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GUYANA'S WATER GOVERNANCE, PUBLIC HEALTH, AND INDIGENOUS EQUITY: A REVIEW OF LEGAL AND POLICY FRAMEWORKS AFFECTING AMERINDIAN COMMUNITIES

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ABSTRACT

Access to safe drinking water is recognised worldwide as a fundamental human right and a primary determinant of public health; however, inequities persist among Indigenous (Amerindian) communities in Guyana. This review analyses the legal, institutional, and governance frameworks that shape water quality and access. Drawing on grey literature, policy documents, and limited peer-reviewed evidence, it evaluates key legislation and institutional actors. Despite high national coverage of “improved” water sources, disparities remain in hinterland regions due to weak enforcement, inadequate monitoring, and environmental stressors. A rights-based analysis identifies gaps in consultation, accountability, and recognition of Indigenous governance. Reviewed literature indicates that strengthening regulatory systems, infrastructure, data collection, and Indigenous participation is necessary to advance equitable public health outcomes.

Keywords: Guyana, Indigenous, Amerindian, Water Quality, Water Access, Public Health

1 INTRODUCTION

Across South America, Indigenous communities make up a significant proportion of national populations. Over the years, their inclusion in policies has progressed unevenly over time. Some countries, such as Brazil, offer greater inclusion of Indigenous groups and have more engaged community leaders who voice their concerns to help update and create new policies. Other countries demonstrate limited inclusion of Indigenous communities, such as Guyana [1, 2, 3]. A key issue of concern is the basic right to safe drinking water in Guyana's Indigenous communities. Programmes and funding are allocated to community leaders; however, little to no progress is made in improving drinking water systems, and these issues are often neglected by both the government and community leaders [3-7]. The terms Amerindian and Indigenous are used interchangeably in this article. Amerindian reflects Guyana's embedded terminology within its statutory and policy frameworks, whereas Indigenous aligns with international rights-based discourse. As such, the dual usage aligns with international and broader postcolonial frameworks [1,3,5,6].

Amerindians, the Indigenous peoples of Guyana, predominantly reside in rural areas (often near waterways). Approximately two decades ago, some villages gained access to drinking water through pipes and wells; before that, they boiled river water or rainwater when it was available, which was used for drinking and other livelihood needs. Some small Indigenous communities still have no access to safe drinking water and rely on traditional sources [7, 8]. The issue of water quality and access is also fundamental to population health, which the United Nations (UN) recognises. This has direct implications for disease prevention, nutrition, and socioeconomic development. Indigenous populations also have barriers in the hinterland regions of the country; it is still their right to have access to safe and clean drinking water as a human right, provided by the governing bodies [9-12]. Moreover, Indigenous people worldwide are known for their environmental sustainability, highlighting the potential for collaboration with the Environmental Protection Agency (EPA). The environmental protection statutes direct the EPA of Guyana to classify water for different uses and to develop water quality standards associated with public health and ecosystem protection, especially during and after floods or droughts. By establishing biological and chemical standards and facilitating compliance monitoring and enforcement across Guyana, these projects seek to reduce pollution and public health hazards. This aligns with the responsibilities of the Environmental Protection Act of Guyana (Cap. 20: 05) [13-15].

These findings indicate the need for strengthened government accountability in ensuring equitable access. Despite contemporary policy frameworks, historical marginalisation should be eradicated, along with any vulnerability of Amerindians, and legal pluralism as it relates to postcolonialism. Guyana's national statistics suggest that approximately 94% of the population uses an improved drinking water source; however, this hides significant regional disparities [14]. This figure mainly reflects coastal and urban populations that have near-universal improved sources of water and access, while the hinterland regions lag with a low rate of 42% in accessible Amerindian-dominated regions, such as the Upper-Takutu-Upper Essequibo and Upper Demerara Berbice River [7]. This study examines the legal and policy frameworks governing water quality and accessibility in Indigenous communities in Guyana. Additionally, the institutional implementation, governance, and empirical evidence of access and outcomes will be examined. Rights-based critiques will be used to highlight systematic gaps in the human rights and Indigenous policy analyses [2, 4, 6, 14, 16, 17]. Thus, this review applies a rights-based and decolonial perspective to identify systemic gaps in policy design and implementation. This review draws primarily on grey literature, supported by limited peer-reviewed studies published on Indigenous water policies and their health. This can be considered a limitation and highlights the research gap on the topic. It argues that Guyana's water governance framework, while formally comprehensive, structurally marginalises Indigenous communities through limited integration of customary governance, uneven policy implementation, and insufficient accountability mechanisms.

2 METHODOLOGY

2.1 Research Design

This study combines qualitative policy analysis and a structured narrative literature review to evaluate how the institutional, legal, and governance frameworks shape drinking water access and quality in Indigenous (Amerindian) communities in Guyana. This policy analysis approach is appropriate for evaluating how formal legislative frameworks, institutional mandates, and governance structures affect implementation results and public health equity. This review integrates peer-reviewed literature, policy documents, institutional reports, and other grey literature to evaluate the relationship between statutory water governance, Indigenous rights frameworks, and public health outcomes.

Policy analysis focuses on three principal dimensions of water governance. Firstly, legal frameworks governing water access and quality in Guyana. Secondly, the institutional implementation of water policies by national and international actors. Thirdly, Public health and environmental implications for Indigenous communities located in rural and hinterland regions. The rationale for this approach enables a comprehensive assessment of policy commitments, implementation gaps, and governance challenges affecting equitable access to and quality of drinking water.

2.2 Literature Search Strategy

A structured search was conducted between January 2025 and February 2026 to identify academic publications and policy documents relevant to Indigenous water governance and drinking water access/quality in Guyana. Searches were performed using multiple academic databases and institutional repositories to capture both peer-reviewed research and grey literature. The search predominantly yielded grey literature, as there was limited peer-reviewed literature on the topic of interest. A total of 87 sources were identified, with 44 selected after screening for relevance to water governance, Indigenous communities, and public health in Guyana.

Databases and institutional sources included Scopus, Web of Science, Google Scholar, PubMed, and ResearchGate. Grey literature and policy documents were retrieved from the Government of Guyana institutional websites, Guyana Water Incorporated, Environmental Protection Agency Guyana, UNICEF, the United Nations website, the World Health Organisation, the Pan American Health Organisation, the Inter-American Commission on Human Rights, and the

Department of Public Information, Guyana. Grey literature inclusion in this article is significant because policy development, infrastructure planning, and institutional reporting on water governance in Guyana are often documented primarily through government and international organisation reports rather than peer-reviewed journals. This contributes to gaps in policy implementation and development for Indigenous communities.

2.3 Boolean Search Terms

The search terms were singular and in combination with Boolean operators such as “AND” and “OR” to identify relevant literature. The keywords were developed from three main thematic areas, which are: Indigenous/Amerindian populations, water governance and public health outcomes. The primary Boolean search string used across the databases was: (“Indigenous” OR “Amerindian” OR “Indigenous communities”) AND (“drinking water” OR “water quality” OR “water access” OR “water governance”) AND (“Guyana”) AND (“public health” OR “health outcomes” OR “waterborne disease”). The variations of the Boolean search string included: (“Indigenous water governance” OR “Indigenous water rights”) AND (“South America” OR “Guyana”) AND (“WASH” OR “water sanitation hygiene”) AND (“Indigenous communities”) AND (“policy” OR “governance”). These combinations were used across the databases to increase the retrieval of relevant literature.

2.4 Inclusion and Exclusion Criteria

2.4.1 Inclusion criteria

Relevant articles were screened based on the predefined literature inclusion criteria, which included the following: articles addressed drinking water access, water quality, or water governance in Guyana; discussed Indigenous or Amerindian communities in relation to water access or public health; analysed policy frameworks, legal instruments, or governance systems relevant to water management; examined environmental contamination, mining or climate-related water impacts affecting Indigenous, and were published in English.

2.4.2 Exclusion criteria

The exclusion of sources was based on the following: Articles focused exclusively on urban water infrastructure without reference to Indigenous communities, addressed water governance in other countries without reference to Indigenous communities, lacked policy discussion, governance, or public health implications, were unrelated to water access and quality, and were not inclusive of Indigenous communities. Relevant studies were screened and thematically analysed to identify key policy, governance, and public health implications.

2.5 Policy and Legal Document Analysis

Notably, key legislative and regulatory frameworks governing water resources in Guyana were analysed, including the Water and Sewerage Act (2002), the Environmental Protection Act, and the Amerindian Act, which shape national water governance systems and define institutional mandates of Guyana. Publicly available documents, strategic plans, and institutional reports from national regulatory agencies and international organisations were reviewed to assess policy implementation, infrastructure development, and water quality monitoring practices in Indigenous communities. Individual attention was given to the roles of Guyana Water Incorporated, the Environmental Protection Agency of Guyana, the Department of Public Information and intersectoral Water, Sanitation and Hygiene (WASH) initiatives.

2.6 Analytical Approach

A qualitative thematic analysis was used to integrate findings from the literature and policy documents. Sources were reviewed and categorised according to the following themes: legal and policy frameworks governing water resources, institutional implementation and governance structures, access disparities between coastal and hinterland regions, environmental risks and contamination of traditional water sources, and Indigenous participation in water governance.

These themes facilitate the identification of repeated patterns in policy design, implementation, and governance gaps affecting drinking water access in Indigenous communities. The analysis also briefly incorporated rights-based and decolonial governance perspectives to examine how statutory water governance systems interact with Indigenous practices and community-level management.

Limitations

This study is unique to the country and thus relies on grey literature and institutional reports, reflecting the public availability of limited peer-reviewed research and data on Indigenous water governance in Guyana. These constraints highlight a broader research gap and underscore the need for future empirical studies examining water quality, access, policies and public health outcomes in Indigenous regions.

3 RESULTS AND DISCUSSIONS

3.1 Legal Policy Frameworks Governing Water Quality

3.1.1 National Water Governance and Statutory Law

In relation to water governance, the Water and Sewerage Act (2002) remains the primary legal instrument of authority over all of Guyana's water resources. It also governs water provision and quality regulation in Guyana. Not only does this Act grant the state ownership of all bodies of water recognised as resources, but it also establishes obligations for potable water provision and mandates the development of regulatory standards for waterworks, monitoring and quality by the corresponding ministry. The responsible body is therefore tasked with defining water rights, monitoring usage, and protecting against contaminants, as well as addressing community differences in this context [14, 17, 18, 19].

Structurally, the Act established Guyana Water Inc. (GWI) as a state-owned public company mandated to produce, treat and distribute potable water. It is intended to strategically plan and document water quality monitoring and treatment processes, which would result in improvements to the national standard. The improvement of standards should further align its operations with the World Health Organisation (WHO) potable water guidelines [13, 20, 14]. The EPA and GWI have similar powers in terms of water quality and access; therefore, their collaboration is essential to reducing the inequity of safe drinking water access to rural Indigenous communities throughout Guyana. Additionally, GWI aligns with the UN Sustainable Development Goal 6 for clean water and sanitation. Initiatives and investments include drilling wells, installing distribution systems, and expanding drinking water coverage in some interior communities that are closer to urban areas [2, 4, 7, 20, 21].

3.2 Customary Rights and Policy Interfaces

Traditional Amerindian water governance coexists with statutory law; however, these rights are primarily internal to the community and do not override national water policies. The Amerindian Act gives Village Councils the right to establish local regulations for water supply and the preservation of water sources internally. Crucially, state laws only acknowledge customary water use through preserving clauses that preserve preexisting rights without specifically listing them. This leaves room for ambiguity regarding the methods used to gain or decide traditional access to good-quality drinking water [7, 23].

4 INSTITUTIONAL IMPLEMENTATION AND POLICY INSTRUMENTS

4.1 Guyana Water Inc. (GWI) and Quality Monitoring

GWI's operational profile indicates two sources of safe water, which are treated water via treatment plants and direct use of untreated well or spring water, especially in rural areas of Guyana. Institutional efforts to monitor parameters such as pH, turbidity, iron, coliform bacteria and *Escherichia coli* show commitment to water quality monitoring and control; however, no research or records are published in rural interior regions, so there is no means of understanding the effectiveness of such measures at a larger scale [2, 20]. These measures are intended to support the Ministry of Health's involvement in identifying, recording and preventing or treating water-related illnesses in the rural communities. Moreover, knowing the extent of water quality issues should highlight the need for these villages to have proper healthcare facilities to treat simple symptoms such as diarrhoea in small children who are a part of the vulnerable population [2, 19, 24, 25].

GWI's Strategic planning initiative from 2021 to 2025 emphasised enhancing operational efficiency, water safety and reliability for better public health outcomes for drinking water quality. However, the plan highlights challenges of the WHO drinking water quality standards being inconsistently met when surface water sources are being used. This indicates a gap in the plan to eliminate quality control responsibilities [20].

4.1.1 Inter-sectoral Coordination and WASH Policy Development

Public health actors, such as the Ministry of Health, UNICEF, the World Health Organisation (WHO), and the Pan American Health Organisation (PAHO), partnered to conduct multi-sectoral consultations, reinforcing Water, Sanitation, and Hygiene (WASH) coordination. The ministry acknowledges that sanitation is an integral factor in disease prevention and hygiene encouragement across all communities [2, 19, 26]. However, many communities lack adequate water systems and improved water quality. There is no regular monitoring to ensure the standards are being met throughout the communities.

4.1.2 Implementation Outcomes in Indigenous Communities

Government reports on recent infrastructure investments not only included wells but also a communal system to extend to underserved residents of Indigenous communities, to improve access rates [7, 27]. From 2020 to 2024, coverage increased from approximately 46% to more than 90% in hinterland areas; however, many villages remain excluded from the recorded data. There are many small Indigenous villages along the rivers where their ancestors settled; these rivers are the Aruka River (North West District), Corentyne River, Orealla River, Demerara River, Berbice River, Essequibo River, Abary River, Pomeroon River, Mazaruni River, Cuyuni River, Potaro River, Rupununi River, Barima River and the Waini River, which are mostly populated among the many rivers of Guyana. Others are located near the country's border, such as the Ireng River and the Takutu River. Along these rivers and their forests are many small underserved Indigenous communities with persistent infrastructure gaps regarding water treatment capacity, access and quality assurance [19, 22, 28, 29]. Access does not necessarily ensure water safety perpetually [2, 14].

5 LOCAL GOVERNANCE AND CAPACITY BUILDING

Guyana's non-governmental bodies, such as the Amerindian Peoples Association (APA), engage in capacity building, environmental training, and community monitoring, highlighting the role of Indigenous actors from a local governance context. It is not formal policy, but the community-level engagement articulates fundamental principles and reinforces the need for policy frameworks that integrate Indigenous traditional knowledge with state water management practices [1, 23, 28, 30].

6 EMPIRICAL EVIDENCE ON ACCESS AND QUALITY IN INDIGENOUS CONTEXTS

6.1 Access Disparities

National surveys suggest that overall access to improved drinking water sources in Guyana is high, this does not accurately reflect the households in the interior regions of Guyana and poor sanitation and hygiene present public health vulnerabilities [2, 7, 14, 31]. Qualitative reports indicate that independent media and civil society highlight issues in the interior communities, such as infrastructure, absence of treatment facilities, and high reliance on alternative sources (rivers, rainwater) that are often unsafe. Consuming unsafe water results in intensified health risks and burdens of water collection [2, 14, 32].

7 ENVIRONMENTAL AND CLIMATE IMPACTS

Indigenous communities are exposed to climate impacts which correlate with public health concerns, as droughts reduce surface water and increase risks of contamination; similarly, floods compromise water sources and increase health risks and hygiene. Environmental changes, therefore, interact with policy gaps in infrastructure and governance. Since these communities are in remote and sometimes inaccessible areas by road, they are not only isolated but also at risk of water insecurity [10, 33, 34]. Systematic testing remains limited for flood timelines conducted in the interior regions to monitor or assess water quality consumed by the communities [2, 4, 11, 14]. The regulatory agencies are not conducting tests, and there is a need for specific cases, such as mercury levels near mining areas, to determine if there is compliance with thresholds. Regulatory agencies are mandated to monitor the water quality systematically across all regions rather than reactively during emergency events [35].

7.1 Environmental Contamination and Traditional Water Sources

Indigenous communities persistently rely on traditional water sources such as rivers, springs and creeks, which are vulnerable to contamination. In many of the communities in Guyana, mining activities are occurring, such as gold, bauxite and other mineral resource mining; this presents contamination issues from artisanal and small-scale gold mining (ASGM) and other land use activities [2, 7, 34]. The Inter-American Commission on Human Rights reported complaints of alleged waterway pollution that undermines Indigenous health via exposure to heavy metals such as mercury and other contaminants. This report was disputed by government officials; however, these claims highlight the policy-environment nexus, which affects water quality in the Indigenous territories. Further investigation is required to determine whether these reports are accurate so that the health of Indigenous people is not at risk [4, 6, 11, 34, 35]. According to the WHO, one way to research this exposure is to select riverine areas and test the water samples for mercury levels or other contaminants to assess the implications for public health. To further evaluate the effects on nutrition and neurodevelopment, hair mercury levels in Indigenous people living close to ASGM sites can be compared to WHO standard values [10, 11, 14, 12, 23, 35, 36].

8 RIGHTS-BASED AND POLICY CRITIQUES

8.1 Human Rights and Access Challenges

The Inter-American Commission on Human Rights argue that, concerning Amerindian communities, Guyana's legal frameworks have not guaranteed non-discriminatory access to necessities such as water [2, 7, 6, 37]. These critiques highlight that formal policies fail in practice due to implementation gaps, lack of consultation, and substandard infrastructure [14].

8.2 Decolonial and Governance Perspectives

International studies commonly show that Indigenous water governance highlights how state-centric water policies alienate Indigenous epistemologies and sovereignty, especially in countries such as Guyana that are in the process of development [4, 27, 38].

8.3 Equity Considerations

There are gaps in the analysis for microbiological and chemical contaminants in water sources in the interior regions of Guyana. As a result of inconsistent water quality monitoring, communities have grown accustomed to the current water quality, except for a few members voicing their opinions to gain better water quality and systems [2, 19, 29]. There is limited treatment infrastructure available in the communities, which would require implementation through policy frameworks aligned with WHO standards, fully operational and monitored throughout the year [30].

8.4 Indigenous participation and governance

To mitigate job disadvantages in communities, policy frameworks could incorporate new programs to provide jobs in infrastructure needed for water quality treatment and monitoring or water quality testing (monitoring and regulation), with reports to the Governmental Water Quality authorities. A comparable model exists in agencies such as the Guyana Forestry Commission (GFC), which employs trained indigenous residents to monitor logging activities in their communities. The GFC uses local Indigenous residents who are trained to fill the positions; similarly, this can be implemented in the water resources sector. Indigenous inclusion in water governance is important [39]. According to Huntington [1], it was found that governance structures that excluded Indigenous voices undermine the cultural rights, sovereignty and effective management of water resources that are a part of their livelihood. This indicates another gap between culturally appropriate and sustainable water governance models in Guyana, given its diverse Amerindian population.

Indigenous people should be considered in environmental preservation initiatives and in the integration of land-use policies, as they own private lands and rely heavily on water supplies. According to Howard et al. [35], land use policies that permit mining, logging, and other harmful anthropogenic activities to take place within or close to Indigenous communities continue to undermine water quality regulations. This leads to integrated water safety issues that should incorporate environmental protection laws and Indigenous land tenure rights to achieve long-term public health results in impacted areas [2, 33, 39].

9 SYNTHESIS AND POLICY GAPS

Overall, there are interconnected themes in the literature reviewed, including grey literature. Firstly, formal water policy and legislation (inclusive of the Water Sewerage Act, EPA mandates and GWI obligations) provide a statutory basis for drinking water provision and quality regulatory control throughout Guyana; However, it does not explicitly integrate Indigenous water rights or sovereignty. It is more focused on the populations of the capital and more developed towns and regions. This results in customary practices being exposed to interpretive uncertainty [20]. Secondly, institutional enforcement and infrastructure development are irregular, as coastal and urban areas are prioritised, leaving the interior and Indigenous communities underserved. This is evidence of spatial and socio-economic inequities that suggests the need for greater integration into the national budget frameworks. Thirdly, the environmental and climate stressors that exacerbate the access and quality issues in rural areas should be considered. This highlights the necessity of updated and modified policy tools that acknowledge climate resilience, local water source preservation, and community monitoring [2, 7, 8, 27]. Effective policies are characterised by the fact that the public benefits from their involvement in the initial decision-making process. New policies or programs can involve residents to reduce costs and utilise human resources effectively. For example, the Guyana National Pathway Workers program (NPW), commonly called the 10-day worker program, was established in 2022 to employ citizens to work 10-days per month in the public sector to create jobs and increase financial relief. However, this program is not closely managed, and in the rural communities, the workers under the program do small tasks in the community, such as cleaning and maintenance. This program can be seen as an opportunity to create more permanent and productive jobs to the community and country. It is recommended that the programs be shaped to help government agencies in basic

data collection and monitoring that may be utilised by GWI and other regulatory agencies within the Ministry. Information on each community's water system and the necessary upgrades should be available [19, 20, 40]. Lastly, rights-based critiques are an area of concern, which includes human rights assessments as they relate to rural community members; increased procedural fairness in policy formulation is necessary. Additionally, legally enforced water quality rights and accountability mechanisms for state compliance should be demanded by rights-based critiques, inclusive of human rights evaluation [6, 7].

10 PUBLIC HEALTH IMPLICATIONS

National surveillance on waterborne disease incidence is limited in most underdeveloped countries; this alters public perceptions of disease burden and water quality perception. There is a need for peer-reviewed research to assess the widespread community concerns about potable water quality, including its physical, chemical and biological properties. Perceptions of water contamination influence household water practices and reliance on alternative sources such as bottled water, which can be hard to access in rural areas and pose a financial strain. In the rural areas of Guyana, not only is there little access to bottled water, but travelling long distances to obtain water is tedious and expensive [2, 7]. The areas that do have access to bottled water usually charge a higher price due to transportation to the area, which makes it unaffordable to residents. There are wells and spring water sources in the riverine areas; however, many are unsafe due to contamination and the absence of purification or treatment methods. This neglect is linked to perceptions of both objective and subjective risks, which impact water use behaviour by Indigenous people, health anxieties, and trust in public utilities when available [4, 14, 29].

Additionally, unimproved water sources and sub-standard sanitation infrastructure are determinants of enteric infections, diarrhoeal disease and other communicable illnesses. Moreover, these negative health outcomes are related to vulnerable populations, such as small children, the elderly and immunocompromised individuals. It is a trend that Indigenous households in rural areas have higher burdens of risk factors than the national averages. They also experience broader social determinants and impacts on their nutrition. This is important to the Indigenous population since their dietary reliance on aquatic food sources links water quality, nutrition, and health status. This association highlights the exposure to contaminants, the limitations of water policies, and the need for holistic approaches for not only nutrition but also food security and environmental health of the population [10, 11].

11 CONCLUSION

Guyana's formal water governance framework asserts broad commitments to safe drinking water and formal institutional structures to fulfil these commitments. However, gaps in policy articulation, implementation, monitoring, and regulation, as well as Indigenous involvement, indicate continuous inequities in the public health of Amerindian communities. Future research in Guyana should prioritise community-led assessments of water governance, health outcome studies, and disaggregated monitoring data to enhance water policies and equity responses in rural areas. Despite progress in access to safe drinking water, challenges remain regarding quality assurance, environmental degradation, and equity, particularly affecting Indigenous communities. Significant gaps in public health, such as systematic monitoring and Indigenous governance engagement, threaten health goals despite improvements in policy implementation and infrastructure.

STATEMENTS ON COMPLIANCE WITH ETHICAL STANDARDS

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