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Challenges in Accessing Clean Water and Sanitation: An Analysis of Niger and Peru

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Abstract

This article examines the challenges in accessing clean water and sanitation services in two different parts of the world, Niger and Peru. While access to safe clean water and adequate sanitation is a fundamental human right, millions of people around the world remain deprived of these essential services. Niger and Peru, although being across the world and culturally distinct, face similar challenges in ensuring clean water and sanitation for their population. In Peru, communities located in the rural mountains/highlands struggle with insufficient infrastructure and contamination. In Niger, weak sanitation systems have made the communal waters prone to diseases causing public health challenges. Although there are organizations that are raising awareness and bringing solutions to these remote areas of the world, a lack of adequate water and sanitation has led to severe impacts.

I. Introduction

Access to clean drinking water and adequate sanitation remains one of the most pressing global development challenges of the twenty-first century. Despite decades of international initiatives, millions of people still lack reliable access to safe water sources, and more than two billion people live without basic sanitation facilities. These gaps are not merely technical or infrastructural problems—they represent urgent threats to public health, human dignity, and social and economic development. The World Health Organization consistently identifies unsafe water, poor sanitation, and inadequate hygiene as major contributors to preventable diseases and premature deaths worldwide, particularly among children under five. As climate change, population growth and rapid urbanization intensify water stress across regions, understanding how different countries confront these challenges has become increasingly important.

This article focuses on comparing access to drinking water and sanitation services in Niger and Peru. Drawing on data from the World Bank (2025) and a wide range of scholarly and institutional sources, the analysis examines national trends, rural-urban disparities, and the socioeconomic and ethical dimensions that shape water and sanitation outcomes. It evaluates how each country's historical development, demographic patterns and governance structures influence their progress toward universal access. In addition, the article explores how global principles, such as the human right to water and sanitation, inform national policies and external support efforts.

The article is organized into six sections. Following this introduction is a brief literature review that contextualizes major themes and findings related to water and sanitation challenges in both countries. Next, it presents socioeconomic background indicators to situate Niger and Peru within broader development trends. The analysis section then examines national and rural-urban data on water and sanitation access. The subsequent ethical analysis section explores how justice-based frameworks apply to each country's situation. The article concludes with a discussion of key findings, implications, and potential pathways for improving equitable access to safe water and sanitation services.

II. Brief Literature Review

Growing global awareness of inadequate access to clean water and sanitation in Niger and Peru has led to increased research on potential solutions, external support efforts, and the impacts on local communities. The Local Burden of Disease WaSH Collaborators (2020) emphasize the importance of detailed geospatial estimates to better track and address the lack of safe water and sanitation that continues to threaten health in low- and middle-income countries. Literature from the United Nations Children's Fund (UNICEF) Niger (2024), The Borgen Project (2023), and Pinchoff, Dougherty and Dadi (2023) examines challenges in Niger, while studies by Ioris (2012), the Organisation of Economic Co-operation (OECD) (2021), Hernández-Vásquez et al. (2021) and Exum (2018) explore similar issues in Peru.

- Local Burden of Disease WaSH Collaborators (2020) examines access to safe drinking water and sanitation is essential for preventing disease, improving wellbeing and achieving global development goals. The study highlights that unsafe water and sanitation remain major causes of under-5 diarrhoeal mortality and contribute to infectious diseases, neglected tropical diseases, and negative nutrition and social outcomes. Despite international recognition of these services as human rights and progress during the Millennium Development Goals era, access remains uneven, especially in sub-Saharan Africa and parts of Asia. The study emphasizes the need for high-resolution geospatial estimates to monitor inequities and advance the Sustainable Development Goals for universal access.
- A United Nations Children's Fund (UNICEF) (2024) report examines how limited access to clean water and sanitation in Niger causes high child mortality and deepens poverty, especially in rural areas. Only 56 percent of people have drinking water and 13 percent have sanitation. To address these intertwined health, infrastructure and development concerns, UNICEF collaborates closely with the Government of Niger to guide and operationalize water, sanitation and hygiene (WASH) strategies. A targeted municipal-wide WASH approach is being piloted in Maradi, Tahoua and Zinder to improve resource management, enhance public-private partnerships, and implement digital monitoring systems for water point functionality.
- The Borgen Project focuses on how Niger's water crisis reinforces gender inequality, poverty and poor health. Most rural areas lack basic sanitation, forcing women and girls to spend hours collecting water, limiting education and income opportunities. Wells Bring Hope addresses these challenges through solar-powered wells, hygiene education, and local capacity building that promote sustainability and gender empowerment. Their programs reduce child mortality, increase school attendance, and expand women's

economic roles. This long-term, community-centered approach demonstrates how integrated water access and sanitation initiatives can drive lasting social and economic transformation across Niger's vulnerable communities.

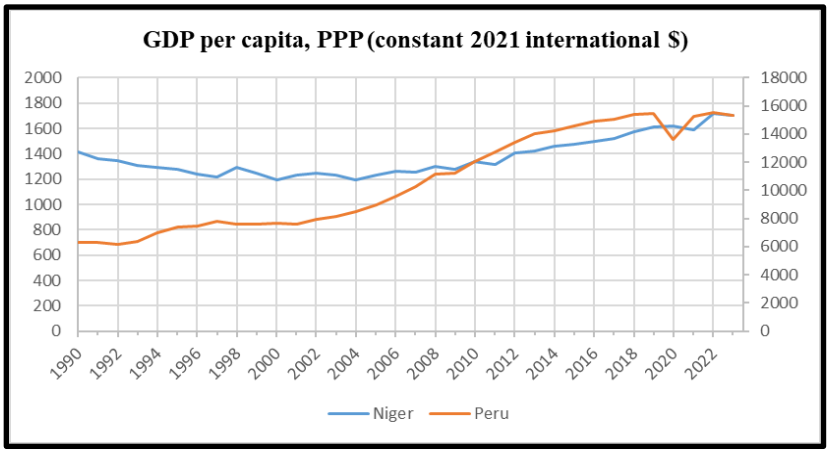
- Pinchoff, Dougherty and Dadi (2023) discuss how water scarcity and inadequate infrastructure in Niger hinder effective hygiene practices, increasing disease risk. Research from Maradi and Zinder shows that households near reliable water sources are more likely to maintain handwashing stations and apply correct hygiene behaviors. Social and behavior change initiatives further enhance these outcomes, especially among women. The findings emphasize that combining infrastructure investment with education is essential for lasting health improvements. Integrating reliable water access, hygiene promotion, and women's empowerment remains key to reducing disease and addressing inequities in Niger's WASH sector.
- Ioris (2012) describes how water scarcity in Lima, Peru is not just about a lack of water, but also about social and political issues. The article shows how government policies often treat scarcity as natural, while in reality it is made worse by poor housing, discrimination against low-income communities, and limited improvements that are often driven by political interests. New management approaches also rely heavily on technical solutions and leave out local communities from decisions. The study argues that water scarcity in Lima is the result of unequal systems and policies, not just limited water resources.
- Exum et al. (2018) examine the access to clean water and improved sanitation remains a public health challenge in many low-income urban regions of Peru, such as communities like Iquitos. Unsafe water, poor sanitation, and inadequate hygiene contribute to infections, impaired growth, and environmental enteric dysfunction (EED) in young children. Recent studies in Peru measuring biomarkers of gut inflammation and permeability show that children living with unreliable water access or nearby fecal waste exhibit higher intestinal inflammation, particularly elevated myeloperoxidase. These findings reinforce that harmful WASH conditions impact gut health early in life, potentially reducing growth and vaccine effectiveness. Improving sanitation and water reliability in vulnerable Peruvian communities is therefore critical for preventing disease, supporting healthy development, and enhancing immunization outcomes.
- A report by the Organization for Economic Co-operation and Development (OECD) (2021) highlights Peru's struggles to achieve universal access to clean water and sanitation, a challenge made more urgent by the COVID-19 pandemic. As of 2021, millions still lack basic water (9.2 percent) and sewerage services (25.2 percent), with sharp inequalities between urban and rural areas. Water access is further threatened by floods, pollution from poor waste management and economic activities, and growing pressures from climate change and population growth. The report stresses that stronger water governance, better policy coordination, and improved regulation are essential to secure safe and sustainable water for all Peruvians.
- Hernandez-Vasquez et al. (2021) analyzed household survey data (2008–2018) to track access to safe drinking water in Peru and the role of socioeconomic inequality. Overall access improved only slightly, from 47 percent to 52 percent, with significant gains in large cities but little to no progress in small cities. Inequalities widened, as wealthier households saw improvements while poorer households often experienced declining access, especially

in smaller urban areas. The findings emphasize that progress has been uneven and call for equity-focused policies and infrastructure investment to improve access in vulnerable communities.

III. Socioeconomic Background

Figure 1 illustrates the growth of purchasing power parity (PPP)-adjusted GDP per capita in Niger and Peru from 1990 to 2022, with Niger using the left vertical axis, and Peru using the right vertical axis. In Niger, PPP-adjusted GDP per capita increased from $1,412 in 1990 to $1,718 in 2022. In contrast, Peru's PPP-adjusted GDP per capita rose from $6,318 in 1990 to $15,549 in 2022. Keeping the two different vertical axes in mind, Figure 1 shows that Peru consistently maintained a significantly higher PPP-adjusted GDP per capita than Niger throughout the period. Niger experienced a relatively slow average annual growth rate of only 0.61 percent, compared to Peru's average annual growth rate of 2.85 percent. Overall, Niger's PPP-adjusted GDP per capita grew by approximately 21.7 percent between 1990 and 2022, while Peru's increased by more than 146 percent, highlighting the substantial economic progress Peru has made over the past three decades.

Figure 1: PPP-adjusted GDP per capita, 1990–2022

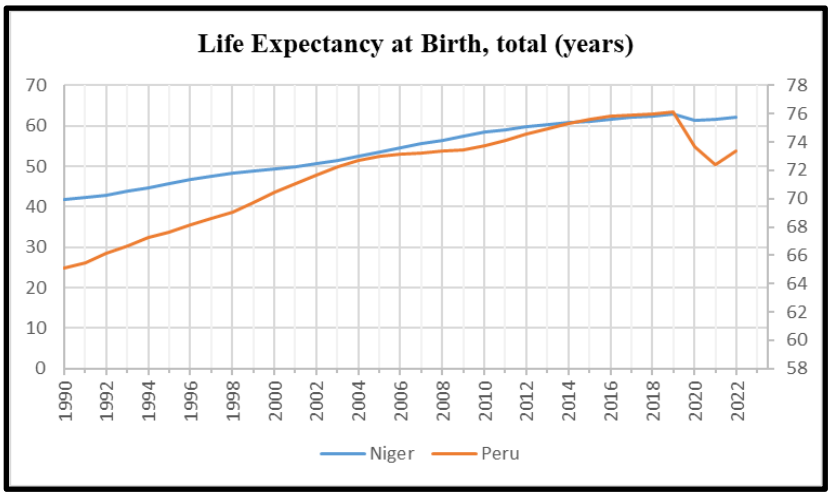


Source: Created by author based on World Bank (2025).

Figure 2 illustrates the evolution and differences in life expectancy between the two countries from 1990 to 2022. At the beginning of the 1990s, there was a noticeable gap in total life expectancy at birth, with Peru showing a higher life expectancy than Niger. Over time, however, the life expectancy of both countries gradually converged, becoming quite similar in the early 2000s, particularly around 2006 and again between 2016 and 2017 with the life expectancy rates between the two countries being less than 15 years.

Conversely, both countries experienced declines in total life expectancy at birth between 2019 and 2021 due to the COVID-19 pandemic—by 1.5 years (from 2019 to 2020) in Niger, and by 2.5 years (from 2019 to 2020) and an additional 1.3 years (from 2020 to 2021) in Peru. Post COVID-19 pandemic both countries seemed to slowly increase their total life expectancy again with Niger's life expectancy increasing by 0.5 years (from 2021 to 2022) and Peru's life expectancy increasing by 1 years (from 2021 to 2022).

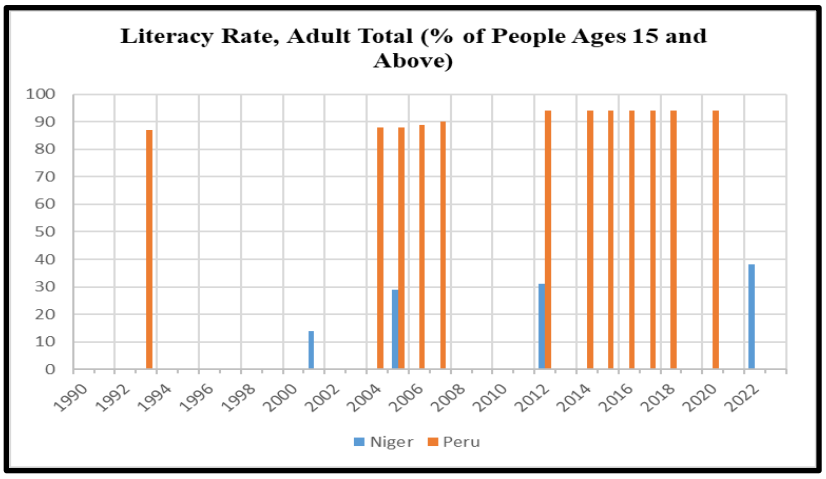
Figure 2: Total Life Expectancy at Birth in Years, 1990–2022



Source: Created by author based on World Bank (2025).

Figure 3 presents the available data on adult literacy rates in Niger and Peru for all years reported by the World Bank (2025). Although there are gaps in data availability that make direct comparison difficult, the evidence clearly shows that Niger's literacy rate has increased significantly, from 14 percent in 2000 to 38 percent in 2022 (last reported year). However, this remains far below Peru's literacy rate, which reached 94 percent in 2020. Specifically, Niger's literacy rate rose from 14 percent in 2000 (the first year it was reported) to 38.1 percent in 2022, while Peru's literacy rate increased from 87 percent in 1994 (its first reported year) to 94 percent in 2020 (last reported year), maintaining that level since 2012.

Figure 3: Adult Literacy Rates (in percent), all available years



Source: Created by author based on World Bank (2025).

When comparing all three figures, it is evident that Peru has consistently had a much higher literacy rate than Niger. Nonetheless, Niger has shown notable improvement in related indicators such as PPP-adjusted GDP per capita and life expectancy at birth. Unfortunately, its literacy rate remains relatively low, having yet to surpass the 40 percent mark.

IV. Analysis of Facts

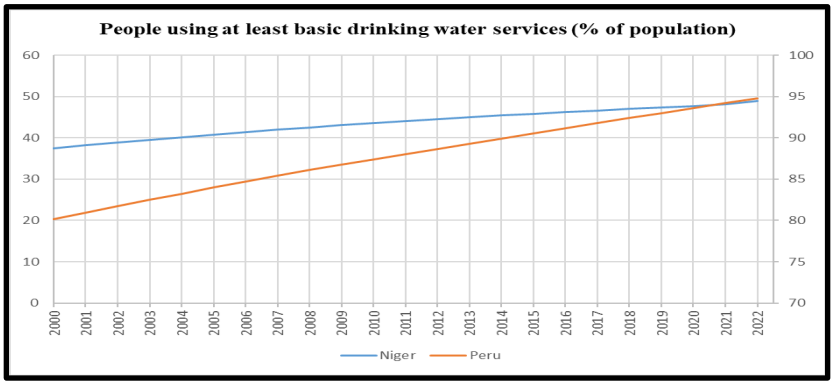
In this section of the article, two subsections are analyzed to address the issue of limited access to safe and clean drinking water and sanitation services in Niger and Peru. The first subsection presents nationwide data on access to drinking water and sanitation services in both countries, as reported by the World Bank (2025). Specifically, the data highlight the use of "basic" drinking water services, "basic" sanitation services, and "safely managed" drinking water services. During this analysis, no data were available on the percentage of people in Niger using safely managed drinking water services between 1990 and the present, which may indicate a severe lack of access to such services in the country. The second subsection examines the use of basic drinking water services, basic sanitation services, and safely managed drinking water services within both urban and rural contexts.

IV.1. National Overview of Drinking Water and Sanitation Accessibility

Figure 4 illustrates the percentage of people using at least basic water services, including those with access to both basic and safely managed water services, for Niger (using the left vertical axis) and Peru (using the right vertical axis) from 2000 to 2022. According to the World Bank (2025), basic drinking water services are defined as the use of drinking water from an improved source, provided that the total collection time does not exceed thirty minutes for a round trip. Improved water sources include piped water, boreholes or tubewells, protected dug wells, protected springs and packaged or delivered water.

The first recorded data on the population using at least basic drinking water services dates back to the year 2000. Since then, the percentages for both Niger and Peru have steadily increased over the past twenty-two years. In 2000, 37.5 percent of Niger's population and 80.2 percent of Peru's population had access to at least basic drinking water services. Figure 4 shows that both countries experienced steady growth, but at opposite levels of access. Peru has shown significant improvement, with access rising from 80.2 percent in 2000 to 94.8 percent in 2022. Niger, while also showing an upward trend, continues to lag behind. At the start of the millennium, only 37.5 percent of Niger's population had access, increasing modestly to 48.9 percent in 2022. Although progress has been made, less than half of Niger's population currently has access to at least basic drinking water services, which remains concerning. Overall, Niger and Peru display contrasting trends in the proportion of their populations with access to at least basic drinking water services.

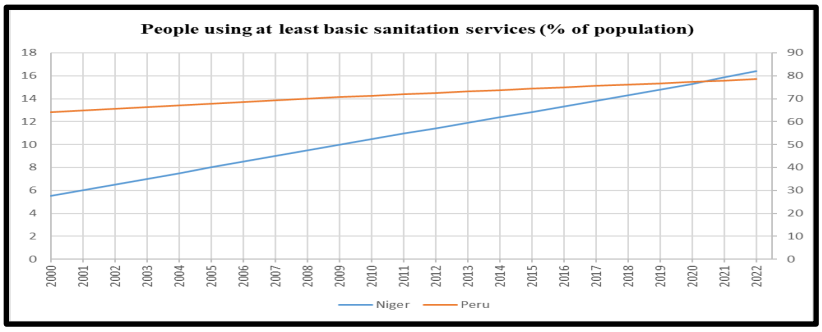
Figure 4: People Using at Least Basic Drinking Water Services (percent), 2000–2022



Source: Created by author based on World Bank (2025).

Figure 5 illustrates the percentage of the population with access to at least basic sanitation services in Niger (using the left vertical axis) and Peru (using the right vertical axis). Similar to Figure 4, data collection began in 2000, and the two countries display highly contrasting trends. The data show that Peru has significantly greater access to sanitation services compared to Niger. In Niger, access to basic sanitation is severely limited, increasing only from 5.5 percent in 2000 to 16.4 percent in 2022. This indicates that at the start of data collection, almost none of Niger's population had access to basic sanitation, and even today, the majority still live without such services in unsanitary conditions. In contrast, Peru presents a different picture. The percentage of Peruvians with access to at least basic sanitation services rose from 64.1 percent in 2000 to 78.3 percent in 2022. Although more than 20 percent of the population still lacks access, Peru's data show a steady upward trend. Overall, the two countries exhibit opposite conditions regarding sanitation access—Peru showing substantial coverage, while Niger's persistently low percentage highlights the country's ongoing struggle to develop and maintain adequate sanitation infrastructure.

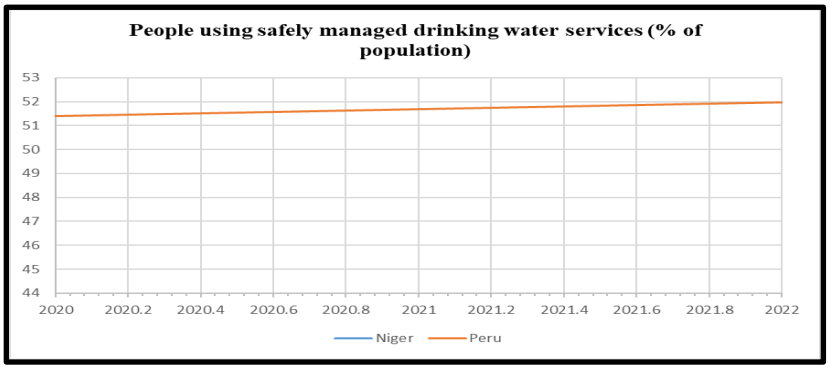
Figure 5: People Using at Least Basic Sanitation Services (percent), 2000–2022



Source: Created by author based on World Bank (2025).

Figure 6 illustrates the percentage of people using safely managed drinking water in Peru from 2000 to 2022, with Niger having no available data. The percentage of the Peruvian population with access to safely managed drinking water is relatively low compared to Figure 4, which showed access to at least basic drinking water services. The data indicate a slight increase from 44.9 percent of the Peruvian population in 2000 to 52.0 percent in 2022; however, this still means that nearly half of Peru's population lacks access to safely managed drinking water.

Figure 6: People Using Safely Managed Drinking Water Services (percent), 2000–2022



Source: Created by author based on World Bank (2025).

This suggests that while many Peruvians may have access to water, it is not necessarily accessible on premises but may require a collection time of up to 30 minutes for a round trip. In contrast, Niger has no reported data for safely managed drinking water. However, based on Figure 4, only 16.4 percent of Niger's population had access to basic drinking water services in 2022. Therefore, the percentage of Niger's people with access to safely managed drinking water is even lower than 16.4 percent. This puts most of Niger's population at risk of disease, dehydration and other health issues.

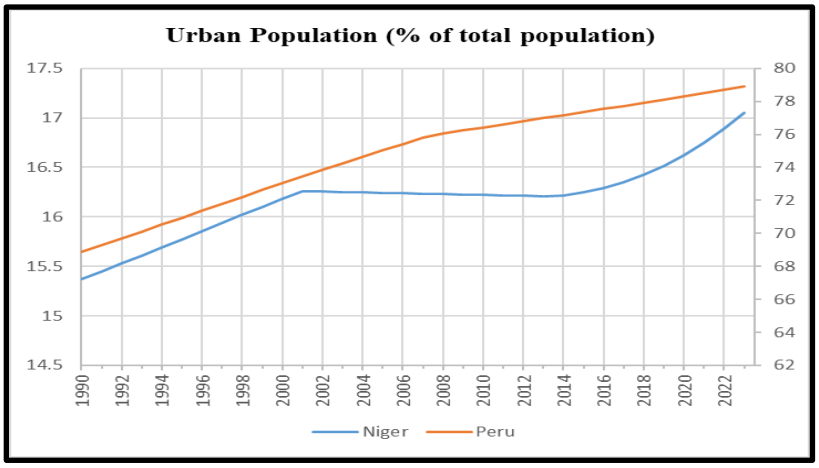
IV.2. Differential Access to Safe Water and Sanitation: Rural vs. Urban Contexts

In this section of the article, comparing rural and urban populations in both countries is important when comparing the access to water services and sanitation since rural and urban populations experience different lives. However, comparing the urban population in both countries is important due to the fact that one country experienced a greater rise in urbanization than the other between 1990 and 2022. Urbanization is generally defined as an increase in the share of the urban population, which typically implies the emergence and development of cities.

Figure 7 demonstrates the percentage of the total population living in an urban population in Niger and Peru from 1990 to 2022. Given the huge difference between the two countries, Niger is charted using the left vertical axis, while Peru is shown using the right vertical axis. As Figure 7 shows, the percentage of Peru's urban population has increased in the past thirty years from 68.9 percent in 1990 to 78.7 percent in 2022. Despite that rural-urban migration is not the only reason for urbanization, these numbers still support that some of the Peruvian people are moving to cities and leaving their rural homes.

On the other hand, the share of the urban population in Niger has stayed relatively the same for the past thirty-two years, increasing from 15.4 percent of the population in 1990 to 16.9 percent of the population in 2022, reflecting a cumulative increase of only 1.5 percentage points. This demonstrates that urbanization has not taken a serious effect in Niger, which also implies that Niger has not benefitted yet from the typically positive impacts of urbanization. On the other hand, Niger still has the opportunity to benefit from the forthcoming urbanization as it can be expected to be forthcoming in the next few decades.

Figure 7: Urban Population (in percent of total population), 1990–2022

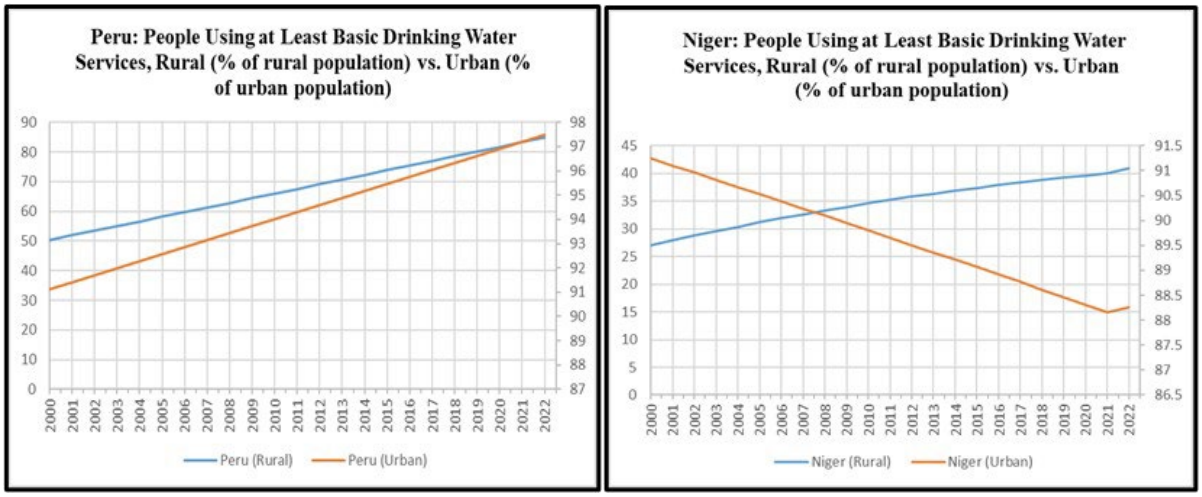


Source: Created by author based on World Bank (2025).

Figures 8 and 9 illustrate the differences in the percentage of the population in urban and rural communities in Niger and Peru with access to at least basic drinking water services between 2000 and 2022. Peru's data (Figure 8) show a steady increase over the past twenty years in the percentage of both urban and rural populations with access to at least basic drinking water services, along with a significant reduction in the urban-rural gap. In 2000, there was a gap of over 40 percentage points, with 50.4 percent of the rural population and 91.1 percent of the urban population having access. By 2022, this gap had narrowed to less than 14 percentage points, with 84.9 percent of the rural population and 97.5 percent of the urban population having access. This trend demonstrates Peru's efforts to improve water accessibility in rural areas while continuing to increase access in urban communities.

Niger's data (Figure 9) show a more mixed trend. Access for the urban population slightly declined, from 91.2 percent in 2000 to 88.3 percent in 2022, which is unexpected as one might anticipate either stability or improvement over time. In contrast, the rural population experienced growth, increasing from only 27.1 percent in 2000 to 40.9 percent in 2022. While this indicates some progress in rural water accessibility, roughly 60 percent of Niger's rural population still lacks access to basic drinking water, suggesting that many people may need to travel long distances for water or live without reliable access, which remains a serious concern.

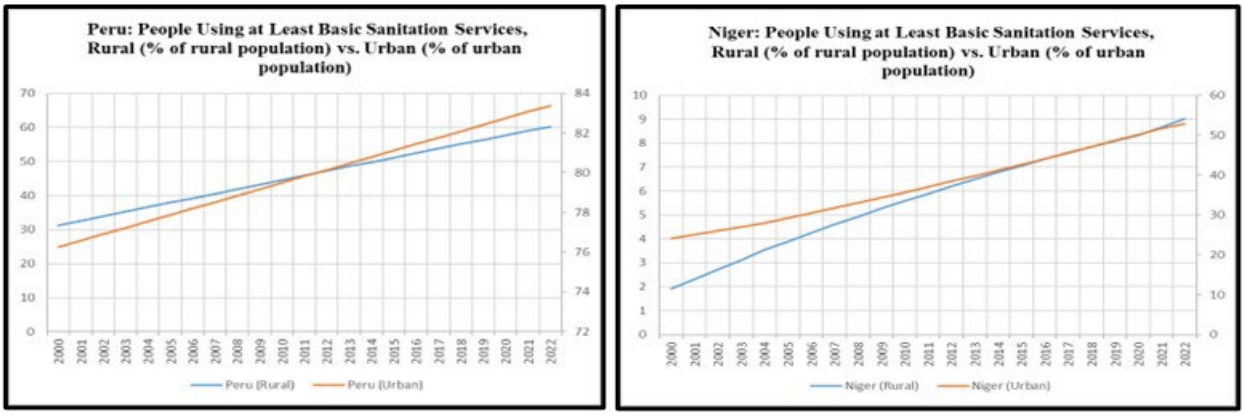
Figure 8 and 9: People Using at Least Basic Drinking Water Services in Peru and Niger, Rural versus Urban (percent), 2000–2022



Source: Created by author based on World Bank (2025).

Figures 10 and 11 compare the percentage of urban and rural populations using at least basic sanitation services, respectively, in Niger and Peru from 2000 to 2022. Figure 10 shows the gap between rural and urban populations in Peru. In 2000, only 31.2 percent of the rural population (shown on the left vertical axis) had access to at least basic sanitation services, compared to 76.3 percent of the urban population (shown on the right vertical axis), an almost 50-percentage-point difference. Over time, however, this divide narrowed significantly as access in rural areas increased. By 2022, 60.3 percent of the rural population and 83.4 percent of the urban population had access to basic sanitation services. This trend indicates that efforts to expand sanitation access in rural regions of Peru have been effective.

Figure 10 and 11: People Using at Least Basic Sanitation Services in Peru and Niger, Rural versus Urban (percent), 2000–2022

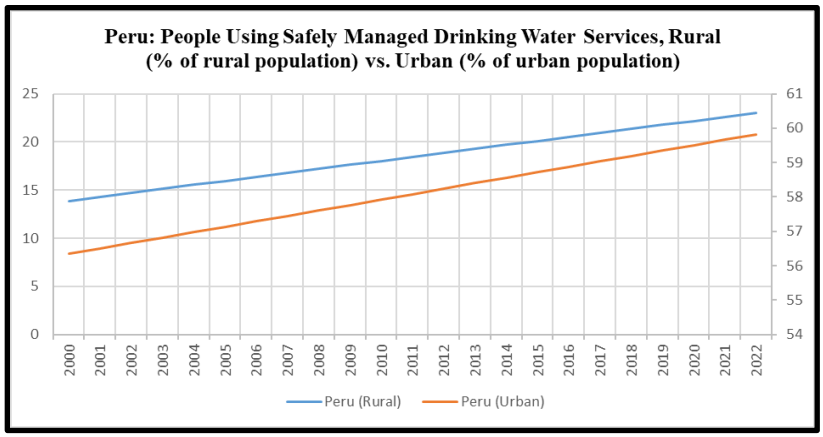


Source: Created by author based on World Bank (2025).

Figure 11 shows a much larger and more persistent divide between rural and urban populations in Niger, shown respectively on the left and right vertical axes. In 2000, only 1.9 percent of the rural population and 24.2 percent of the urban population had access to basic sanitation services. By 2022, access rose to 9.0 percent in rural areas and 52.8 percent in urban areas. While urban access has improved, the disparity remains severe, particularly for rural communities. The data suggests that Niger's progress has been concentrated in urban areas, leaving rural regions significantly underserved and highlighting the need for greater investment in rural sanitation infrastructure.

Figure 12 illustrates the difference in the percentage of the population using safely managed drinking water services in rural and urban areas of Peru from 2000 to 2022 (there is no such data for Niger in the World Bank (2025)). Overall, the data show an upward trend in both rural and urban areas. In 2000, 13.9 percent of the rural population and 56.3 percent of the urban population had access to safely managed drinking water services. By 2022, access had increased in both settings, rising to 23.0 percent in rural areas and 59.8 percent in urban areas.

Figure 12: People Using Safely Managed Drinking Water Services in Peru, Rural versus Urban (percent), 2000–2022



Source: Created by author based on World Bank (2025).

Although access to basic drinking water services has improved, access to safely managed services remains limited in both communities, with fewer than 60 percent of people covered. Additionally, substantial progress is still needed in rural areas, where well under 25 percent of the population has access to safely managed drinking water services. It is concerning that no information is reported for Niger, especially because urban communities there typically show better access to basic drinking water services compared to rural areas. Without updated data, it is difficult for the population to know whether their drinking water is safe.

V. Ethical Analysis

This section examines the ethical dimensions of access to water and sanitation services in Peru and Niger. The first subsection establishes why access to these services constitutes a broader ethical issue by analyzing key arguments and principles that frame water and sanitation as fundamental human needs and rights drawing on the work of Risse (2014) and United Nations Development Programme (UNDP) (2006). The second and third subsections evaluate how these ethical principles are embodied in water and sanitation initiatives carried out, respectively in Niger and Peru. In other words, the second and third subsections highlight the extent to which each country's programs promote fairness, equity and access for all.

V.1. Ethical Dimension of Clean Water and Sanitation

Access to safe water and sanitation is widely recognized as a fundamental human right, formally affirmed by the United Nations General Assembly in 2010. Risse (2014) provides a strong ethical foundation for this right by arguing that water constitutes a justice issue for two central reasons. The reasons are that it is life-giving and non-substitutable, and that it is part of nature, meaning its existence is not owed to human accomplishment. Because humanity collectively owns naturally occurring resources, all individuals, as co-owners, must have equal opportunity to meet their basic needs. Risse therefore grounds the right to water and sanitation in natural, pre-institutional rights that nation states and global institutions have a duty to protect through their political and economic arrangements.

Ethical arguments surrounding sanitation, though sometimes less explicitly articulated than those for water, follow similar human rights reasoning. Poor sanitation causes illness, accelerates the spread of disease, and undermines the human right to life and dignity. The fairness and justice approach, as outlined by the Markkula Center for Applied Ethics (2021), further reinforces these ethical claims by asserting that individuals should be treated equitably. It is fundamentally unjust for some people to enjoy adequate water and sanitation while others do not. Moreover, limited access to these services often generates compounding injustices: individuals, especially women and children, may spend significant time collecting water or recovering from preventable illnesses such as diarrhea, limiting opportunities for education, income generation and social participation. Thus, inadequate access to water and sanitation is directly linked to broader ethical issues such as poverty, illness and premature death, deepening existing inequalities and perpetuating cycles of injustice.

These ethical concerns are further demonstrated by global disparities. While the average person in Europe uses more than 50 gallons of water per day and the average person in the United States uses over 100 gallons, most of the 1.1 billion people categorized as lacking access to clean water use less than 1¼ gallons daily—far below the World Health Organization's recommended minimum of 5 gallons for drinking and basic hygiene (United Nations Development Programme

(UNDP), 2006). Similarly, 2.6 billion people lack access to adequate sanitation, due to multiple barriers—including poverty, gender inequality, behavioral priorities, perceptions of sanitation as a private good, and its absence from national policy agendas—that prevent equitable access (United Nations Development Programme (UNDP), 2006). Together, these frameworks make clear that access to water and sanitation is not only a developmental concern but an ethical imperative grounded in justice, human rights, and the collective responsibility to ensure dignity and survival for all.

V.2. Ethical Considerations in Expanding Clean Water and Sanitation Services in Niger

The figures in section IV demonstrate how Niger is far behind Peru's status in terms of spreading nationwide access to clean safe drinking water and sanitation. Ethical reasoning around sanitation, though often less explicit, follows similar human rights and justice principles. Poor sanitation contributes to disease, undermines dignity, and violates the human right to life. The fairness and justice approach further illuminates how inequitable access to water and sanitation creates compounding injustices: households without safe water or sanitation spend more time collecting water, experience higher disease burdens, and suffer educational and economic disadvantages.

This burden falls disproportionately on women and children, reinforcing gender inequality and limiting opportunities for schooling, income and safety (Markkula Center for Applied Ethics, 2021). In Niger, these ethical concerns are especially acute. Despite the World Health Organization's guidance that each person requires at least five gallons of clean water per day for consumption and basic hygiene, only 56 percent of Niger's population has access to a source of drinking water, and just 13–14 percent has access to basic sanitation (UNICEF Niger, 2024). More than 71 percent of the population practices open defecation (World Bank, 2025), fueling disease transmission, malnutrition and preventable child mortality.

These human rights–based ethical foundations shape the existing institutional and organizational structures through which Niger and its development partners address water and sanitation challenges. The Government of Niger works closely with UNICEF through the National Water, Sanitation and Hygiene Program (PROSEHA) 2016–2030, which aims to strengthen municipal water management, expand sanitation services, reduce open defecation, and improve WASH resilience in the face of environmental stressors (UNICEF Niger, 2024). This national program reflects ethical commitments to equity, dignity, and the protection of vulnerable populations by operationalizing strategies that integrate infrastructure development with behavior change, digital monitoring, and climate resilience planning. In regions such as Maradi, Tahoua and Zinder, UNICEF supports municipal-wide WASH models that enhance public-private partnerships and strengthen governmental capacity to deliver sustainable water services, an institutional expression of states' associative responsibilities to secure access for all (UNICEF Niger, 2024).

Non-governmental organizations also form part of Niger's ethical response structure. The NGO Wells Bring Hope implements holistic WASH interventions that combine deep-well installation, hygiene training, sanitation infrastructure, agricultural education, and long-term maintenance planning (The Borgen Project, 2023). Their model emphasizes community ownership and women's empowerment, addressing the gender inequalities deeply intertwined with water insecurity (The Borgen Project, 2023). By reducing water-collection burdens and increasing educational and economic opportunities for women and girls, such interventions respond directly to the ethical concerns regarding fairness, gender equity, and the right to a life of dignity (The Borgen Project, 2023).

Research in Niger highlights the ethical importance of linking infrastructure with behavior-change interventions. Studies in Maradi and Zinder show that proximity to reliable water points increases the likelihood of functional handwashing stations and improves women's knowledge of critical hygiene practices, demonstrating that water access is foundational for enabling healthy behaviors (Curtis et al., 2019). These findings reinforce the ethical imperative to ensure not only the availability of water but also the conditions, education, resources and environmental stability that allow individuals to use water in ways that promote health and dignity.

V.3. Ethical Considerations in Expanding Clean Water and Sanitation Services in Peru

The ethical foundations surrounding access to clean water and sanitation in Peru draw heavily on human-rights and justice-based frameworks. Ethical arguments related to sanitation, though historically less explicit than those for drinking water, consistently follow a human-rights approach, emphasizing that inadequate sanitation threatens the right to life by increasing exposure to disease and preventable illness. The fairness and justice approach, as outlined by the Markkula Center for Applied Ethics (2021), further underscores the inherent inequity in conditions where some communities enjoy reliable water and sanitation while others lack even basic services. This perspective illuminates how unequal access generates downstream injustices, lost educational and economic opportunities, gendered burdens of water collection, and heightened risk of sanitation-related illness, all of which compound broader ethical issues such as poverty, preventable disease and premature death.

These ethical principles are essential for understanding Peru's contemporary challenges, where water scarcity and sanitation deficits are shaped not only by environmental conditions but also by deep social, political and economic inequalities. As Ioris (2012) argues, water scarcity in Lima is not a purely physical shortage but a socially produced condition reinforced by discriminatory housing patterns, uneven urban development and management strategies that privilege technocratic solutions over community participation. Such structural inequities create "multiple scarcities," where low-income neighborhoods face persistent deficits in water reliability, drainage, and sanitation infrastructure, even as economic growth expands service access for wealthier districts (Ioris 2012). These inequities mirror the justice-based ethical critiques: water access is not merely uneven but is systematically distributed in ways that reinforce existing hierarchies.

Further evidence reveals how Peru's water and sanitation challenges disproportionately burden marginalized communities. National-level analyses show that Peru remains off track for achieving SDG 6. Hernandez-Vásquez et al. (2021) found that between 2008 and 2018, access to safe drinking water increased only modestly, from 47 percent to 52 percent, and that inequalities widened substantially: wealthier households experienced the greatest improvements, while poorer households in smaller cities often saw stagnation or declines. These patterns demonstrate that Peru's progress has not met ethical principles of equity or fairness: access is increasingly tied to socioeconomic status, city size and geographic location.

Public health research provides additional ethical concerns by documenting how inadequate water and sanitation fuel biological harm early in life. Studies in peri-urban and rural regions such as Iquitos and Cajamarca show that unsafe water, poor waste management and close proximity between children and domestic animals contribute to diarrheal disease, antimicrobial-resistant infections, and environmental enteric dysfunction (Exum et al., 2018; Larson et al., 2023). These findings reveal an ethically troubling cycle in which infrastructural deficits translate into chronic inflammation, stunting, and reduced vaccine effectiveness in young children—harms that

disproportionately affect the poorest households. This aligns with human-rights ethics: a failure to provide safe water and sanitation undermines children's right to health and future opportunity.

Peru's policy responses acknowledge many of these inequities but remain limited by governance fragmentation. The National Sanitation Policy 2017–2021 and the Water Resources Law 2009 formally recognize the human right to water and sanitation and call for integrated water-resources management. However, institutional coordination failures, political instability and insufficient financing have restricted their effectiveness. OECD assessments highlight gaps in data, regulation and multi-level governance that hinder equitable service expansion. Though Peru has introduced economic and financial instruments, such as abstraction charges and payments for ecosystem services, implementation remains uneven, with current rates insufficient to close the country's USD 46-million water-sector funding gap by 2035.

VI. Conclusion

The analysis presented in this article demonstrates that access to safe drinking water and adequate sanitation remains deeply unequal between and within Niger and Peru, shaped by socioeconomic conditions, governance structures and geographic disparities. While both countries have made progress over the past two decades, the magnitude and pace of improvement differ significantly. Peru has expanded access across both urban and rural regions, gradually narrowing long-standing inequalities and increasing basic service coverage. In contrast, Niger continues to face extremely limited access, especially in rural areas where the vast majority of the population resides. The absence of reported data on safely managed drinking water in Niger highlights not only gaps in infrastructure but also systemic constraints in monitoring, regulation and institutional capacity.

Across both countries, the ethical analysis underscores that limited access to water and sanitation is not simply a developmental challenge but a direct violation of the human right to health, dignity and basic survival. Justice-based frameworks make clear that unequal access produces compounding disadvantages, burdens that disproportionately fall on marginalized groups, particularly women, children and low-income households. The cases of Niger and Peru illustrate how water scarcity, sanitation deficits and infrastructural inequities perpetuate cycles of poverty, disease and social exclusion. At the same time, the initiatives reviewed, ranging from Peru's regulatory reforms to Niger's partnerships with UNICEF and NGOs, demonstrate practical pathways through which governments and organizations can operationalize ethical commitments into policy and action.

Moving forward, both countries would benefit from strengthened governance, expanded rural investment, and improved monitoring of safely managed water. In Niger, prioritizing sanitation infrastructure and reducing open defecation remain urgent needs. In Peru, addressing persistent socioeconomic and regional inequalities will be critical to advancing toward universal coverage. Ultimately, closing these gaps requires a combination of sustained political will, community-based approaches, and long-term investment in resilient and equitable water and sanitation systems. By viewing water and sanitation not only as technical goals but as ethical imperatives, policymakers and development partners can better ensure that all individuals have the opportunity to live healthy and dignified lives.

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