International Journal of Management and Commerce Innovations ISSN 2348-7585 (Online)
Vol. 14, Issue 1, pp: (536-547), Month: April 2026 - September 2026, Available at: www.researchpublish.com

Stakeholders Participation and Sustainability of National Irrigation Authority Projects in Wajir County, Kenya

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DOI: https://doi.org/10.5281/zenodo.20624565

Published Date: 10-June-2026

Abstract: **This study examined the effect of stakeholder engagement on the sustainability of National Irrigation Authority projects in Wajir County. Despite significant investment in water projects, many projects in the county remain unsustainable, non-functional, or abandoned, limiting access to reliable water supply for over 70% of residents between 2020 and 2025. The study specifically investigated the influence of stakeholder training, decision-making processes, stakeholder communication, and stakeholder participation in leadership on project sustainability. The research was guided by Agency Theory and Stakeholder Theory and adopted a descriptive research design. Data were collected using semi-structured questionnaires from a sample of 353 respondents selected through cluster sampling from a target population of 3,000 community members. Descriptive and inferential statistics, including Pearson correlation and multiple regression analysis, were used to analyze the data. The findings revealed that stakeholder training, decision-making processes, stakeholder communication, and stakeholder participation in leadership all had a statistically significant positive effect on the sustainability of National Irrigation Authority projects ($p < 0.05$). The study concludes that effective stakeholder engagement enhances project sustainability through improved participation, communication, leadership, and decision-making. The study recommends the establishment of effective stakeholder training programs, inclusive decision-making mechanisms, strong communication strategies, and visionary leadership practices to improve the long-term sustainability and performance of water projects in Wajir County, Kenya.**

Keywords: **Stakeholder engagement; Project sustainability; Irrigation projects; Decision-making process; Community participation.**

1. INTRODUCTION

Globally, governments play a central role in addressing socio-economic challenges such as poverty, unemployment, and inequality through development initiatives and community-based interventions aimed at improving livelihoods. In developing regions, public sector support remains essential in strengthening community-driven development processes that enhance inclusive growth and poverty reduction (Kisang, 2019). However, despite these efforts, many regions, particularly sub-Saharan Africa, continue to experience high levels of multidimensional poverty and food insecurity, underscoring the need for sustainable development strategies (Akotia, 2021).

Community-based development approaches emphasize the active involvement of community members in identifying priorities, planning interventions, and managing projects. Such participatory approaches enhance ownership, accountability, and long-term sustainability of development outcomes (Soyemi, 2024). Globally, participatory governance gained prominence from the 1970s, particularly in developed countries such as the United Kingdom and Canada, where reforms promoted citizen engagement in decision-making, policy formulation, and public accountability (UK Government Policy Report, 2019; Smith & Graham, 2022). These systems demonstrate that stakeholder involvement improves transparency, legitimacy, and effectiveness of public policies.

In Africa, governance reforms have increasingly embraced decentralization and citizen participation to improve development outcomes. For instance, post-apartheid reforms in South Africa and decentralized governance systems in Uganda and Guinea highlight the importance of stakeholder engagement in enhancing project success and accountability (Thwala, 2019; Al-Khalifa et al., 2019; Ochieng, 2025). Similarly, Kenya has implemented constitutional reforms through devolution to strengthen public participation in planning, budgeting, and monitoring of development projects (Legal Resources Foundation Trust, 2019).

Project sustainability is broadly understood as the ability of projects to maintain environmental, social, and economic benefits over time. However, many projects fail to achieve long-term success due to weak governance, limited stakeholder engagement, and inadequate institutional capacity (Project Management Institute, 2017; World Bank, 2018). Sustainable projects require not only economic viability but also social inclusion, stakeholder satisfaction, and effective institutional arrangements (Karlsen, 2018; Silvius & Schipper, 2020).

Stakeholder participation is a key determinant of project sustainability and involves the active involvement of stakeholders in planning, implementation, monitoring, and evaluation. Empirical studies show that participation enhances transparency, accountability, and ownership, thereby improving project outcomes (Reed et al., 2020; Bryson et al., 2021). Key dimensions of stakeholder participation include decision-making, communication, training, and leadership, all of which contribute to improved project performance and sustainability (Omondi & Kinoti, 2020; Oppong et al., 2020; Muller et al., 2021).

In Kenya, irrigation projects implemented by the National Irrigation Authority are critical for enhancing food security and livelihoods in arid and semi-arid regions such as Wajir County. However, despite significant investments, many projects face sustainability challenges due to limited stakeholder involvement and weak governance structures, necessitating further investigation into the role of stakeholder engagement in ensuring long-term project success.

2. LITERATURE REVIEW

The literature review is anchored on four main theoretical perspectives—Stakeholder Theory, Agency Theory, Resource Mobilization Theory, and Stewardship Theory—which collectively explain how stakeholder engagement influences project sustainability. Stakeholder Theory, as advanced by Freeman, Wicks, and Parmar (2004), emphasizes that project success depends on balancing the interests of diverse stakeholders such as communities, financiers, governments, and implementing agencies. It challenges shareholder-centric approaches by arguing that long-term project sustainability is achieved when stakeholder needs are integrated into decision-making processes. Scholars such as Clarkson (1995) and Donaldson and Preston (1995) reinforce this view by noting that sustainable organizational performance is rooted in strong stakeholder relationships, shared ownership, and alignment of organizational goals with stakeholder expectations.

Agency Theory, developed by Jensen & Meckling (1976), explains relationships between principals and agents, where project managers (agents) may not always act in the best interest of beneficiaries (principals), leading to agency conflicts. The theory highlights the importance of accountability mechanisms, monitoring systems, and transparency to minimize opportunistic behavior and improve project outcomes (Donaldson & Muth, 1998). Empirical studies such as Eisenhardt et al. (2020), Nguyen and Nguyen (2021), and Osei-Kyei and Chan (2022) demonstrate that participatory decision-making and strong governance structures reduce information asymmetry and enhance project performance. However, critics including Davis et al. (2020) and Hill and Jones (2021) argue that the theory overemphasizes control mechanisms while underestimating trust, cooperation, and social relationships in development projects.

Resource Mobilization Theory, originally developed by McCarthy & Zald (1977), explains that the success and sustainability of projects depend on the effective acquisition and utilization of financial, human, and material resources. Contemporary interpretations emphasize the role of leadership, coordination, and stakeholder collaboration in mobilizing resources for sustainable development (Edwards & McCarthy, 2020; Jenkins, 2022). Empirical evidence from Obeng et al. (2020), Mutinda and Wanyoike (2021), and Njeru and Kihoro (2023) confirms that effective resource mobilization enhances project sustainability, particularly when supported by participatory governance structures. Nonetheless, scholars such as Ludwig and Pemberton (2020) and Bosi and Giugni (2022) critique the theory for overemphasizing formal resources while neglecting the role of social capital and informal networks.

Stewardship Theory, as developed by Davis, Schoorman & Donaldson (1997), offers a contrasting perspective by assuming that managers act as stewards whose primary motivation is to advance organizational and stakeholder interests rather than self-interest. This theory highlights trust, collaboration, and shared responsibility as key drivers of organizational success (Blair, 2020; Hernandez, 2021). Empirical studies such as Muriithi and Wanyoike (2020), Alshammari et al. (2021), and Ofori and Sackey (2023) support the view that stewardship-oriented leadership enhances accountability, stakeholder trust,

and sustainability of development projects. However, critics argue that the theory is overly optimistic about human behavior and underestimates the need for monitoring and control systems (Daily et al., 2020; Nicholson & Kiel, 2021).

The empirical literature further reinforces the centrality of stakeholder engagement in determining project sustainability. Evidence on community training shows that capacity building is crucial for sustaining projects after donor withdrawal, as lack of skills often leads to project failure (Harvey & Reed, 2007). Khwaja (2014) similarly finds that training improves decision-making and project outcomes, while studies in Africa such as Oduwo (2014) and Onchoke (2013) highlight persistent gaps in community education and empowerment. However, Meinich (2010) notes that even in the absence of formal training, strong participatory processes can still generate ownership, although sustainability remains uncertain without structured capacity development.

Studies on decision-making processes consistently show that limited stakeholder participation undermines project effectiveness. Chifamba (2013) and Mironga et al. (2018) report that weak inclusion mechanisms and poor communication reduce community influence in project planning and implementation. Conversely, Ejimabo (2015) demonstrates that participatory and innovative decision-making significantly improves project performance. Similar findings by Ngugi and Wanyonyi (2018) confirm that stakeholder involvement enhances donor-funded project outcomes, although capacity constraints often limit effective participation.

Communication is also widely recognized as a critical determinant of sustainability. Kakaza (2019) emphasizes that effective communication enhances stakeholder involvement and project success, while Nyabera (2015) and Njuguna (2016) confirm its positive relationship with project performance. However, inadequate communication and weak feedback mechanisms continue to hinder project success in many contexts, as noted by Patricio (2013) and Ndou (2013). Al-Khalifa et al. (2019) and Alqaizi (2018) further argue that structured communication systems and stakeholder engagement improve decision quality and alignment of project objectives.

Leadership emerges as another key factor influencing project sustainability. Studies such as Masanyiwa and Kinyashi (2018) and Mulyungi and Mungatu (2017) show that inclusive leadership enhances project success by strengthening coordination and stakeholder involvement. However, leadership effectiveness is often constrained by political interference and inadequate community participation (Ofuoku, 2011). Similarly, empowerment-focused studies such as Oino et al. (2019) highlight both the benefits and limitations of participatory leadership approaches.

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3. RESEARCH METHODOLOGY

The study adopted a descriptive research design to systematically describe the characteristics of respondents and examine relationships among study variables (Creswell & Creswell, 2017; Mugenda & Mugenda, 2003). The target population comprised 3,000 beneficiaries of National Irrigation Authority projects in Wajir North Constituency, specifically users of the Ogorgi water pan and Bute mega dam.

A sample of 353 respondents was selected using Taro Yamane's (1960) formula at a 95% confidence level. Cluster sampling was used to group respondents by villages, while purposive sampling identified those directly involved in project activities.

Primary data were collected using structured questionnaires with a five-point Likert scale. Data collection followed ethical approval from the institution and NACOSTI, and was administered using a drop-and-pick method.

A pilot study involving 35 respondents was conducted to refine the instrument and ensure validity and reliability. Cronbach's Alpha ($\alpha \geq 0.7$) was used to test reliability using SPSS version 26.0.

Data were analyzed using SPSS through descriptive statistics (frequencies and percentages) and inferential statistics, including Pearson correlation and multiple regression analysis. The study estimated the effect of leadership skills, stakeholder training, decision-making, and communication on project sustainability using a regression model.

Diagnostic tests were conducted to ensure validity of regression assumptions, including tests for multicollinearity (VIF), normality (Shapiro–Wilk), and heteroscedasticity (Breusch–Pagan). Where necessary, corrective measures such as weighted regression were applied to ensure reliable estimates.

Ethical standards were upheld through informed consent, confidentiality, and formal research authorization, ensuring professional and responsible conduct throughout the study.

4. FINDINGS AND DISCUSSIONS

4.1 Descriptive Statistics

The study examined stakeholder participation and its relationship with the sustainability of National Irrigation Authority projects in Wajir County, Kenya. Descriptive statistics were used to summarize respondents' perceptions across key dimensions, including stakeholder training, decision-making processes, and stakeholder communication.

4.1.1 Stakeholder Trainings

Figure 1: Type of Training Received

Type of Training	Percentage (%)
Leadership skills	21.03
Technical skills	51.59
Environmental sustainability skills	27.38

Study Data (2025)

The findings indicate that most respondents (51.59%) received technical skills training, followed by environmental sustainability skills (27.38%) and leadership skills (21.03%). This reflects the technical nature of irrigation projects in the study area.

Figure 2: Effectiveness of Training

Training Effectiveness	Percentage (%)
Extremely effective	36.11
Effective	47.62
Neutral	16.27

Study Data (2025)

A majority of respondents (83.73%) considered the training effective or extremely effective, suggesting that capacity-building initiatives were generally well received.

4.1.2 Decision-Making Process

Figure 3: Involvement in Decision Making

Level of Involvement	Percentage (%)
Not involved at all	13.10
Actively involved	33.73
Occasionally involved	53.17

Study Data (2025)

Most respondents (53.17%) reported occasional involvement in decision-making, indicating limited but existing stakeholder participation, largely influenced by centralized project implementation structures.

Figure 4: Transparency in Decision Making

Level of Transparency	Percentage (%)
Not transparent	17.86
Somewhat transparent	53.97
Very transparent	28.17

Study Data (2025)

The results show moderate perceptions of transparency, with most respondents indicating that decision-making processes were somewhat transparent.

Figure 5: Level of Satisfaction

Satisfaction Level	Percentage (%)
Neutral	13.49
Very satisfied	19.05
Satisfied	67.46

Study Data (2025)

A large majority (86.51%) of respondents expressed satisfaction with the decision-making process, indicating overall positive perceptions.

4.1.3 Stakeholder Communication

Figure 6: Rate of Communication

Communication Rate	Percentage (%)
Good	57.14
Fair	25.40
Great	17.46

Study Data (2025)

The findings indicate that communication was generally perceived as good, with more than half of respondents rating it positively.

Figure 7: Method of Communication

Communication Method	Percentage (%)
Community meetings	69.05
Social media platforms	16.27
Emails and letters	14.66

Study Data (2025)

Community meetings were the dominant communication channel, reflecting the local participatory context of project implementation.

Figure 8: Project Updates Frequency

Frequency of Updates	Percentage (%)
Weekly updates	52.78
Monthly updates	33.33
Rarely receive updates	13.89

Study Data (2025)

Most respondents (52.78%) reported receiving weekly project updates, indicating relatively frequent information dissemination.

4.1.4 Stakeholder Participation in Leadership Skills

This section presents the extent of participation in leadership skills by the respondents and how these participation relate to the project sustainability. The analysis focuses on several dimensions including planning, implementation and monitoring and evaluation as displayed in table 1.

The respondents were requested to react to the question of how they perceive participation in leadership skills attributes as displayed in table 1.

Table 1: Descriptive Statistics of Participation in Leadership Skills

	N	Mean	Std. Dev
What extent do stakeholders participate planning	252	4.1389	.73647
What extent do stakeholders participate implementation	252	4.2183	.67096
What extent do stakeholders participate M&E	252	4.0952	.69062
Valid N (listwise)	252		

Study Data (2025)

On the aspect of the extent do stakeholders participate planning, extent do stakeholders participate implementation and extent do stakeholders participate M&E, majority of the respondents agreed with the assertions at a mean 4.1389, 4.2183 and 4.0952 with a variance of 0.73647, 0.67096 and 0.69062 respectively.

4.1.4.1 Challenges that hinder Stakeholder Participation in Leadership Skills

The study identified several challenges affecting stakeholder participation in leadership skills within National Irrigation Authority projects in Wajir County. The findings revealed that limited resources were the major challenge affecting participation, followed by poor communication and lack of awareness. This suggests that inadequate financial and material support significantly constrains effective stakeholder involvement in leadership-related activities.

Table 2: Challenges Hindering Stakeholder Participation in Leadership Skills

Challenges	Percentage (%)
Lack of awareness	17.46
Poor communication	26.69
Limited resources	55.95

Source: Study Data (2025)

4.1.5 Stakeholder Participation in Leadership Skills

This section presents the extent of project sustainability. The analysis focuses on several dimensions including project viability, project funding, benefits and project value as displayed in table 3. The respondents were requested to react to the question of how they perceive project sustainability attributes as displayed in table 3.

Table 3: Descriptive Statistics of Project Sustainability

	N	Mean	SD
Plan's ideas are both socially and financially feasible	252	4.3333	.56456
The recipients have benefited from the projects carried out by the plan	252	4.5238	.58826
Five years after donor support ends, Plan's initiatives are still in operation	252	4.3810	.65422
Even after donor financing ends, a sizable number of individuals still gain from the project	252	4.4762	.50043
When donor money ends, the project's scope of work frequently stays the same or grows	252	4.3810	.65422
Valid N (listwise)	252		

Study Data (2025)

The findings indicated that the majority of respondents strongly agreed that the projects implemented by Plan were both socially and financially sustainable. Respondents confirmed that beneficiaries continued to benefit from the projects, that the initiatives remained operational even five years after donor support ended, and that the scope of the projects either remained stable or expanded after donor funding ceased. The statements recorded high mean scores of 4.3333, 4.5238, 4.3810, 4.4762, and 4.3810, respectively, with relatively low standard deviations of 0.56456, 0.58826, 0.65422, 0.50043, and 0.65422, indicating strong agreement and consistency among respondents regarding the sustainability of the projects.

4.2 Correlation Analysis

Correlation analysis was done for this research utilizing Pearson product moment correlation to ascertain the link inherent between the stakeholder participation and sustainability of National Irrigation Authority projects in Wajir County, Kenya.

Table 4: Correlations Test

		stakeholder trainings	decision making process	stakeholder communication	Leadership skills	project sustainability
stakeholder trainings	Pearson Correlation	1	.600**	.724**	.321**	.346**
	Sig. (2-tailed)		.000	.000	.000	.000
	N	252	252	252	252	252
decision making process	Pearson Correlation	.600**	1	.676**	.396**	.517**
	Sig. (2-tailed)	.000		.000	.000	.000
	N	252	252	252	252	252
stakeholder communication	Pearson Correlation	.724**	.676**	1	.495**	.612**
	Sig. (2-tailed)	.000	.000		.000	.000
	N	252	252	252	252	252
stakeholder participation in leadership	Pearson Correlation	.321**	.396**	.495**	1	.706**
	Sig. (2-tailed)	.000	.000	.000		.000
	N	252	252	252	252	252
project sustainability	Pearson Correlation	.346**	.517**	.612**	.706**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	252	252	252	252	252

**. Correlation is significant at the 0.01 level (2-tailed).

Researcher Data (2025)

The aforementioned results demonstrated a significant link, albeit with varying degrees of strength, between all of the stakeholder engagement characteristics evaluated in this study and sustainability National Irrigation projects in Wajir County, Kenya. Stakeholder trainings and project sustainability had a somewhat favorable (0.346) but significant (0.000) relationship ($p<0.05$). With a Pearson correlation value of 0.517 and a significant level of 0.000 ($p<0.05$), the decision-making process showed an average positive link with project sustainability.

Stakeholder communication was shown to be crucial for assessing project sustainability with a p-value of 0.000 ($p<0.05$) and to have a high positive link with project sustainability with a Pearson correlation of 0.612. With a Pearson correlation value of 0.706 and a significant level of 0.000 ($p<0.05$), stakeholder engagement leadership qualities showed a very good link with project sustainability.

4.3 Analysis of Regression

OLS multiple linear regression analysis was performed to ascertain if stakeholder participation significantly affects the sustainability of national irrigation projects in Wajir County, Kenya. The effect of each independent variable on sustainability was quantified.

4.3.1 Model Summary

The Model Summary, denoted by R-squared (R^2), is a statistical measure that shows the extent to which the independent variables (stakeholder trainings, decision-making process, stakeholder communication, and participation in leadership skills) in a regression model account for variation in the dependent variable (Project sustainability), as table 5 below illustrates.

Table 5: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.786[a]	.618	.612	.22190

a. Predictors: (Constant), stakeholder participation in leadership, stakeholder trainings, decision making process, stakeholder communication

Researcher Data (2025)

As shown in Table 5, the regression output results show that the R-square (coefficient of determination) is 0.618, indicating that changes in stakeholder training, decision-making, stakeholder communication, and participation in leadership skills can account for 61.8% of the variations in sustainability of National Irrigation Projects in Wajir County. The remaining 38.2% of the changes were caused by variables not included in the researcher's model.

4.3.2 Analysis of Variance

A variance analysis illustrates the connection between two variables. This section shows how the primary variable is impacted by inferential statistics, namely the p-value (shown as "sig" for significance). P-values are considered significant if they are less than 5%. Finding the F statistic and associated p-value also facilitated the assessment of project sustainability. Table 6 presents the data in a systematic way.

Table 6: ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	19.664	4	4.916	99.841	.000[b]
	Residual	12.162	247	.049		
	Total	31.825	251			

b. Predictors: (Constant),participation in leadership, stakeholder trainings, decision making process, stakeholder communication

Researcher Data (2025)

The regression model was statistically significant and successfully predicted the relationship between stakeholder engagement and the sustainability of national irrigation projects in Wajir County, according to the p-value of 0.000 in the ANOVA findings shown in table 6. According to the F test, significance is indicated by any F value greater than one. In this case, the model is deemed significant since the computed F value was 99.841, which is greater than one.

4.3.3 Regression Coefficients

The values of the regression constants that allow the researcher to determine how independent factors affect the dependent variable are shown in Table 7.

Table 7: Regression Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.754	.228		3.307	.001
	stakeholder trainings	-.241	.070	-.203	-3.468	.001
	decision making process	.191	.060	.175	3.182	.002
	stakeholder communication	.287	.050	.388	5.776	.000
	participation in leadership	.534	.048	.510	11.177	.000

a. Dependent Variable: project sustainability

Researcher Data (2025)

In Wajir County, Kenya, an OLS was conducted to determine the relationship between stakeholder engagement and the sustainability of national irrigation projects. The regression equation that follows was determined.

Y (Project Sustainability**) = 0.754 - 0.241X_1+ 0.191X_2+0.287X_3+0.534X_4**

These results were discussed and interpreted as follows:

Without any stakeholder involvement, the project sustainability level was established to be 0.754 times. This was found to be significant at p-value of 0.001.

4.4 Hypotheses Tests Results Discussion

The hypothesis testing results revealed that stakeholder participation significantly influenced the sustainability of National Irrigation projects in Wajir County, Kenya. Stakeholder training had a significant negative effect on project sustainability (β = -0.241, p = 0.001), leading to the rejection of the first null hypothesis. Despite the negative coefficient, the findings emphasized the importance of stakeholder involvement in designing and implementing training programs to enhance project effectiveness and sustainability. The findings were consistent with previous studies that linked community training with improved project performance and stakeholder engagement.

The decision-making process was also found to have a positive and statistically significant effect on project sustainability (β = 0.191, p = 0.002). Consequently, the second null hypothesis was rejected. The study established that inclusive decision-making enhances efficiency, innovation, leadership, and organizational development, thereby improving sustainability outcomes. These findings supported earlier studies that highlighted the importance of participatory decision-making in project success.

Similarly, stakeholder communication significantly and positively affected project sustainability (β = 0.287, p = 0.000), resulting in the rejection of the third null hypothesis. Effective communication was associated with improved trust, better relationships, and enhanced decision-making among stakeholders, which ultimately contributed to successful project outcomes. The findings aligned with previous studies that identified stakeholder communication as a critical determinant of project performance.

Finally, stakeholder involvement in leadership skills emerged as the strongest predictor of project sustainability (β = 0.534, p = 0.000), leading to the rejection of the fourth null hypothesis. The results demonstrated that leadership participation enhances collaboration, productivity, and organizational success, thereby promoting long-term project sustainability. These findings were consistent with prior empirical studies emphasizing the significance of stakeholder leadership engagement throughout the project life cycle

5. CONCLUSION AND RECOMMENDATIONS

The study concluded that stakeholder participation significantly influences the sustainability of National Irrigation Authority projects in Wajir County, Kenya. Stakeholder training was found to have a statistically significant effect on project sustainability, leading to the rejection of the first hypothesis. The findings suggest that effective training programs enhance stakeholder involvement, improve skills acquisition, and contribute to long-term project sustainability.

The study further established that the decision-making process significantly affects project sustainability. Effective and inclusive decision-making practices were associated with improved organizational performance, innovation, and project outcomes. Stakeholder communication also demonstrated a strong and significant influence on sustainability, indicating that regular and transparent communication enhances trust, collaboration, and project success.

In addition, stakeholder participation in leadership skills recorded the strongest positive relationship with project sustainability. Leadership involvement was found to enhance coordination, teamwork, and stakeholder commitment, thereby improving the long-term sustainability of irrigation projects.

Based on the findings, the study recommends that project stakeholders establish practical and inclusive training programs aimed at improving participation, enhancing return on investment, and promoting continuous learning. Organizations should also strengthen decision-making processes by ensuring stakeholder involvement in planning and implementation to improve project effectiveness.

The study further recommends that project managers adopt effective communication strategies to promote transparency, trust, and stakeholder engagement throughout the project cycle. Finally, organizations should strengthen leadership capacity by promoting participatory leadership practices that encourage teamwork, shared vision, and stakeholder collaboration in order to enhance the sustainability of irrigation projects.

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