



RESEARCH BRIEF – DECEMBER 2014

WATER AND SECURITY IN NIGER AND THE SAHEL

EXECUTIVE SUMMARY

The Sahel is one of the more unstable and underdeveloped regions in the world, and its inhabitants face chronic water insecurity—a problem that will be exacerbated in the near future by rapid population growth. This brief assesses water security in the Sahel by focusing on Niger—a landlocked Sahelian country characterized by rural livelihoods and recurrent political conflict—and addressing the prospects for local, national, and international institutions to mitigate water conflict. The brief concludes that robust institutions are a critical conflict-mitigating tool and that local-level adaptations may be more effective in addressing water stress than broad national policies.

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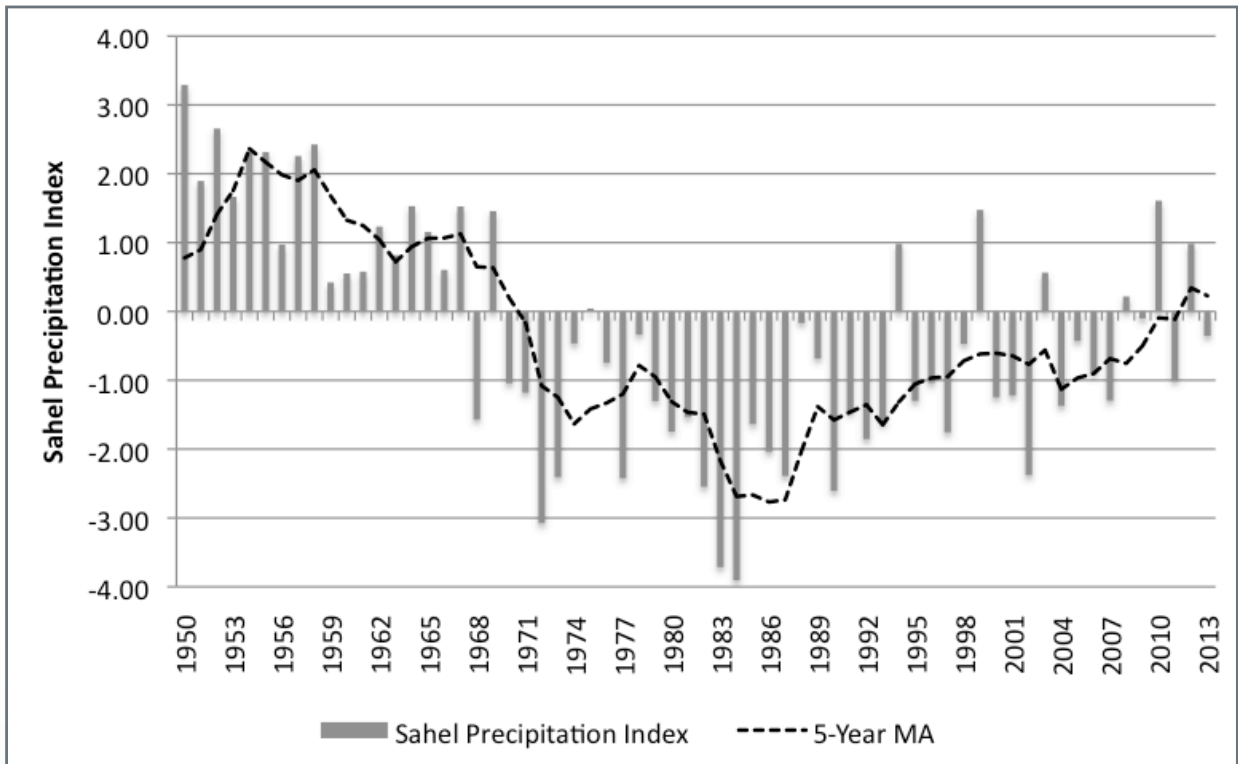
Spanning the width of the African continent, the Sahel region—the zone of agro-climatic transition between the Sahara and more densely populated Sudanian Savannah—is one of the more underdeveloped and unstable regions in the world. The region's inhabitants experience high rates of chronic food insecurity, punctuated by seasonal and conflict-induced periods of acute scarcity. The region performs poorly on indicators of human development, accounting for some of the highest levels of poverty in the world. Armed insurgent groups contest state authority across the region, using the region's vast ungoverned spaces as bases from which to launch attacks against local governments and plan attacks against Western targets.

Since 1950, the region has become increasingly arid, with the 1980s having been the driest decade (see Figure 1). Though climate models forecast a modest increase in precipitation (around 10 percent) by the end of the century and parts of the Sahel have experienced a recent greening, these positive trends confront the reality of rapid population growth and increasing environmental impact.

In 2010, two Sahelian countries were below the critical 1,000 m³ per capita threshold that defines water scarcity.¹ Even holding current renewable fresh water supplies constant, six countries—including the continent's most populous, Nigeria—will be below that threshold by 2030.²

These national statistics mask large internal gaps in access to water, with many of the stocks of renewable freshwater located in Sahelian countries but outside of the Sahel band. Multiple stakeholders—ranging from pastoral herders to subsistence and plantation agriculturalists, fishers, and mining companies—make competing claims on water resources. These competing claims occur in a sociopolitical context where certain livelihoods and identity groups are marginalized within existing institutions, exacerbating grievances

Figure 1. Sahel Precipitation Index, 1950-2013



Notes: Values represent standardized deviations from long-term climatic means. Beginning in the early 1970s, the Sahel experienced nearly three decades of well below normal rainfall. "5-Year MA" is the five-year moving average of the SPI.

Data source: Janowiak 1988³

and generating perceptions that non-violent, institutional dispute—resolution mechanisms are not viable options for seeking redress.

This brief assesses the water security situation in Niger, a landlocked Sahelian country characterized by explosive population growth, primarily rural livelihoods, and recurrent political conflict. Through four vignettes, it demonstrates water resources can be a source of both conflict and cooperation, with cooperative relations having tended to prevail at the interstate level but less cooperative outcomes have been seen at the local level. Moreover, structural changes in demand for power and crop irrigation will likely place significantly more stress on these water resources—and diplomatic relations around them—than in the past. However, the third case study highlights the positive interactions between local governments, NGOs, and development assistance organizations that have helped reforest Burkina Faso and Niger, providing both long-term benefits and short-term assistance to local families.

A CLOSER LOOK AT NIGER

Roughly twice the size of Texas, Niger is one of the poorest states in the world. It ranks second to last in the world on the Human Development Index, a summary measure for assessing long-term progress in three basic dimensions of human development: a long and healthy life, access to knowledge, and a decent standard of living.

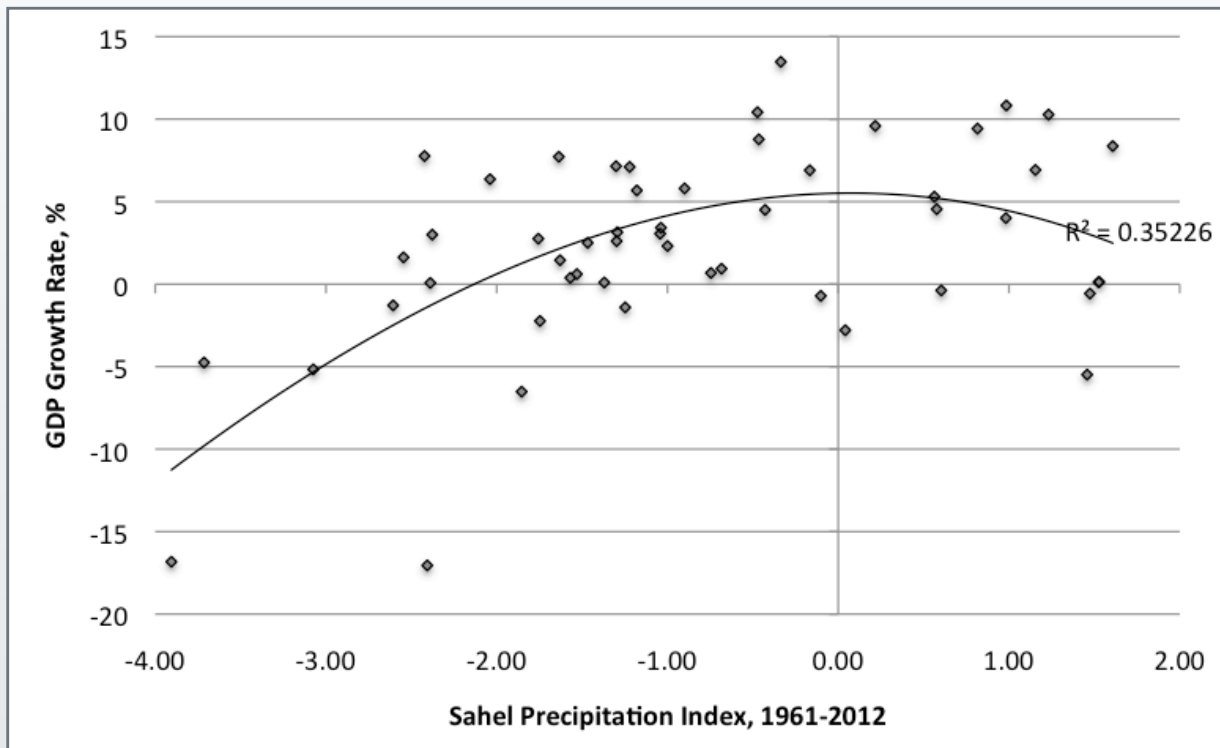
Even by regional standards, Niger is highly dependent on rain-fed agriculture. Less than 12 percent of the land is arable, most of which is located along the southern border with Burkina Faso, Benin, Nigeria, and Chad. The overwhelming majority of agricultural activity is rain-fed. Subsistence farming of millet and sorghum accounts for 40 percent of GDP and 87 percent of employment.⁴ More so than even other Sahelian countries, economic conditions in Niger are almost entirely dependent on environmental conditions (see Figure 2). Periods of drought are a significant drag on economic growth, while high precipitation levels (roughly above one standard deviation greater than normal) are also a brake on growth. Despite

the increasing importance of Niger’s mineral exports, this correlation has become stronger over time, suggesting that over the near term, water availability will be an even more important determinant of economic growth and prosperity.

Because of recurrent droughts and excessive year-to-year variability in rainfall, Nigerien agricultural production is highly erratic: production per capita (mt/person) of millet, the country’s most important staple grain, halved from 1983 to 1984 before nearly doubling in 1985. Bucking global trends, Niger has seen virtually no general increase in agricultural productivity: whereas global yields for maize, rice, and wheat all nearly doubled between 1970 and 2012, yield for Nigerien millet increased only by 29 percent. Yield for sorghum actually contracted by two percent. The combination of stagnant yields, limited arable land, and rapid population growth have made Niger increasingly dependent on food imports, with the import dependency ratio (imports as a share of total food supply) having more than tripled since 1995.

Though Niger’s governance institutions are relatively robust by regional standards, Niger is located in one of the worst neighborhoods for political violence. Of its seven neighboring countries, four are battling ongoing insurgencies (Algeria, Libya, Mali, and Nigeria) and one more (Chad) has just transitioned out of conflict in the past three years. These insurgencies have had significant cross-border dynamics, as groups have exploited the often weakly defended borders between countries to launch armed attacks. Al-Qaeda in the Islamic Maghreb (AQIM), Boko Haram, Movement for Unity and Jihad in West Africa (MUJWA), and the Those Who Sign with Blood Brigade all operate as transnational rebel organizations, with operations across the Sahara-Sahel region. The past several years have seen increasing military cooperation and coordination between regional governments, with nine ECOWAS states and Chad contributing troops to the UN-supported, African-led International Support Mission to Mali (AFISMA).

Figure 2. Economic Growth and Rainfall in Niger, 1961-2012



Notes: Values represent standardized deviations from long-term climatic means. Rainfall is one of the main drivers of economic growth in Niger, with periods of drought (negative values for the Sahel Precipitation Index) associated with significant economic contractions.
Data source: Janowiak 1988 and World Bank 2014⁵

Institutional Challenges: Competition over Water Along Lake Chad

As the largest lake in the Sahel, Lake Chad has historically been home to a diverse set of ethnic groups and livelihood patterns, with the lake providing critical ecosystem services and employment to farmers, fishers, and herders. The lakeshore and various islands are home to 150,000 fishers, a similar number compared to those on much larger Lake Victoria. Since the 1970s, however, water levels in Lake Chad have receded by as much as 50 percent, in part due to massive population growth in the catchment area and increased drawdowns for crop irrigation.⁶ This has contributed to public health problems and placed significant strain on local livelihoods. Waterborne diseases such as diarrhea, cholera, and typhoid have become increasingly prevalent.⁷ Nigerien and Nigerian fishers and herders increasingly cross borders in pursuit of freshwater and fish stocks.

Uranium mining is water intensive, both in underground and open pit operations, and Niger has both. By Areva-NC's calculations, it has pumped 270 million meters³ over the past four decades at its mines in Arlit.

Conflicts between fisher communities straddling international borders are not unique to Lake Chad,⁸ but conflicts there between fishing communities and between migrant fishers and local law enforcement officers have been recurrent since the 1980s. This pattern of incursion by “outsiders” and defensive responses by local communities and law enforcement is a recurrent theme in environmental conflicts.

Among the ideas for building resilience, increased devolution of lake governance to local communities has been put forward. While the Lake Chad Basin Commission has been an effective vehicle for co-management at the international level, it has operated with relatively little input from local communities. Including these communities could help to develop a sense of local ownership of environmental problems and opportunities to build resilience.

As the preceding discussion of local governance institutions argues, however, this may not be a panacea, especially if these institutions come to be characterized by exclusionary patterns of rule and major stakeholders do not have a voice at the table. Because they are more migratory, fishers and herders would be more likely to be underrepresented in these institutions.

Resource Depletion: The Tuareg and Uranium Mining

The extractive sector is a major consumer of water resources and is almost entirely foreign and/or state-owned. Working with Nigerien state-owned firms, French multinational Areva-NC has been mining uranium in northern Niger since the 1970s, with a third mine near Imouraren set to open. The China Nuclear International Uranium Corporation (Sino-U) is developing a mine and processing plant near Azelik, some 50 km northwest of Agadez. These operations are all in northern Niger, the homeland of the Tuareg. The Tuareg make up eight percent of the Nigerien population and are primarily pastoralists. Throughout Niger's independence, the Tuareg have been either actively discriminated against or excluded from holding national political power.

Uranium mining is water intensive, both in underground and open pit operations, and Niger has both. By Areva-NC's calculations, it has pumped 270 million m³ over the past four decades at its mines in Arlit.⁹ This has led to conflicts over drawdown rates by multinational firms. In a news series about the mining, anti-mine activists alleged that uranium mining would deplete northern Niger's groundwater supplies in the next four decades.¹⁰ Though Areva-NC has contested this point, it is part of the national and international discourse around water and mining. Areva-NC has responded to these concerns by touting their internal water-saving initiatives, which they assert have made mining less water-intensive over time.¹¹

As with most extractive industries, and perhaps more so with radioactive material, there are also grievances related to local environmental impacts, which include fear of groundwater contamination. Moreover, relations between the central government and Areva-NC are currently

strained: a 2006 law increased taxes on uranium extraction, but Areva-NC has refused to comply with these rules. Sino-U involvement in mining in Niger has to date been less politicized, though 600 workers went on strike in December 2013 over working conditions.

Uranium mining has been central to the Tuareg discourse. Because of their double marginalization as an ethnic minority and a primarily pastoral livelihood, the Tuareg have long sought autonomy from the central government, often employing violent means. These conflicts were relatively minor, accounting for 215 battle deaths in the 1990s and an additional 128 in the 2000s.¹² The 1995 peace agreement had promised the Tuareg population a greater share of resources derived from uranium mining, which was one catalyst for the 1990 rebellion. At the outset of the 2007-2009 rebellion, the rebels' demands included a greater share of monies derived from mining and Tuareg incorporation into the national military.

Averting Conflict through Co-Management: The Niger River Basin

Flowing from Guinea to its outlet in Nigeria, the Niger River Basin is home to an estimated 150 million people, with the predominant livelihoods being farming, fishing, and herding. While not as dramatic as the decline in the Lake Chad Basin, the Niger River has seen declining discharge, with discharge volumes since the 1980s well under observed values for most of the 20th century.¹³ This has put the population of the inner Niger delta—a wetland located just south of the Sahara in Mali and home to 1.5 million people—at risk.

In general, interstate relations in the Niger River Basin are predominately cooperative. Historically, cooperation over these shared river basins predominated over conflict. None of the Sahelian basin countries have engaged in militarized actions over water resources, and co-management of the Niger River occurs under the auspices of one of the most elaborate and highly institutionalized river treaties in Africa, the Niger Basin Authority. However, the upstream/downstream nature of the resource, combined with economic and population growth in the region, raises the specter of conflict over water diversion for dam projects and irrigation, both at the interstate and local level.

Two large projects threaten to undermine livelihoods in the delta. The first, a Malian government initiative, is building dams to divert the flow of the river to irrigate water-intensive crops like rice, sugar, and cotton—most of which are destined for export. That the two main beneficiaries would be South African and Chinese firms is a potential exacerbating factor.

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The second is the Fomi dam project, a large hydroelectricity project in eastern Guinea, almost 1,000 km upstream. A report by Wetlands International notes that while the aggregate cost and benefit of these projects (including both upstream and downstream consequences) would be positive in the case of the dams for irrigation projects, it would be negative for the Fomi dam.¹⁴ However, these negative consequences accrue mostly to Mali, the downstream country, with the positive benefits of increased electrical power accruing to Guinea, the upstream country.

This issue is typical of upstream/downstream relationships, though there have been no reports of violence around these projects. This points to the relative resiliency of regional co-management institutions, as these types of projects have been significant sources of diplomatic strain in other contexts—for instance, Egypt and Ethiopia clashing over the large Renaissance Dam project.

Building Capacity through Conservation: Reforestation in the Nigerien Sahel

By the 1980s, two decades of persistent drought had taken a massive human and ecological toll on Niger. Persistent drought had drastically cut yields, forcing farmers to overextend cultivation into lands unsuitable for agriculture. Inputs were underutilized, causing the lands to be depleted

at an alarming rate. Local forests were harvested for conversion to fuel as charcoal. The result was encroaching desertification, with formerly productive cropland turned into zipélé—barren landscapes where even underbrush struggled to gain a foothold.¹⁵ Initial efforts to enforce top-down conservation strategies did not leverage local populations' knowledge or participation, and were met with local indifference, if not opposition.

Beginning in the 1980s, Sahelian farmers began experimenting with low-tech, low-cost solutions to increasing aridity. These included modifying traditional planting pits to work with increasingly arid conditions, placing stone barriers (bunds) along contour lines to limit erosion and prevent rapid runoff, thus facilitating enhanced soil moisture retention and marshaling traditional methods of forest management to regenerate native trees and shrubs alongside traditional crops.

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The reestablished forests provided a variety of ecosystem services to farmers, including reducing wind-driven erosion and seed loss and providing on-farm fodder for livestock.¹⁶ These innovations were particularly effective in promoting reforestation in the Zinder region of Niger and the Yatenga region of Burkina Faso, preventing desertification and in some areas reclaiming desert over 5,000,000 hectares of land in southern Niger.

These striking interventions had mostly indigenous roots. In both cases, innovations came from experimentation by local farmers, with limited assistance from NGOs. Major development organizations played a secondary role in helping to scale up their adoption over larger expanses of territory, which required more resources and technical training capacity, as well as scientific know-how to evaluate the effectiveness of these interventions.

Even in the scaling-up stage, local communities were crucial. Some interventions were small enough in scale to be undertaken by a single farm, but larger projects, like dams and terracing, required coordination and collective action. This was facilitated through revitalized village associations, often working in conjunction with international donors who could provide some modest compensation for labor, including food-for-work programs for the poorest villagers.¹⁷ Thus, these innovations had the positive side effect of enhancing social capital and directly affecting nutritional outcomes.

INSIGHTS FOR MOVING FORWARD

Due to poverty, geography, and patterns of political exclusion, Niger is among the most-likely cases for experiencing water-related conflict. Despite this, the vignettes presented above show that cooperation rather than conflict has been the norm. This points to a role for institutions, both at the local and international level, in helping to pacify interactions around this critical natural resource. Moreover, they suggest that adaptation to increasing water scarcity need not be high tech or guided by national-level policy. Given the space to act creatively, small-scale agriculturalists can implement water-saving technologies that increase resilience and reduce drawdown rates. 🇳🇪

ENDNOTES

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- 16 Ibid.
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This material is based upon work supported by, or in part by, the U. S. Army Research Office grant number W911NF-09-1-0077 under the Minerva Initiative of the U.S. Department of Defense.

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