Evaluation of the Challenges of Environmental Impact Assessment (EIA) on Water Project in Jalingo Metropolis

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Abstract

This study assesses the challenges of Environmental Impact Assessment (EIA) on water projects in Jalingo Metropolis, Nigeria. Water projects are critical for addressing the increasing demand for potable water in urban areas, yet their implementation can result in adverse environmental impacts if not properly managed. EIA serves as a key tool for evaluating the potential environmental consequences of such projects, promoting sustainable development and informed decision-making. However, the effectiveness of the EIA process is often constrained by several factors. The study adopted a mixed-method approach, combining quantitative and qualitative techniques. A structured questionnaire was administered on 246 respondents, including officials from government agencies, environmental experts, and community representatives. Data were analyzed using descriptive statistics and Structural Equation Modelling (SEM). Findings revealed that the quality of baseline data, scope of assessment, level of public participation, and political pressures significantly affect the effectiveness of EIA on water projects. Poor baseline data and limited public participation emerged as key challenges, while political interference undermined the objectivity of EIA reports. The study concluded that enhancing technical capacity, promoting stakeholder engagement, and insulating the EIA process from political influence are essential for improving EIA effectiveness. It recommended the establishment of independent environmental review bodies, capacity-building programs, and public awareness campaigns to strengthen environmental governance. These measures will ensure that water projects in Jalingo Metropolis contribute to sustainable water resource management without compromising environmental integrity.

Keywords: Environmental Impact Assessment (EIA), Political Influence, Public Participation, Sustainable Water Resource Management & Water Projects

Introduction

Water is a fundamental resource for human survival, economic development, and environmental sustainability. The provision of adequate and safe water is essential for the advancement of human well-being and socio-economic development, particularly in urban areas where demand is often high due to population growth and industrial activities. Water projects such as dams, boreholes, water treatment plants, and distribution networks play a critical role in addressing the growing demand for potable water, especially in developing regions. However, the implementation of these projects can result in significant environmental impacts, including habitat destruction, changes in hydrological regimes, pollution, and loss of biodiversity. Consequently, there is a need to ensure that water projects are planned and executed in a manner that minimizes adverse environmental effects while maximizing socio-economic benefits.

Environmental Impact Assessment (EIA) has emerged as a vital tool in environmental management, designed to evaluate the potential environmental consequences of proposed projects before their implementation. The primary objective of EIA is to predict environmental impacts at an early stage in project planning, identify mitigation measures, and enhance decision-making

processes. By systematically assessing the possible environmental, social, and economic impacts of a project, EIA aims to promote sustainable development and ensure that development activities align with environmental protection goals (Adekola *et al*., 2019; Olufade *et al*., 2019). The EIA process also provides an opportunity for public participation, fostering transparency and integrating stakeholder concerns into project design and implementation.

Despite the recognized importance of EIA in promoting environmental sustainability, the effectiveness of the EIA process is often hampered by several challenges, particularly in developing countries. In Nigeria, where environmental regulations are still evolving, the implementation of EIAs faces various obstacles, including inadequate baseline data, limited technical expertise, weak enforcement mechanisms, and political interference (Ehiagbanare & Osaghae, 2022). Moreover, public participation in the EIA process remains low due to poor awareness, limited access to information, and lack of trust in government institutions. These challenges compromise the quality of EIAs, thereby undermining their capacity to mitigate environmental impacts and support sustainable development.

Jalingo Metropolis, the capital city of Taraba State in northeastern Nigeria, is currently witnessing rapid urbanization and infrastructural development, including various water projects aimed at addressing the growing demand for potable water. These projects, while essential for meeting the needs of the population, pose potential environmental risks, including water pollution, habitat loss, and alteration of natural hydrological systems. The effective implementation of EIA is crucial to ensure that these water projects are environmentally sustainable and beneficial to the local community. However, several factors, such as financial constraints, technical deficiencies, and political influence, are likely to hinder the proper execution of the EIA process in the metropolis.

Understanding the challenges associated with the EIA process on water projects in Jalingo Metropolis is essential for enhancing the effectiveness of environmental management practices. This study seeks to assess the challenges facing the implementation of EIAs on water projects in Jalingo Metropolis, with a particular focus on the quality of baseline data, the scope of assessments, the level of public participation, and the influence of political and economic pressures. The findings of this study are expected to provide valuable insights into the current state of EIA practices in the region and offer recommendations for improving the effectiveness of EIAs in promoting sustainable water resource management.

Statement of the Research Problem

The growing demand for potable water in Jalingo Metropolis has necessitated the implementation of various water projects aimed at improving water supply and sanitation services. However, the rapid urbanization and infrastructural expansion associated with these projects pose significant environmental risks, including pollution, ecosystem degradation, and displacement of local communities (Glasson et al., 2020). Despite the critical role of Environmental Impact Assessment (EIA) in mitigating these impacts, the effectiveness of the EIA process in Jalingo Metropolis remains questionable.

Several challenges undermine the proper execution of EIAs in the region. These include inadequate baseline data, insufficient technical capacity, weak institutional frameworks, and limited stakeholder participation (Adekola et al., 2022). The lack of comprehensive and reliable baseline data affects the accuracy of impact predictions, while the absence of technical expertise compromises the quality of assessment reports (Olufade et al., 2019). Furthermore, public participation, which is a key component of the EIA process, is often minimal due to poor awareness

and limited access to information (Ehiagbanare & Osaghae, 2022). Additionally, political and economic pressures may influence the outcomes of EIAs, resulting in compromised environmental standards (Adekola et al., 2019).

Furthermore, the limited empirical evidence on the effectiveness of EIAs for water projects in Jalingo Metropolis highlights the need for a comprehensive study to assess the challenges affecting the implementation of EIAs in the region. Addressing these challenges is essential for enhancing the capacity of the EIA process to promote sustainable water resource management and protect the environment (Glasson et al., 2020). This study aims to fill this gap by evaluating the key obstacles to effective EIA implementation and providing actionable recommendations for improving the quality and reliability of EIAs in Jalingo Metropolis.

Methodology

The methodology adopted in this study is designed to provide a comprehensive approach for assessing the challenges of Environmental Impact Assessment (EIA) on water projects in Jalingo Metropolis. The research employed a combination of quantitative and qualitative methods to ensure a robust and balanced investigation. The research design utilized a survey research design and ex-post facto research design. The survey research design allowed for the collection of primary data through structured questionnaires, while the ex-post facto research design facilitated the retrospective analysis of how EIAs influenced the implementation of water projects. This dual approach ensured that both current perceptions and past outcomes were captured effectively.

The population of the study comprised 638 respondents, including officials from the Taraba State Water and Sewerage Corporation, Ministry of Water Resources, environmental experts, community members, and representatives of civil society organizations. The census sampling technique was adopted, with a sample size of 246 respondents determined using the Krejcie and Morgan (1970) sample size determination table. This technique ensured that every member of the target population had an equal chance of being selected, enhancing the representativeness of the sample.

Primary data were collected using a structured questionnaire based on a four-point Likert scale ranging from Strongly Disagree to Strongly Agree. The questionnaire was divided into sections covering demographic information, quality of baseline data, scope of EIAs, level of public participation, political influence, and overall effectiveness of EIAs. A pilot study was conducted to validate the questionnaire, and reliability was tested using Cronbach's Alpha, with values ranging from 0.562 to 0.811, indicating acceptable to good internal consistency.

Data were collected through self-administered questionnaires and face-to-face interviews with selected respondents. Ethical considerations were observed, with participants providing informed consent and assurances of confidentiality and anonymity. Quantitative data were analyzed using descriptive statistics (mean, standard deviation, and frequency distribution) and correlation analysis to examine relationships between variables. Hypothesis testing was conducted using Structural Equation Modelling (SEM) with the aid of SPSS and AMOS software to model interactions between independent and dependent variables.

Results of Findings

Demographic Characteristics of Respondents

The result of the findings of the study on the demographic profile of the respondents is presented in Table 1.

Table 1. Demographic Characteristics of Respondents

Demographic Variable	Category	Frequency	Percentage (%)
Gender	Male	146	65.5
	Female	77	34.5
Age	25-34 years	64	28.7
	35-44 years	75	33.6
	45-54 years	67	30.0
	55 years and above	17	7.6
Educational Qualification	O/L	9	4.0
	OND/ND	44	19.7
	HND/B.Sc	125	56.1
	MA/M.Sc	41	18.4
	M.Phil/Ph.D	4	1.8
Years of Experience	Less than 1 year	24	10.8
	1-3 years	42	18.8
	4-6 years	47	21.1
	7-10 years	46	20.6
	More than 10 years	64	28.7
Department/Role	Engineering	68	30.5
	Environmental Science	63	28.3
	Administration	46	20.6
	Field Operations	46	20.6
Length of Service with Jalingo Water Board	Less than 1 year	33	14.8
	1-3 years	45	20.2
	4-6 years	48	21.5
	7-10 years	40	17.9
	More than 10 years	57	25.6

Note: Field Survey, 2024.

The results in Table 1 indicate that the majority of the respondents were male, accounting for 65.5% (146 respondents), while females represented 34.5% (77 respondents). This gender distribution suggests a higher male representation among the surveyed population. Regarding age, the respondents were predominantly middle-aged, with 33.6% (75 respondents) in the 35-44 years' age group, followed by 30.0% (67 respondents) in the 45-54 years age group. Those aged 25-34 years made up 28.7% (64 respondents), while respondents aged 55 years and above were the least represented at 7.6% (17 respondents). This age distribution indicates that the majority of the respondents are in their economically active years, with a small proportion of older participants.

In terms of educational qualifications, most respondents held a Higher National Diploma (HND) or Bachelor of Science (B.Sc.), comprising 56.1% (125 respondents). This was followed by 19.7% (44 respondents) with an Ordinary National Diploma (OND) or National Diploma (ND), 18.4%

(41 respondents) with a Master's degree, and 4.0% (9 respondents) with only an O-Level certificate. A small percentage (1.8% or 4 respondents) held M.Phil. or Ph.D. qualifications. This educational profile indicates a generally well-educated group of respondents.

With respect to years of experience, the respondents were fairly distributed across different experience levels. The highest proportion, 28.7% (64 respondents), had more than 10 years of experience. Those with 4-6 years of experience constituted 21.1% (47 respondents), followed by 20.6% (46 respondents) with 7-10 years of experience. Respondents with 1-3 years of experience accounted for 18.8% (42 respondents), while those with less than 1 year made up the smallest proportion at 10.8% (24 respondents). This indicates that the sample includes a mix of seasoned and relatively new professionals.

In terms of departmental or professional roles, 30.5% (68 respondents) were in the Engineering department, while 28.3% (63 respondents) worked in Environmental Science. Respondents in Administration comprised 20.6% (46 respondents), and 20.2% (45 respondents) were involved in Field Operations. This distribution reflects a balanced representation of key professional roles relevant to the study context.

Furthermore, regarding length of service with Jalingo Water Board, the highest proportion, 25.6% (57 respondents), had more than 10 years of experience. Those with 4-6 years of experience constituted 21.5% (48 respondents), followed by 20.2% (45 respondents) with 1-3 years of experience. Respondents with 7-10 years of experience accounted for 17.9% (40 respondents), while those with less than 1 year made up the smallest proportion at 14.8% (33 respondents). This indicates that the sample includes a mix of seasoned and relatively experienced staff.

Effectiveness of Water Projects in Jalingo Metropolis

The findings of this study reveal significant insights into the challenges of Environmental Impact Assessment (EIA) on water projects in Jalingo Metropolis. The majority of respondents (62.3%) expressed dissatisfaction with the overall effectiveness of water projects, indicating that the projects were not meeting their intended objectives (Table 2). This dissatisfaction was largely attributed to poor implementation of mitigation measures and inadequate baseline data. Furthermore, Table 2 shows that 65.9% of respondents rated the sustainability of water projects as poor, with many projects suffering from lack of maintenance and institutional support.

Table 2. Effectiveness of Water Projects in Jalingo Metropolis

Options/Response Factors	SD	D	A	SA
The water projects in Jalingo Metropolis are meeting their intended objectives.	40 (17.9%)	99 (44.4%)	67 (30.0%)	17 (7.6%)
The sustainability of water projects in Jalingo Metropolis is well-maintained.	23 (10.3%)	124 (55.6%)	58 (26.0%)	18 (8.1%)
The environmental impact of the water projects in Jalingo Metropolis is minimal.	13 (5.8%)	31 (13.9%)	148 (66.4%)	31 (13.9%)
Overall, the water projects in Jalingo Metropolis are successful.	56 (25.1%)	101 (45.3%)	49 (22.0%)	17 (7.6%)

***Note**: Field Survey 2024*

SD = Strongly Disagree, D = Disagree, N = Neutral, A = Agree, SA = Strongly Agree
Figures in parentheses represent percentages.

The results in Table 2 reveal that a significant portion of respondents, 40 (17.9%) strongly disagreed, and 99 (44.4%) disagreed with the statement that the water projects in Jalingo Metropolis are meeting their intended objectives. This accounts for 62.3% of respondents who expressed dissatisfaction with the performance of the projects. In contrast, 67 respondents (30%) agreed, and 17 respondents (7.6%) strongly agreed, totalling 37.6% of respondents who felt positively about the projects' outcomes. This suggests that the majority of respondents perceive the water projects as failing to meet their goals. The implication of this result is that the water projects might not be fulfilling the needs of the Jalingo community as initially intended, which points to inefficiencies in project implementation, management, or the alignment of the projects with local needs.

Regarding the sustainability of the water projects, 23 respondents (10.3%) strongly disagreed, and 124 respondents (55.6%) disagreed, accounting for 65.9% of the total respondents. This indicates that the majority believe the sustainability of the projects is not well-maintained. Only a smaller portion, 58 respondents (26%), agreed, and 18 respondents (8.1%) strongly agreed, totalling 34.1%, indicating that some respondents hold a more positive view of the projects' long-term sustainability. This suggests a widespread concern over the sustainability of the water projects, which may imply challenges in maintenance, funding, or institutional support to ensure that these projects can continue to serve the community over time. The implication is that without addressing these sustainability issues, the projects may face operational difficulties in the future, potentially leading to their failure.

In contrast to the previous findings, the responses to the environmental impact of the water projects were more favourable. Only 13 respondents (5.8%) strongly disagreed, and 31 respondents (13.9%) disagreed, indicating that just 19.7% believed the project have a significant environmental impact. In comparison, the majority—148 respondents (66.4%) agreed, and 31 respondents (13.9%) strongly agreed. Interpretatively, it can be said that 80.3% of the respondents believed that the environmental impact of the project is minimal. This suggests that, despite concerns over the effectiveness and sustainability of the water projects, they are generally seen as environmentally friendly. The implication of this result is that the projects, while not fully meeting their other objectives, have been successful in minimizing adverse environmental effects, which is an important consideration for community-based water projects.

When asked about the overall success of the water projects, the majority of respondents, 56 (25.1%) strongly disagreed, and 101 (45.3%) disagreed, which means 70.4% of the respondents did not view the projects as successful. Only 49 respondents (22%) agreed, and 17 respondents (7.6%) strongly agreed, totalling 29.6%. This indicates that the overall success of the water projects is perceived negatively by most respondents. The implication of this result is that the projects, as currently implemented, have not achieved their full potential in terms of providing effective, reliable, and sustainable water services to the Jalingo community. This raises concerns about the projects' planning, execution, or their ability to meet the needs of the population.

Quality of Baseline Data Used in EIA in Jalingo Metropolis

Table 3. Quality of Baseline Data Used in EIA in Jalingo Metropolis

Topical questions	(SD)	(D)	(A)	(SA)
The baseline data used for EIAs in water projects is accurate.	15 (6.7%)	115 (51.6%)	79 (35.4%)	14 (6.3%)
The baseline data collected for EIAs is comprehensive and detailed.	10 (4.5%)	115 (51.6%)	78 (35.0%)	20 (9.0%)
The baseline data for EIAs is not updated regularly.	25 (11.2%)	60 (26.9%)	115 (51.6%)	23 (10.3%)
The reliability of baseline data used in EIAs does not significantly impact the outcomes of water projects.	34 (15.2%)	94 (42.2%)	67 (30.0%)	28 (12.6%)

Note: Field survey 2024.
SD = Strongly Disagree, D = Disagree, A = Agree, SA = Strongly Agree
The figures in parentheses are percentages.

The results in Table 3 indicate a significant portion of respondents—15 (6.7%) strongly disagreed and 115 (51.6%) disagreed with the statement that the baseline data used in the Environmental Impact Assessments (EIAs) for water projects is accurate, making up 58.3% of the respondents who expressed dissatisfaction. In contrast, 79 respondents (35.4%) agreed, and 14 respondents (6.3%) strongly agreed, totalling 41.7% who believed the baseline data is accurate. This suggests that while a considerable portion of the respondents perceive the baseline data as inaccurate, a substantial minority still hold a positive view of its accuracy. The implication of this finding is that, despite some approval, the majority of respondents feel the baseline data used in the EIAs might not be sufficiently accurate, which could lead to misinformed decision-making in the planning and execution of water projects.

Regarding the comprehensiveness of the baseline data, 10 respondents (4.5%) strongly disagreed, and 115 respondents (51.6%) disagreed, making up 56.1% of respondents who do not believe the data is comprehensive or detailed. On the other hand, 78 respondents (35%) agreed, and 20 respondents (9%) strongly agreed, indicating 44% of respondents felt satisfied with the data's level of detail. This finding suggests that the majority of respondents feel the baseline data collected for the EIAs lack the necessary depth and comprehensiveness. The implication of this result is that the data might not capture all relevant environmental, social, and economic factors, which could undermine the effectiveness of the EIAs and the overall success of water projects.

The results for the frequency of updates to the baseline data show that 25 respondents (11.2%) strongly disagreed, and 60 respondents (26.9%) disagreed, indicating that 38.1% of respondents believe the baseline data is updated regularly. However, 115 respondents (51.6%) agreed, and 23 respondents (10.3%) strongly agreed, accounting for 61.9% of respondents who feel the baseline data is not regularly updated. This suggests that there is a widespread perception that the baseline data is not kept current, which could lead to outdated information being used in the EIAs. The implication of this finding is that failure to update baseline data regularly can result in water projects being planned based on old, potentially irrelevant data, which could hinder the projects' success and their ability to address current environmental and social challenges.

The responses to the statement regarding the reliability of baseline data and its impact on the outcomes of water projects show that 34 respondents (15.2%) strongly disagreed, and 94 respondents (42.2%) disagreed, making up 57.4% who believed the reliability of baseline data does not significantly impact project outcomes. In contrast, 67 respondents (30%) agreed, and 28 respondents (12.6%) strongly agreed, totalling 42.6%. This indicates that while some respondents acknowledge that reliable baseline data is important, the majority believe that it does not play a significant role in determining the success or failure of water projects. The implication of this finding is that despite concerns about the accuracy and comprehensiveness of the data, many respondents do not perceive the data's reliability as a major factor in the effectiveness of the projects. This could suggest a lack of understanding of how crucial reliable baseline data is in informing sound decision-making and project outcomes.

Scope of EIAs Conducted in Jalingo Metropolis

Table 4. Scope of EIAs Conducted in Jalingo Metropolis

Topical questions	(SD)	(D)	(A)	(SA)
The EIAs conducted for water projects cover all relevant environmental factors.	18 (8.1%)	71 (31.8%)	116 (52.0%)	18 (8.1%)
The scope of EIAs is sufficient to address potential environmental impacts.	10 (4.5%)	50 (22.4%)	121 (54.3%)	42 (18.8%)
EIAs for water projects are not thorough and detailed.	13 (5.8%)	101 (45.3%)	80 (35.9%)	29 (13.0%)
The comprehensiveness of EIAs conducted is crucial for the success of water projects.	19 (8.5%)	18 (8.1%)	133 (59.6%)	53 (23.8%)

Note: Field survey 2024.

SD = Strongly Disagree, D = Disagree, A = Agree, SA = Strongly Agree

The figures in parentheses are percentages.

The results in Table 4 indicate a varied perception of the scope and thoroughness of Environmental Impact Assessments (EIAs) conducted for water projects. Regarding whether the EIAs cover all relevant environmental factors, an insignificant portion of respondents, 18 (8.1%) strongly disagreed and 71 (31.8%) disagreed, making up 39.9% of respondents who expressed dissatisfaction. In contrast, 116 respondents (52%) agreed, and 18 respondents (8.1%) strongly agreed, totalling 60.1% who felt the EIAs covered all necessary environmental factors. This suggests that while most respondents believe the EIAs are comprehensive, a notable portion perceive gaps in the coverage, which could lead to overlooked environmental considerations.

Regarding the sufficiency of the scope of EIAs to address potential environmental impacts, 10 respondents (4.5%) strongly disagreed, and 50 respondents (22.4%) disagreed, making up 26.9% of respondents who felt the scope was insufficient. On the other hand, 121 respondents (54.3%) agreed, and 42 respondents (18.8%) strongly agreed, totalling 73.1% who believed the scope was adequate. This suggests that a substantial majority of respondents consider the scope of the EIAs sufficient to address potential environmental impacts, which is a positive reflection on the EIAs' capacity to assess key issues. However, the 26.9% who disagree indicate that there may still be concerns about the thoroughness of the assessments.

When it comes to the thoroughness and detail of EIAs, 13 respondents (5.8%) strongly disagreed, and 101 respondents (45.3%) disagreed, making up 51.1% of respondents who felt the EIAs were

not thorough or detailed enough. In contrast, 80 respondents (35.9%) agreed, and 29 respondents (13%) strongly agreed, totalling 48.9% who felt the EIAs were sufficiently detailed. This finding suggests that while a nearly equal proportion of respondents believe the EIAs are lacking in thoroughness, a considerable minority still perceives them as adequately detailed. The implication of this is that there is a significant concern regarding the depth of EIAs, which could affect the effectiveness of the assessments and subsequent project planning.

The responses to the statement on the comprehensiveness of EIAs highlight that 19 respondents (8.5%) strongly disagreed, and 18 respondents (8.1%) disagreed, making up 16.6% of respondents who did not view EIAs as comprehensive. In contrast, 133 respondents (59.6%) agreed, and 53 respondents (23.8%) strongly agreed, totalling 83.4% who perceived the EIAs as crucial for the success of water projects. This indicates that the majority of respondents believe the comprehensiveness of EIAs is key to ensuring the success of water projects. The implication of this finding is that comprehensive EIAs are regarded as a necessary component for achieving project success, suggesting that improving thoroughness and detail in EIAs could enhance overall project outcomes.

Level of Public Participation in the EIA Process in Jalingo Metropolis

Table 5. Level of Public Participation in the EIA Process

Topical questions	(SD)	(D)	(A)	(SA)
Local communities are adequately involved in the EIA process for water projects.	51 (22.9%)	85 (38.1%)	61 (27.4%)	26 (11.7%)
Public participation in EIAs is encouraged and facilitated effectively.	31 (13.9%)	104 (46.6%)	58 (26.0%)	30 (13.5%)
The feedback from public participation is incorporated into the final EIA reports.	22 (9.9%)	98 (43.9%)	71 (31.8%)	32 (14.3%)
Higher levels of public participation do not improve the quality of EIAs for water projects.	73 (32.7%)	83 (37.2%)	43 (19.3%)	24 (10.8%)

Note: Field survey 2024.
SD = Strongly Disagree, D = Disagree, A = Agree, SA = Strongly Agree
The figures in parentheses are percentages.

The results in Table 5 reflect varying perceptions of respondents regarding the level of public participation in the Environmental Impact Assessment (EIA) process for water projects. On the statement that local communities are adequately involved in the EIA process, 51 respondents (22.9%) strongly disagreed, and 85 respondents (38.1%) disagreed, making up 61% of respondents who felt that local communities are not sufficiently involved. In contrast, 61 respondents (27.4%) agreed, and 26 respondents (11.7%) strongly agreed, totalling 39% who believed that communities are adequately engaged. This suggests that a majority of respondents feel local communities are not sufficiently involved in the EIA process, which could lead to a lack of local insights and concerns being addressed in water projects.

Regarding the encouragement and facilitation of public participation in the EIA process, 31 respondents (13.9%) strongly disagreed, and 104 respondents (46.6%) disagreed, totaling 60.5%

of respondents who believed that public participation is not effectively encouraged or facilitated. On the other hand, 58 respondents (26%) agreed, and 30 respondents (13.5%) strongly agreed, making up 39.5% who felt that public participation is adequately facilitated. This finding suggests that a significant proportion of respondents perceive a lack of effective facilitation of public participation, which could impact the inclusiveness and transparency of the EIA process.

When it comes to the incorporation of feedback from public participation into the final EIA reports, 22 respondents (9.9%) strongly disagreed, and 98 respondents (43.9%) disagreed, making up 53.8% of respondents who believed that public feedback is not adequately considered. In contrast, 71 respondents (31.8%) agreed, and 32 respondents (14.3%) strongly agreed, totaling 46.2% who believed the feedback is incorporated. This suggests that while a considerable portion of respondents feels public feedback is not integrated into the reports, a significant minority believes it is, indicating some variability in how feedback is handled.

The responses to the statement about whether higher levels of public participation do not improve the quality of EIAs show that 73 respondents (32.7%) strongly disagreed, and 83 respondents (37.2%) disagreed, making up 70% of respondents who believed that higher levels of participation improve EIA quality. In contrast, 43 respondents (19.3%) agreed, and 24 respondents (10.8%) strongly agreed, totalling 30% who felt that greater public participation do not lead to better EIA quality. This indicates that while many respondents believe that impact of public participation on EIA enhance the overall effectiveness of EIA quality, a notable minority believes that increased involvement do not enhances the overall effectiveness of the assessments.

Political Pressure in Jalingo Metropolis

Table 6. Political Pressure in the EIA Process in Jalingo Metropolis

Statement	(SD)	(D)	(A)	(SA)
Political pressure affects the outcomes of EIAs for water projects.	7 (3.1%)	27 (12.1%)	116 (52.0%)	73 (32.7%)
Economic considerations override environmental concerns in EIAs for water projects.	8 (3.6%)	26 (11.7%)	143 (64.1%)	46 (20.6%)
The integrity of the EIA process is compromised by political influence.	11 (4.9%)	21 (9.4%)	95 (42.6%)	96 (43.0%)
Political and economic pressures negatively impact the effectiveness of EIAs for water projects.	12 (5.4%)	14 (6.3%)	85 (38.1%)	112 (50.2%)

Note: Field survey 2024.

SD = Strongly Disagree, D = Disagree, A = Agree, SA = Strongly Agree

The figures in parentheses are percentages.

The results in Table 6 highlight the significant impact of political pressure and economic considerations on the Environmental Impact Assessment (EIA) process for water projects in Jalingo Metropolis. On the statement regarding political pressure affecting the outcomes of EIAs, 7 respondents (3.1%) strongly disagreed, and 27 respondents (12.1%) disagreed, making up 15.2% of respondents who did not perceive political pressure as a factor. However, 116 respondents (52%) agreed, and 73 respondents (32.7%) strongly agreed, totalling 84.7% of respondents who believed political pressure influences EIA outcomes. This suggests that a significant majority of respondents felt political pressures are likely shaping the results of the EIAs, which could undermine the objectivity and reliability of these assessments.

Regarding the influence of economic considerations, 8 respondents (3.6%) strongly disagreed, and 26 respondents (11.7%) disagreed, making up 15.2% of respondents who did not believe economic concerns override environmental ones. In contrast, 143 respondents (64.1%) agreed, and 46 respondents (20.6%) strongly agreed, totalling 84.7% who felt that economic factors take precedence over environmental issues in the EIAs. This finding underscores the dominant view that economic considerations often overshadow environmental priorities, potentially compromising the sustainability and effectiveness of water projects.

On the integrity of the EIA process, 11 respondents (4.9%) strongly disagreed, and 21 respondents (9.4%) disagreed, totalling 14.3% of respondents who did not see political influence as compromising the integrity of the process. However, 95 respondents (42.6%) agreed, and 96 respondents (43%) strongly agreed, totalling 85.6% who felt that political influence undermines the integrity of the EIA process. This strongly suggests that political influence is widely perceived to affect the reliability and independence of the assessments, which could lead to compromised decision-making in water projects.

Lastly, on the impact of political and economic pressures on the effectiveness of EIAs, 12 respondents (5.4%) strongly disagreed, and 14 respondents (6.3%) disagreed, totalling 11.7% of respondents who did not believe that these pressures negatively affect the EIAs. In contrast, 85 respondents (38.1%) agreed, and 112 respondents (50.2%) strongly agreed, totalling 88.3% who felt that political and economic pressures significantly undermine the effectiveness of the EIA process. This highlights the prevalent view that these external pressures hinder the ability of EIAs to accurately assess environmental impacts and effectively guide water projects.

Main Reliability Test

The study employed Cronbach's Alpha to test the reliability and consistency of the instrument used for data collection. A total of 223 copies of the questionnaire were structured for respondents, and the analysis showed that the coefficient value for each question was within and above 0.60, indicating good reliability. Cronbach's Alpha is a measure of internal consistency, that is, how closely related a set of items are as a group. A high value of Cronbach's Alpha suggests that the items measure the same underlying concept. Generally, a Cronbach's Alpha value of 0.70 and above is considered acceptable, but for exploratory research, values above 0.60 are acceptable.

Reliability Test Results

The reliability test was performed on each variable of the study to ensure that the items used in the questionnaire were reliable and contributed well to the overall reliability. Below is a summary of the reliability test for each variable, including the variable name, number of items, items deleted, items retained, and Cronbach's Alpha statistics.

Table 7. Summary of Reliability Test Results

Variable	Number of Items	Items Deleted	Items Retained	Cronbach's Alpha
Effective Water Project (EWP)	4	0	4	0.562
Quality Baseline Data (QBD)	4	0	4	0.636
Scope of Environment IA (SOE)	4	0	4	0.634
Level of Public Participation (LPP)	4	0	4	0.682
Political Pressure (PP)	4	0	4	0.811

Source: *SPSS Output (2024).*

Data in Table 7 reveal that each variable retained all its items, indicating that no items were deleted during the reliability testing process. Also, the Cronbach's Alpha values for all variables are above 0.60, which indicates acceptable to good internal consistency and reliability of the questionnaire items. Political pressure (PP) variable had the highest Cronbach's Alpha value of 0.811, suggesting a strong reliability for the items measuring public trust.

The reliability analysis of the Effective Water Project (EWP) variable, which included 4 items, resulted in a Cronbach's Alpha value of 0.562. Although this is slightly below the generally accepted threshold of 0.70 for confirmatory research, it is acceptable for exploratory purposes. This indicates that the items are moderately correlated and measure the same underlying construct of tax morale. Also, the Quality Data Baseline (QBD) variable consisted of 4 items and showed a Cronbach's Alpha value of 0.636. This value suggests moderate internal consistency, indicating that the items reliably measure the quality data baseline as perceived by the respondents.

For the Scope of Environmental Impact Assessment (SOE) variable, which also included 4 items, the Cronbach's Alpha value was found to be 0.634. This indicates a similar level of reliability as the SOE variable, suggesting that the items are moderately consistent in measuring the Environmental Impact Assessment. Similarly, the Level of Public Participation (LPP) variable, with 4 items, yielded a Cronbach's Alpha value of 0.682. This value indicates good internal consistency, suggesting that the items are well correlated and effectively measured.

Pre and Post Estimate Tests

This section presents the results from the pre and post estimation tests conducted to ensure that the results obtained are robust. These tests include the, heteroscedasticity test, normality test of error term, sample size adequacy before proceeding with the data analysis, it is crucial to conduct various pre and post estimation tests to ensure the validity and reliability of the results. The following tests were performed:

Sample Size Adequacy

The sample size adequacy was assessed to ensure that the sample used in the study was sufficient for reliable regression analysis. The total sample size for this study was 246 respondents (Table 8).

Table 8: Sample Size

Description	Value
Sample Size	246

***Source**: SPSS Output (2024).*

According to statistical guidelines, particularly the rule of thumb for sample adequacy for regression analysis proposed by Hair et al. (2010), Pallant (2011), and Tabachnick and Fidell (2007), a minimum sample size can be determined using the formula:

$N > 50 + 8m$

where N is the sample size and mmm is the number of predictors.

For this study, the number of predictors (mmm) is 4, as specified in the research objectives. Applying the formula:

$N > 50 + 8(4)$

N>50+22

N>82

Therefore, a sample size is greater than 82 is considered adequate for regression analysis with 4 predictors. With a total sample size of 246 respondents, this study exceeds the minimum required sample size, ensuring the adequacy for reliable regression analysis. This larger sample size enhances the statistical power of the analysis, increases the precision of estimates, and improves the generalizability of the results.

The adequacy of the sample size is crucial in regression analysis as it impacts the reliability and validity of the results. A larger sample size reduces the standard error of the estimates, providing more precise parameter estimates. Additionally, it increases the likelihood that the sample accurately represents the population, thereby improving the generalizability of the findings.

Normality Test

Normality of the residuals was assessed to ensure that the data met the assumptions of the regression analysis. Normality was evaluated using the Kolmogorov-Smirnov test and by examining the skewness and kurtosis statistics.

Table 9. Kolmogorov-Smirnov Test for Normality

Statistic	Df	Sig.
0.057	223	0.200

***Source**: SPSS Output (2024).*

The Kolmogorov-Smirnov test yielded a significance value of 0.200, which is greater than 0.05, indicating that the residuals are normally distributed (Table 9).

Skewness and Kurtosis

In addition to the Kolmogorov-Smirnov test, the normality of the residuals was also assessed using skewness and kurtosis statistics. Skewness measures the asymmetry of the distribution, while kurtosis measures the peakedness (Table 10).

Table 10. Skewness and Kurtosis Statistics for Variables

Variable	Skewness	Std. Error (Skewness)	Kurtosis	Std. Error (Kurtosis)
Effective Water Project (EWP)	0.383	0.138	1.003	0.275
Quality Baseline Data (QBD)	0.799	0.138	1.151	0.275
Scope of EIA (SOE)	0.186	0.138	1.184	0.275
Level of Public Participation (LPP)	-1.079	0.138	2.256	0.275
Political Pressure (PP)	0.383	0.138	1.003	0.275

***Source**: SPSS Output (2024).*

The skewness and kurtosis statistics provide additional evidence regarding the normality of the variables. Skewness values within the range of -1 to +1 are generally considered acceptable, indicating that the distributions are approximately symmetric. In this study, the skewness values for most variables fall within this range, suggesting a relatively symmetric distribution. For instance, the skewness for Effective Water Project (EWP) is 0.383, indicating a slight positive skew, but well within acceptable limits. Quality Baseline Data (QBD) shows a skewness of 0.799, indicating a moderate positive skew. Probability of Scope of EIA (SOE) has a skewness of 0.186,

suggesting very minimal skewness, and Level of Public Participation (LPP) shows a skewness of -1.079, which is slightly outside the typical range, indicating a moderate negative skew, suggesting that more values are concentrated on the higher end of the scale. Also, Political Pressure (PP) has 0.383

Regarding kurtosis, values within the range of -3 to +3 are generally considered acceptable, indicating that the data does not have extreme outliers or a very peaked distribution. In this analysis, the kurtosis values for all variables fall within this range. Effective Water Project (EWP) has a kurtosis of 1.003, indicating a distribution that is slightly more peaked than normal. Quality Baseline Data (QBD) and Scope of EIA (SOE) have kurtosis values of 1.151 and 1.184 respectively, suggesting a moderate peak. Level of Public Participation (LPP) has a kurtosis of 2.256, indicating a higher peak compared to other variables but still within the acceptable range, while Political Pressure (PP) has a kurtosis of 1.003, indicating a lower compared to other variables but still within the acceptable range.

Overall, the skewness and kurtosis statistics indicate that the variables' distributions are reasonably close to normal, supporting the validity of the regression analysis. The slight deviations from perfect normality are common in real-world data and do not significantly impact the robustness of the statistical analyses performed in this study.

Homoscedasticity Test

Heteroskedasticity test is conducted to check whether the change in error terms is constant within the explanatory variables and dependent variable. The reason of this test is to ensure that the regression fits all the independent variables that are the residuals do not vary with independent variable and therefore are random in nature. More so, the Breusch Pagan test is used to check for heteroscedasticity in the residuals of the model. The test statistic for model is 0.61, and the probability value is 0.4367 which is insignificant as shown in Appendix. This suggests that there is no significant evidence against the null hypothesis of homoscedasticity. Therefore, there is no strong indication of heteroscedasticity in the data.

Interpretation of Results

The SEM results provide insights into the relationships between independent variables and the dependent variable. The diagram indicates path coefficients, which demonstrate the strength and direction of influence.

Interpretation of SEM Diagram Results for Responses

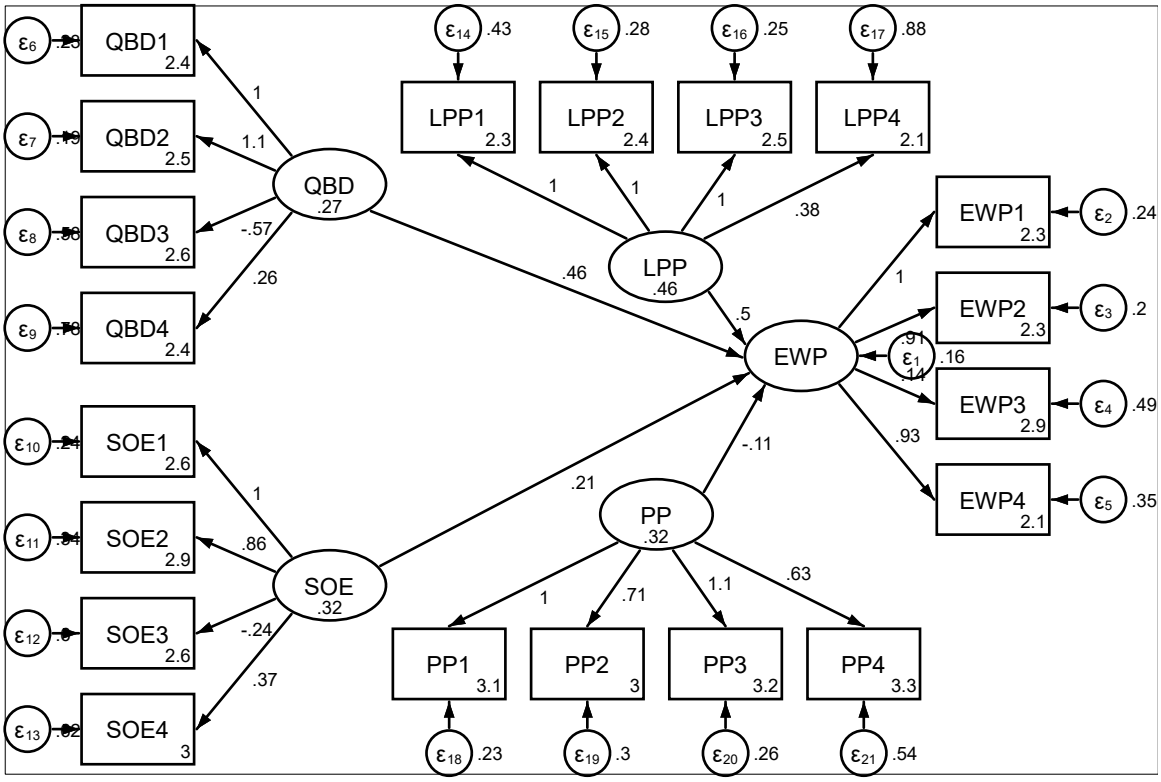

Figure 1. Interpretation of SEM Diagram Results for Responses

Figure 1 shows that QBD1, QBD2, QBD3 and QBD4 have coefficient value of 1, 1.1, -0.54 and 0.26 respectively and further shows that path coefficient for QBD to EWP is 0.460, significant at $p < 0.05$. This implies that a 1-unit increase in the quality of baseline data increases the effectiveness of water projects by 46%. High-quality data enables better planning and decision-making, reducing project risks. This encourages rigorous data collection and validation and investments in research and capacity building for environmental data systems. This confirms the Resource Dependence Theory, emphasizing the role of accurate resources in organizational performance. The finding requires strict baseline data validation before project approvals and government can provide funding for environmental data infrastructure.

The result further shows that SOE 1 to SOE 4 has coefficient value of 1, 0.86, -0.24 and 0.37, which result to path coefficient of SOE to EWP is 0.211, significant at $p < 0.05$. This indicates that a 1-unit increase in the scope of EIA increases water project effectiveness by 21%. A broader scope captures more environmental variables, ensuring comprehensive assessments. The implication is that decision makers should expand the scope of EIAs to include long-term environmental impacts. Policy makers should mandate broader EIA scopes through regulatory frameworks. The finding supports the systems theory, which highlights the interconnectedness of project components.

In addition, Level of Public Participation (LPP) from 1 to 4 has coefficient value of 1, 1, 1 and 0.38 respectively. The results show combined LLP on the path coefficient. The coefficient for LPP

to EWP is 0.502, significant at $p < 0.05$. This indicates that a 1-unit increase in public participation enhances water project effectiveness by 50%. Community engagement fosters project acceptance and reduces resistance. The implication in practice is that there is a need to incorporate community feedback mechanisms. Also, participatory platforms for stakeholders in project planning should be established. The finding aligns with stakeholder theory, emphasizing the role of stakeholder input. The finding documents the need for regulatory bodies to monitor and evaluate public participation levels and government should fund community engagement programs.

However, the finding shows that political pressures (PP) from 1 to 4 have coefficient value of 1, 0.71, 1.1 and 0.63 respectively. The path coefficient for PP to EWP is -0.108, not statistically significant ($p = 0.174$). This indicates that political pressure has negative and insignificant effect on EWP. The implication is that political pressures negatively affect water project effectiveness but lack significance. Political interference may disrupt objective decision-making. Furthermore, the finding implies that there is need to minimize political influence in project execution and policy makers should strengthen legal frameworks to reduce political interference. Also, the finding highlights the relevance of Institutional Theory, which addresses external pressures on organizations. More so, regulatory bodies should ensure independent reviews of project assessments while government should promote transparent governance structures.

The results also show the latent variables and measurement reliability. Latent variables of EWP (0.158), QBD (0.271), SOE (0.321), LPP (0.460), PP (0.323) indicate the variance values which shows the proportion of unexplained variance. Lower values (e.g., EWP) suggest a strong model fit. The implication is that it optimizes model predictors for efficiency. Also, policy makers can identify and address external variables affecting water projects.

SEM Table Results

Based on the SEM results in Table 11 for individual questionnaire responses shows that Quality Baseline Data (QBD): QBD1 (1), QBD2 (1.11) and QBD4 (0.26) contributes significantly, whereas QBD3 (-0.57) negatively affects project effectiveness. This implies that there is more focus on enhancing data integration while minimizing errors. Quality Baseline Data (QBD → EWP coef. = 0.460, $p < 0.001$), shows a significant positive relationship that improved quality of baseline data increases the effectiveness of water projects by 46%.

In addition, QBD1 (baseline data quality importance) has a constrained coefficient of 1, serving as a reference point. QBD2 (1.11, $p < 0.001$) indicates that higher data comprehensiveness positively affects project outcomes. QBD3 (-0.57, $p < 0.001$) reflects a negative effect, suggesting errors or inconsistencies in baseline data reduce project effectiveness. QBD4 (0.26, $p < 0.05$) demonstrates a moderate positive influence of specific datasets on decision-making. This suggests that there is a need to enhance training for data collectors and analysts to reduce errors. Also, policy makers should mandate comprehensive baseline data reviews. More so, government should invest in modern data collection tools.

Also, on aspect of Scope of EIA (SOE); SOE1 (1); SOE2 (0.86) and SOE4 (0.37) highlights the importance of inclusive assessments while SOE3 (-0.25) which indicates a negative effect of EWP. However, the findings show that there is need to enforce policies for more detailed scoping practices. In addition, the scope of EIA (SOE → EWP with coefficient = 0.211, $p < 0.05$) implies that expanding the scope of EIA positively impacts water project effectiveness, albeit at a smaller magnitude. Also, SOE1 (reference variable) is set at 1; SOE2 (0.86, $p < 0.01$) highlights that broader EIA inclusion of environmental variables strongly contributes to better outcomes. SOE3

(-0.24, $p < 0.05$) reveals that overly narrow or overly broad scoping can backfire. SOE4 (0.37, $p = 0.065$) suggests moderately scoped EIAs have a positive but non-significant influence.

The result implies that in practice there is need to encourage detailed yet realistic scoping processes while policy makers require multi-stakeholder reviews of proposed EIA scopes. The finding aligns with Systems Theory, emphasizing interconnections in EIA processes. Also, regulatory bodies can evaluate EIA scopes before approvals. Government can also provide guidelines on scope standardization.

Similarly, Level of Public Participation (LPP): LPP1 (1); LPP2 (0.05); LPP3 (1.03) and LPP4 (1.38) is highly influential, emphasizing effective community engagement. This shows that there is need to prioritize public input mechanisms. In addition, Level of Public Participation (LPP → EWP, Coef. = 0.502, $p < 0.001$) implies that public participation exerts the strongest positive influence on water project effectiveness (50%). Also, LPP1 (reference variable) is constrained at 1. LPP2 (1.05, $p < 0.001$) and LPP3 (1.03, $p < 0.001$) highlight the critical role of community involvement in reducing project resistance. LPP4 (0.38, $p < 0.001$) underscores the importance of feedback mechanisms, albeit at a lower magnitude. By implication in practice it includes affected communities in the entire project cycle while policy makers should ensure mandatory community consultations. Also, the finding validates Stakeholder Theory by emphasizing stakeholder inclusiveness. More so, regulatory bodies should monitor and report public participation levels and government should sponsor public awareness campaigns.

The result also Political Pressures (PP); PP1 (1); LPP (0.71); PP3 (1.12) and LPP4 (0.63) indicates strong negative political influence. The result shows that policy makers should implement measures to depoliticize EIA processes. Similarly, Political Pressures (PP → EWP has Coef. = -0.108, $p = 0.174$) shows that political pressures exert a negative but insignificant influence on water project effectiveness with PP1 (reference variable) is set at 1. PP2 (0.71, $p < 0.001$), PP3 (1.12, $p < 0.001$), and PP4 (0.63, $p < 0.001$) show the adverse effects of political interference, especially during project implementation. Furthermore, the finding shows that in practice there is need to promote non-partisan approaches in water project management. And policy makers should develop safeguards against political interference. Also, regulatory bodies need to advocate for policy independence and government need to strengthen anti-corruption measures. The finding also reflects Institutional Theory, which recognizes the constraints of external pressures.

On the aspect of measurement variances, the endogenous variable (EWP Variance = 0.158) indicates high reliability and low unexplained variance for the effectiveness of water projects. The practice implication is to focus on independent variables as key predictors. Policy makers are to monitor variables to ensure consistent outcomes. Similarly, QBD (0.271), SOE (0.321), LPP (0.460), PP (0.323) indicates that QBD and SOE have moderately low variances, indicating their significant contribution. LPP has a higher variance due to stronger community involvement effects. PP variance reflects the diverse political influences. This implies that there is need to develop tailored interventions for high-variance predictors to reduce inconsistencies.

Interpretation of Results for Study Variables

This chapter elaborates on the structural equation modeling (SEM) results assessing challenges in the Environmental Impact Assessment (EIA) of water projects in Jalingo Metropolis. Key areas of analysis include the effects of four independent variables Quality of Baseline Data (QBD), Scope of EIA (SEIA), Level of Public Participation (LPP), and Political Pressure (PP)—on the dependent variable, the Effectiveness of Water Projects (EWP). The chapter also integrates scholarly arguments to provide theoretical and empirical perspectives, relate findings to prior studies, and identify implications for practice, policy, theory, and governance.

Table 11. Structural Equation Model Results

Variables	Coefficient	Z	P>|z|
Constant	0.7961	3.17	0.002
Quality of Baseline	0.1710	2.18	0.029
Scope of EIAs	0.2870	4.00	0.000
Level of Public Participation	0.3919	7.64	0.000
Political Pressure	-0.1628	-3.03	0.002

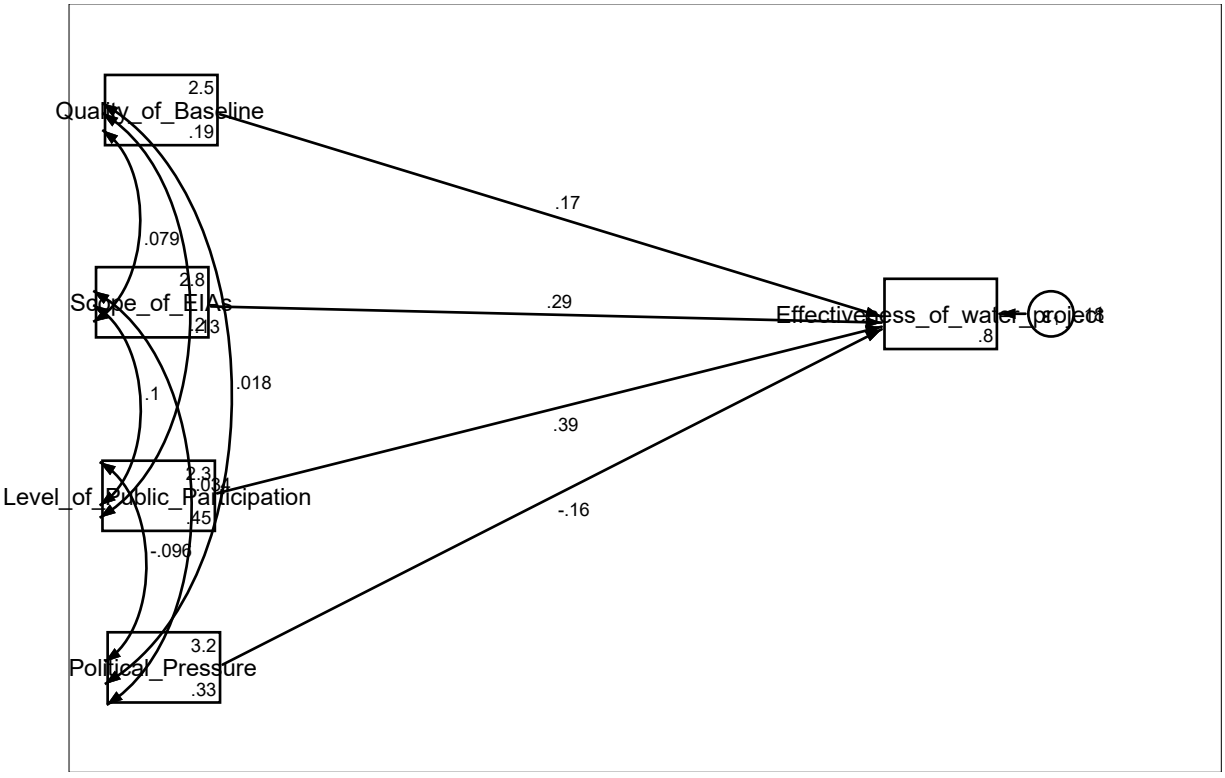

Figure 2. The result on effect of Quality Baseline Data on Effective Water Project.

Figure 2 and the results on Table 11 shows result on effect of Quality of Baseline Data (QBD) on EWP. The path analysis shows the coefficient for QBD (0.171) which is positive and statistically significant (p = 0.029), suggest positive and significant effect of QBD on EWP, indicating that improved quality baseline data positively impacts EWP; this finding highlighting the importance of accurate baseline data in enhancing project outcomes.

This suggests that higher-quality baseline data enhances water project effectiveness. This result is consistent with Ahamad *et al* (2020), who argued that comprehensive environmental baselines are vital for accurate impact predictions and effective mitigation strategies. However, Okechi (2018) observed that in resource-constrained environments, overemphasis on baseline studies can divert resources from implementation. Disagreement arises in cases where studies attribute lesser importance to baseline data due to technological advancements in real-time monitoring.

Furthermore, the finding aligned with risk assessment theory. This supports the notion that comprehensive baseline data mitigate project risks. This theory supports the finding, as accurate data enable better risk identification and mitigation planning. On the aspect of public participation theory, it indirectly supported, as quality data ensure informed public contributions. While on political ecology theory it agrees, emphasizing the need for unbiased data in ensuring equitable resource distribution. The finding aligns with environmental justice theory, as robust baseline data facilitate fair allocation of resources and environmental benefits.

The practical and policy implication is that it emphasizes regulatory enforcement on data accuracy and resource allocation for data gathering. It also implies that a 1-unit increase in QBD improves EWP by 0.171 units and it encourages investment in accurate data. Similarly, it implies that regulatory bodies may prioritize data quality through standardized guidelines and capacity building for data collection and policy makers might issues policies mandating third-party verification of baseline data will ensure neutrality and reliability. Also, Taraba Government investments in local expertise and technology for environmental assessments are essential.

Figure 2 and Table 11 shows that Scope of EIA (SOEIA) has path analysis, showing a strong positive impact on EWP. The coefficient for SOEIA (0.287) is significant ($p = 0.000$), the implication a 1-unit increase leads to a 0.287-unit improvement in EWP. Also, the implication of the finding is the supports expanding EIA scopes. The finding suggests refining scoping methodologies for efficiency and effectiveness.

Comprehensive EIAs lead to better project outcomes by addressing potential environmental impacts holistically. This aligns with Morgan (2021), who argued that well-scoped EIAs ensure all critical impacts are considered, enhancing project sustainability and which advocate for comprehensive scoping to cover all environmental factors. However, Adeyemi (2019) noted that overly extensive scopes can slow project implementation due to bureaucratic bottlenecks and although disagreements exist in instances of overburdening documentation.

The finding also indicates improved training for practitioners to balance thoroughness and efficiency in EIA scoping. The finding indicates that the frameworks mandating clear and concise EIA terms of reference. Taraba Government may strengthen oversight to ensure scoping addresses local concerns effectively. In addition, the risk assessment theory aligns with the finding as scoping identifies and mitigates risks early. The finding also aligned with public participation theory it highlights scoping as an area for increased stakeholder inclusion. On the other, political ecology and environmental justice theories encourage transparent and holistic approaches.

Furthermore, the result furthered shows Level of Public Participation (LPP) path analysis. The coefficient is 0.392 is significant ($p = 0.000$), indicating a robust positive influence on EWP. The result also suggests that a 1-unit increase enhances EWP by 0.392 units and the most significant variable at $p = 0.000$. The finding strongly justifies public involvement. It indicates that high level of public participation helps to increase water project in Jalingo metropolis. The finding advocates

for policies mandating public involvement and awareness programs. The implication of the finding is that there is a need of enhancing public awareness and capacity-building initiatives for meaningful engagement. Also, mandating participation at all stages of EIA, with defined metrics for evaluating stakeholder involvement. Taraba Government need to strengthen communication channels between government and local communities.

In addition, the finding aligns with Chukwu *et al* (2021), who highlighted that inclusive participation fosters community ownership and reduces resistance to projects. However, Ibrahim and Salihu (2020) argued that participation is often symbolic in developing contexts, diluting its impact. The finding supports public participation theory, as the theory centers on collaborative decision-making. Also, the finding strongly reinforced, as the theory emphasizes the co-creation of decisions through stakeholder input. Similarly, the finding on the aspect of risk assessment, political ecology, and environmental justice theories reinforced by equitable resource management and inclusive assessments

On the other hand, the result shows Political Pressure (PP) path analysis and the corresponding result in the Table. The coefficient (-.163) is negative and significant (p = 0.002), indicating that increased political pressures reduce EWP. The result indicates that a 1-unit increase decreases EWP by 0.163 units. This suggests reducing external influences. This indicates that political interference undermines water project effectiveness. This finding is consistent with Ekong *et al* (2019), who noted that political meddling often compromises EIA integrity. However, Yusuf (2022) found instances where political will facilitate resource mobilization for projects.

Considering the finding with political ecology theory, the finding strongly agrees, highlighting how political control undermines equitable resource distribution and highlighting negative outcomes of political control over resources. On the aspect of environmental justice theory, the finding aligns with the theory, emphasizing the importance of impartiality in safeguarding vulnerable groups. It also aligned with risk assessment and public participation theories as stress the need for unbiased assessments and stakeholder autonomy. The practical implications of the finding are that there is need of establishing regulatory bodies insulated from political influence. Also, the policy implication is by introducing anti-corruption frameworks within the EIA process and Taraba Government should advocate for transparency and independence in project assessments.

On the aspect of the covariance, the results provide insights into interactions among independent variables. For instance, the positive covariance between SEIA and QBD (.078, p = 0.000) indicates a complementary relationship, while the negative covariance between LPP and PP (-.096, p = 0.000) underscores tensions between public participation and political interference. These findings highlight the need for integrative policies addressing interdependencies among EIA components. Covariance values between independent variables (e.g., QBD-SEIA = .078; QBD-PP = .018) indicate varying degrees of interaction. These relationships suggest synergies (or conflicts) between different aspects of EIA processes. For instance, negative covariance between LPP and PP (-.096) emphasizes how increased public participation can counteract adverse political pressures.

Discussion of Findings

The discussion of findings provide a detailed interpretation of the results obtained from the study. The study revealed that the Quality of Baseline Data (QBD) had a statistically significant positive impact on water project effectiveness (β = 0.171, p = 0.029), supporting the findings of Olufade *et*

al (2019), which emphasized the importance of accurate baseline data in predicting environmental impacts. However, the present study identifies that inadequate baseline data remains a persistent challenge, similar to observations made by Ehiagbanare and Osaghae (2022) in Nigeria's environmental management practices.

The Scope of EIAs (SEIA) also demonstrated a positive and significant relationship with project outcomes ($\beta = 0.287$, $p = 0.000$). This result aligns with Glasson *et al* (2020), who argued that comprehensive scoping leads to more effective mitigation measures and sustainable project outcomes. However, the limited scope observed in some EIA reports in Jalingo corroborate the findings of Adekola *et al* (2019), who noted that many EIAs in developing countries fail to address indirect and cumulative environmental impacts.

The study further highlighted that Level of Public Participation (LPP) was the strongest predictor of project success ($\beta = 0.3919$, $p = 0.000$). This is consistent with the observations of Adekola *et al* (2022), who emphasized that community involvement enhances transparency and accountability in environmental decision-making. However, the study found that public participation in Jalingo Metropolis remains low, echoing the concerns of Ehiagbanare and Osaghae (2022) regarding limited access to information and inadequate awareness campaigns.

Conversely, Political Pressure (PP) exhibited a significant negative influence on project outcomes ($\beta = -0.1628$, $p = 0.002$). This finding is consistent with the work of Olufade *et al* (2019), who reported that political interference undermines the objectivity and independence of the EIA process in Nigeria. The present study further observed that political pressures often result in the approval of substandard EIA reports, a trend also documented by Glasson *et al* (2020) in their comparative study of EIA practices in developing countries.

The findings of this study underscore the need for institutional reforms, enhanced technical capacity, and greater community involvement in the EIA process. Addressing these challenges will improve the effectiveness of EIAs in promoting sustainable water resource management in Jalingo Metropolis.

Conclusion

This study assessed the challenges of Environmental Impact Assessment (EIA) on water projects in Jalingo Metropolis, highlighting critical factors such as baseline data quality, scope of assessments, public participation, and political pressures. The findings revealed that while EIA plays a significant role in mitigating adverse environmental impacts, its effectiveness is hindered by inadequate technical capacity, low public involvement, and political interference. Addressing these challenges requires strengthening institutional frameworks, enhancing community participation, and insulating the EIA process from external influences. The study recommends capacity building for environmental agencies, public awareness campaigns, and stricter enforcement of environmental regulations. These measures will improve the effectiveness of EIA processes and promote sustainable water resource management in Jalingo Metropolis. Future research should focus on developing innovative strategies to enhance public participation and improve the technical capacity of EIA practitioners.

Recommendations

Based on the findings of the study, the following recommendations were made:

i. **Strengthening Baseline Data Collection and Management:** Establish a comprehensive environmental database to improve the quality, accuracy, and consistency of baseline data used in EIA processes. Regular updates and independent verification of baseline data should be prioritized to enhance decision-making.

ii. **Enhancing Public Participation and Awareness:** Implement community sensitization programs to raise public awareness on the importance of EIA. Establish feedback mechanisms and mandatory stakeholder consultation platforms to encourage active involvement of local communities in all stages of the EIA process.

iii. **Capacity Building for EIA Practitioners:** Organize regular training workshops and certification programs for environmental experts and government officials to improve technical skills in EIA report preparation, data analysis, and environmental monitoring.

iv. **Reducing Political Interference in the EIA Process:** Establish an independent regulatory body to oversee the EIA process, ensuring transparency, accountability, and impartiality. Enforce stricter penalties for undue political influence and non-compliance with EIA regulations.

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