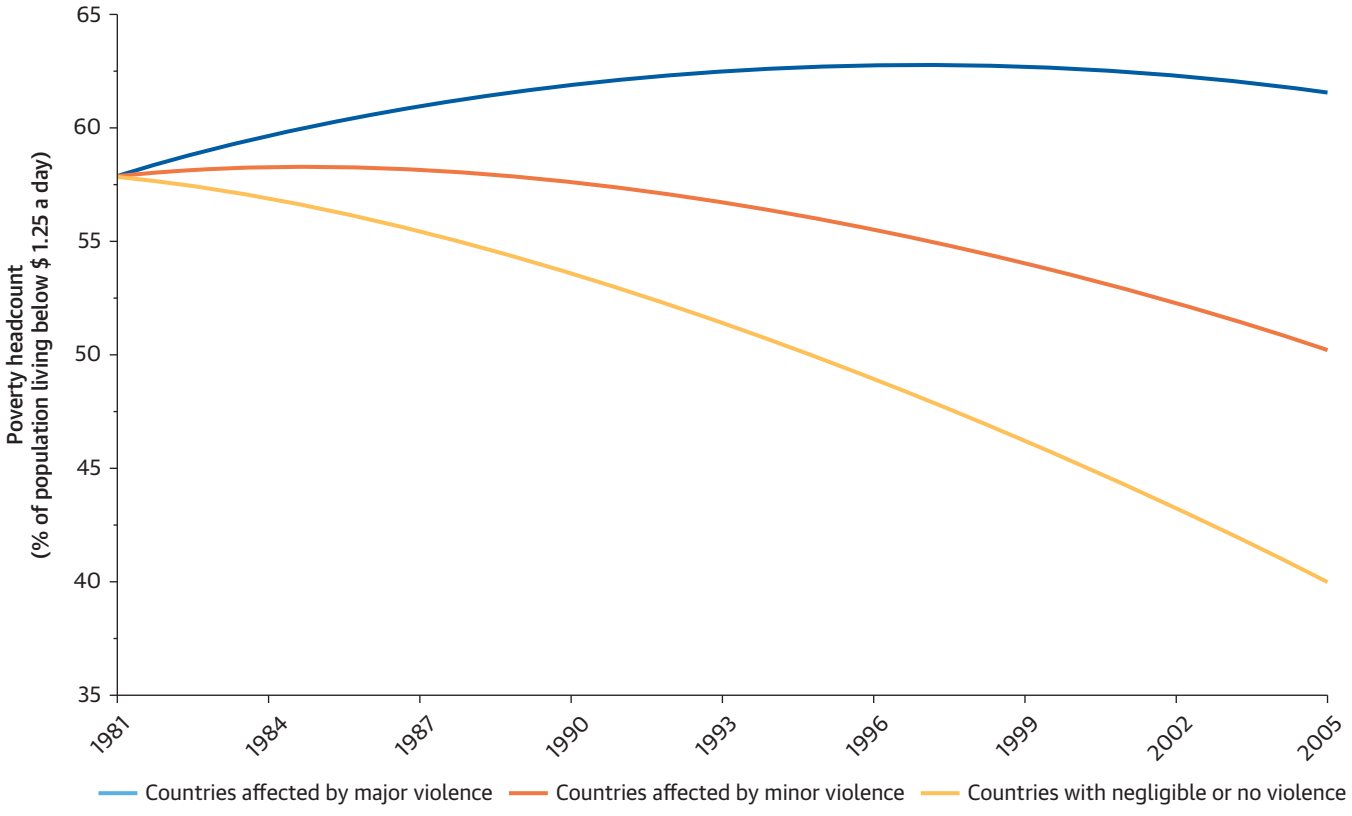
Roughly half of the world's poor will live in fragile contexts by 2030

Fragility, conflict, and violence disrupt development and pose a significant challenge to efforts to eradicate poverty. The gap in poverty rates between fragile and nonfragile countries is widening (Figure 1.1). Looking forward, the World Bank estimates that roughly half of the world's poor will live in fragile contexts by 2030 (World Bank 2011), rising from less than 20 percent today.

Fragile states achieved roughly half the rate of progress of nonfragile states in meeting the water-related Millennium Development Goals. Only 28 percent of fragile states met the target for access to safe drinking water, compared to 60 percent for nonfragile states (OECD 2015). Fragile states have also made slower progress toward meeting the basic sanitation targets, with only 18 percent of fragile states achieving the target, compared to roughly one-third of nonfragile states (OECD 2015).

The World Economic Forum's 2016 annual survey on perceived global risks demonstrates the scale of the fragility challenge. Four of the top five most immediate global

FIGURE 1.1. The Widening Poverty Gap between Countries Affected by Violence and Countries Not Affected



Source: World Bank, *World Development Report 2011*.

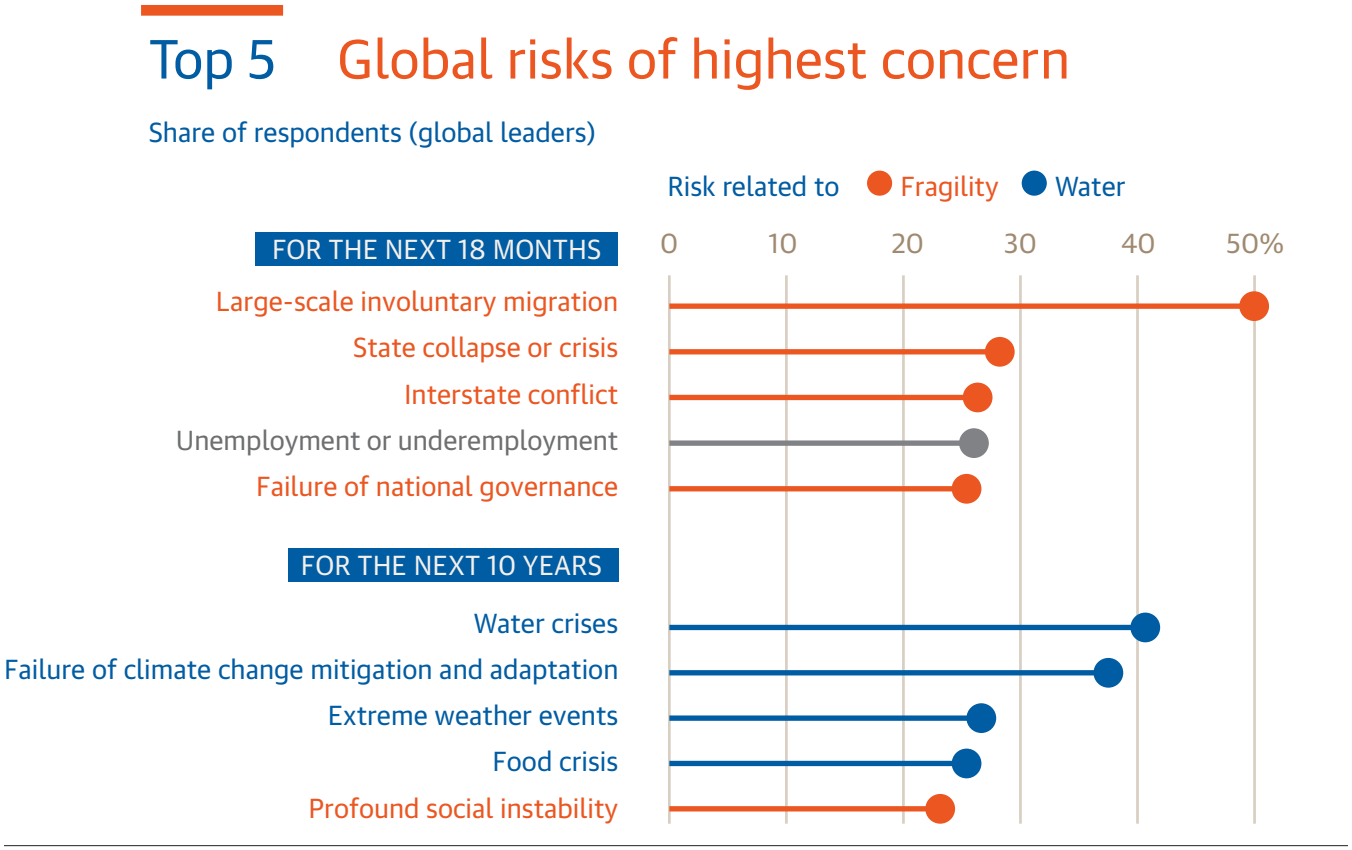
Issues relating to fragility dominate the list of immediate global risks, and issues relating to water management dominate the list of greatest global risks for the coming decade

risks relate to fragility, specifically: involuntary migration, state collapse or crisis, interstate conflict, and failure of national governance. These are displayed in the top panel in Figure 1.2.

When asked to identify the greatest risks to economies and societies for the next ten years, global leaders from multiple sectors identified water crises as the most prominent risk,[1] as shown in the bottom panel in figure 1.2. Four out of the top five global risks (water crises, failure of climate change adaptation and mitigation, extreme weather events, and food crises) are directly related to water management and water-related risks. The fifth global risk, profound social instability, is a common characteristic of fragile states.

Issues relating to fragility dominate the list of immediate global risks, and issues relating to water management dominate the list of greatest global risks for the coming decade. The evidence in this report suggests that the two are interrelated and should be considered simultaneously, rather than in sequence. The prevalence of both near-term and

FIGURE 1.2. Top Five Global Risks of Highest Concern for the Next 18 Months and 10 Years



Source: World Economic Forum, Global Risks Report 2016.
Note: Based on a perception survey of leaders from business, government, academia, and nongovernmental and international organizations surveyed by the World Economic Forum.

This report attempts to advance the discussion on water and fragility risks and to promote action. It presents a typology of policy failures that drive water insecurity and describes how these manifestations of water insecurity can act as destabilizing forces in fragile contexts

medium-term risks related to water and fragility underscores the importance of exploring and better understanding the interactions between water and fragility and the challenges of pursuing water security in fragile contexts.

Untangling the role of water in contributing to fragility is difficult, yet it is becoming a fundamental question for water policy worldwide. Recognizing the importance of water management in poor and fragile states, this report seeks to frame the challenge, draw on a growing body of evidence to explore the dynamics of water insecurity and fragility, and help to identify and inform responses.

This report attempts to advance the discussion on water and fragility risks and to promote action. It presents a typology of policy failures that drive water insecurity and describes how these manifestations of water insecurity can act as destabilizing forces in fragile contexts. By focusing on policy failures in water management, this report differs from previous work on water, conflict and fragility and helps to identify the policy choices available to address the multiple interactions between water and fragility.

Note

1. Here and throughout the report, risk is defined as an uncertain condition or event that can cause significant negative impacts and losses, if it occurs.

References

Hutton, G. 2012. "Global Costs and Benefits of Drinking Water Supply and Sanitation Interventions to Reach the MDG Target and Universal Coverage." WHO/HSE/WSH/12.01, Geneva.

OECD (Organization for Economic Cooperation and Development). 2015. "States of Fragility 2015: Meeting Post-2015 Ambitions." OECD, Paris.

Sachs, J. 2007. "Climate Change Refugees." *Scientific American* 296 (6). https://goo.gl/XqPdDU.

Sadoff, C. W. and D. Grey. 2002. "Beyond the River: the Benefits of Cooperation on International Rivers." *Water Policy*, Vol. 4 (5) pp. 389-403.

Sadoff, C. W., J. W. Hall, D. Grey, J. C. J. H. Aerts, M. Ait-Kadi, C. Brown, A. Cox, S. Dadson, D. Garrick, J. Kelman, P. McCornick, C. Ringler, M. Rosegrant, D. Whittington, and D. Wiberg. 2015. *Securing Water, Sustaining Growth: Report of the GWP/OECD Task Force on Water Security and Sustainable Growth*. University of Oxford.

Subramanian, A., B. Brown, and A. Wolf. 2012. Reaching Across the Waters: Facing the Risks of Cooperation in International Waters. Washington DC: The World Bank.

UN Water (United Nations Water). 2014. "Water Scarcity Factsheet." https://goo.gl/QApzfs.

Veolia Water. 2010. "Finding the Blue Path for a Sustainable Economy. A White Report by Veolia Water." Veolia Water North America, Chicago. https://goo.gl/iJhMcu.

World Bank. 2011. *World Development Report 2011. Conflict, Security and Development*. Washington, DC: World Bank.

——. 2016a. "High and Dry: Climate Change, Water, and the Economy." World Bank, Washington, DC.

——. 2016b. "Forced Displacement by the Boko Haram Conflict in the Lake Chad Region". World Bank, Washington, D.C.

World Economic Forum. 2016. *The Global Risks Report 2016*, 11th edition. Geneva: World Economic Forum.

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Chapter 2 The Vicious Cycle of Water Insecurity and Fragility

Water Security

Water security can be thought of as the goal of water management. The goals of water management can be broadly grouped into two categories: (1) management of water to harness its *productive* benefits and promote human well-being, livelihoods, and socioeconomic development; and (2) management of water to protect societies, economies, and ecosystems from the *destructive* impacts of water such as water-borne diseases, floods, and droughts (Grey and Sadoff 2007; Grey et al. 2013).

Definitions of water security generally recognize the need to manage water-related risks in addition to concerns over the availability of physical resources. Water security has been defined as "*the availability of an acceptable quantity and quality of water for health, livelihoods, ecosystems and production, coupled with an acceptable level of water-related risks to people, environments and economies*" (Grey and Sadoff 2007). More recently, UN-Water developed a definition of water security that explicitly captures interactions with wider social, economic, political, and environmental systems, as "*the capacity of a population to safeguard sustainable access to adequate quantities of acceptable quality water for sustaining livelihoods, human well-being, and socio-economic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability*" (UN-Water 2013).

Water security is a dynamic policy goal that goes beyond single-issue indicators such as water scarcity, pollution, or access to water and sanitation, to think more broadly about society's expectations, choices and achievements with respect to water

Framing the water challenge in terms of water security suggests a dynamic construct that goes beyond single-issue indicators such as water scarcity, pollution, or access to water and sanitation to think more broadly about society's expectations, choices, and achievements with respect to water. It is a dynamic policy goal, which changes as society's values and economic well-being evolve, and as exposure to and societies' tolerance of water-related risks change (Sadoff et al. 2015). Water security differs from concepts of food security or energy security because the challenge is not only one of securing adequate resource provision with equitable benefits, but also of mitigating the hazards that water presents to certain populations where it is not well managed.

Water insecurity materializes when water becomes a concern to society, threatening human and environmental well-being and compromising opportunities for socioeconomic development. Water insecurity is often the result of a combination of adverse hydrological, climatological, and environmental factors, insufficient information and institutional capacity, inadequate infrastructure and maintenance, and ineffective service delivery. It is important to recognize that it may be impossible or too costly to eliminate all water-related risks, and that communities and societies may define policy goals around tolerable levels of water-related risk (Hall and Borgomeo 2013; Grey et al. 2013). These are important public policy choices. To fully inform these risk management decisions, it is important to understand the range of associated risks and resilience capacities, including those related to fragility.

Fragility

The World Bank's *World Development Report 2011* on Conflict, Security, and Development defined fragility as "*periods when states or institutions lack the capacity, accountability, or legitimacy to mediate relations between citizen groups and between citizens and the state, making them vulnerable to violence*."

More recently, the World Bank has developed a risk-based view of fragility, recognizing that fragility results from an accumulation and combination of risk factors. Fragile contexts have a heightened risk of conflict, violence, protracted political crises, and chronic underdevelopment—combined with insufficient capacity by the state, system, and/or communities to manage, absorb, and mitigate these risks.

This risk-based approach acknowledges that fragility: (1) has multiple dimensions that are not limited to state institutions; (2) spreads beyond low-income countries and national borders; and (3) is associated with patterns of risks that need to be identified and addressed to be more effective at preventing violent conflict.

Definitions of fragility from other international organizations adopt a similar risk lens, which sees fragility as a situation when governments and institutions fail to deliver core functions and are unable to manage internal and external stresses (AfDB 2014a; Bazilian

and Chattopadhyay 2016). The African Development Bank, for example, defines fragile situations as a "*condition of elevated risk of institutional breakdown, societal collapse or violent conflict that can affect entire countries or areas within a country*" (AfDB 2014b). This view of fragility recognizes that in some cases, where institutions might otherwise have adequate capacity to deliver services and cope with stresses, they may be caught in broader contexts of fragility or geopolitical instability. These definitions echo influential work and research in development economics that emphasizes the crucial role of institutional practices in economic development and the success of inclusive development efforts (North 1990; Acemoglu and Robinson 2012).

In settings where governance is poor, fragile contexts are characterized by a range of issues that serve as further drivers of fragility. In the social sphere, fragile contexts are often characterized by migration, lack of employment opportunities, inequality in access to basic services, and social exclusion. In the economic and financial realms, issues such as the lack of economic diversification, reliance on subsistence-level livelihoods, reliance on revenues from natural resources, large fiscal deficits, and income inequality can create fragility.

Political factors characterizing fragile contexts include limited participation or representation of particular groups in political life, legacies of violence, power capture by elites or individuals, and corruption.

Environmental factors characterizing fragile contexts include scarce natural resources, land degradation, unsustainable resource extraction, or geographic isolation. Furthermore, some environmental dimensions, such as climate change and extreme weather events, can have unpredictable compounding effects that worsen fragile contexts.

With these drivers in place, when institutions insufficiently and ineffectively respond to escalating risks of any kind, the ability of affected populations to cope with and build resilience to risks can be challenged. Consequently, affected populations can become aggrieved and social relationships can be strained. As these stresses escalate, governance systems may be undermined as the affected populations question the legitimacy of institutions.

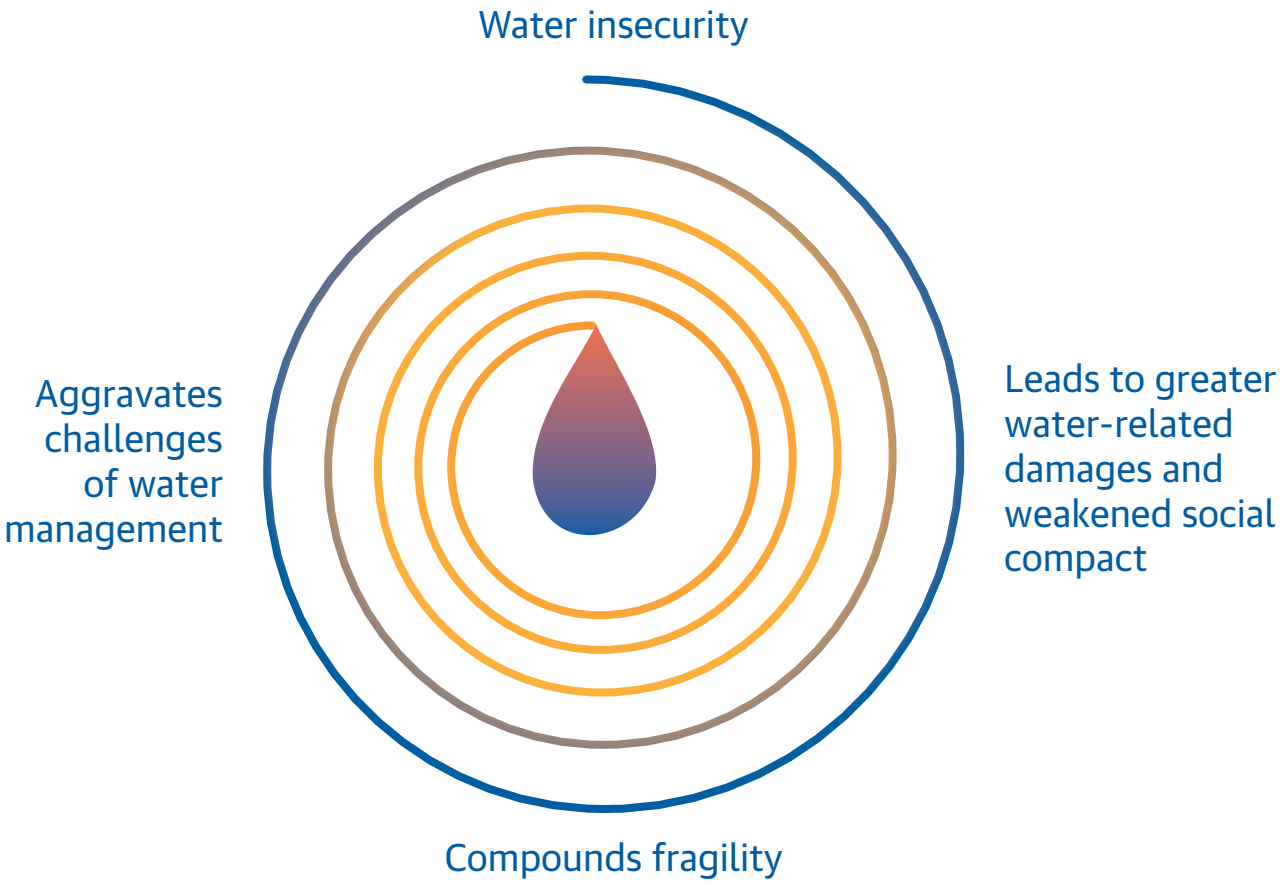
The Dynamics of Water Insecurity and Fragility

Water security is more difficult to achieve in fragile contexts, and failure to achieve water security has greater consequences in fragile contexts

Water security is more difficult to achieve in fragile contexts—and the failure to achieve water security has greater consequences in fragile contexts. This reciprocal relationship is summarized in figure 2.1. The figure depicts the interaction of water insecurity and fragility as a vicious cycle: as water security becomes more difficult to achieve because of fragility, failure to achieve it results in greater social, political, and economic costs and consequences, leading to increased fragility.

A wide range of factors make it more difficult to achieve water security in fragile contexts, including constrained human and financial resources, weakened and overwhelmed institutions, degraded information and infrastructure systems, and obstacles to physical

FIGURE 2.1. The Vicious Cycle of Water Insecurity and Fragility



security and access. In some fragile contexts characterized by violent conflict, infrastructure may be seriously degraded and institutions may be weakened to the point where governments are unable to provide basic water and sanitation services. Similarly, in contexts characterized by extreme environmental and climate-related fragility, governments may be incapable of managing major water-related hazards, resulting in social disruptions, migration, and losses of life and livelihoods.

The impacts of water insecurity can be more damaging because certain populations can be more vulnerable in fragile contexts. Just as government systems tend to be weakened in fragile states, social systems and community-level coping mechanisms can be overwhelmed.

As the impacts of water insecurity materialize, they can have negative and differential impacts on the well-being and livelihoods of populations and economies within nations. As a result, government credibility may be undermined and the social compact with some groups can be weakened. When water insecurity repeatedly affects population, it can act as a risk multiplier, fueling perceptions of institutions and governments "not doing enough," exacerbating existing grievances (such as perceptions of marginalization or of resource mismanagement), creating new risks (including displacement or epidemics) and

generating inequities (notably, poorly designed and inequitable responses to water-related disasters).

The legitimacy of governance systems is often challenged in fragile contexts. Water insecurity can serve as a compounding factor in these cases, placing additional burdens on institutions that are already weakened, further undermining government credibility, eroding the social compact between affected populations and their governments, and in turn, perpetuating a vicious downward spiral. Reversing the water insecurity and fragility cycle requires carefully designed and implemented interventions that target both water insecurity and drivers of fragility.

The social compact is a key element of this framing. It is broadly interpreted as the relationship between members of society and the state that grants legitimacy to states' actions and policies. Widely applied to describe western styles of government, the social compact model is also useful to describe situations where the state or institutions provide extended benefits, subsidized services, and guarantees for public employment in return for support (Yousef 2004).

The social compact starts to deteriorate when institutions are no longer perceived as legitimate and credible because of their inability, unwillingness, or general neglect to support inclusive and equitable policies, provide functional services, and broadly meet the public's implicit or explicit needs and expectations

The social compact starts to deteriorate when institutions are no longer perceived as legitimate and credible because of their inability, unwillingness, or general neglect to support inclusive and equitable policies, provide functional services, and broadly meet the public's implicit or explicit needs and expectations. In relation to water, these expectations may include reliable and affordable water supplies, as well as protection from droughts and floods, and from appropriation of river waters by upstream users. When water shortages arise and governments fail to provide adequate supply and access, affected populations can express their discontent, sometimes violently. For example, riots broke out in Algeria in 2002 (BBC News 2002) and in Bolivia (Cuiza 2016) over water shortages. In 2016, river use disputes between the Indian states of Karnataka and Tamil Nadu resulted in rioting in Karnataka's capital city of Bangalore (Reuters 2016).

Moreover, certain groups within a society may be perceived as receiving preferential treatment: for example, by experiencing better water services or protection from water-related disasters. In Indonesia, for example, greater investments in disaster risk reduction have taken place in the wealthier and more politically represented regions of Western Sumatra and Central Java (Williams 2011). When differential investments are made, whether for economic or social or political reasons, this can strengthen perceptions inequity and exclusion. When government is associated with these investments, and in locations where these imbalances build on historical grievances, this can contribute to further deterioration of the social compact.

This framing offers insights into the dynamic interactions between water and fragility. Policy work on fragility also recognizes the reinforcing negative feedback between increasing fragility and deteriorating services, and emphasizes that factors other than failure to deliver basic services contribute to undermining the social compact and trust in

governments, such as historical and political influences and legacies of violence (OECD 2008; Baird 2010; World Bank, 2017).

Although figure 2.1 is helpful in conceptualizing the interactions between water insecurity and fragility, it does not present the mechanism by which water insecurity contributes to fragility and vice versa. There are multiple mechanisms and they are not necessarily direct.

Starting from the seminal work of Homer-Dixon on environmental security and the links between environment and conflict (Homer-Dixon 1994), the most commonly cited mechanism linking water and fragility is water scarcity. A large number of scholars have concurred in this characterization, citing water scarcity as a source of potential conflict especially in areas where water resources are transboundary (IPCC 2001, 950). More recently, water scarcity induced by climate change has been cited as a contributing factor to the Syrian civil war (Gleick 2014; Kelley et al. 2015).

Scholars have also highlighted the lack of empirical support to justify the hypothesis that resource scarcity leads to conflict (Theisen 2008; Koubi et al. 2013). To the contrary, some situations of scarcity have driven significant institutional and technological advances– suggesting that resource conflicts may also lead to the formation of novel institutional arrangements to manage scarcity.

The hypothesis that water scarcity fans violent conflict is just one of the possible channels of interaction between water insecurity and fragility. Thinking about the problem in terms of water security allows us to employ a much broader framing, which encompasses water-related disasters (flooding, drought, and pollution incidents) but also water services (such as quality, affordability, and reliability of water delivered to citizens) and the sustainable management of water resources. In other words, framing the challenge in terms of water security allows us to examine multiple channels by which water insecurity interacts with fragility.

Given that the impacts of water insecurity are mediated by policy choices, focusing on policy failures helps to understand how institutions can reverse or perpetuate the vicious cycle

The multiple channels of interactions between water insecurity and fragility are described as policy failures. Given that the impacts of water insecurity are mediated by policy choices, focusing on policy failures helps to understand how institutions can reverse or perpetuate the vicious cycle. This report identifies three types of policy failure that give rise to the water insecurity and fragility cycle:

1. Failure to provide water services
2. Failure to protect against water-related disasters
3. Failure to preserve surface, ground and transboundary water resources.

Failure to provide water services takes place when individuals lack access to water supply and sanitation services that meet a series of standards, including reliability, quality, and affordability. This failure is often due to weak governance arrangements, insufficient investment, and degraded infrastructure, resulting in inadequate and/or unequal access. Poor security in especially fragile locations can worsen these problems, and consequently

can increase vulnerabilities of populations in those locations. A significant burden in this area often falls on women, who remain largely responsible for domestic water supply and family health issues.

In some instances, nongovernmental providers such as the private sector or nongovernmental organizations (NGOs) might deliver services. In these cases, government oversight of nongovernmental actors may be essential to guarantee water services. This can be particularly challenging in fragile contexts, especially in contexts where the service providers may be in opposition to government.

Failures to protect against water-related disasters occur when institutions' preparedness, response, and relief efforts following a disaster are deemed insufficient by citizens and foster dissatisfaction toward the government, often strengthening feelings of exclusion. Failure to protect against water-related disasters may be the result of institutions' failure to provide information on disaster preparedness or early warning, to comprehensively develop disaster preparedness plans, to prevent settlements in exposed areas, or to gain access to remote areas. Households and their members (men, women, and children) face different vulnerabilities depending upon their social and economic circumstances; disaster impacts and recovery options can vary widely. Therefore, mitigating risks of negative feedback to the water insecurity-fragility cycle requires building on a nuanced understanding of these affected populations and their social compact with government.

Failure to preserve surface, ground, and transboundary water resources is a third mechanism linking water insecurity with fragility. Governments are often perceived as being responsible for guaranteeing the adequacy of water resources for their populations, and for preserving healthy aquatic ecosystems. Failure to preserve water resources may result from inadequate demand management; a lack of planning, investment, and maintenance of water infrastructure; or from a failure in institutional and regulatory arrangements to manage demand (particularly of groundwater), allocate scarce water resources, and protect water quality. This type of failure may also occur if parties who share transboundary rivers or aquifers (riparians) develop or use significant amounts of water without cooperative agreements. It can sometimes be challenging to conceive of the ground-level implications of the institutions and governance processes that manage transboundary waters. Nonetheless, their functions and the data they rely on for decision making require meeting standards of inclusivity and representation in order to yield sustainable outcomes and to benefit users of all types across the basin.

When multiple failures to address water insecurity occur over a long period of time, they act as risk multipliers that compound fragility

Although these mechanisms are framed from the perspective of water security, they are reciprocal and mutually reinforcing in the cycle previously described. Fragility, conflict, and violence can be the cause of these failures, and these failures can exacerbate fragility, conflict, and violence. For example, the ongoing armed conflict in the Republic of Yemen has significantly damaged the country's water supply and irrigation infrastructure and has severely eroded institutional capacity for water management and service delivery across

both urban and rural areas. But this dramatic conflict-related shock comes on top of a systemic water resource crisis that has built up over the past three decades, which itself has been a driver of conflict. This underscores the complex dynamic arising when multiple failures to address water insecurity occur over a long period of time, acting as risk multipliers that compound fragility.

The impacts of climate change are likely to transmit either directly or indirectly through all three mechanisms. Climate change can reduce the availability and quality of water resources, undermining governments' efforts to deliver services (Barnett and Adger 2007). Climate change is already influencing the occurrence of water-related disasters: for instance, by increasing the frequency of climate extremes such as El Niño Southern Oscillation (Stocker et al. 2013; Power et al. 2013; Cai et al. 2015). In some areas of the world, climate change may bring about dramatic shifts in environmental conditions, reducing water availability and making it more difficult for governments to preserve adequate water resources for their citizens. For example, climate change's impacts on snow and glacial melt processes in the Tibetan plateau (Asia's water tower) have the potential to severely impact water security in the five major river basins of Southeast Asia, in particular the Indus and Brahmaputra basins (Immerzeel et al. 2010).

The most challenging situations are likely to occur in areas under fragile contexts that are chronically water insecure, where water-related shocks or disruptions of water supplies overwhelm government's capacity for response and resilience

Invariably, as climate change occurs, the most vulnerable and impoverished communities will confront the greatest risks to their property and livelihoods. Where resilience is weak and government involvement is insufficient, the social compact between affected groups and authorities could be in jeopardy.

The most challenging situations are likely to occur in areas under fragile contexts that are chronically water insecure, where water-related shocks (such as drought or floods) or disruptions of water supplies (such as infrastructure damage) overwhelm government's capacity for response and resilience.

References

Acemoglu, D. and J. Robinson. 2012. *Why Nations Fail: The Origins of Power, Prosperity, and Poverty*. New York: Crown Business.

AfDB (African Development Bank). 2014a. *From Fragility to Resilience: Managing Natural Resources in Fragile States in Africa*. Tunis: African Development Bank Group.

——. 2014b. Addressing Fragility and Building Resilience in Africa: The African Development Bank Group Strategy 2014-2019. https://goo.gl/n4Qtpm.

Baird, M. 2010. "Service Delivery in Fragile and Conflict-affected States." Background Report for the *World Development Report*. World Bank, Washington DC.

Barnett, J., and W. N. Adger. 2007. "Climate Change, Human Security and Violent Conflict." *Political Geography* 26 (6): 639-55.

Bazilian, M., and D. Chattopadhyay. 2016. "Considering Power System Planning in Fragile and Conflict States." *Energy for Sustainable Development* 32: 110-20.

BBC News (British Broadcasting System News). 2002. "Algerians Riot over Water Shortages" (accessed June 30, 2016), https://goo.gl/c2p4Tp.

Cai, W., G. Wang, A. Santoso, M. J. McPhaden, L. Wu, F.-F. Jin, A. Timmermann, M. Collins, G. Vecchi, M. Lengaigne, M. H. England, D. Dommenget, K. Takahashi, and E. Guilyardi. 2015. "Increased Frequency of Extreme La Nina Events under Greenhouse Warming." *Nature Climate Change* 5: 132-37.

Cuiza, Paulo. 2016. "Gobierno apuesta a cisternas para attender la falta de agua en La Paz y los vecinos vuelven a marchar," La Razón Digital, November 23.

Gleick, P. H. 2014. "Water, Drought, Climate Change, and Conflict in Syria." *Weather, Climate and Society* 6 (3): 331-40.

Grey, D., D. Garrick, D. Blackmore, J. Kleman, M. Muller, and C. Sadoff. 2013. "Water Security in One Blue Planet: Twenty-first Century Policy Challenges for Science." *Philosophical Transactions of the Royal Society* A 371 (2002): 20120406.

Grey, D., and C. W. Sadoff. 2007. "Sink or Swim? Water Security for Growth and Development." *Water Policy* 9: 545-71.

Hall, J., and E. Borgomeo. 2013. "Risk-based Principles for Defining and Managing Water Security." Philosophical Transcriptions of the Royal Society A 371 (2002): 20120407.

Homer-Dixon, T. F. 1994. "Environmental Scarcities and Violent Conflict: Evidence from Cases." *International Security* 19 (1): 5-40.

Immerzeel, W. W., L. P. H. van Beek, and M. F. P. Bierkens. 2010. "Climate Change Will Affect the Asian Water Towers." *Science* 328 (5984): 1382-85.

IPCC (Intergovernmental Panel on Climate Change). 2001. *Third Assessment Report: Climate Change 2001: Working Group 2: Impacts, Adaptation and Vulnerability*. Cambridge, UK: Cambridge University Press.

Kelley, C. P., S. Mohtadi, M. A. Cane, R. Seager, and Y. Kushnir. 2015. "Climate Change in the Fertile Crescent and Implications of the Recent Syrian Drought." *Proceedings of the National Academy of Sciences* 112 (11): 3241-46.

Koubi, V., G. Spilker, T. Bohmelt, and T. Bernauer. 2013. "Do Natural Resources Matter for Interstate and Intrastate Armed Conflict?" *Journal of Peace Research* 51 (2): 227-43. doi: 10.1177/0022343313493455.

North, D. 1990. *Institutions, Institutional Change and Economic Performance*. New York: Cambridge University Press.

OECD (Organisation for Economic Co-operation and Development). 2008. "Service Delivery in Fragile Situations: Key Concepts, Findings and Lessons." OECD/DAC Discussion Report, Organization for Economic Cooperation and Development, Paris.

Power, S., F. Delage, C. Chung, G. Kociuba, and K. Keay. 2013. "Robust Twenty-first Century Projections of El Niño and Related Precipitation Variability." *Nature* 502: 541-45.

Reuters. 2016. "One Killed in Riots in Indian IT Hub over River Water Dispute" (accessed September 15, 2016), https://goo.gl/sAsvnD.

Sadoff, C. W., J. W. Hall, D. Grey, J. C. J. H. Aerts, M. Ait-Kadi, C. Brown, A. Cox, S. Dadson, D. Garrick, J. Kelman, P. McCornick, C. Ringler, M. Rosegrant, D. Whittington, and D. Wiberg. 2015. *Securing Water, Sustaining Growth: Report of the GWP/OECD Task Force on Water Security and Sustainable Growth*. University of Oxford.

Stocker, T. F., D. Qin, G-K Plattner, M. M. B. Tignor, S. K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex, and P. M. Midgley, eds. 2013. *Climate Change 2013: The Physical Science Basis*. Working Group I Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Summary for Policymakers (IPCC).

Theisen, O. M. 2008. "Blood and Soil? Resource Scarcity and Internal Armed Conflict Revisited." *Journal of Peace Research* 45 (6): 801-18. doi: 10.1177/0022343308096157.

UN Water (United Nations Water). 2013. "Water Security and the Global Water Agenda." Analytical Brief, United Nations University, Institute for Water, Environment, and Health, Hamilton, Ontario, Canada.

Williams, G. 2011. "Study on Disaster Risk Reduction, Decentralization and Political Economy: The Political Economy of Disaster Risk Reduction." Background report for the Global Assessment Report on Disaster Risk Reduction, UN/ISDR, Geneva.

World Bank. 2017. *World Development Report 2017. Governance and the Law*. Washington, DC: World Bank.

Yousef, Tarik M. 2004. "Development, Growth and Policy Reform in the Middle East and North Africa since 1950." *Journal of Economic Perspectives* 18 (3): 91-115.

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Chapter 3 Interactions between Water Insecurity and Fragility

Caution is needed when assessing linkages between water and fragile situations, such as migration and conflict, because there are no "easy" answers (Jägerskog and Swain 2016). The evidence presented in this chapter on the linkages between fragility and water insecurity is therefore not meant to provide definitive explanations for complex environmental and social processes, but rather to highlight interactions that should be considered by practitioners and researchers working on these issues.

Failure to Provide Water Services

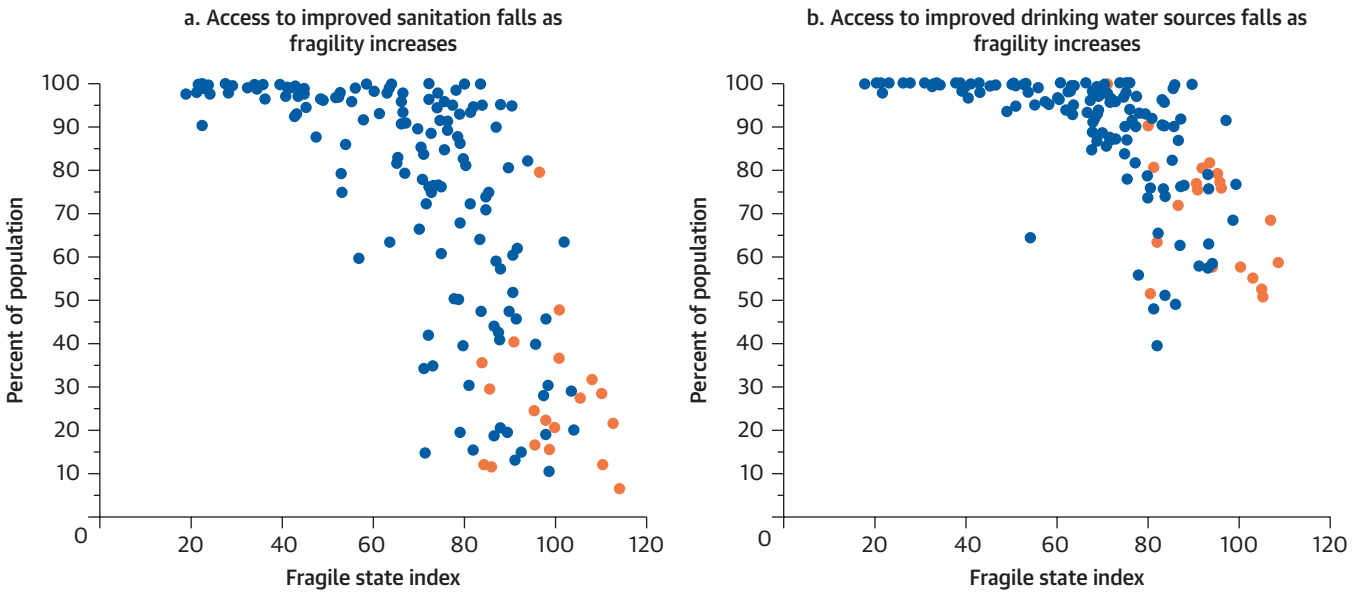
Fragility and Access to Water Supply and Sanitation

Fragility, especially in the form of violent conflict, significantly reduces and weakens governments' ability to meet basic service requirements

Provision of basic services can enhance social and economic opportunities, helping to stabilize fragile contexts and contributing to peace-building efforts (Devictor 2016). On the other hand, fragility, especially in the form of violent conflict, significantly reduces and weakens governments' ability to meet basic service requirements. This chapter presents some examples to illustrate how failure to provide water services can contribute to fragility, and how fragility makes it more difficult for institutions to provide basic water services.

Fragile states have made much slower progress toward meeting the water-related Millennium Development Goals than nonfragile states (OECD 2015). This lack of progress is captured in figure 3.1, which shows the relationship between fragility and access to

FIGURE 3.1. Fragility and Access to Improved Sanitation and Drinking Water Sources

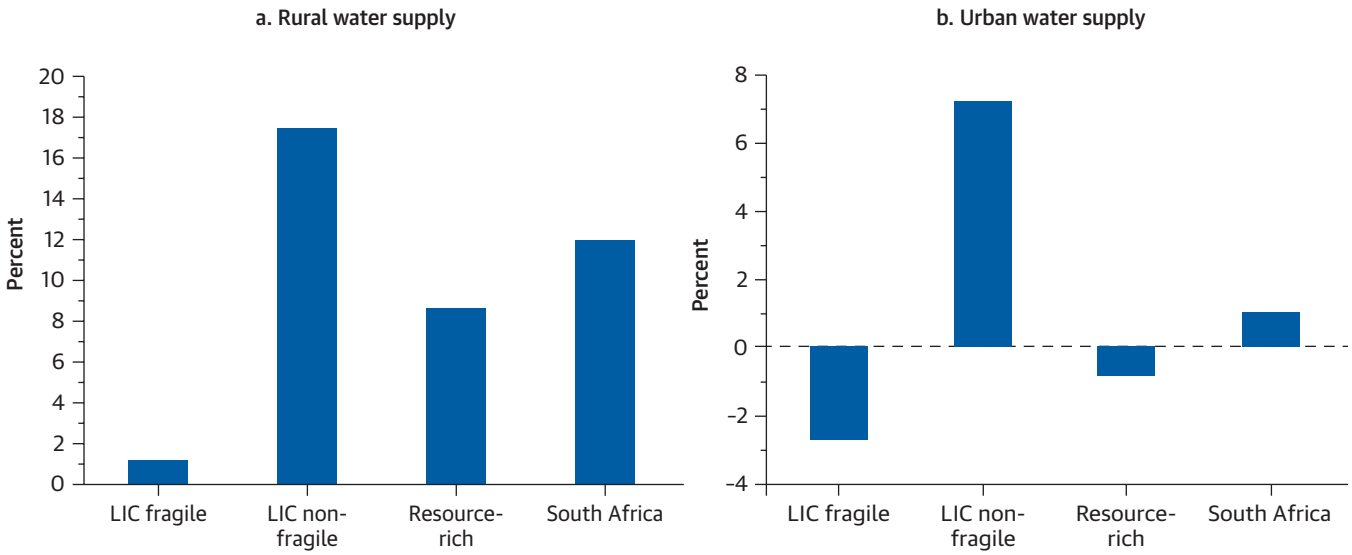


Source: World Bank using data from WHO/UNICEF Joint Monitoring Programme and The Fund for Peace.
Note: The Fragile States Index is constructed so that higher scores indicate greater instability. Countries in the 2017 World Bank's Harmonized List of Fragile Situations are shown in orange. Iraq, Libya, and Syrian Arab Republic are not included because of the lack of up-to-date statistics on access.

improved drinking water sources and sanitation facilities. Access statistics are plotted against the Fragile States Index published by the Fund for Peace.[1] Countries in the 2015 World Bank's Harmonized List of Fragile Situations are shown as orange dots (see full list in appendix A). Access statistics drop markedly as the fragility index increases. This correlation does not confirm a causal relationship (that is, it does not suggest whether a lack of water services causes fragility, or whether fragility causes a lack of water services), but it does indicate a strong interrelationship.

A significant divergence in performance between fragile and nonfragile states can also be observed in progress toward water supply coverage across different country groupings in Africa (figure 3.2). Between 1990 and 2008, the biggest improvements in water supply coverage occurred in low-income stable countries, compared to low-income fragile countries, where the percentage of urban water supply coverage decreased (panel b in figure 3.2). Low-income stable countries in Africa have made greater improvements in reducing open defecation, achieving a 14 percent reduction between 1990 and 2008 compared to 7 percent in fragile low-income countries, according to the World Bank Water and Sanitation Program (WSP) (WSP 2011). Furthermore, these same data reveal that resource-rich countries,[2] most of which are fragile or conflict affected, have been slower at extending services than low-income stable countries. This latter evidence illustrates that even where fragile states manage to tap into additional funding from natural resources, this does not easily translate into improvements in water service delivery.

FIGURE 3.2. Progress in Water Supply Coverage across Different Country Groupings in Africa, 1990–2008



Source: WSP 2011.
Note: LIC = lower-income countries, according to the World Bank's classification.

Incidence of water-borne disease and mortality is highest in fragile situations, as would be expected as a consequence of inadequate access to water supply and sanitation services. Data from the World Health Organization (WHO) shows that the burden of water-borne diseases is much greater in fragile contexts. This relationship is shown in panel a of figure 3.3, which plots mortality attributed to unsafe water, sanitation, and hygiene[3] against the Fragile States Index.

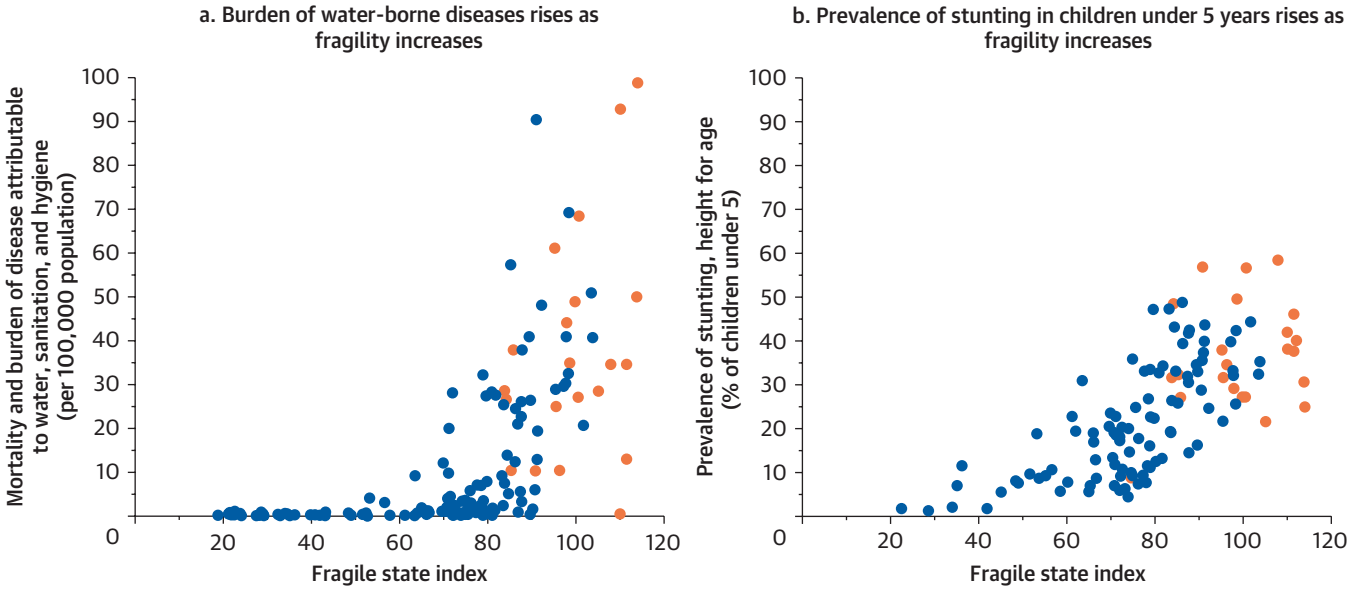
Childhood stunting is also most pronounced in fragile contexts. Poor sanitation is the second leading cause of child stunting worldwide (Danaei et al. 2016). Childhood stunting has permanent negative consequences that prevent children from reaching their full developmental potential, including diminished brain development and increased risks of nutrition-related chronic diseases such as diabetes and hypertension. As shown in panel b of figure 3.3, the incidence of stunting is greater in fragile contexts, reflecting the lack of access to improved water and sanitation services.

The impacts of inadequate access to water supply and sanitation are more pronounced in fragile contexts

Water Service Delivery in Fragile Contexts

Governments of countries affected by fragility, conflict, and violence often face a chaotic mix of damaged infrastructure, alternative service delivery arrangements, dilapidated utilities, and externally driven support to water service provision. In fragile postconflict situations, government institutions often fail to meet donors' accountability requirements for implementing aid. This combination of water insecurity and fragility has several consequences for water service delivery.

FIGURE 3.3. Fragility and Burden of Water-Borne Diseases and Prevalence of Stunting in Children under 5 Years



Source: World Bank, using data on the burden of water-borne diseases from the World Health Organization and data on the prevalence of stunting from the World Bank. Rankings for the 2016 Fragile State Index are from The Fund for Peace.

Note: The Fragile States Index is constructed so that higher scores indicate greater instability. Countries in the 2017 World Bank's Harmonized List of Fragile Situations are shown in orange.

A first consequence is that a large share of external financing is channeled through nonstate actors, including the United Nations system and international NGOs (WSP 2016). Although this can help deliver humanitarian aid and relief, it can also contribute to undermining governments' ability and credibility to deliver services, reinforcing the vicious cycle depicted in figure 2.1.

Channeling aid through nonstate actors can delay the development of core government service delivery functions

Channeling aid through nonstate actors can delay the development of core government service delivery functions. This was the case in Liberia, where decades of civil war destroyed both water infrastructure and the institutions required for planning and coordinating water sector interventions (de Waal and Hirn 2015). In this initial postwar cycle of water insecurity and fragility, donors opted not to invest in state-led service delivery interventions, instead relying on nonstate actors to implement and manage delivery of water, sanitation and hygiene services (WSP 2016). In the short term, these interventions were a vital humanitarian response to restore a basic level of service and to deliver a peace dividend. However, targeting, quality, and sustainability of infrastructure delivered this way was poor, particularly in the case of hand-pumps in rural areas. In the longer term, this model of service delivery by nonstate actors limited growth in the government's capacity both to deliver water services itself and to oversee the delivery by nonstate actors.

A second consequence of the water insecurity-fragility cycle is the widespread emergence of alternative service providers, particularly in urban areas. Where state-mandated

institutions fail to deliver services, alternative providers will emerge or will step in. For example, in the oil-rich city of Port Harcourt, Nigeria, where the Water Board has been in crisis ever since the military administration assumed power in the 1990s, 99 percent of households now depend on privately drilled, nonutility sources of water. Similarly, alternative providers have become mainstream in Mogadishu, Somalia, where private boreholes and networks have emerged to serve over 1 million people and have entirely substituted for the municipal water supply system that was destroyed. The alternatives that emerge are generally more expensive and supply lower-quality water than state-mandated utilities. Moreover, these solutions lead to unregulated water use and overexploitation, which often triggers a failure to preserve surface and groundwater resources, as discussed.

In some situations, opposition or militant organizations step in to provide services. These groups may have additional intentions to capitalize on perceptions of exclusion and grievance, and through that, to actively undermine governments' authority or gain effective control over territories. For instance, in the early 2000s in Lebanon, Hezbollah's service sector delivered water to about 45 percent of the residents of the southern suburbs of Beirut, meeting basic community needs in the absence of the Lebanese state (Flanigan and Abdel-Samad 2009). Similarly, the Sadrist movement in Iraq and the Muslim Brotherhood in the Arab Republic of Egypt have employed provision of water and other basic services to contest and compete against existing authorities (Godwin 2012; Brooke 2015).

Governments of countries affected by fragility, conflict, and violence often face a chaotic mix of damaged infrastructure, alternative service delivery arrangements, dilapidated utilities, and externally driven support to water service provision

More recently, the Islamic State of Iraq and the Levant (ISIL) has attempted to use basic service provision as a strategy to maintain its grip on power. This strategy has had limited success, given that most skilled technicians have fled Islamic State lands and that the group's government and financial planning abilities are poor (Byman 2016). A potentially more troubling strategy is where opposition groups may intentionally withhold or disrupt access to water, using 'water as a weapon'. Some argue that ISIL seeks to manipulate access to water to do harm (DuBois King 2015; von Lossw 2016) or to strategically control civilian population movements (Tawfeeq and Abdelaziz 2016) in order to gain military advantage.

A third consequence of the water insecurity and fragility cycle is damage to the infrastructure required to deliver water services. In fragile and postconflict situations, damaged or absent water infrastructure and weakened institutional capacity constrain the ability of government actors to deliver water services: for instance, by inhibiting their ability to prevent the spread of water-borne diseases. Iraq is an example of how fragility and conflict can destroy water infrastructure, reversing progress in water security and limiting the government's ability to provide water services. Three decades of war, internal conflict, and sanctions have undermined Iraq's water systems (IAU 2011). In the 1980s, Iraq was reported to have some of the best health indicators among the nations in the Middle East (Webster 2011), yet today these improvements have been

reversed due to the collapse of the health system and water and sanitation infrastructure (Zolnikov 2013). In 2003, the collapse of sanitation infrastructure led to an increased incidence of water-borne diseases (Library of Congress 2006). Since then, there have been periodic outbreaks of cholera in the country (in 2007, 2012, and 2015) (Bagcchi 2016).

It is worth noting as well that impacts of such damage vary, and socially excluded groups, women and children, have particular and acute vulnerabilities in these circumstances. These groups may disproportionately face risks of physical harm when acquiring water, suffer reduced cash flow for purchasing water, and reside in areas that are not prioritized for reconstruction.

Efforts to restore damaged infrastructure are complicated by issues of displacement because the movement of internally displaced persons and refugees is uncertain, making long-term infrastructure planning more difficult. In Jordan, the population in the northern border region has doubled in recent years due to the influx of refugees from the Syrian war. In this impoverished and disenfranchised region of the country, the social compact that Jordanian residents had with their government was already strained before the war. Now, the region's challenges—including gaps in infrastructure and service delivery, unemployment, a lack of affordable housing—are worsening and causing conflict between Jordanians and Syrians to simmer.

In the realm of water services, the combined population is heavily dependent on tanker trucks. Because of a voucher system among refugees and the high willingness-to-pay among humanitarian aid providers, the cost of tanker water has quadrupled and poor communities are suffering neglect. Furthermore, as development agencies have considered options to drill wells in this arid location in order to provide water to the combined population, Jordanian residents have protested against investments that could encourage refugees to remain for the longer term (Ruckstuhl 2014). This case highlights the complexities of developing inclusive water service systems that account for uncertain demographics and that do not escalate local conflict between "new" and "old" residents and increase fragility.

In addition to issues of population movement, security is also a major issue. Poor security in a particular location can hinder infrastructure and service delivery operations, thus reinforcing grievances and perceptions of exclusion and neglect within a beleaguered community affected by conflict.

Poor security in a particular location can hinder infrastructure and service delivery operations, thus reinforcing grievances and perceptions of exclusion and neglect within a beleaguered community affected by conflict

As time goes by, it gets harder to rebalance the trade-off between delivering water supply infrastructure and building institutions that deliver sustainable water supply services. This is due both to the buildup of unmanaged infrastructure delivered by external humanitarian actors and a proliferation of alternative service delivery arrangements that fill the void in service delivery. The latter results in the emergence of a strong private sector, or other interests, which become more entrenched over time and thus more resistant to the rebuilding of government institutions to provide or oversee

service delivery. Together, these factors raise the threshold of state capacity required to manage and regulate services (WSP 2016).

Service Delivery and State Legitimacy

The potential for basic services to contribute to peace and state-building has been recognized by numerous international organizations and donors (OECD 2008; Baird 2010; World Bank 2011; Devictor 2016). Water services, in the form of reliable access to water supply and sanitation, have been identified as potential contributors to stabilization and state-building (OECD 2008). Case studies confirm the potential role of services in reinstating the social compact, increasing state legitimacy in fragile contexts, and contributing to stability (Weinthal, Troell, and Nakayama 2011; Burt and Keiru 2011).

Yet the linkages between basic service delivery and state-building are under-researched and far from straight forward (Mason 2012). Mcloughlin (2015) argues that: "*Received wisdom holds that the provision of vital public services necessarily improves the legitimacy of a fragile or conflict-affected state. In practice, however, the relationship between a state's performance in delivering services and its degree of legitimacy is nonlinear. Specifically, this relationship is conditioned by expectations of what the state should provide, subjective assessments of impartiality and distributive justice, the relational aspects of provision, how easy it is to attribute (credit or blame) performance to the state, and the characteristics of the service.*"

The characteristics of service delivery refers to how different types of services trigger public awareness and translate into public opinion on state legitimacy through different pathways. Public opinion on state legitimacy depends on the way people collectively experience services: the visibility of services (including infrastructure such as roads, water, and electricity); whether they can be measured objectively (such as recording how often a light is turned on on versus judging whether a child is getting a good education); and whether they are experienced homogenously by people living in a geographic area (as for electricity and water) or heterogeneously (such as individual encounters with doctors or health extension workers) (Guerrero 2011).

Beyond how people experience services, whether they attribute the deterioration or improvement of services to state actors is a critical intervening step in establishing a link between service delivery and state legitimacy. Who people perceive to be delivering the services matters. A study by the international NGO Tearfund examining the links between provision of water, sanitation, and hygiene (WASH) services and state-building in South Sudan found that, while communities had high expectations of their government in the period following independence, they continued to identify NGOs as the parties directly responsible for service delivery, even though the local government was involved in site selection and program reporting (Kooy and Wild 2012). Understanding the impact of modalities of service provision (for instance, whether community managed or top-down) on stability and conflict dynamics is important (Kooy, Wild, and Mason 2015; World Bank 2017).

The type of service, who delivers it, and how it is delivered are all key determinants of the relationship between service delivery and state legitimacy

Conversely, other research finds that citizens can incorrectly attribute government services to nonstate actors in situations where both provide services and where nonstate actors were more effective at branding their services (McLoughlin 2015). In a study on a water project financed by the World Bank in Zimbabwe, the Beitbridge Emergency Water Supply and Sanitation Project, 75 percent of residents who attributed the service improvement to the town council had an improved opinion of them (WSP 2014). But only 11 percent of residents were able to make any link between the improvements and the council. This was a missed opportunity to realize a "double dividend" in the form of both improved services and improved resident perceptions of the town council.

The limited empirical evidence suggests that though intuitively compelling, the link between service delivery and state legitimacy is neither automatic nor simple. Rather it depends on a combination of the technical characteristics of specific types of service provision and is subject to social interpretation specific to the context. It is also two way, with good service delivery potentially resulting in credit, but poor service delivery—including perceptions of corruption and mismanagement—resulting in blame and erosion of legitimacy. In other words, the type of service, who delivers it, and how it is delivered are all key determinants of the relationship between service delivery and state legitimacy.

As part of postwar reconstruction effort, with support through the World Bank's Mostar Water Supply and Sanitation Project (2000-04), Mostar's utility was reintegrated and began providing unified water and sewage services to city residents of all ethnicities

For example, in Mostar during the Bosnian war, the city's water utility was split. What had once been a unified service provider for all city residents became two ethnically segregated entities in the midst of conflict. Then, as part of postwar reconstruction effort, with support through the World Bank's Mostar Water Supply and Sanitation Project (2000-04), Mostar's utility was reintegrated and began providing unified water and sewage services to city residents of all ethnicities. This was an extremely complex task logistically, administratively and politically; however, it became the first example of service reintegration—and institutional reconciliation—in a city where government and civilians had been deeply divided by ethnic violence. With this reform, the water service provider became a model for inclusiveness and the establishment of a new social compact (World Bank 2005).

It should be noted that perceptions of legitimacy can vary across a population. Though some groups may be satisfied with their government and ex post analysis may show improved relations and a strengthened social compact as a consequence of investment, this may not be true for all. Those who benefit from an investment may see authorities as more legitimate, while vulnerable, disenfranchised, and marginalized groups who have not benefited or who perceive inequitable outcomes may perceive the opposite.

Failure to provide water services can undermine institutional legitimacy even in contexts not directly affected by fragility, conflict, and violence. The episode of lead contamination of drinking water in the city of Flint, Michigan, in the United States provides such an example. Flint's drinking water was contaminated following a decision to change the city's water source as a cost-saving measure (Bellinger 2016). The failure to apply corrosion inhibitors (required by U.S. environmental legislation) to the new water supplies

resulted in lead being leached from pipes into the distribution system, causing serious contamination and a public health hazard. The episode undermined citizens' confidence in the agencies responsible for regulating and providing water supplies. A recent survey found that only 47 percent of U.S. citizens were confident that their tap water was safe for consumption, with more than half citing Flint's water crisis as a sign of a more widespread problem (AP-GfK 2016).

Failure to Protect from Water-Related Disasters

Water-related disasters can act as risk multipliers in fragile contexts, contributing to conflict, violence, or migration

Water-related disasters can act as risk multipliers in fragile contexts, contributing to conflict, violence, or migration. Drought is often cited as a main contributor to humanitarian crises, but flooding and hurricanes can equally pose challenges to stability and development in fragile contexts. From 2005 to 2009 alone, more than 50 percent of the population affected by natural disasters (including drought, floods, hurricanes, and earthquakes) lived in fragile contexts (Harris, Keen, and Mitchell 2013).

The contribution of water-related disasters to fragility depends largely on the response of government institutions following a disaster and also on their involvement in prevention and preparedness. The 2010 and 2011 floods in Pakistan, Cyclone Nargis in Myanmar in 2008, Hurricane Katrina in the U.S. Gulf coast in 2005, and the 2012 drought in Northern Mali present interesting cases demonstrating the mechanisms by which water-related disasters contribute to the vicious cycle of water insecurity and fragility.

The 2010 floods in Pakistan affected roughly 20 million people, caused widespread damage (estimated at more than $40 billion) and nearly 2,000 casualties (Webster, Toma, and Kim 2011). Government and foreign aid failed to reach many remote areas of the country. The absence of a government response in remote flood-affected areas strengthened perceptions of marginalization in those communities and opened the space for militant groups such as the Taliban to provide basic relief services. The scale of the floods also meant that a stretched government had fewer resources to engage in operations to contain militant groups, which exploited the flood-related disruption to carry out attacks (Waraich 2010). On a smaller scale, the 2011 Sindh floods in southeastern Pakistan resulted in social unrest and protests, motivated by the government's poor response and class discrimination in flood relief and assistance operations (Mitra and Vivekananda 2015; Rüttinger et al. 2016).

Cyclone Nargis, which devastated Myanmar's Ayeyarwady Delta in 2008, is another example of how failures to protect citizens from water-related disasters can fuel grievances toward governments. Cyclone Nargis is the worst natural disaster in Myanmar's recorded history. The cyclone and its aftermath killed over 140,000 people, affected about 2.4 million people, and caused widespread destruction (Fritz et al. 2009). The ruling military junta's response to Nargis was slow and inadequate. Government officials initially played down the impact of the disaster and refused to accept foreign aid donations or allow foreign aid workers to enter the country (Özerdem 2010).

Observers have suggested that the junta's refusal to accept international aid was partly due to fears of losing legitimacy if they were seen as incapable of managing the emergency, as well as concerns about foreign powers interfering with internal politics and supporting opponents to the regime who were concentrated in the region affected by the cyclone (Selth 2008). The regime's apparent inability and/or unwillingness to protect the population was seen as a turning point in the dissolution of the military junta and the series of democratic reforms that followed.

Even in nonfragile developed countries, water-related disasters can overwhelm institutions and cause severe social disruptions and loss of confidence in government. In August 2005, Hurricane Katrina hit the U.S. city of New Orleans, causing flooding that killed more than 1,800 people, displaced 1.5 million people for an extended period of time, and left $100 billion in total property damage (Delli Priscoli and Stakhiv 2015). Although the arrival of the storm had been forecast and ample warning given, government agencies were largely unprepared. Following the event, institutions failed to establish clear lines of authority to coordinate interventions, compromising relief and rescue operations and leading to preventable deaths and suffering. In the aftermath of Katrina and in response to national and international criticism, the U.S. House of Representatives created a Select Bipartisan Committee to Investigate the Preparation for and Response to Hurricane Katrina. The Committee recognized institutional failures of local, state, and federal governments and invited Congress to accept some blame for the insufficient response (U.S. House of Representatives 2006). In the words of the Committee report, this failure to protect from water-related disasters was "*an abdication of the most solemn obligation to provide for the common welfare*" (U.S. House of Representatives 2006).

At the other end of the hydrological spectrum, droughts also have the potential to act as risk multipliers in fragile contexts. Drought has been identified as an important element in the "toxic cocktail" that led to instability and conflict in northern Mali (Lewis 2012). In early 2012, conflict erupted in northern Mali between separatist forces (MNLA, Mouvement National de Libération de l'Azawad) and government forces. Separatist movements in northern Mali gained support following droughts in the 1970s and 1980s, when the loss of traditional livelihoods undermined the social fabric, adding to social instability and perceptions of marginalization (Stewart 2013). The 2012 drought and the lack of effective national and international responses have been linked to strengthened support for separatist movements in northern Mali which, combined with other factors such as the return of fighters from Libya, led to full-scale military confrontation in early 2012 (Lecocq and Belalimat 2012). Reports from northern Mali suggest that the roots of instability still must be addressed, with communities in northern Mali reportedly pointing toward the central government's neglect, as well as water and food insecurity, as reasons contributing to the spread of jihadist movements and rebels in the region (Arsenault 2015).

Climate change, population growth, and urbanization trends may exacerbate interactions between water-related disasters and fragility. More frequent and severe extreme

Trends in climate change, population growth, and urbanization mean that more people will be living in harm's way and that disasters will become more harmful. Greater efforts are needed to build resilient communities and prevent water-related disasters from aggravating or triggering fragility

weather events due to climate change increase the destructive power of these disasters. At the same time, high rates of population growth and urbanization, especially in coastal cities in Asia and Africa, will significantly increase exposure to water-related disasters (Neumann et al. 2015). In concert, these trends mean that more people will be living in harm's way and that disasters will become more harmful. These developments call for greater efforts to build resilient communities and prevent water-related disasters from aggravating or triggering fragility.

Failure to Preserve Surface, Ground, and Transboundary Water Resources

Water security underscores the importance of ensuring adequate quantities and quality of water resources. This requires, among other factors, demand management to motivate conservation and water use efficiency; water resources planning, development, and management; effective and equitable allocation; monitoring and enforcement to manage overexploitation and pollution; and cooperative management of both domestic and international shared waters.

Failure to preserve surface, ground, and transboundary water resources occurs where government institutions fail to enforce regulation to avoid the depletion of aquifer systems or the large-scale contamination of water bodies. Similarly, weak institutions may fail to mediate conflicts over scarce water resources that could promote cooperation domestically between user groups, as well as between nations over transboundary water resources.

Failure to Preserve Surface and Ground Water Resources

The Republic of Yemen offers a tragic example of the water insecurity and fragility cycle related to the failure to preserve adequate and sustainable surface and groundwater water resources. The Republic of Yemen's water crisis, dubbed the "forgotten conflict" in the press,[4] is severely undermining livelihoods and perpetuating social violence and conflict. In a context of fragility characterized by legacies of past and ongoing violence, partisan and fragmented state governance, elite capture, and proliferation of small arms, water disputes have acted as a trigger for local conflict and collective violence (Hales 2010). According to estimates from the government of Yemen, violence resulting from disputes over access to land and water caused more than 4,000 deaths a year before the 2015 conflict. Water shortages have also led to protests (Aden in 2009) and conflicts between rural and urban users (Hales 2010).

Efforts to preserve the Republic of Yemen's water resources have been piecemeal and hindered by strong economic interests, political sensitivities, and weak state authority (Hales 2010). As in other fragile contexts where elites have used their power to capture mineral resources and rents, large land-owners and political elites in the Republic of Yemen have captured scarce water resources and suitable agricultural land to invest in

cash crops, most notably *qat* (Ward 2014). *Qat* is a mild stimulant consumed by an estimated one in three Yemenis[5] that has no nutritional value and whose cultivation consumes more than half of the country's water resources (Lichtenhaeler 2010). In a country where about 50 percent of children under the age of five are stunted and 40 percent are underweight (World Bank 2015), limiting *qat* cultivation and reforming agricultural water use are a priority for food security, poverty reduction, and for preserving adequate, sustainable water resources (World Bank 2007). Yet attempts to curtail further expansion of *qat* cultivation and regulate water use in agriculture have been met with resistance due to strong vested interests (Lichtenhaeler 2010). This failure to preserve water resources is a critical element in perpetuating water insecurity, contributing to malnutrition and gender inequality and triggering conflict in the Republic of Yemen.

Failure to preserve surface water resources can also act as a risk multiplier triggering ethnic violence and conflict. In Kenya, ethnic conflict often ensues over access to water resources. In 2012, at least 80 people were killed in ethnic violence over water resources between the Orma and Pokomo people in the drought-prone Tana River County.[6] Water was also at the center of violent conflict between Maasai herdsmen and Kikuyu farmers (Wolf 2007).

Failure to preserve surface waters may also occur where unregulated discharges from industries or domestic users pollute water resources. High levels of water pollution can threaten ecosystems and human development, constraining water use for human consumption and agriculture. In the Palar river basin in Tamil Nadu in southern India, pollutant discharge from tanneries made water unsuitable for irrigation and consumption. This unmanaged pollution crisis led to a drinking water crisis, which in turn caused protests and disputes between the tanning industry and the irrigators (Wolf 2007).

Failure to Preserve Transboundary Water Resources

Countries are increasingly developing transboundary waters to meet escalating water demands and to more actively manage and develop these large shared river systems and aquifers to strengthen resilience to climate change. Growing demand for energy is also leading to increasing development of hydropower dams in transboundary basins (Zarfl et al. 2015). These trends suggest that competition will intensify and contention may grow over the use of transboundary water resources, both in shared rivers and shared groundwater aquifers.

Competition will intensify and contention may grow over the use of transboundary water resources, both in shared rivers and shared groundwater aquifers

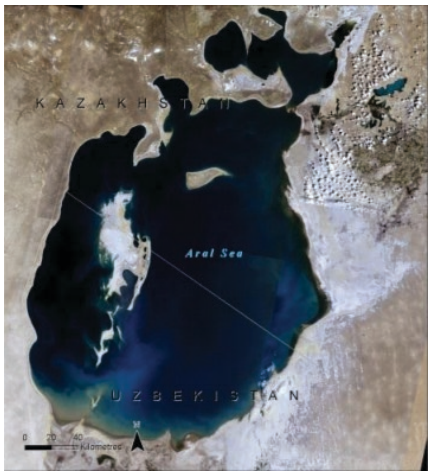
Large-scale hydraulic infrastructure is currently being planned or developed in the upstream regions of the Amu Darya, Mekong, Nile, and Tigris-Euphrates Rivers, for example. All these rivers basins include at least one fragile state. When they are completed, these infrastructure projects could potentially influence the volume and timing of river flows in countries downstream. Because none of these rivers has fully inclusive treaty arrangements, this development creates uncertainties about the availability and quality of transboundary water resources and potential tensions both within and among the riparian states sharing those rivers.

Central Asia's Aral Sea illustrates how a failure to preserve transboundary water flows has compounded environmental fragility, accelerated the deterioration of water resources, and engendered regional tensions and fragility (Wolf and Newton 2014). The two main rivers feeding the Aral Sea, the Amu Darya and the Syr Darya, are shared by Afghanistan, Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan, and Uzbekistan. Before 1991, all these countries except Afghanistan were part of the Soviet Union and the Soviet authorities coordinated regional water usage. The Soviet Union also made significant investments in expanding irrigation. Over-exploitation of the water resources feeding the Aral Sea happened in a regulated environment under the Soviet System. However, as coordinated management disintegrated over time, the increasing desiccation of the Aral Sea (map 3.1),

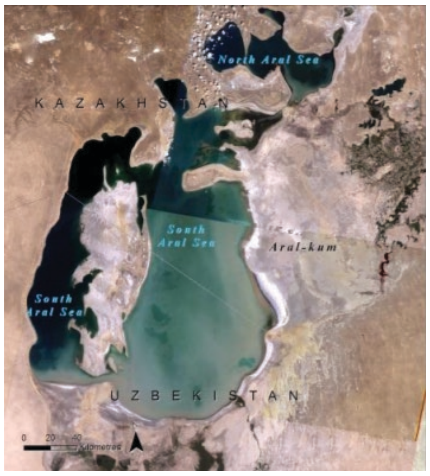
MAP 3.1. Landsat Satellite Images Showing the Constant Decline of the Aral Sea from 1977 to 2013

a. September 1977

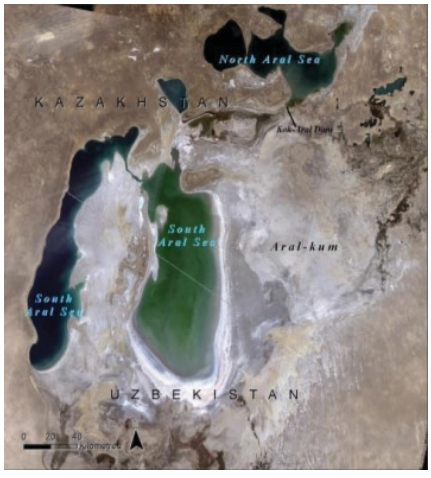
b. April–June 1986



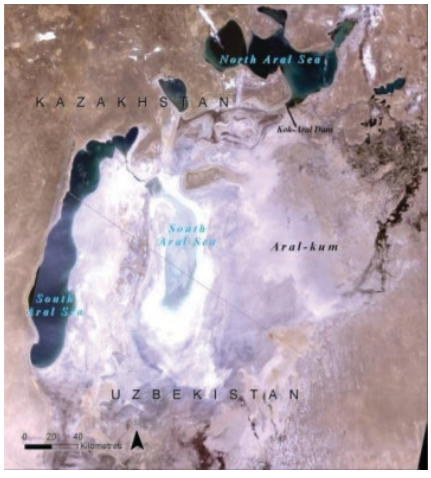
c. July–October 1999



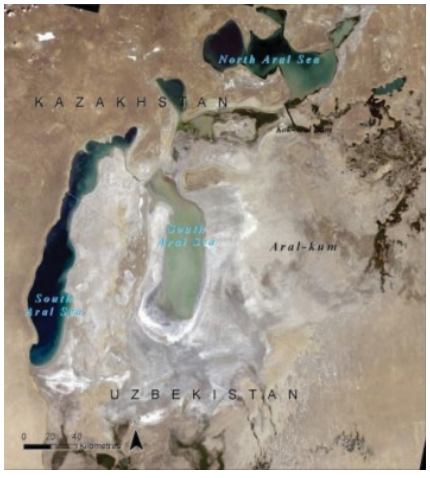
d. July–September 2006



e. June 2009



f. June 2013



Source: UNEP Global Environmental Alert Service (2014) with data from USGS/NASA.

which covers just 10 percent of its original area prior to the 1960s (Shi, Wang, and Guo 2014), and competing interests in the water resources among riparian countries gave rise to several instances of water-related interstate tensions (Chatterjee et al. 2013).

Competition over transboundary water resources is often cited as a trigger for interstate conflict and violence. However, research indicates that transboundary waters have induced cooperation more often than conflict between nations. Shared waters provide motivation for dialogue and cooperation between neighboring states, even in the presence of disputes over other issues (Wolf 2007). And while climate change is causing water flows to become less predictable and extreme events to be more frequent and severe, the need to manage these risks in transboundary basins can motivate high-level policy dialogue and actions both to strengthen existing agreements and to promote greater cooperation in shared basins (Rüttinger et al. 2016).

Shared waters provide motivation for dialogue and cooperation between neighboring states, even in the presence of disputes over other issues

In fragile contexts and those with legacies of significant tensions over transboundary waters, investment in cooperative transboundary water management could help to deescalate tensions, promote stability, and provide resilience to hydrological shocks or river developments that might otherwise act as a trigger for conflict. Cooperative efforts could include sharing information to strengthen disaster risk management and ensure environmental flow of or coordinate the operation of dam cascades; establishing institutions such are river basin organization or treaties to ensure transparency and equity in the management of shared basins; and promoting the joint planning, operation, and/or ownership of infrastructure to optimize the sustainability and productivity of the river system (Delli Priscoli and Wolf 2009; Sadoff and Grey 2005).

Multiple Failures to Address Water Insecurity

The three failures to address water insecurity described rarely occur in isolation. Fragility and water insecurity often interact in multiple ways. For instance, failure to preserve surface and groundwater resources might lead to displacement in urban areas where weak local institutions may fail to provide water services to newcomers, thus combining the first and third mechanisms. This section presents some examples of these multiple interactions. The discussion centers on fragile contexts characterized by forced displacement, to illustrate the numerous ways in which forced displacement affects water security and multiple institutional failures to address water security can compound fragility and contribute to population movement.

The Impact of Forced Displacement on Water Security

In recent years, the number of forcibly displaced people has surged. The United Nations High Commissioner for Refugees (UNHCR) reports that 65.3 million people were displaced at the end of 2015—the highest number since UNHCR began keeping records (UNHCR 2015). These numbers have significant implications for water security. Displaced people living in camps or host communities often struggle to access basic water supply

and sanitation services, and place sudden significant burdens on both service delivery systems and the underlying water resource in host communities. The United Nations Children's Fund (UNICEF) estimates that in refugee camps in Tanzania some residents live on less than three liters of water per day—far less than the World Health Organization's recommended amount of at least 20 liters per capita per day to meet basic hygiene needs and ensure basic food hygiene (UNICEF 2015).

In addition to the stress that displacement puts on water services and water resources, displaced populations are often forced to settle in areas that were previously uninhabited because they are exposed to water-related risks. In Colombia, conflict and lawlessness in the rural areas have forced people to migrate to informal settlements in urban areas, in spots that are often located in floodplains and on unstable slopes where the risk of flooding is higher (Williams 2011). A survey of internally displaced people in Colombia found that flooding was the topmost perceived risk in their new informal settlements. Between 40 and 80 percent of the respondents displaced to large urban centers such as Barranquilla, Cartagena, Villavicencio, and Florencia identified flooding as the most severe risk affecting their well-being (ICRC and WFP 2007). This fragility-related displacement therefore increases vulnerability to water-related disasters in urban areas and the consequences to health and security that follow.

Displaced populations are often forced to settle in areas that were previously uninhabited because they are exposed to water-related risks

Migration to informal settlements on the edges of urban areas puts additional stress on the range of urban services, increasing risk of exclusion, competition, and conflict, and worsening the potential for urban fragility (Zetter and Deikun 2010). Overwhelmed water, health, and education systems compound the risks that these populations will succumb to water-related illnesses. Women and girls tend to bear the greatest burdens in these circumstances. Their household responsibilities—such as procuring and transporting water, caring for the sick, and meeting family members' nutritional needs—increase, reducing the time available to attend school, work in a paid job, or pursue other possibilities to earn money. These patterns make females highly vulnerable, especially in circumstances of violence. Rather than participating constructively in a productive economy, women and girls become increasingly vulnerable and indirectly reinforce conditions of fragility.

Multiple linkages between displacement, water-related risks, and water-borne diseases can be observed in Sierra Leone's capital city of Freetown. During and following the civil war in Sierra Leone, the population of Freetown grew rapidly (map 3.2). The city, confined to a volcanic peninsula hemmed in by coastline and steep hills, grew from a few hundred thousand people in the late 1980s to over 1.5 million people in 2015. This rapid increase in the city's population—fueled by a combination of forced displacement and economic migration—has forced many poorer people to settle in marginal areas along the coastal floodplains and in hillside slums. With negligible investment in stormwater management and an annual rainfall of 3000mm, these marginal areas are prone to regular flooding, landslides, and conditions conducive to cholera outbreaks (the last

MAP 3.2. Growth of Urban Areas and Loss of Forest Cover in Sierra Leone's Freetown Forest Reserve between 1986 and 2015

a. 1986

b. 2015

Source: Water and Sanitation Program.

significant one was in 2012). The unmanaged settlement has also led to encroachment on the main dam that supplies the city. In a further intensification of the cycle, even after the war has officially ended, the risk of relapse into conflict remains, at the same time that infrastructure and government legitimacy need to be rebuilt. During the transition out of war, as households experience new vulnerabilities in these settlements and perceive inequitable benefits from recovery efforts, historical grievances can resurge, hindering the forging of the new and critically important social compact.

Forcibly displaced migrants pose additional demands on the water resources of host communities, often creating tensions. The Syrian crisis is an example of how fragility-related migration places additional burden on the water resources of host countries, intensifying some of the water security challenges these countries are already facing. Following the start of the Syrian civil war in 2011, a stream of forcibly displaced migrants left the Syrian Arab Republic for neighboring countries, including Jordan, Turkey, and Lebanon. The case of Lebanon is emblematic. The country's population is estimated to have increased by about 30 percent since the start of the war, causing an increase in water demand, as well as the volume of sewage requiring treatment (Farajalla 2016). The majority of refugees live in host communities, outside refugee camps, where they place an unplanned burden on water resources and services. In Lebanon, the Ministry of Environment estimates that domestic water demand has increased by 43 million m^3 to 70 million m^3 a year, which corresponds to an increase in national water demand of between 8 and 12 percent (Ministry of Environment of Lebanon 2014). The increase in water demand is exacerbating current stresses on water resources, particularly groundwater. On a similar scale, the influx of refugees has led to an increase of between 8 and

14 percent of the volume of wastewater generated in Lebanon, placing an unplanned burden on limited wastewater treatment facilities and increasing public health risks from contamination (Ministry of Environment of Lebanon 2014).

In areas already facing water challenges, such as Jordan, forced displacement has led to accelerated unsustainable exploitation of groundwater and pollution of aquifers (Mercy Corps 2014). The Jordanian Minister of Water and Irrigation is reported to have said in 2013: "*We live in a chronic water problem. And we are now at the edge of moving from a chronic water problem into a water crisis. The element that will trigger this movement is the number of Syrian refugees*" (Francis 2015). As water prices are rising and supply systems are straining to meet increased demand, tensions within and between Jordanian residents and Syrian refugees are rising. This is an immediate example of how fragility-related displacement tests the ability of governments to achieve water security—particularly to provide water services and to preserve surface water and groundwater resources.

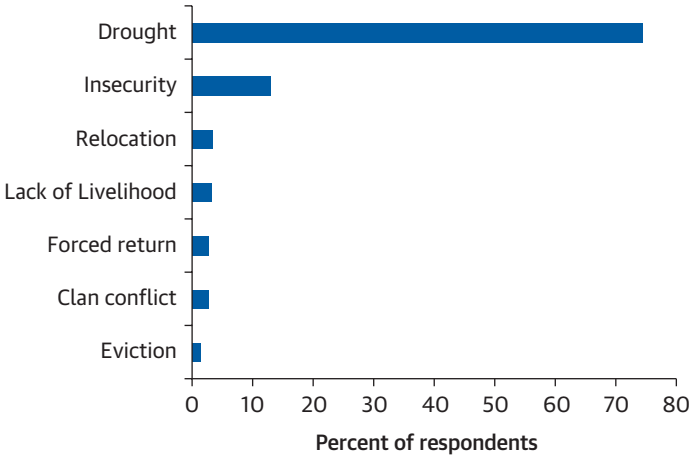
This example also highlights important questions about water supply and water management in and around refugee camps, where governments often delegate authority to the UNHCR. This creates a complex governance environment characterized by confused perceptions within host communities regarding systems of authority. Zaatari refugee camp in northern Jordan is the second largest camp in the world and has become the fourth largest city in Jordan. Water supply for the camp and surrounding Jordanian communities is drawn primarily from a shared underlying groundwater aquifer. Water resource issues, much like the local economy, transcend the borders of the camp. Under these circumstances, as the government seeks to maintain a social compact with its citizens, the activities of international aid agencies working to provide water for refugee camps can have a notable impact on the water security of surrounding communities, potentially aggravating fragility dynamics.

The Impact of Water Insecurity on Forced Displacement

The preceding examples illustrate how fragility-driven displacement can aggravate water insecurity, but the opposite can also occur, where water insecurity can drive displacement and compound fragility.

Scholars and commentators have observed that the Syrian government's failure to address water insecurity before and during the 2011 drought acted as a "risk multiplier" in the civil war. Poor water and agricultural management practices in Syria, including ageing and inefficient irrigation systems and excessive abstraction of groundwater, were largely left unaddressed by the government (de Châtel 2014) and led to a failure to preserve adequate availability of water resources. The inability and unwillingness to develop and implement agricultural and water policies to sustainably manage water resources greatly exacerbate Syria's vulnerability to water-related shocks (Sowers, Waterbury, and Woertz 2013). When the drought hit this weakened system in 2011, the negative impacts on rural livelihoods and agricultural production were significant.

FIGURE 3.4. Main Reasons for Movement among 141,480 Somalis Displaced between July and September 2011



Source: UNHCR 2011.

A very poor government response (a failure to protect from a water-related disaster)—characterized by attempts to downplay the severity of the drought and the subsequent humanitarian crisis—greatly increased the impact of the drought on rural livelihoods and contributed to migration from rural areas to urban centers (Gleick 2014). Rural migrants in urban environments faced poor services and lack of opportunities. These conditions fanned sentiments of disaffection and exclusion, and combined with other factors such as corruption, inequality and legacies of violence, fueled grievance and unrest toward the Assad regime, which then escalated into a full-scale civil war.

When institutions are unable to preserve water resources and provide water services, water-related disasters can trigger movements of people. Population movements triggered by water insecurity—especially drought—have occurred in many parts of the world where governments were unable to adequately plan for hydrological variability and allocate water resources (Gemenne, Zickgraf, and Ionesco 2015). In Somalia, for example, a review of the shocks inducing displacement found drought to be one of the most commonly occurring factors alongside violence and insecurity (Bryld, Kamau, and Sinigallia 2014). The 2011 drought triggered a spike in the numbers of displaced Somalis, both refugees and internally displaced (Hammond 2014), with more than 70 percent of displaced people citing drought as the main reason driving them from their homes (UNHCR 2011), as shown in figure 3.4. Many of these other drivers of migration, such as insecurity, clan conflict, lack of livelihood, forced return, and eviction, could become more potent under drought conditions, demonstrating again the interconnectedness within the water insecurity and fragility cycle.

Forced displacement in Iraq provides another example of how in fragile contexts characterized by natural resource scarcity and sectarian politics and marginalization, multiple failures to address water security can lead to forced displacement, fueling perceptions of social exclusion and further instability. Recent research by the International Organization for Migration (IOM) suggests that water insecurity has been a factor in driving recent population displacement in Iraq (IOM 2012). In 2010, the IOM conducted an assessment to measure the impact that water insecurity—defined as physical lack of water, salinity, and poor water quality—has had on 27,830 vulnerable families in Iraq. The research found that in many governorates of Iraq, especially those located in the south, a very large proporiton of internally displaced persons cited water insecurity as the main reason for displacement (map 3.3, panel) and also the main reason preventing

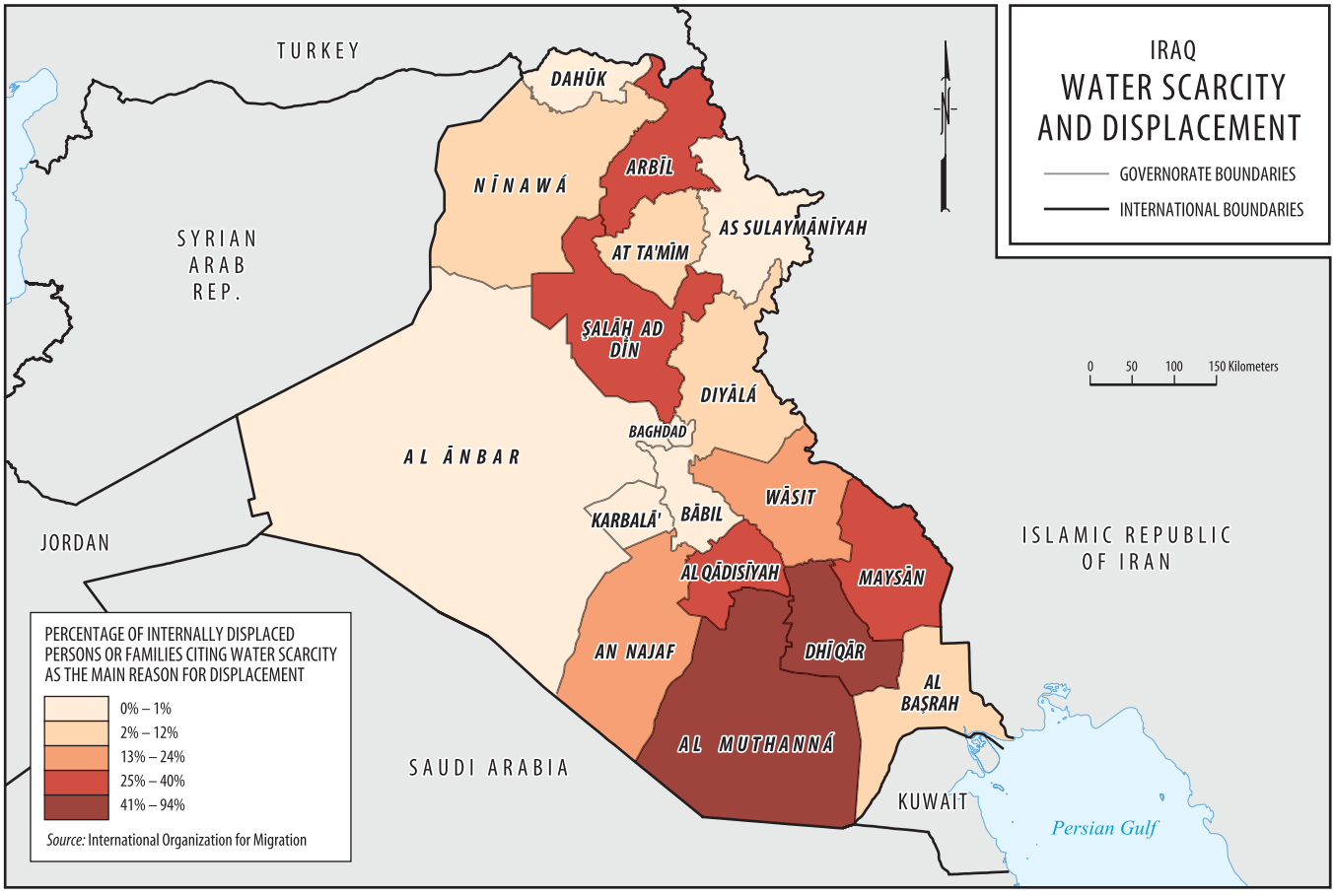
In many governorates of Iraq, especially those located in the south, a very large proportion of internally displaced persons cited water insecurity as the main reason for displacement

them from returning to their home (map 3.3, panel b), ahead of other factors included in the survey such as conflict, ethnic discrimination, or unemployment.

The concentration of water-related displacement in the southern governorates reflects the ongoing desiccation of the Iraqi marshes due to a long history of upstream diversions, dam building, and uncoordinated and fragmented planning in the Tigris and Euphrates basin (UNEP 2001). In this case, the failure to preserve surface water resources combines a failure to reach transboundary water management agreements with upstream Syria and Turkey, along with intentional domestic water diversions in the 1980s and 1990s aimed at weakening opponents to Saddam's regime. The failure to preserve water resources in the Iraqi Marshes is not only driving displacement, reinforcing local perceptions of marginalization and exclusion, and perpetuating fragility, it is also causing losses in biodiversity and in the cultural knowledge of the Marsh Arabs (Fawzi et al. 2016).

MAP 3.3. Percentage of Internally Displaced Persons in Iraq Citing Water Scarcity as the Main Reason for Displacement and for Preventing their Return to their Place of Origin

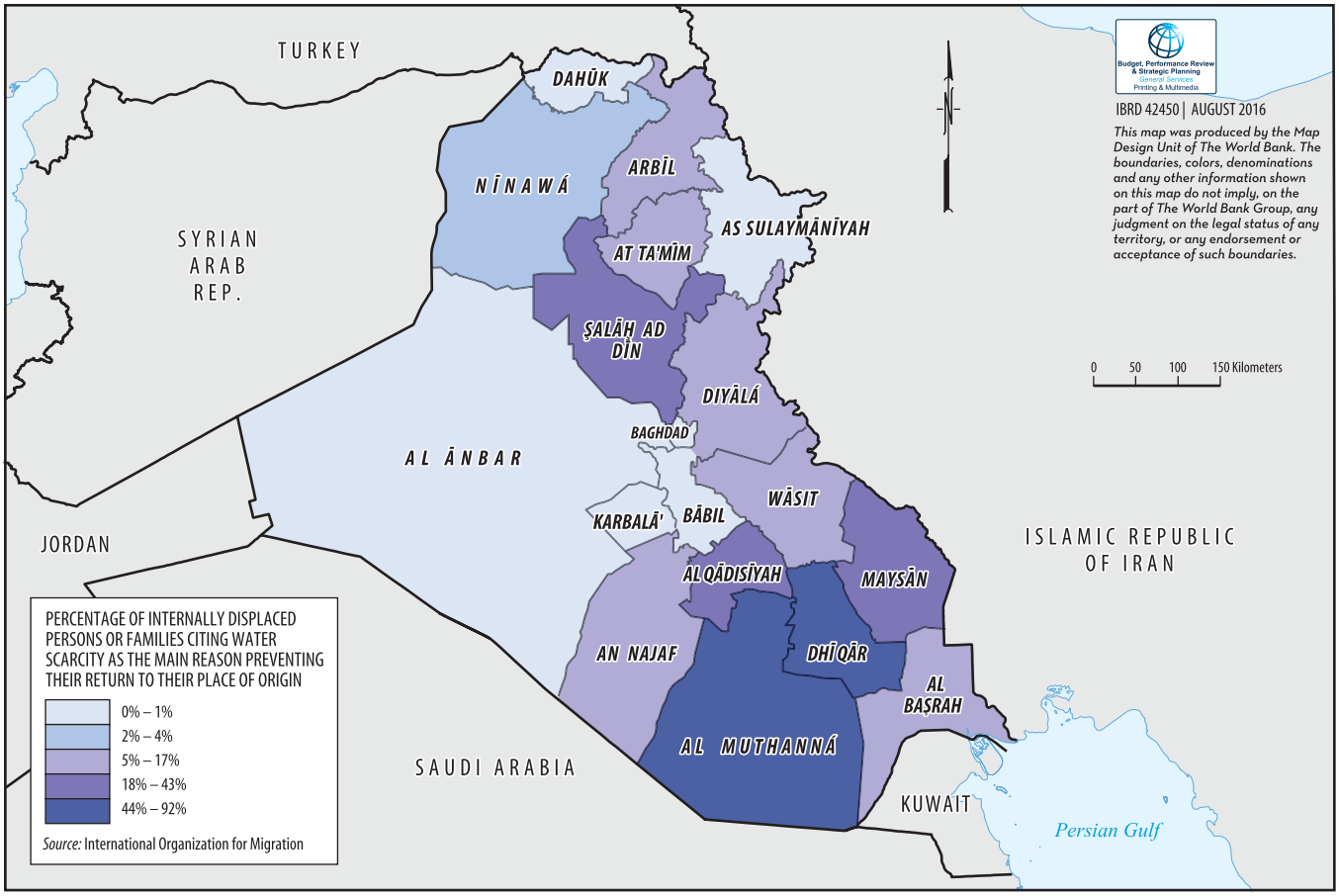
a. Main reason for displacement



map continues next page

MAP 3.3. continued

b. Main reason preventing their return to place of origin



Source: IOM 2012.

Before the recent upsurge of violence in Iraq, international organizations strategically invested in marshland communities with the objective of improving services and restoring environmental resources to enable recovery, development, and return. These efforts were conducted in partnership with local authorities with the expectation of rebuilding trust and encouraging the social compact between government entities and civilians. Some achieved notable successes, including an increase in water supply to 25,000 people (Aoki, Al-Lami, and Kugaprasatham 2011; Weinthal, Troell, and Nakayama 2013). This case illustrates how strategic investment by external parties can aim to improve government-citizen relations, intentionally intervening on the water security and fragility dynamic.

Examples of water insecurity contributing to population displacement abound, both recently and historically. There are also many examples of human settlement affected by water risks and opportunities (Delli Priscoli 1998; Grey and Cooke 1977). In Ethiopia,

men's labor migration markedly increases following drought (Gray and Mueller, 2012). A similar pattern was observed in Niger, where young men between the age of 25 and 35 regularly move to urban centers in response to drought (Afifi, 2011). In Burkina Faso, people living in drier areas were found to be more likely to migrate than people living in areas with higher rainfall availability (Henry, Schoemaker, and Beauchemin 2004). In Brazil, large movements of migrants from the arid north-east occurred from 1995 to 2000 in response to drought events in the 1990s (Fusco 2012).

The shrinking of Lake Chad has forced ethnically diverse pastoralist communities from the Republic of Niger and other riparian countries to move further south (World Bank 2016b). This water-related displacement has heightened conflict over scarce resources among ethnic groups, many of which are armed. In fragile contexts where armed and violent groups operate, these tensions could trigger further conflicts among riparians in the Lake Chad region.

Water-related population movement is often difficult to assess because the impacts of slow onset water-related disasters, such as drought, on livelihoods are often delayed, and have many causes, and because multiple drivers affect the decision to move (Ginnetti and Franck 2014). The evidence presented here does not suggest that drought or water insecurity cause population movement; rather it suggests that water-related factors can act as a risk multiplier for population movement, especially in fragile contexts where resilience mechanisms are weak. Drought, like other water-related disasters, cannot be prevented. However, investments in drought preparedness, creation of early warning systems, and diversification of water supply and livelihood sources can protect populations and economies from the harmful consequences of these disasters.

Both the frequency and intensity of droughts and floods are expected to grow. Emphasis must therefore be placed on mitigating water-related risks and building resilient communities—particularly in fragile contexts where the vulnerabilities of certain demographic groups are acute, governance challenges persist, and the risk of broader insecurity, conflict, and violence remains.

Notes

1. The Fragile States Index is an annual ranking of 178 nations based on their levels of stability and the pressures they face. The Index is based on The Fund for Peace's proprietary analytical platform, the Conflict Assessment System Tool (CAST). Based on comprehensive social science methodology, data from three primary sources are triangulated and subjected to critical review to obtained final score for the tmFragile States Index (The Fund for Peace 2016).

2. Resource-rich countries (Angola, Cameroon, Chad, Nigeria, Sudan, and Zambia) were defined as countries with more than 10 percent of GDP from natural resource rents from oil, mining, and the like.

3. World Health Organization data from 2012 on burden of disease were calculated by first combining information on the increased (or relative) risk of a disease resulting from exposure with information on how widespread the exposure is in the population (in this case, the percentage of the population with exposure to unsafe water, sanitation, and lack of hygiene).

4. https://www.theguardian.com/global-development-professionals-network/2015/apr/02/water-scarcity-yemen-conflict.

5. http://www.newsweek.com/2015/01/30/al-qaida-plans-its-next-move-yemen-300782.html.

6. http://www.ipsnews.net/2012/09/kenyas-water-wars-kill-scores/.

References

Afifi, T. (2011) Economic or environmental migration? The push factors in Niger; in: International Migration, vol 49, nr 1, pp e95-e124.

Aoki, C., A. Al-Lami, and S. Kugaprasatham. 2011. "Lessons Learned from Environmental Management of the Iraqi Marshlands in the Post-conflict Period." *Water International* 36 (2): 197-206.

AP-GfK (Associated Press-GfK Public Affairs and Corporate Communications). 2016. "AP-GfK Poll: About Half of Americans Confident in Tap Water" (accessed July 1, 2016), https://goo.gl/3moJhm.

Arsenault, C. 2015. "Drought, Expanding Deserts and Food for Jihad Drive Mali's Conflict." Reuters (accessed June 15, 2016), https://goo.gl/2yxpjP.

Bagcchi, S. 2016. "Cholera in Iraq Strains the Fragile State." *The Lancet, Infectious Diseases* 16 (1): 24-25.

Baird, M. 2010. "Service Delivery in Fragile and Conflict-affected States." Background Report for the *World Development Report*. World Bank, Washington DC.

Bellinger, D. C. 2016. "Lead Contamination in Flint—An Abject Failure to Protect Public Health." *New England Journal of Medicine* 374 (12): 1101-03.

Brooke, S. 2015. "The Muslim Brotherhood's Social Outreach after the Egyptian Coup." Working Paper, Brookings Institution, Washington, DC.

Bryld, Erik, Christine Kamau, and Dina Sinigallia. 2014. "Analysis of Displacement in Somalia." World Bank Group, Washington, DC.

Burt, M., and B. J. Keiru. 2011. "Strengthening Post-conflict Peacebuilding through Community Water-Resource Management: Case Studies from Democratic Republic of Congo, Afghanistan and Liberia." *Water International* 36 (2): 232-41.

Byman, D. 2016. "Understanding the Islamic State-A Review Essay." *International Security* 40 (4): 127-65. doi:10.1162/ISEC_r_00235.

Chatterjee, P., H. Gugarats, E. Caner, M. Du Jardin, A. Goss, and H. K. Sahnai. 2013. "Case Study 4: The Aral Sea Basin. In *Bridges over Water,* edited by A. Dinar, S. Dinar, S. McCaffrey, and D. McKinney, 2nd ed., 339-62. Singapore: World Scientific.

Danaei, G., K. G. Andrews, C. R. Sudfeld, G. Fink, D. C. McCoy, E. Peet, A. Sania, M. C. Smith Fawzi, M. Ezzati, and W. W. Fawzi. 2016. "Risk Factors for Childhood Stunting in 137 Developing Countries: A Comparative Risk Assessment Analysis at Global, Regional and Country Levels." *PLOS Medicine*. http://dx.doi.org/10.1371/journal.pmed.1002164.

de Châtel, F. 2014. The Role of Drought and Climate Change in the Syrian Uprising: Untangling the Triggers of the Revolution. *Middle Eastern Studies* 50 (4): 521-35.

de Waal, Dominick Revell, and Maximilian Leo Hirn. 2015. "The Intricacies of Attracting and Sustaining Investment in WASH in Fragile States: Lessons from Liberia." Working Paper 106721, World Bank, Washington, DC.

Delli Priscoli, J., and E. Stakhiv. 2015. "Water-related Disaster Risk Reduction (DRR) Management in the United States: Floods and Storm Surges." *Water Policy* 17: 58-88.

Delli Priscoli, Jerome. 1998. "Water and Civilization: Using History to Reframe Water Policy Debates and to Build a New Ecological Realism." *Water Policy* 1: 623-36.

Devictor, X. 2016. "Forcibly Displaced: Toward a Development Approach Supporting Refugees, the Internally Displaced and Their Hosts." World Bank, Washington, DC.

DuBois King, Marcus. 2015. "The Weaponization of Water in Syria and Iraq," *The Washington Quarterly* 38 (4): 153-69.

Farajalla, N. 2016. "Impact of Syrian Refugees on Lebanon's Water Resources. In *Water, Migration and How They Are Interlinked,* edited by A. Jägerskog and A. Swain. Working Report 27. Stockholm: SIWI (Stiftelsen Stockholm International Water Institute).

Fawzi, N. A.-M., K. P. Goodwin, B. A. Mahdi, and M. L. Stevens. 2016. "Effects of Mesopotamian Marsh (Iraq) Desiccation on the Cultural Knowledge and Livelihood of Marsh Arab Women." *Ecosystem Health and Sustainability* 2(3): e01207. doi: 10.1002/ehs2.1207.

Flanigan, S. T., and M. Abdel-Samad. 2009. "Hezbollah's Social Jihad: Nonprofits as Resistance Organizations." *Middle East Policy* 16 (2): 122-37.

Francis, A. 2015. "Jordan's Refugee Crisis." Carnegie Endowment for International Peace. http://carnegieendowment.org/files/CP_247_Francis_Jordan_final.pdf.

Fritz, H. M., C. D. Blount, S. Thwin, M. K. Thu, and N. Chan. 2009. "Cyclone Nargis Storm Surge in Myanmar." *Nature Geoscience* 2: 448-49.

Fusco, W. 2012. "Regiões Metropolitanas do Nordeste: Origens, Destinos e Retornos de Migrantes," *Revista Interdisciplinar da Mobilidade Humana* XX (39): 101-16.

Gemenne, F., C. Zickgraf, and D. Ionesco. 2015. *The State of Environmental Migration 2015*. Paris: International Organization for Migration.

Ginnetti, J., and T. Franck. 2014. "Assessing Drought Displacement for Kenyan, Ethiopian and Somali Pastoralists." Technical Report, Norwegian Refugee Council and Internal Displacement Monitoring Centre (IDMC), Geneva.

Gleick, P. H. 2014. "Water, Drought, Climate Change, and Conflict in Syria." *Weather, Climate and Society* 6 (3): 331-40.

Godwin, M. J. 2012. "Political Inclusion in Unstable Contexts: Muqtada al-Sadr and Iraq's Sadrist Movement." *Contemporary Arab Affairs* 5 (3): 448-56. doi: 10.1080/17550912.2012.695462.

Gray, C., and V. Mueller. 2012. "Drought and Population Mobility in Rural Ethiopia." *World Development* 40 (1): 134-45.

Grey, D. R. C., and H. J. Cooke. 1977. "Some Problems in the Quarternary Evolution of the Landforms of Northern Botswana." *CATENA* 4 (1-2): 122-33.

Guerrero, Alejandro. 2011. "Rebuilding Trust in Government via Service Delivery: The Case of Medellin, Colombia." World Bank, Washington, DC.

Hales, G. 2010. "Under Pressure: Social Violence over Land and Water in Yemen." Issue Brief Number 2, Yemen Armed Violence Assessment.

Hammond, L. 2014. "History, Overview, Trends and Issues in Major Somali Refugee Displacements in the Near Region." New Issues in Refugee Research, UNHCR Research Paper No. 268, United Nations High Commissioner for Refugees, https://goo.gl/XskK29.

Harris, K., D. Keen, and T. Mitchell. 2013. "When Disasters and Conflicts Collide. Improving the Links between Disaster Resilience and Conflict Prevention." Overseas Development Institute, London.

Henry, S., B. Schoumaker, and C. Beauchemin. 2004. "The Impact of Rainfall on the First Out-migration: A Multi-level Event-history Analysis in Burkina Faso." *Population and Environment* 25: 423. doi:10.1023/B:POEN.0000036928.17696.e8.

IAU (Inter-Agency Information and Analysis Unit). 2011. "Water in Iraq Factsheet." United Nations Country Team Iraq, Baghadad, http://goo.gl/DMSbBs.

ICRC (International Committee of the Red Cross) and WFP (World Food Programme). 2007. "Una mirada a la población desplazada en ocho ciudades de Colombia: respuesta institucional local, condiciones de vida y recomendaciones para su atención." ICRC and WFP.

IOM (International Organization for Migration). 2012. "IOM Iraq Special Report: Water Scarcity." https://goo.gl/jLAEW2.

Jägerskog, A., and A. Swain, ed. 2016. *Water, Migration and How They Are Interlinked*. Working Report 27. Stockholm: SIWI (Stiftelsen Stockholm International Water Institute).

Kooy, M., and L. Wild. 2012. "Tearfund WASH Service Delivery in South Sudan: Contributions to Peace-building and State-building." London: Overseas Development Institute.

Kooy, M., L. Wild, and N. Mason. 2015. "Doing Things Differently: Can Water Supply, Sanitation and Hygiene Services Support Peace and State-building Processes?" *Development Policy Review* 33 (4): 433-56.

Lecocq, Baz, and Nadia Belalimat. 2012. *The Tuareg: Between Armed Uprising and Drought*. African Arguments. London: Royal African Society. https://goo.gl/Ew4PHO.

Lewis, D. 2012. "Mali Coup Shakes Cocktail of Instability in Sahel." Reuters (accessed: June 9, 2016), https://goo.gl/vpOAeE.

Library of Congress, Federal Research Division. 2006. "Country Profile: Iraq." https://www.loc.gov/rr/frd/cs/profiles/Iraq.pdf.

Lichtenthaeler, G. 2010. "Water Conflict and Cooperation in Yemen." Middle East Report 254, Middle East Research and Information Project, Washington, DC.

Mason, N. 2012. Relationships between Water Supply, Sanitation and Hygiene (WASH) Service Delivery and Peace-building and State-building. A Review of the Literature." ODI Working Report 362, Overseas Development Institute, London.

Mcloughlin, Claire. 2015. "When Does Service Delivery Improve the Legitimacy of a Fragile or Conflict-Affected State?" *Governance* 28 (3): 341-56. doi:10.1111/gove.12091.

Mercy Corps. 2014. "Tapped Out: Water Scarcity and Refugee Pressures in Jordan." Mercy Corps, Portland, Oregon.

Ministry of Environment of Lebanon. 2014. "Lebanon Environmental Assessment of the Syrian Conflict and Priority Interventions." MOE/EU/UNDP Report, Beirut, https://goo.gl/5c9DQa.

Mitra, S., and J. Vivekananda. 2015. "Compounding Risks: Disasters, Fragility and Conflict." Policy brief, International Alert, London.

Neumann, B., A. T. Vafeidis, J. Zimmermann, and R. J. Nicholls. 2015. "Future Coastal Population Growth and Exposure to Sea-level Rise and Coastal Flooding-A Global Assessment." *Plos ONE* 10 (6): e0131375. doi: 10.1371/journal.pone.0131375.

OECD (Organisation for Economic Co-operation and Development). 2008. "Service Delivery in Fragile Situations: Key Concepts, Findings and Lessons." OECD/DAC Discussion Report, Organization for Economic Cooperation and Development, Paris.

——. 2015. "States of Fragility 2015: Meeting Post-2015 Ambitions." Organization for Economic Cooperation and Development, Paris.

Özerdem, A. 2010. "The Responsibility to Protect in Natural Disasters: Another Excuse for Interventionism? Nargis Cyclone, Myanmar." *Conflict, Security and Development* 10 (5): 693-713.

Ruckstuhl, Sandra. 2014. "Conflict-Sensitive Development Programming in Transitional Situations: Lessons from Water-Related Projects." Research Paper, United States Agency for International Development, Washington, DC.

Rüttinger, L., D. Smith, G. Stang, D. Tänzler, and J. Vivekanada. 2016. *A New Climate for Peace: Taking Action on Climate and Fragility Risks*. An independent report commissioned by the G7 members.

Sadoff, C. W. and D. Grey. 2005. "Cooperation on International Rivers: A Continuum for Securing and Sharing Benefits." *Water International* Vol. 30, No. 4, pp 420-427.

Selth, A. 2008. "Even Paranoids Have Enemies: Cyclone Nargis and Myanmar's Fears of Invasion." *Contemporary Southeast Asia* 30 (3): 379-402.

Shi, W., M. Wang, and W. Guo. 2014. "Long-term Hydrological Changes of the Aral Sea Observed by Satellites." *Journal of Geophysical Research, Oceans* 119: 3313-26. doi:10.1002/2014JC009988.

Sowers, J., J., Waterbury, J. and E. Woertz (2013) Did Drought Trigger The Crisis in Syria? Footnote.

Stewart, D. J. 2013. "What is Next for Mali? The Roots of Conflict and Challenges to Stability." Strategic Studies Institute and U.S. Army War College Press. https://goo.gl/WD9z7T.

Tawfeeq, M., and Salma Abdelaziz. 2016. "ISIS Uses Water as Weapon in Mosul Fight," CNN (Cable News Network), December 1 (accessed December 11, 2016). http://www.cnn.com/2016/11/30/middleeast/mosul-water-isis/.

UNEP (United Nations Environmental Programme). 2001. "The Mesopotamian Marshlands: Demise of an Ecosystem." UNEP/DEWA/TR.01-3, Division of Early Warning and Assessment, United Nations Environment Programme, Nairobi.

UNEP Global Environmental Alert Service. 2014. "The Future of the Aral Sea Lies in Transboundary Cooperation." *Global Environmental Alert Service* Bulletin 63 (1)-2014.

UNHCR (United Nations High Commissioner for Refugees). 2011. "Somalia. Population Movement Tracking." http://data.unhcr.org/horn-of-africa/download.php?id=455.

——. 2015. "Worldwide Displacement Hits All-time High as War and Persecution Increase." Press release, June 18, http://www.unhcr.org/558193896.html.

United States, House of Representatives. 2006. "A Failure of Initiative. Final Report of the Select Bipartisan Committee to Investigate the Preparation for and Response to Hurricane Katrina." Report 109-377, U.S. Government Publishing Office, Washington DC. https://goo.gl/BEVULu.

von Lossow, Tobias. 2016. "The Rebirth of Water as a Weapon: IS in Syria and Iraq." *The International Spectator* 51 (3).

Waraich, O. 2010. "Has Pakistan's Military Lost Ground to the Floods? TIME World (accessed July 1, 2016) https://goo.gl/03Ap2Y.

Ward, C. 2014. *The Water Crisis in Yemen: Managing Extreme Water Scarcity in the Middle East*. I. B.Tauris

Webster, P. C. 2011. "Iraq's Health System Yet to Heal from Ravages of War." *The Lancet* 378 (9794): 863-66.

Webster, P. J., V. E. Toma, and H.-M. Kim. 2011. "Were the 2010 Pakistan Floods Predictable?" Geophysical Research Letters 38 (4): L04806. doi:10.1029/2010GL046346.

Weinthal, E., J. Troell, and M. Nakayama. 2011. "Water and Post-conflict Peacebuilding: Introduction." *Water International* 36 (2): 143-53.

——. 2013. *Water and Post-Conflict Peacebuilding*, 3rd volume. Routledge.

Williams, G. 2011. "Study on Disaster Risk Reduction, Decentralization and Political Economy: The Political Economy of Disaster Risk Reduction." Background report for the Global Assessment Report on Disaster Risk Reduction, UN/ISDR, Geneva.

Wolf, A. 2007. "Shared Waters: Conflict and Cooperation." Annual Review of Environmental Resources 32: 241-69.

Wolf, A., and J. Newton. 2014. Case Study of Transboundary Dispute Resolution: Aral Sea. http://www.transboundarywaters.orst.edu/research/case_studies/Documents/aral_sea.pdf

World Bank. 2005. "Bosnia-Herzegovina Mostar Water Supply and Sanitation." World Bank, Washington, DC. http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2006/01/17/000160016_20060117125630/Rendered/PDF/34620.pdf.

——. 2007. "Yemen: Towards Qat Demand Reduction." Report No. 39738-YE. World Bank, Washington, DC.

——. 2011. *World Development Report 2011. Conflict, Security and Development*. Washington, DC: World Bank.

——. 2015. "Nutrition Glance, Yemen." World Bank, Washington, DC.

——. 2016b. "Forced Displacement by the Boko Haram Conflict in the Lake Chad Region". World Bank, Washington, D.C.

——. 2017. *World Development Report 2017. Governance and the Law*. Washington, DC: World Bank.

WSP (Water and Sanitation Program, World Bank). 2011 "Pathways to Progress: Transitioning to Country-Led Service Delivery Pathways to Meet Africa's Water Supply and Sanitation Targets." World Bank, Washington, DC. http://www.wsp.org/sites/wsp.org/files/publications/CSO-Synthesis-Report.pdf

——. 2014. "Beitbridge Emergency Water Supply and Sanitation Project. Effects on service access and citizen confidence in government institutions." World Bank, Washington, DC.

——. 2016. "Water Supply, The Transition from Emergency to Development Support: Evidence from Country Case Studies in Africa." World Bank, Washington, DC.

——. 2016. "Water Supply, The Transition from Emergency to Development Support: Evidence from Country Case Studies in Africa." World Bank, Washington, DC.

Zarfl, C., A. E. Lumsdon, J. Berlekamp, Laura Tydecks, and K. Tockner. 2015. "A Global Boom in Hydropower Dam Construction." *Aquatic Sciences* 77 (1): 161-70.

Zetter, R., and G. Deikun. 2010. "Meeting Humanitarian Challenges in Urban Areas." *Migration Review*, Issue 34, University of Oxford, Oxford, UK.

Zolnikov, T. R. 2013. "The Maladies of Water and War: Addressing Poor Water Quality in Iraq." *American Journal of Public Health* 103 (6): 980-87.

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Chapter 4 Pursuing Water Security in Fragile Contexts

The 2011 *World Development Report* on Conflict, Security, and Development asserts that the process of escaping fragility and moving toward a virtuous cycle of confidence-building and institutional transformation requires at least a generation (World Bank 2011). Countries undertaking this transition face a legacy of pervasive and enduring mistrust, which makes action to address collective challenges or provide public goods more difficult. The transition process is not linear or smooth. It requires strategic, targeted investment to address grievances and inequity, and it is vulnerable to internal and external shocks that can push countries back into fragility.

Outsiders cannot restore confidence and transform institutions for countries because these processes are domestic and must be nationally led. But international actors can become third-party intermediaries in situations of conflict and discontent, and they can provide external support and incentives that are sensitive to the context of the conflict and help build resilience to environmental, economic, and social stressors.

Third parties can also promote transparency of data, which is essential to supporting a socially inclusive approach and to building constructive civilian-government relations. Data and information that can be particularly constructive to share in these circumstances—both to prevent conflict and to foster trust—can describe investments, the distribution of services and benefits, and hydrology. In the management of shared water resources at any scale (whether within or between nations), systems for sharing hydrological data can be politically complicated; yet they are integral to coordinated, equitable and informed planning processes that cultivate confidence.

In the management of shared water resources at any scale, systems for sharing hydrological data can be politically complicated; yet they are integral to coordinated, equitable and informed planning processes that cultivate confidence

Efforts to reverse the vicious cycle of water insecurity and fragility must occur within broader efforts to escape from fragility. They are thus likewise hindered by weak citizen-state relations, exogenous shocks, and the limited role that outsiders can play in transforming domestic institutions. At best, water-related investments and institutions can be at the cutting edge of this transformation—pushing it forward rather than holding it back.[1] But equally important is the notion that water-related investments can provide a measure of resilience to shocks that could otherwise threaten to push a country back into broader fragility.

Water-related investments can provide a measure of resilience to shocks that could otherwise threaten to push a country back into broader fragility

Before setting out a framework to help identify appropriate types of water-related investments later in this section, some examples are given of situations where water sector institutions have been at the cutting edge of promoting stability and have helped prevent a country sliding back into fragility.

Water Management as a Catalyst for Development and Stability

In supporting utility reform across fragile states in Sub-Saharan Africa, the World Bank's Water and Sanitation Program (WSP) has found that results have been strongly influenced by the interaction of interventions to increase water availability and the political incentives to make services work. In drier countries where a crisis at the central government level has led to an upsurge of subnational authority, local political incentives for acting on water have been very strong. Where crises have diminished the central government's presence and legitimacy, through war (Somalia) or hyperinflation (Zimbabwe), politicians at the subnational level have viewed the opportunity to improve water supply as a tangible collective action problem worth acting upon to demonstrate local competence against central impotence.

Addressing water supply has the potential to bolster both the legitimacy and the local tax base of emerging subnational entities. Network supplies have economies of scale that enable services to be delivered at prices well below alternative solutions (private boreholes or water tankers)—often by orders of magnitude. With lower costs per cubic meter, water revenues have been viewed as a way of directly and indirectly increasing the tax base. Taxing water sales directly has increased the tax base. For instance, in Somalia, 5 percent of the sales of the Hargeisa Water Agency are remitted to the Somaliland central bank. Water revenues in Zimbabwe account for up to 50 percent of municipal revenues. Water services, particularly in Zimbabwe, have also been seen as an indirect mechanism to increase and broaden the tax base. Municipalities can cut off water when tariffs are not being paid. Servicing new housing plots with water and sewer can raise the auction price of land and expand the population of houses that are ratable. These joint opportunities have prompted the emerging regional and local governments to be willing both to deliver water and to charge for it, ensuring stable and financially sustainable services in a fragile context.

By contrast, in countries like Liberia and Sierra Leone that have remained highly centralized and that have abundant water resources, high rainfall, and shallow aquifers, utility reform has been a much lower political priority. For wealthier households, it has been

relatively simple to privatize a solution to water supply by sinking a well in their backyards. Alternative service delivery models have sprung up as hydrogeology is conducive to low-cost alternative water sources. This has fueled a vicious cycle of expanding alternatives and shrinking utility services (as discussed earlier).

In the wake of violence and conflict, the military can play a significant role in reconstructing infrastructure and thus helping to rebuild the social contract between a beleaguered population and its government. However, in fragile and conflict-affected countries, distrust due to any history of military oppression can persist. In postindependence Senegal, for example, the Armee-Nation project, a civil-military effort to protect citizens through collaborative development projects, promoted positive relations between these entities. The project yielded investment in several types of water infrastructure, including wells, water retention basins, canals, and wastewater treatment facilities. In addition to fostering trust between civilians and security forces, these activities also helped build durable solutions to water access challenges and reduce risks of future conflict (Partners for Democratic Change 2010).

Improvements in the delivery of irrigation water, local consultation, and equitable access to resources can also act as a catalyst for development and stability, preventing countries from sliding back into fragility

Improvements in the delivery of irrigation water, local consultation, and equitable access to resources can also act as a catalyst for development and stability, preventing countries from sliding back into fragility. Following ethnic conflict and population displacement in southern Kyrgyz Republic in 2010, the World Food Programme and the Food and Agricultural Organization of the United Nations promoted the rehabilitation of irrigation channels employing ethnically mixed groups, bringing Uzbek and Kyrgyz populations to work together on a common resource management challenge (Troell and Weinthal 2014). The shared management of irrigation infrastructure and the development of water user associations to resolve disputes over water access at the local level were used to facilitate reconciliation and dialogue in the postconflict situation (UN PBSO 2012). Strengthening water institutions and improving mechanisms for inclusive, local participation in turn allowed communities to develop trust over the management of irrigation infrastructure. Water-related investments served as a platform to reduce fragility and increase cooperation among groups.

Transboundary water agreements and cooperation can act as a catalyst for development and stability

Transboundary water agreements and cooperation can also act as a catalyst for development and stability. The Indus Water Treaty of 1960 is an example of how successful transboundary water cooperation can promote regional stability and prevent conflict over water resources. The treaty provides a plan for allocation of the flow of the Indus River between India and Pakistan and a mechanism to resolve disputes (Salman and Uprety 2003). The success of the treaty demonstrates the importance of encouraging and facilitating the creation and strengthening of institutions and actors to preserve and manage transboundary waters. The World Bank's positive third-party role in brokering the Indus Water Treaty in 1960 further suggests that international organizations and donors can actively promote such agreements across national and international borders.

Another example of the role that initiatives over transboundary waters can play in promoting regional stability and cooperation comes from the Middle East. In 2013, Israel,

Jordan, and the Palestinian Authority signed a memorandum of understanding outlining pilot regional water-sharing initiatives. These include a desalination plant in Aqaba, Jordan, where the water produced will be shared with Israel, increased releases to Jordan from Israel's Sea of Galilee, and the sale of water from Israel to the Palestinian Authority. This agreement was facilitated by the World Bank, again highlighting the contribution that international organizations and donors can make in playing a constructive third-party role and promoting cooperative transboundary water management as a tool for stability and prosperity.

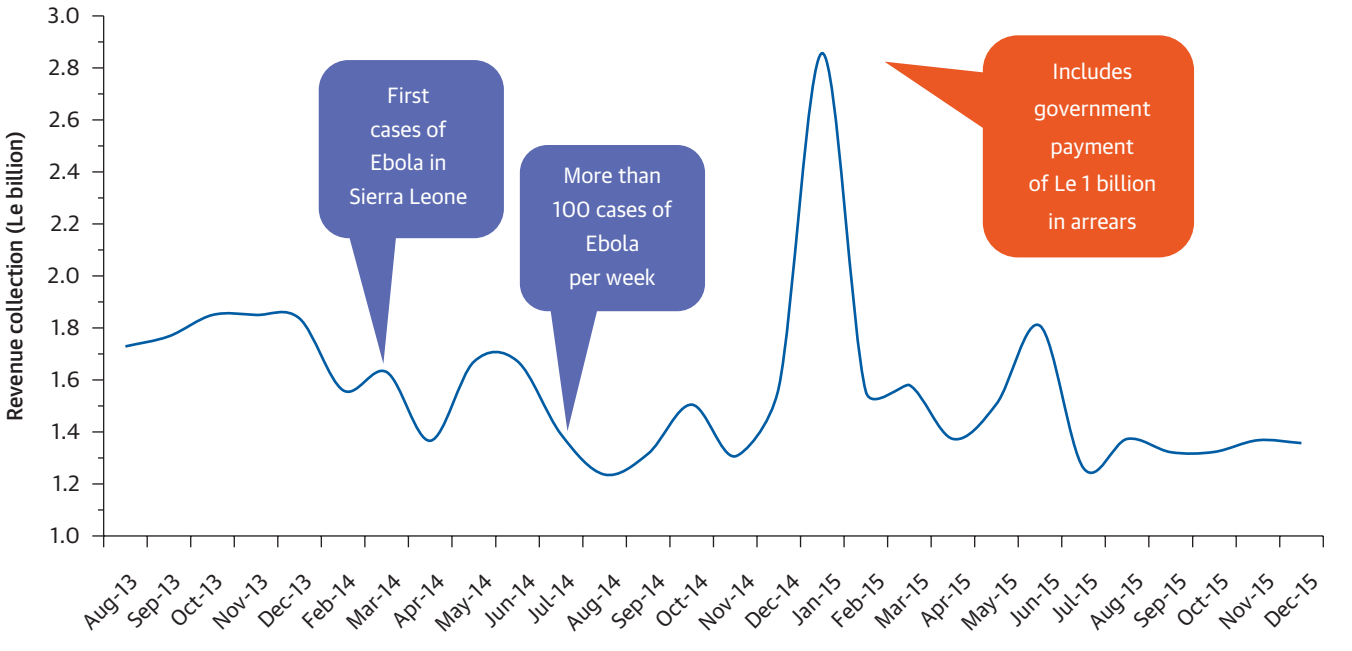
Water Management Institutions as Buffers to Shocks

Functioning water management institutions and robust water-related investments can act as buffers at times of crises, reducing the risks of further fragility

In contexts that are already fragile, when the capacity to deal with water-related challenges is inadequate, natural disasters and socioeconomic crises can create additional conditions of fragility and increase the potential for conflict and violence. By contrast, functioning water management institutions and robust water-related investments can, at times, act as buffers at times of crises, reducing the risks of further fragility.

In early 2014 Sierra Leone was hit by a major shock: the announcement of the first suspected cases of Ebola Virus Disease. In late 2103 and early 2014, the World Bank Water and Sanitation Program had been working with the country's largest utility, Guma Valley Water Corporation (GVWC), to upgrade their customer billing system and carry out a

FIGURE 4.1. Monthly Collections by the Guma Valley Water Corporation during the 2014 Outbreak of Ebola Virus Disease in Sierra Leone



Source: Water and Sanitation Program 2016.
Notes: Le = Sierra Leone leones; An improved billing system and customer database allowed the water utility to sustain revenues and keep operations going during the outbreak of Ebola Virus Disease, aiding the response.

survey of all their customers. As the Ebola Virus Disease outbreak took hold, many of GVWC's larger commercial customers scaled back or shut down their businesses, reducing consumption and thus the utility's revenues. However, the utility used the new billing system and improved customer database to keep track of the shifting demand as new users such as humanitarian agencies moved into the capital city of Freetown. The utility also introduced innovations such as SMS (short message service) billing to reduce the amount of physical contact their staff had with customers. The government also paid arrears for past water use to stabilize the utility in a period of crisis. These combined actions helped to meet costs, sustain revenues (figure 4.1), retain staff at work, and keep operations going, enabling GVWC to be an active part of the Ebola Virus Disease response that was extending services with humanitarian actors into poorer areas of Freetown. In Guinea, in the capital city of Conakry, where there was no similar intervention to improve the billing system at the main utility (SEG, Société des Eaux de Guinée), the Ebola Virus Disease outbreak contributed to a drop of 35 percent in revenue collected from private households and a related drop in collection efficiency from 92 percent to 59 percent.

Zimbabwe provides another example of how functioning water institutions can provide a cushion during shocks. During the height of the hyperinflation crisis in 2008, Zimbabwe was also struck by a cholera outbreak. UNICEF provided utilities with water treatment chemicals that they had stopped using when hyperinflation of the Zimbabwe dollar made the chemicals unaffordable. However, from 2009 onward, when the country adopted the U.S. dollar and other neighboring currencies, revenues bounced back and a system of service-level benchmarking was brought in across all utilities. Stable revenues and clear performance indicators helped improve efficiency of water utilities and freed up cash for small critical investments, allowing for continued water services to be delivered in an environment where sanctions and national debt hampered internal and external investment, creating the potential for instability.

A General Framework for Investment that Reverses the Cycle of Water Insecurity–Fragility

The preceding examples illustrate how interventions can address the water insecurity and fragility cycle. Success in these endeavors requires strategies that recognize the fragile context, the water context, and the perpetual interaction between them. Interventions can be proactive in promoting security, development, and peacebuilding through long-term development operations; or they can be reactive, responding to shocks and crises when required. To be truly conflict-sensitive (to move from "do no harm" to proactive "peacebuilding"), all such interventions should promote inclusive governance—which is the crux of maintaining the social compact—and should take into account the distribution of benefits from investment in the short term and long term. Equitable benefits can be integral both to maintaining and building stability and reducing risks of exclusion, grievance, conflict, and fragility (Ruckstuhl 2012).

Interventions should promote inclusive governance and should take into account the distribution of benefits from investment in the short term and long term

Investments in visible water infrastructure (such as water supply and irrigation) and in improving services can bolster support for nascent transition governments, helping to strengthen citizen-state relations and to support domestically led development processes

During positive periods of development opportunity, water sector investments can contribute to the broader escape from fragility. In these more standard long-term development operations, local domestic actors seek help to work on very visible water management issues, addressing concerns where citizens and institutions feel water management can "pinch" most. Investments in visible water infrastructure (such as water supply and irrigation) and in improving services can bolster support for nascent transition governments, helping to strengthen citizen-state relations and to support domestically led development processes. Good data and information about water resources and supply are important components of any investment. They promote principles of transparency, which are required to build relationships—including between civilians and governments, and between parties in fragile contexts.

During periods of positive development opportunity, proactive, conflict-sensitive investments may also be designed to strengthen inclusive water resources management and water-related disaster risk management systems. These investments build resilience and help avoid or mitigate potential "trigger" events that might result from exclusionary practices that can cause or deepen fragility. These systems can also help governments deliver services and protections that mitigate risk should the country experience an increase in fragility.

During shocks and protracted crises, local measures to reinforce existing water sector institutions and infrastructure in the face of adversity, and to promote inclusion within them, may promote stability, preventing countries from sliding further into fragility. Investments in highly visible infrastructure may not be possible (for example, during armed conflict) or desirable (for example, visibly supporting state institutions that are being contested), but inaction will lead to failures that hurt the poor and vulnerable most. Investments can instead be focused on less visible but critically important issues that enable water sector institutions to strategically address needs and inequities, promote inclusion, and mitigate risks of fragility. These investments include improving water quality and efficiency of services; protecting water resources that utilities and populations rely upon; and/or preventing state institutions from promoting exclusionary policies and practices, such as those that benefit private or factional interests. As in the case of "traditional" long-term investments, good information and data sharing are essential to any activity that seeks to promote trust and build relationships in fragile contexts.

While a period of development opportunity such as following a peace agreement may seem easy to distinguish from a health crisis like Ebola Virus Disease, in practice, "fragility" is a dynamic condition that is comprised of a wide array of causes and characteristics. Thus it is often difficult to pinpoint whether a country is on a trajectory toward being more or less fragile. Moreover, though development agencies can play an important role as third-party intermediaries, it is rare that external development support (as opposed to humanitarian response) can adapt quickly enough to respond precisely to these waves of progress and regress.

The framework in table 4.1 sets out options for external development to support water sector institutions in situations of development opportunity and in situations of

TABLE 4.1. Examples of Water-Related Investments Aimed at Reversing the Water Insecurity and Fragility Cycle

	SITUATIONS OF **DEVELOPMENT OPPORTUNITY**	SITUATIONS OF **SHOCKS AND PROTRACTED CRISIS**
Provide water services Guaranteeing water services that meet standards of affordability, reliability and quality helps to reverse the vicious cycle. Investments to reduce inadequate and unequal access to water services can promote stability in fragile contexts.	Promote cost recovery and efficiency in water utilities Develop a customer database Finance labour intensive irrigation rehabilitation and expansion Strengthen dam safety Construct small-scale hydropower for isolated communities	Support cost recovery with one-off subsidies or in-kind donations for operating needs Retain skilled staff Extend water utility services to IDPs and host communities
Protect from water-related disasters Preparedness and response to disasters are central elements of the social compact. Disaster impacts and recovery options vary widely so investments need to account for different gender, social and economic circumstances.	Develop disaster preparedness plans Integrate remote sensing data into information systems Upgrade hydrometeorological forecast and early warning systems Enhance flood protection and drought management systems Adopt conflict sensitive approaches to DRR Strengthen communication for disaster response	Protect key hydrometeorological early warning and ICT systems Ensure equity and transparency in disaster response and relief efforts
Preserve surface, ground- and transboundary water resources Governments need to guarantee the adequacy of water resources for their populations and to preserve healthy aquatic ecosystems. Working towards sustainable waterresources management and cooperative water sharing agreements is key to reverse the water security and fragility cycle.	Sustain water resources planning, monitoring and enforcement Regulate and monitor groundwater abstraction Rehabilitate/develop water storage infrastructure using labour intensive methods Share information in transboundary basins Pursue cooperative transboundary water agreements	Protect critical interconnected infrastructure Prevent encroachment by private and fractional interest Prevent investments in non-sustainable solutions Monitor compliance with transboundary agreements

Source: World Bank.

Note: DRR = Disaster Risk Reduction; ICT = information and communication technologies; IDPs = internally displaced persons.

shocks and crises. These activities are complementary and can be scaled and adapted to suit countries and the diverse needs of communities within them (such as Khyber Pakhtunkhwa, the Federally Administered Tribal Areas and Baluchistan in Pakistan) so the distribution of benefits can be strategically planned to mitigate fragility and promote equity over time.

Support during periods of development opportunity should prepare water institutions for situations of shock. Similarly, responses during periods of shock should support, not undermine, longer-term investments in periods of development opportunity.

Pursuing water security in fragile contexts requires cross-sectoral approaches. Reversing the water insecurity and fragility cycle means designing and implementing interventions across different sectors, not just the water sector. For instance, addressing forced displacement linked to water insecurity entails providing water services but also creating livelihood opportunities or improving land zoning and housing to prevent displaced communities from settling in flood-prone areas or areas without adequate safe water resources. In order to reduce the risks of fragility and promote economic diversification, the water-related interventions in table 4.1 need to be considered as part of a broader set of cross-sectoral investments.

Reversing the cycle of water insecurity and fragility also means focusing water-related interventions on livelihood outcomes, prioritizing and designing interventions to promote employment opportunities, including for vulnerable groups that have experienced greater risk to the security of their livelihoods. In countries where a large share of the labor force is employed in irrigated agriculture, interventions to preserve resources and reach transboundary water agreements can stabilize the delivery of irrigation water, in turn stabilizing livelihoods dependent on agriculture. Similarly, labor-intensive rehabilitation of water and irrigation infrastructure can provide temporary employment opportunities in fragile contexts. To the reduce the risks of fragility and promote economic diversification, water-related interventions need to be considered as part of a broader set of cross-sectoral investments.

To reduce the risks of fragility and promote economic diversification, water-related interventions need to be considered as part of a broader set of cross-sectoral investments

Note

1. This can be the case even if it is unrealistic to expect that water sector institutions can be transformed in isolation of other domestic institutions.

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Chapter 5 Conclusion

As political instability and fragility unfold in many parts of the world, investments in water security may not seem a priority compared with investments to address deteriorating humanitarian and political circumstances. Yet, as this report has argued, water insecurity and fragility are very much interrelated. Water security can both contribute to fragility and to stability and should therefore be considered as an integral part of broader strategies for escaping fragility. The report identified three mechanisms linking water insecurity to fragility: (1) failure to provide citizens with water services; (2) failure to protect citizens from water-related disasters; and (3) failure to preserve surface, ground, and transboundary water resources. These failures are symptoms of water insecurity, which can weaken the social compact between a government and its people, adding to a downward spiral of water insecurity and fragility. Conversely, addressing these failures and achieving water security can diminish the role of water as a risk multiplier, provide an increased measure of resilience for countries that slide deeper into fragility, and contribute to stability and equitable long-term development.

The complex interrelationships between water and fragility suggest that robust water management systems should be a priority in fragile contexts

Development efforts are increasingly being undertaken in contexts affected by fragility, protracted conflict, and crises (Devictor 2016). At the same time, humanitarian actors call for bridging the artificial gap between relief and development interventions (ICRC 2015). Water-related investments can play an important role in this context, alleviating human suffering and promoting stability.

The complex interrelationships between water and fragility suggest that robust water management systems should be a priority in fragile contexts. Failures to deliver services

or to ensure resilience to water-related shocks will have particularly powerful effects in fragile contexts, and can prolong and deepen fragility. For water security to continue to be central to poverty reduction efforts and development, water-related investments need to increasingly address compound risks arising from fragility, conflict, and violence.

References

Devictor, X. 2016. "Forcibly Displaced: Toward a Development Approach Supporting Refugees, the Internally Displaced and Their Hosts." World Bank, Washington, DC.

ICRC (International Committee of the Red Cross). 2015. "Urban Services during Protracted Armed Conflict: A Call for a Better Approach to Assisting Affected People." ICRC, Geneva.

Partners for Democratic Change. 2010. "Senegal's Armée-Nation: Lessons Learned from an Indigenous Model for Building Peace, Stability and Effective Civil-Military Relations in West Africa." Partners for Democratic Change, Washington, DC. http://www.partnersglobal.org/where/africa/Senegals percent20Armee percent20Nation.pdf

Ruckstuhl, Sandra. 2012. "Implementing Water Supply Projects in Countries Affected by Conflict and Social Fragility." Operational Guidance Note, Social Development Department, World Bank. Washington, DC. http://documents.worldbank.org/curated/en/996921468152706423/pdf/685090NWP00PUB0l0development0papers.pdf.

Salman, Salman M. A.; Uprety, Kishor. 2003. *Conflict and cooperation on South Asia's international rivers : a legal perspective.* Law, justice, and development series. Washington, DC : World Bank Group.

Troell, J., and E. Weinthal. 2014. "Harnessing Water Management for More Effective Peacebuilding: Lessons Learned." In *Water and Post-Conflict Peacebuilding*, edited by E. Weinthal, J. Troell, and M. Nakayama. London: Earthscan.

UN PBSO (United Nations Peacebuilding Support Office). 2012. "Peace Dividends and Beyond: Contributions of Administrative and Social Services to Peacebuilding." United Nations Peacebuilding Support Office, New York.

World Bank *World Development Report 2011. Conflict, Security and Development*. Washington, DC: World Bank.

WSP (Water and Sanitation Program, World Bank). 2016. "Water Supply, The Transition from Emergency to Development Support: Evidence from Country Case Studies in Africa." World Bank, Washington, DC.

Appendix A Harmonized List of Fragile Situations

TABLE A.1. World Bank Harmonized List of Fragile Situations, Fiscal Year 2017[a]

Country	WBG CPIA	AfDB CPIA	ADB CPIA	Harmonized average	Peacekeeping missions[b]	Political and peacebuilding missions[c]
IDA Eligible						
Afghanistan	2.692		2.800	2.75		P
Burundi	3.067	3.231		3.15		P
Central African Republic	2.458	2.376		2.42		P
Chad	2.783	3.264		3.02		
Comoros	2.833	2.238		2.54		
Congo, Dem. Rep.	3.000	3.329		3.16	Pk	
Côte d'Ivoire	3.275	3.640		3.46	Pk	
Djibouti	2.967	3.362		3.16		
Eritrea	1.942	2.094		2.02		
Gambia, The	2.925	3.116		3.02		
Guinea-Bissau	2.475	2.717		2.60		P
Haiti	2.900			2.90	Pk	
Kiribati	2.950		3.050	3.00		
Kosovo	3.525			3.53	Pk	
Liberia	3.100	3.463		3.28	Pk	
Madagascar	3.142	3.168		3.15		
Mali	3.383	3.679		3.53	Pk	
Marshall Islands	2.600		2.900	2.75		
Micronesia, Fed. Sts	2.775		2.950	2.86		
Myanmar	3.075		3.133	3.10		
Papua New Guinea	3.000		3.258	3.13		
Sierra Leone	3.267	3.310		3.29		P
Solomon Islands	2.975		3.225	3.10		
Somalia		1.111		1.11		P
South Sudan	1.867	1.971		1.92	Pk	
Sudan	2.425	2.545		2.49	Pk	
Togo	2.975	3.229		3.10		
Tuvalu	2.858		2.975	2.92		
Yemen, Rep.	2.608			2.61		

table continues next page

TABLE A.1. continued

Country	WBG CPIA	A1DB CPIA	ADB CPIA	Harmonized average	Peacekeeping missions[b]	Political and peacebuilding Missions[c]
Economies						
West Bank and Gaza						P
Blend						
Zimbabwe	2.858	2.655		2.76		
IBRD Only						
Iraq						P
Lehanon						P
Libya						P
Syrian Arab Republic						

Source: World Bank.

Note: ADB = Asian Development Bank; AfDB = African Development Bank; AU = African Union; CPIA = Country Policy and Institutional Assessment; IBRD = International Bank for Reconstruction and Development; IDA = International Development Association; P=Peacebuilding; Pk = Peacekeeping; WBG=World Bank Group.

a. "Fragile Situations" have: either a) a harmonized average CPIA country rating of 3.2 or less, or b) the presence of a UN and/or regional peace-keeping or peace-building mission during the past three years. This list includes only IDA eligible countries and non-member or inactive territories/countries without CPIA data. IBRD countries with CPIA ratings below 3.200 do not qualify on this list due to non disclosure of CPIA ratings; IBRD countries that are included here qualify only by the presence of a peacekeeping, political or peace-builing mission - and their CPIA ratings are thus not quoted here.

b. Specifically defined as the presence of a UN and/or regional (eg: AU, EU, OAS, NATO) peace-keeping operation in this country in the last three years, with the exclusion of border monitoring operations [sources: UN DPKO, AU, EC, websites] For additional information regarding this list, please read the FCS Information Note and FAQ found on our website: www .worldbank.org/fragilityandconflict.

c. Specifically defined as the presence of a UN and/or regional (eg: AU, EU, OAS) peace-building and political mission in this country in the last three years [sources: UN DPKO, AU, EU websites].

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