CSIS BRIEFS

Unraveling the Water Crisis in Venezuela

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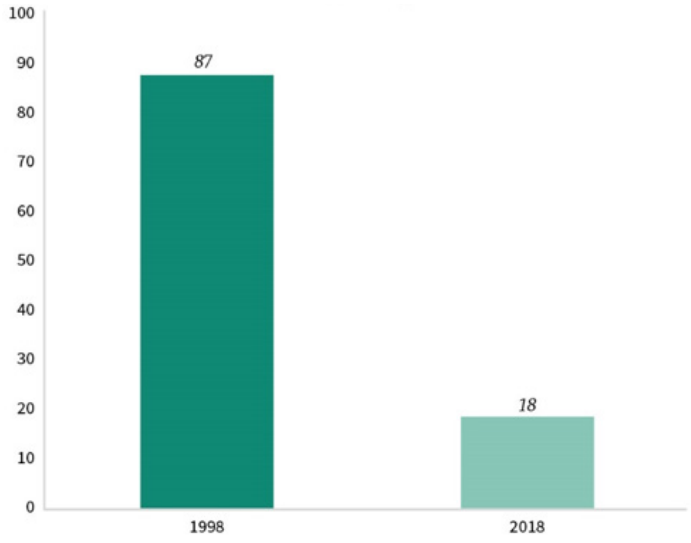
THE ISSUE

A conference, including a plenary session and a series of roundtables, was held at the Center for Strategic and Institutional Studies (CSIS) in Washington, D.C. on October 3-4.[1] This conference examined the magnitude of the water crisis in Venezuela. Plan País—an initiative of the Venezuelan National Assembly which completed a diagnostic of the water crisis as part of its action plan for reconstruction—along with U.S., Venezuelan, and other international experts,[2] discussed strategies for reconstruction of the physical water supply system and rebuilding of its management institutions at the national level.

Experts also discussed the roles of public-private partnerships, the United States, other bilateral donors, and international finance in the rebuilding efforts. These discussions resulted in increased awareness of the challenges, lessons, and opportunities for Venezuela and the international community in both the mid- and long-term time frames in mitigating one of the country's most urgent humanitarian needs. This brief details the conclusions and recommendations discussed at this conference.

Figure 1: Access to Regular Supply of Clean Drinking Water in Venezuela (*by percentage*)



Source: Data from "Derecho al Agua," CEPAZ, National Report, October 2018, https://cepaz.org/documentos_informes/emergencia-humanitaria-compleja-en-venezuela-derecho-al-agua/.

MAGNITUDE OF THE WATER CRISIS

Despite ranking as one of the world's top 15 countries in renewable fresh water resources, nearly 8 out of 10 Venezuelans do not have continues access to clean drinking water and basic sanitation. For most citizens, the water they sporadically consume is of dubious quality or not drinkable. Clean water in Venezuela has become a luxury, and even with price controls set in place, a bottle of water is about $3, a significant portion of the country's minimum wage of approximately $8 a month.

Venezuela's water crisis also impacts wastewater collection, sanitation, control over sewage, and farmer's access to water for irrigation. Partly as a result, national production in agriculture, including for main crops such as rice, corn, and coffee, has fallen to approximately 60 percent within the last 20 years. This fall in agricultural production is associated with the average nationwide weight loss of 24 pounds in 2017. Those gaps in access,

quality, and management of the nation's water resources are having a devastating long-term effect on the health, education, economy, and dignity of the Venezuelan people. The most vulnerable are children, whose cognitive development is most susceptible to impacts from anemia, chronic malnutrition, and preventable communicable diseases. These appalling conditions are forcing more Venezuelans to flee.

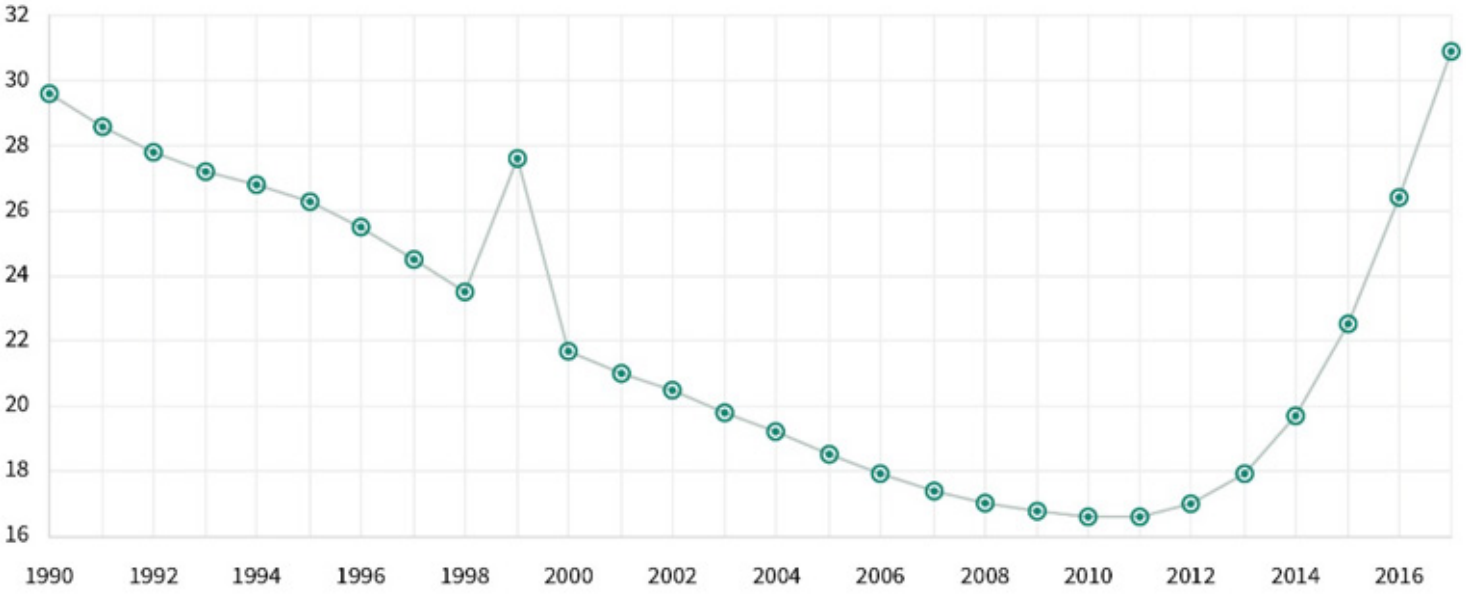
About a million Venezuelans are exposed to contaminated supplies, putting the population at risk of contracting waterborne viruses, especially threatening the lives of children and the most vulnerable. The magnitude of the water crisis as shown in Figure 1, which notes that in 1998, 87 percent of the population was estimated to have a continuous and regular supply of clean drinking water. The percentage dropped precipitously in the years after Maduro took power, falling to 18 percent in 2018.

The impact of the water crisis has impacted the mortality rate of children under five years of age. Their mortality rate in 2017 was 31 deaths per 1,000 live births, a level higher than in 1990 and that is worse than countries such as Cambodia and Bangladesh. According to the UNICEF report, had the mortality rate for children stayed where it was in 2010, 12,000 fewer children would have died in 2017. According to the World Health Organization (WHO), improving access to water, sanitation, and hygiene can help prevent child mortality in Venezuela.

QUICK FACTS ON VENEZUELA'S WATER CRISIS

- **Humanitarian**: Two nationwide blackouts—one on March 7, which lasted 90 hours, and another on March 25—and the rationing of electricity have diminished water flows and supply for Venezuelan citizens, resulting in about 60 percent less available water than in 1999.
- **Education**: Educational facilities at all levels (from primary institutions to universities) have closed down in part because of no access to water service for either drinking or sanitation. According to the Living Conditions Survey (Encovi) of 2018, 28 percent of students did not attend school due to the shortage of water, 22 percent due to the lack of food at home, and 13 percent due to food shortages at school.
- **Health**: The lack of clean water has led to what physicians in Venezuela detail as increases in cases of diarrhea, typhoid fever, tuberculosis, malaria, zika virus, dengue, and hepatitis A. Many hospitals have closed due to shortages of varying types: 80 percent do not have access to water, 53 percent do not have adequately equipped rooms, and 60 percent do not have beds. In addition, Venezuela has an alarming maternal mortality rate. In 2017, for every 100,000 live births, 125 mothers died, an increase from the rate in 2005, of 113 deaths per 100,000 live births.

Figure 2: Child Mortality Rate in Venezuela



Source: "Key Demographic Indicators - Venezuela," UNICEF, https://data.unicef.org/country/ven/.

CHALLENGES OF THE WATER CRISIS IN VENEZUELA

The following are key challenges to mitigating the damage of the water crisis in Venezuela and to planning a coordinated response to rebuild the country's water management system.

1. *Absence of Water and the Impact on the Country's Health System*[3]

   There is a direct link between the absence of clean water and diarrheal diseases, which are the causes of infant and child mortality. Insufficient potable water and poor sanitation within Venezuela have also contributed to a rise in cases of Hepatitis A, malaria, and dengue, among other vector-borne diseases. Preventable childhood diseases, such as diphtheria, have returned. Between 2016 and 2018, about 1,249 cases of transmission diseases have been confirmed—after 24 years of full eradication. Between 2017-2018, there were about 6,400 confirmed cases of Measles, according to the Pan American Health Organization (PAHO). Infant, child, and maternal mortality have all reached levels not seen in Venezuela in decades.

2. *Lack of Institutional Capacity*

   Corruption, lack of maintenance, and departure of trained professionals have left the water infrastructure in Venezuela in a deplorable state. Without institutional capacity, monitoring infrastructure and management system conditions have been a taxing task for all stakeholders. As a result, water systems are operating at half their capacity and are unable to regularly provide safely treated water to nearly 90 percent of the population.

3. *Access to Humanitarian Aid*

   The Maduro regime continues to reject most humanitarian aid to Venezuela. This year, for the first time, although publicly non-committal, the Maduro regime allowed the UN Office for the Coordination of Humanitarian Affairs (UNOCHA) to begin to assess needs and allowed some humanitarian aid deliveries. However, the international community needs to continue to increase pressure on the Maduro regime to allow access for all urgent and badly-needed aid. Perhaps more importantly, the international response must ensure that any humanitarian aid in Venezuela follows international standards, which includes the de-politicization of food and social benefits, unlike what has characterized the Maduro regime. Challenges to distribution, logistics, infrastructure, and supply chains need to be addressed, including securing the distribution of emergency food supplies from both corruption and looting.

People carry cans and buckets to collect water from a broken pipe, flowing into a sewage canal at the Guaire river in Caracas on March 11, 2019, as a massive power outage continues affecting some areas of the country.

Similarly, developing an emergency plan to restore public services, such as access to water and sanitization, would be key to alleviating the suffering of the Venezuelan people. Venezuela currently lacks social infrastructure and has demonstrated an inability to meet basic humanitarian needs, particularly with respect to access to clean water. Not only is the massive restoration of the infrastructure a multi-year and multi-billion-dollar challenge, but in parallel fashion, the new government will need to build strong institutions and partnerships at every level to be able to maintain and manage the renewed water and humanitarian response system.

4. *Brain Drain*

A significant barrier in constructing a strategic plan is the significant brain drain that has occurred in Venezuela. About 15 percent (4.5 million) of Venezuelans have fled the country since 2015, including many of the engineers, scientists, medical professionals, and business leaders who are needed to rebuild the country. It is also imperative to retain talent and expertise, as it will be difficult to close the talent gap once the reconstruction period begins. For perspective, in Chile 64 percent of the approximately 85,000 Venezuelan residents registered in 2017 had an undergraduate or graduate degree. The electricity sector in Venezuela has suffered from the brain drain, as more than 20,000 employees working for Corpoelec, the Venezuelan electrical sector, have fled.

5. *Lack of Data*

   There is an absence of data and analysis on the challenges and needs of the water distribution network. It is vital to conduct thorough fact-finding missions to be able to assess the crisis and understand how to respond. Gathering such data requires engagement with local communities via monitoring and evaluation instruments and conducting field research in conjunction with funding from international financial institutions, including the Inter-American Development Bank (IADB) and the World Bank. In addition, local communities would benefit from best practices in water usage, integration, and operation.

6. *Blackouts*

   Absence of reliable electricity and power is a critical factor to maintaining availability of water to cities across the country. The most recent nationwide blackout occurred on March 7 and lasted 90 hours, affecting most of the country. In October 2016, there was another power outage that affected 16 of Venezuela's 24 states, and in 2017 alone, reports show there were more than 18,000 power outages throughout the country. As Plan País experts explained during the conference, the gaps in electricity and energy mean that there is no power on a regular basis to pump water through the system, nor to power treatment plants. Restoring the electrical grid in such a way that is more impervious to cyberattacks or political manipulation will be crucial to the long-term maintenance and operation of water treatment plants in Venezuela.

IN NUMBERS

$400,000,000

The amount of money Venezuela would approximately need the first year to initiate both an initial and long-term response for the rehabilitation of water sanitation and the restoration of a reliable water supply, according to Plan País experts.

13 gallons/habitant

About 50 liters or 13.2 gallons will be required per person to meet the emergency needs in all cities in Venezuela, according to Plan País experts.

ROADMAP FOR RECOVERY

Venezuela requires international support to relieve the suffering of its citizens. Extensive and immediate political, economic, and institutional reforms, backed by significant international humanitarian aid and technical and financial assistance, are crucial for the stabilization and recovery of Venezuela. Once there is a transition to a post-Maduro era, or a "day after," the immediate objective is to relieve the current catastrophic conditions affecting the health and well-being of the Venezuelan people.

The United States, multilateral institutions, and the international community will need to play an essential role to help stabilize Venezuela during an initial response (the first six months of the post-crisis transition), during a second phase (the following three years), and in the long term (over the next decade and beyond) to foster sustainability. It is evident that to promote inclusivity, stability, security, and prosperity in Venezuela, access to water and sanitation is essential. Without potable water, schools and hospitals cannot operate, the economy does not advance, and the Venezuelan people, especially the most vulnerable, suffer.

CONFERENCE RECOMMENDATIONS

Pre-response Planning, Coordination, and Financing

1. Strategic planning to restore trust and transparency among citizens will be crucial. A clear strategy is needed with respect to all social and public services but particularly with respect to water. Coordinating and planning with different stakeholders to define that strategy is essential. Venezuela's National Assembly initiative, Plan País, must coordinate efforts with the United States, other like-minded countries, bilateral and multilateral development and financial institutions,

and private-sector representatives. The coordinated water planning process should seek to identify potential financial, human, and institutional resources ready to be tapped at the outset of the transition.

2. Coordination between Plan País experts, donors, and humanitarian agencies is key for information sharing. Plans covering reconstruction needs, pending final on-the-ground data review, should be set in motion.
3. Venezuela's interim government, leading international financial institutions, and bilateral donors should work in unison for a comprehensive international humanitarian response, or a "Donor Conference."

Initial Response (First Six Months): Providing for Emergency Humanitarian Needs

4. The top priority during the first six months is to bring water and sanitation to as many Venezuelan citizens as possible, including through hospitals, schools, and other social institutions, such as community-based civil society organizations. About 70 percent of the Venezuelan population lives near the northern coast, so efforts should focus on those northern cities and communities to identify those in need of urgent assistance. That said, the most vulnerable people tend to live in rural areas toward the south of the country, including in indigenous communities.

   The UNOCHA and other UN agencies, particularly UNICEF and PAHO/WHO, should have their own six-month disaster response plans shared with Plan País and with other bilateral and donor entities.

5. Ports, airports, roads, and other infrastructure would need to be quickly prepared to receive humanitarian aid, equipment, and other technical assistance. The U.S. Southern Command and USAID Office of Foreign Disaster Assistance emergency response pre-positioned water and water treatment capacity should be incorporated into the coordinated Venezuelan response in conjunction with the UNOCHA.

"Without potable water, schools and hospitals cannot operate, the economy does not advance, and the Venezuelan people, especially the most vulnerable, suffer."

6. Hospitals should be guaranteed access to water through new or repaired wells using chlorine or other emergency purification treatments.
7. Venezuela's transitional government, in partnership with Plan País, would need to implement proper management of international assistance and establish professional public health coordinating mechanisms. It will be key to incentivize the return of professional health workers from the diaspora to collaborate with international health agencies and adopt control measures against epidemics.

Caracas public water system. Map's Author: Norberto Bausson, Plan País.

Source: BP, Statistical Review of World Energy (London, 2019), https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/statistical-review/bp-stats-review-2019-full-report.pdf.

8. The priority, precedence, timing, appropriateness, and execution of tasks will be essential for "the day after" in Venezuela. It is important to parallel long-term financing with a short-term response: they are both essential parts of a successful recovery. An early assessment of both the financial and energy gaps is critical to having a successful initial response in Venezuela.

Medium-term Response (Six Months to Three Years):

9. Reestablishment of functioning institutions related to the major nationwide water distribution systems, including their roles in managing future reconstruction, planning, and financing, should be a high priority in this period.
10. A non-politicized recruitment and human resource management system should include a focus on attracting engineers and water system managers from the diaspora, either temporarily or permanently, to help re-establish the water system.
11. A new regulatory framework will be required for public-private partnerships to play a role in the self-sustaining financing of the water system, as will water emergency response programs in poor communities while the economy recovers. The private sector can be a key partner in bringing both needed investment and technical capacity. However, regaining trust in Venezuela's institutions and rule of law would be pre-conditions for most companies to consider entering the country.
12. There must be an assessment of the current state of water security with respect to major reservoirs and watersheds. The volume of renewable fresh water in Venezuela is approximately 1,200 cubic kilometers. However, most of this water cannot be accessed by the population.

Long-term Recovery (Three Years and Beyond)

13. Initial planning for long-term recovery and reform needs to begin now. While the focus on service delivery will initially be on responding to emergency needs and avoiding further deterioration, the planning for long-term sustainable water and sanitation must be a parallel concern. Investments to restore or bring major physical plants online will have to be sequenced in the most efficient way possible.

    Decisionmakers will need to prioritize cost recovery and devise master plans aimed at the sequencing of infrastructure investment. Such a sequencing will help mitigate the gaps in financing and energy usage that may occur during the initial and long-term stages of reconstruction. Communication with Venezuelans should be clear that taxes will be needed for the regeneration of the infrastructure, capacity, and provision of services in the country. A master sequencing plan will then cover, via subsidies, the apparent gaps for those without the capacity to contribute much during the initial stages of recovery.
14. Venezuela must re-establish and sustain a credible and reliable supply chain and logistics for water supply and for water management treatment with clear lines of territorial responsibility.
15. Public-private partnerships (PPPs) can be a key component in rebuilding efforts. The public sector alone will be overburdened and may lack the human resources to overcome the water crisis. PPPs can

IS THERE A ROLE FOR INNOVATIVE TECHNOLOGIES?

The humanitarian needs in Venezuela are far greater than the money available. Finding cost-efficient mechanisms to provide clean and safe water should be a priority. The use of new technologies, such as remote sensing and satellite images, would allow for the most precise diagnostics of the crisis at hand, aiding the identification of leaks on the micro and macro levels, the rehabilitation of submarine pipes, and the use of ozone in the water treatment system.

Moving forward, the digitalization and integration of technology in water management systems can help enable precise diagnostics and distribution. Digitizing the water management system has led to positive results in Japan and China. Adherence to good data will be important in both the diagnostic and distribution stages. Data is essential to monitoring current water usage and tracking increases in access to safe drinking water throughout the multiple stages of reconstruction.

Overall, given that Venezuela's water management system and its institutions would need to be modernized, the use of new technological tools could create "out-of-the-box" solutions for cost-efficiency and transparency goals. Countries such as Japan, Spain, France, Mexico, Bolivia, and the United States, among others, can offer lessons learned and transfer know-how to Venezuela.

assist in introducing market-based solutions to public goods problems, such as infrastructure and access to clean water, that can stimulate robust development. In Kenya, the Obama administration launched a PPP that catalyzed private lending using U.S. government procurement power. Such a move would greatly help the financing of the reconstruction ahead. An important factor to communicate to Venezuelan citizens is the difference between privatization and the participation of the private sector, helping allay any fears or mistrust they might have in private institutions.

16. Venezuela will need to implement fundamental water laws that guarantee access to clean water for every citizen, regardless of income or political affiliation. Within the legal and regulatory framework, water administration roles must be defined at the municipal, regional, and national levels to ensure that every community can hold its leaders accountable for deficits in implementation and execution. Transparency is critical, and decisionmakers need to implement a framework that provides clear oversight of compliance with laws and regulations to satisfy Venezuelans who have seen corruption and politicization at all levels of the public sector.
17. Partnerships with universities in the region and with other functioning water systems on a "sister-city" basis should be organized to bring available technology and equipment into Venezuela's reconstruction effort.
18. Human resource development in the water sector will require its own comprehensive planning and financing, with a significant focus on attracting back the engineers, research scientists, and managers now in exile.

CONCLUSION

From the first day of recovery, **ensuring access to water and sanitation for all**, national civic education, information dissemination, and public participation will be crucial. However, the next Venezuelan democratic government, whenever it arrives, will not be able to accomplish all of this alone. Venezuela will require sustained and coordinated international support. In addition to providing for emergency humanitarian needs and fostering long-term development programs, the country faces a severe crisis without clean water and adequate sanitation. ■

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ENDNOTES

1. This conference was attended by over 250 participants and viewed by almost 1,000 observers online, including viewers from Venezuela, Colombia, Mexico, Argentina, Brazil, Panama, Ecuador, Spain, France, and Japan.

2. The experts featured at this conference include: Juan Andrés Mejía, President of the Plan País Committee & Deputy of the Venezuelan National Assembly; Bonnie Glick, Deputy Administrator of the US Agency for International Development; José María de Viana, Technical Coordinator for Public Services, Plan País; María Julia Bocco, Water and Sanitation Lead Economist at the Inter-American Development Bank; Norberto Bausson, Water and Sanitation Coordinator for Plan País; Hugo Rojas, General Director for the National Association of Water and Sanitation Utilities of Mexico (ANEAS); Nora Cecilia Bracho Parra, Deputy for the Venezuelan National Assembly & President of the Permanent Commission of Administration and Services for the Venezuelan National Assembly; Germán E. Uzcategui B., Civil Engineer & International Consultant in Water Sanitation for Plan País; Katherine Bliss, Senior Fellow at the Global Health Policy Center at CSIS.

3. Official government data either is highly suspect, according to international organization sources, or simply not available. Data sources cited included universities, doctors, hospital administrators, and non-government health organizations.