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Examining Community Perception of Water Governance in the Town of Lethem, Upper Takutu-Upper Essequibo (Region 9) Guyana

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Abstract

Effective water governance ensures resourceful management of water resources, including, equitable access to clean water, especially in hinterland communities where there are limited stakeholder engagements, and significant constraints on institutional resources. Grounded in institutional, stakeholder, social capital, and sustainable development theories, a Structural Equation Modeling (SEM) methodology was employed to analyze the perceptions of stakeholders in the town of Lethem, located in Upper Takutu-Upper Essequibo (Region 9), Guyana about the state of water governance in the community. More specifically, the goal of the study was to garner stakeholders' perception of governance effectiveness including institutional capacity, transparency, accountability, community engagement, and water resource sustainability. The findings show that institutional capacity and transparency significantly impact governance perceptions, while community engagement and sustainability also have positive contributions. These outcomes highlight the relevance and need for capacity-building initiatives, improved policy enforcement, and inclusive governance mechanisms to enhance water management outcomes in Lethem and similar communities. The insights provided offer valuable recommendations for policymakers and practitioners seeking to strengthen water governance frameworks in developing regions.

Keywords: *Institutional Theory, Social Capital Theory, Stakeholder Theory, Structural Equation Modeling, Sustainable Development Theory.*

Introduction

According to Bakker and Morinville [2], water governance encompasses the administrative, social, political, and economic structures that are in place to control and manage water resources in a sustainable and equitable manner. Effective water governance is essential for tackling issues such as climate change, urbanization, and transboundary conflicts over shared water resources [17, 31]. In this regard, although government institutions play an important role, their effectiveness frequently depends on adaptable and inclusive policies and strategies that involve a range of community stakeholders [20, 12]. Collectively, these factors highlight the intricacy and many aspects of water administration in guaranteeing fair access and enduring resource sustainability.

In hinterland communities, where institutional capacity and stakeholder participation are frequently limited, water governance is especially important for guaranteeing equitable access to sustainable and clean water resources.

Literature Review

This study is aligned to institutional, stakeholder, sustainable development, and

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social capital theories. Taken together, these theories provide framework for establishing the theoretical grounding that builds an understanding of stakeholders' perception of water governance in their communities.

Institutional Theory

Institutional theory "is used to understand organizational behavior as situated in and influenced by its environment. Organizations operate in a social environment that changes, because of new laws, the emergence of new standards, rules or norms, new patterns of behavior, and new participants" [24].

This theory provides the framework for understanding the extent to which organization systems interact with each other and influence the behaviours of their members. Researchers [3] argue that the strengths of these interactions and interrelationships are based on three factors - trust, legitimacy, and accountability.

Trust is the basis on which stakeholders assess the legitimacy and reliability of institutions that are tasked with ensuring effective management of resources in their communities. In the context of this research, participants views about the state of water governance are likely to be positive if the perceive the institution with responsibility for this vital resource as a transparent organization that prioritize the community's interest in relation to water security and sustainability. Any deficiency in trust will yield the opposite result [11, 17].

With regards to transparency and accountability. Research [12] shows that transparent decision-making and clear communication about policies and resource allocations bolster the legitimacy of governance systems. In relation to water governance, these practices are essential for enhancing stakeholder perceptions. Experts in the field [12], argue that:

> *"When decisions on water resource management are made without sufficient engagement or clarification, stakeholders may view these processes as exclusive or prejudiced. This view may undermine faith in governing systems and result in poor perceptions. In contrast, organizations that emphasize transparency—by freely disseminating information regarding water allocation, policy objectives, and implementation strategies—are more likely to cultivate favorable attitudes of governance efficacy."*

Therefore, policies that prioritize transparency and accountability are likely to generate positive perceptions about water governance practices.

Stakeholder Theory

Stakeholder theory is premised on the fact that when members of a community are involved in decisions that affect their livelihoods their perceptions about the institutions and systems responsible for advocating, implementing and managing those decisions are likely to be positive [17]. This underscores the importance of inclusivity, and collaboration as essential tenets of effective governance [9, 6]. Stakeholders' views on the governance matters, and when they are provided with opportunities to contribute to the development of their communities, they are more inclined to regard governance systems as legitimate and effective. This aligns to the argument that projects in indigenous communities must engage a diverse range of community members to have more impactful, equitable and sustainable outcomes [23].

Several studies [11, 17] emphasize the efficacy of indigenous-led water management programs in Australia, wherein the integration of traditional knowledge and practices into governance frameworks not only augmented sustainability but also improved views of equity and efficacy. Additionally, those studies contend that mitigating socioeconomic gaps via targeted interventions can empower marginalized groups and enhance their capacity to benefit from governance systems. These

observations correspond with this study's emphasis on inclusive governance approaches and highlight the necessity of addressing the many demands and interests of stakeholders in Lethem.

Another practical dimension of stakeholder theory relates to cooperation on cross-border water governance. In some areas of the world, given the proximity of borders, there is often the need to share water resources [14]. In a case study titled, "water without borders" [18] examined the opportunities and challenges of joint management of water resources between the USA and Canada, given the fact that the share a border in which this critical resource is found. The basic tenet of the findings from this study is that "effective transboundary governance requires balancing ecological sustainability, economic interests, and social equity, often through adaptive frameworks and conflict-resolution mechanisms" (p148). This argument aligns with [31] position, that cross-border governance of water resources is an intricate undertaking that necessitate inclusive and adaptive governance strategies for the benefit of stakeholders on both sides of the border.

In the context of this research the town of Lethem share a border, and by extension valuable water resources with Brazil. While there is currently no agreement of sharing of water resources, looking into the future, stakeholder theory dictates that in the future cross-border collaboration among local stakeholders in Lethem and Brazil, through government resource agreements can foster a sense of ownership and accountability, resulting in more positive perceptions of governance outcomes.

Overall, stakeholder theory provides the foundation for comprehending how including stakeholders in decision-making procedures might raise opinions about how effective water governance is. Governance systems can satisfy the many requirements and interests of stakeholders while promoting legitimacy and confidence by placing a high priority on meaningful participation, inclusivity, and collaboration [11].

Sustainable Development Theory

Sustainable development theory is premised on achieving coherency and balance between economic, social, and environmental objectives with a focus on achieving long-term sustainability of resources, and by extension benefits for all stakeholders [8]. More specifically, the theory highlights environmental health, and economic growth as factors that influence the well-being of humans [8, 30]. In this regard, suitable development in communities such as the town of Lethem, is assured when programs and policies are focused on addressing immediate social and economic needs, and by extension promote long-term viability. Therefore, the theory established the groundwork for examining stakeholders' perception of governance.

A key factor in encouraging support for sustainable governance methods is environmental awareness. According to [8], effective environment awareness dictates proactive policies that focuses on promoting intuitional and public awareness of environmental issues that affect communities, including water pollution. As a result, including this framework as a key theoretical perspective in this study provides the grounding for examining the extent to which governance structures incorporate environmental concerns into their decision-making processes.

Social Capital Theory

Social capital theory focuses on the importance of networking, and collaboration in addressing complex challenges such as water governance. A key dimension of the theory are the tenets of trust and collaboration. According to [20], "strong social capital—built through trust, reciprocity, and collaboration—enhances the ability of governance systems to achieve equitable and sustainable outcomes" (p. 6).

Relating to this study, stakeholders trust in the institutions with responsibility for water governance are critical for fostering perceptions of the effectiveness of the measures in place to ensure adequate, safe, sustainable water supply to the community. For instance, if community stakeholders perceive that those institutions are acting in their best interest, they are more likely to be supportive and compliant with policies laid out for sustainable water management [17, 28]. The opposite ensues if the perceptions are negative.

Another critical element of social capital theory is community involvement and the need of cultural awareness in establishing robust social networks [11]. According to [11]:

> *"Indigenous groups with robust social capital are more adept at sustainably managing water resources. In these communities, traditional knowledge and practices frequently underpin collective action, promoting trust and collaboration among stakeholders (p.42)."*

These insights are relevant for garnering a nuanced understanding of the important role community engagement and cultural sensitivity, can play in building and maintaining strong social connections to achieve shared goals.

Methodology

In this study, the factors that influence stakeholders' perception of the efficacy of water governance in the town of Lethem are examined using the Structural Equation Modeling (SEM) [1]. A cross-sectional survey methodology was employed to gather primary data [17] from key stakeholders involved in, and affected by water governance practices, such as residents, community leaders, government officials, and representatives from non-governmental organizations (NGOs).

The SEM analysis was appropriate because, in contrast to conventional regression models, SEM offers goodness-of-fit indices to assess the extent to which the hypothesized model accurately represents the observed data. This guarantees that the conclusions derived from the study are generalizable and statistically valid [1]. SEM analysis helps to identify the most significant indicators of water governance effectiveness by measuring the importance and strength of governance variables. This evidence-based methodology enables water management institutions, local governments, and policymakers to evaluate the initiatives that will have the greatest impact on improving water governance.

The stakeholders in the town of Lethem, who are either involved in or impacted by water governance comprise the target population for this study. To guarantee that the sample was a true representation of the diverse stakeholder groups, non-probability convenience, and purposeful samplings were employed, where respondents were selected based on their willingness and availability to participate [25, 7, 29]. Given the fact that Lethem is in the hinterland regions of Guyana and the population is geographically dispersed, convenience sampling was appropriate.

Equally, it was important to garner the perspective of key stakeholders such as members of the town council, the Regional Democratic Council, managers at Guyana Water Incorporated, members of the private sector community, and other community leaders. For this reason, purposeful sampling was also considered, since these stakeholders are involved in water governance in the community at various levels.

This combination of convenience and purposeful sampling enhanced the diversity of the participants, and as a result, reduced the possibility of potential bias, avoiding under representation or overrepresentation of stakeholder groups in the community.

According [5] power analysis for SEM, "a minimum of 200–300 respondents is necessary to obtain sufficient statistical power. Consequently, the estimated sample size is determined" (p. 194). According to the

Regional Democratic Council, the approximate size of the population in Lethem is 3000 people. To arrive an adequate sample size for a 95% confidence level and 5% margin of error a sample size of 341 respondents was considered. Three hundred and seventy-seven responses were collected from participants, representing an oversampling by 2.6%. As a result, improving the representation of various stakeholder groups.

The objective of this research was to gain a nuanced understanding of community members perception of the state of water governance in the town of Lethem.

The primary data was gathered using structured questionnaires that was administered through online surveys and in-person interviews. To assess stakeholders' perspectives regarding five critical constructs, the questionnaire comprises Likert-scale items (1 = Strongly Disagree to 5 = Strongly Agree). The five constructs include:

1. Institutional capacity (IC): This entails the perceived effectiveness of availability of resources, administrative effectiveness, and policy enforcement.
2. Transparency and Accountability (TA): This entails, the perceived integrity of governance processes, access to information, and reporting mechanisms.
3. Community Engagement (CE): This entails the process of involving stakeholders in the decision-making process and water governance initiatives.
4. Water Resource Sustainability (WS): These include environmental considerations, conservation efforts, and long-term water security perceptions.
5. Stakeholders Perceived Effectiveness: This focuses on the overall assessment of water governance effectiveness.

The questionnaire items were adapted from validated governance and water management instruments that have been employed in previous studies. Cronbach's Alpha and Composite Reliability (CR) values exceeding 0.7 was employed to assess each construct using multiple-item scales, thereby guaranteeing internal consistency. Even though water resource sustainability had the least significant impact of the four constructs, it was still a significant predictor of governance efficacy.

Results

A Structural Equation Modeling (SEM) approach was employed to analyze the factors affecting stakeholders' perceptions of the efficacy of water governance in Lethem. The model comprised five latent constructs:

1. Institutional Capacity (IC)
2. Transparency and Accountability (TA)
3. Community Engagement (CE)
4. Sustainability of Water Resources (SWR)
5. Stakeholder Perceived Efficacy (SPE)

Several multiple goodness-of-fit indicators were employed to evaluate the SEM model, and the results are as follows:

1. Chi-Square (χ^2/df) = 2.18 ($p < 0.05$) – Acceptable fit
2. Comparative Fit Index (CFI) = 0.923 – Good fit
3. Tucker-Lewis Index (TLI) = 0.910 – Good fit
4. Root Mean Square Error of Approximation (RMSEA) = 0.057 – Acceptable fit
5. Standardized Root Mean Square Residual (SRMR) = 0.045 – Good fit

These results substantiate the use of SEM. They indicate that the SEM model provides a statistically acceptable fit [5], to the data. Given the nature of this study, it can be concluded that these results provide adequate substantiation of the relationship between the variables.

Table 1. Structural Equation Modeling Path Analysis Results

Paths	Standardized Estimate (β)	S.E.	t-value	p-value	Support
IC → SPE	0.41	0.07	5.12	<0.001	Supported
TA → SPE	0.36	0.06	4.79	<0.001	Supported
CE → SPE	0.33	0.05	4.25	<0.001	Supported
WS → SPE	0.27	0.08	3.10	0.002	Supported

From the results presented in table 1, The model showed that Institutional Capacity, Transparency and Accountability, Community Engagement, and Water Resource Sustainability have a positive impact on Stakeholder Perceived Effectiveness of Water Governance ($p < 0.05$).

Discussion

Stakeholder perceptions regarding the efficacy of water governance were discovered to be most strongly predicted by institutional capacity. This finding underscores the significance of administrative efficacy, regulatory enforcement, and resource availability in the development of public trust in governance. Institutional challenges, including inconsistent water supply, limited technical expertise, and bureaucratic inefficiencies, have been reported as significant issues to be addressed [2, 15].

In addition, transparency and accountability were identified as substantial predictors of the efficacy of water governance. The results indicate that stakeholders' impressions of governance efficacy are enhanced when they are provided with information, transparent decision-making processes, and mechanisms for holding authorities accountable [10, 13]. In Lethem, the absence of public access to financial records and water management policies has been identified as a significant governance challenge. To mitigate these challenges, implementing mechanisms such as regular community reporting, and open access to water governance data would inspire confidence [26].

Community engagement serves as vital activity for the development of stakeholder perceptions regarding the effectiveness of governance. The SEM results suggest that active participation in decision-making by citizens, local leaders, and organizations increases their perception of the effectiveness of governance [21, 4]. However, the lack of formal mechanisms for engagement, logistical barriers, as well as limited consultation initiatives in hinterland communities such as Lethem mean that community participation in water governance remains low. Participation can be enhanced through public engagement in community-driven water management programs, participatory policy development, and inclusive decision-making processes [5].

Even though water resource sustainability had the least influence among the four constructs, it remained an important predictor of governance effectiveness. This indicates that stakeholders view long-term water security, conservation practices, and climate resilience efforts as crucial elements in governance assessments [20, 27].

In Lethem, seasonal droughts and insufficient conservation efforts present considerable challenges to the sustainability of water resources. Incorporating climate-adaptive policies, sustainable water

management practices, and investing in water conservation technologies will be crucial for effective long-term governance [16].

Several policy and practice recommendations can be derived from the findings to enhance water governance in Lethem and similar hinterland communities.

It is imperative to enhance water governance by bolstering institutional capacity, as it directly affects the capacity of local institutions to manage resources effectively and establish public trust. In developing regions like Lethem, challenges such as inconsistent water supply and limited expertise can be addressed by increasing funding and technical support for local water governance institutions [3, 15]. It is equally important to enhance the enforcement of regulations and the implementation of policies, as inadequate enforcement frequently undermines governance endeavors, resulting in resource mismanagement and inefficiencies [22, 16].

Furthermore, successful capacity-building initiatives in comparable contexts have demonstrated that the development of training programs for water management professionals can improve technical capacity and promote sustainable practices [19, 20]. For example, [6] conducted research that demonstrated the substantial improvement in water governance outcomes in rural areas because of the combination of professional training and community-driven programs.

These strategies, which are substantiated by empirical findings, illustrate that investing in institutional capacity not only resolves immediate governance deficiencies but also establishes the groundwork for lasting sustainability and resilience.

The establishment of open-access platforms for public disclosure of decisions can improve accountability and transparency in water governance by guaranteeing that stakeholders have access to vital information regarding resource allocation and policy [13, 26]. As evidenced by successful governance changes in water-scarce regions, the establishment of independent oversight committees to monitor governance performance further strengthens accountability by offering an objective assessment of institutional activities [10, 16]. Increasing community involvement is equally important since it allows local actors to participate in decision-making processes through the creation of community water committees and public consultations [21, 20].

Fostering climate-resilient water management techniques, like rainwater collection and conservation programs, can help alleviate seasonal scarcity and guarantee resource availability over the long run, hence addressing sustainability issues [27]. It is also crucial to strengthen environmental regulations to stop pollution and over-extraction because studies show that proactive regulatory actions greatly enhance ecosystems and water security [16, 19].

Conclusion

This study shed light on the vital role of institutional capacity, transparency, community engagement, and sustainability in shaping stakeholder perceptions of water governance in Lethem. Institutional effectiveness and accountability have been identified as the most significant indicators of governance efficacy, underscoring the need for effective policy implementation, regulatory supervision, and public involvement. While community participation and sustainability have less influence, they are still important factors in promoting long-term governance success. To improve water governance, focused investments in technical capacity, participatory decision-making, and climate-resilient policies are needed. The findings serve as a platform for future research and policymaking, underlining the significance of inclusive and adaptable governance systems in resolving water security issues in hinterland communities.

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Conflict of Interest

The author declares that there is no conflict of interest related to the research and publication of this study.

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