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Community Engagement and Sustainability of Large Water Supply Projects in Kenya: A Case of Chebara Dam in Elgeyo Marakwet County



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Abstract

Purpose: The general objective was to examine the association between community engagement and the sustainability of Chebara Dam supply projects in Elgeyo Marakwet County. **Methodology:** The investigation used mixed method research design. The target population is 1340 members of the community, members of the water project committee, community leaders, technical staff and members of the government involved in water resource management were the target population. Stratified random sampling was used to ensure adequate representation of key stakeholder group and structured questionnaire was 308 was arrived at from the target population of 1,340 using Yamane formula. Furthermore, the data was collected from key informant using interview and was analyzed using thematic content analysis and NVIVO. Additionally, SPSS version 24 was used to analyze the data and find out the relationships among the variables and the magnitude of the effects.

Findings: The study concluded that community participation has positive and statistically significant link with sustainability of Chebara Dam water supply project. Information sharing has a positive and statistically significant association with sustainability of Chebara Dam water supply project. Capacity building has positive and statistically significant relationship with sustainability of Chebara Dam water supply project. Stakeholder collaboration has a positive and significant relationship with sustainability of Chebara Dam water supply project. Government policy had a positive and statistically significant moderating effect on the relationship between community engagement and sustainability of Chebara Dam water supply project.

Unique Contribution to Theory, Policy and Practice: The study recommended that the County Government of Elgeyo Marakwet, water sector agencies, and project managers strengthen community participation throughout the entire project cycle to promote inclusive decision-making, establishing regular stakeholder consultation forums, strengthening community-based water management committees and providing continuous capacity-building on water resource management and infrastructure maintenance.

Key Words: *Community Participation, Information Sharing, Capacity Building, Stakeholder Collaboration and Government Policy*

1. Background of the Study

Water is life! Development of safe, reliable and affordable water supplies is a critical challenge in Kenya. Despite various policy changes and investments in infrastructure, many systems face issues such as intermittent supply, low financial sustainability, and insufficient community ownership, all of which hinder sustainability (Nirman, 2025). Despite the continued growth of service coverage due to the successive policy reforms and infrastructural investments, most systems experience the lack of continuity, financial unsustainability, and lack of community ownership, which deteriorate sustainability. The combination of a supportive policy framework, a substantial degree of community involvement, and a strong institutional capacity determines whether water systems survive and adjust to climate, demographic and economic pressures. A targeted empirical study which correlates these three determinants with quantifiable sustainability outcomes would assist policy makers and practitioners to concentrate on interventions that can be used to produce sustainable improvements.

Sustenance issues have been rising among extensive water supply projects all over the world, especially due to climate variability, accelerated urbanization, and growing demographic demands (Rossi & Peres, 2023; Nirman, 2025). The participation of the community has been identified as a determining factor in enhancing the sustainability of projects, and participatory models offer a boost in project relevance, performance, and sustainability (Tseklevs et al., 2022; Ali & Kamraju, 2024). European and Asian empirical research has shown that those projects where local stakeholders are involved in the planning, decision-making, and monitoring stages have a higher completion rate and long-term operation (Machado, Oliveira, & Matos, 2022; Waiharo & Otieno, 2025). Irrespective of these observations, there are still issues with how to adequately convert engagement into tangible sustainability deliverables, especially where institutional capacity and resources are scarce (Simon & Moturi, 2025; Ali & Kamraju, 2024).

Statement of the Problem

In contemporary global environments, effective water resource management is essential for socio-economic development and equitable access to clean water (Nwokediegwu et al., 2024; Rossi & Peres, 2023). Water systems are increasingly complex due to climate variability, population growth, and technological challenges (Nirman, 2025; Ligombi, Kyando & Mgeni, 2025). Consequently, community involvement, institutional capacity, and adaptive policies are critical for sustainability. Despite reforms, Kenya still faces service interruptions, high non-revenue water, and weak governance. Evidence on participation and institutional capacity remains mixed.

Large water projects are undermined by limited community participation, poor planning and lack of collaboration among stakeholders. Chebara Dam (1999) was meant to support water supply in Eldoret and environs but water supply in Uasin Gishu and Elgeyo Marakwet is still not adequate and contested. The dam is primarily for the benefit of Uasin Gishu, which led to conflicts between counties regarding who owns the water and how it should be shared (Standard

Newspaper, 2023). Population growth, climate change, poor governance, and infrastructure are all contributing factors to water scarcity in Kenya, leading to increasing water shortages (Water Resources Authority, 2024; Republic of Kenya, 2025). The problems are also seen in Nakuru, Machakos in Kenya, Tanzania, and Ethiopia where participation is weak and sustainability is limited (Kamau et al., 2025; Odhiambo et al., 2025; Ligombi et al., 2025).

Reports indicate that the project experienced delays due to unresolved compensation and resettlement issues affecting over 1,000 households, including allegations of mismanagement of funds intended for compensation, relocation, corporate social responsibility, and community development projects (The Star, 2019; Wainaina, 2019; People Daily, 2021; Standard Media Group, 2021). Consequently, communities continue to experience irregular water access, limited employment opportunities, inadequate awareness of environmental initiatives, and incomplete community infrastructure, reducing the anticipated socio-economic benefits of the project (Chepsiror, 2020; Standard Media Group, 2021). Although global, regional, and Kenyan studies acknowledge that community engagement and stakeholder collaboration enhance project resilience and sustainability, existing literature remains fragmented, with limited integration of theoretical perspectives, inadequate application of mixed-methods approaches, and insufficient attention to power dynamics and indigenous knowledge. These gaps justify the need for this study to examine how community engagement influences Chebara Dam Water Supply Project sustainability in Elgeyo Marakwet County. This study therefore examines how community engagement influences the sustainability of the Chebara Dam water project. Hence, the investigation focuses on; the relationship between community engagement and sustainability of large water supply projects in Kenya, with a focus on Chebara Dam in Elgeyo Marakwet County.

Objectives of the Study

1. To assess the role of Community Participation on the sustainability of Chebara Dam in Elgeyo Marakwet County.
2. To evaluate the influence of Information Sharing on the sustainability of Chebara Dam in Elgeyo Marakwet County.
3. To determine the influence of Capacity Building on the sustainability of Chebara Dam in Elgeyo Marakwet County.
4. To analyze the role of Stakeholder Collaboration on the sustainability of Chebara Dam in Elgeyo Marakwet County.
5. To examine the moderating effect of the government policy on the relationship between community engagement and the sustainability of the Chebara Dam water supply project in Elgeyo Marakwet County, Kenya.

2. Literature Review

Theoretical Framework

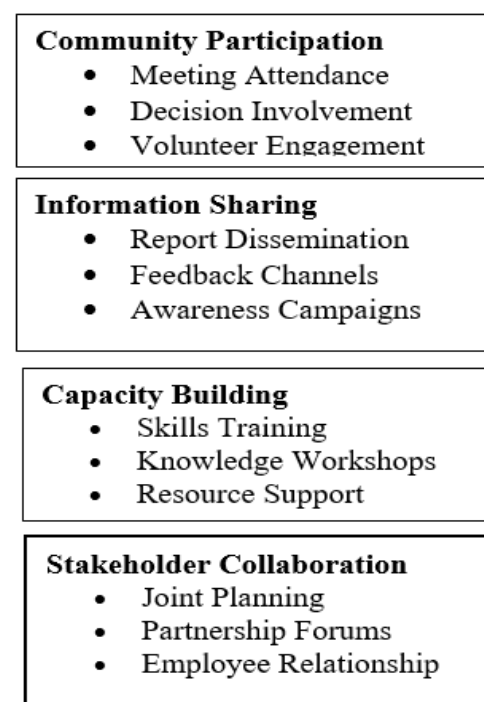
The study draws on three theories which have been developed to understand the association between community involvement and sustainability of long-term water supply projects on a

large scale. Stakeholder Theory (Freeman, 1984) suggests that the success and sustainability of the project would depend on the balance of interest among all the relevant stakeholders: local communities, government institutions, NGOs and the private sector partners of the project, which would lead to collaborative engagement and shared responsibility. The primary hypothesis is that inclusive engagement would help to drive accountability, better decision making, resource mobilization, and sustainability. If not considered, then the projects can be inefficient or unsuccessful.

Resource-Based View (RBV) (Barney, 1991) states that internal capabilities and resources of an organization are the key determinants of its competitive strength and overall performance. In the framework of water supply programs, technical experience, financial resources, and human resources (skilled workers) are crucial in the success of the project. This theory is based on the idea that long-term viability and sustainability of projects are enhanced by strategic and effective use of these resources. On the same note, the Theory of Planned Behavior (TPB) (Ajzen, 1991) theory conceptualizes human behavior based on personal attitudes, existing social norms, and perceived behavioral control. This means that, in water projects, the way in which community participation is determined is based on the perceptions of the residents, their expectations of society as well as their confidence in their ability to participate in a meaningful way and contribute to the project outputs.

Conceptual Framework

Independent Variable



Dependent Variable

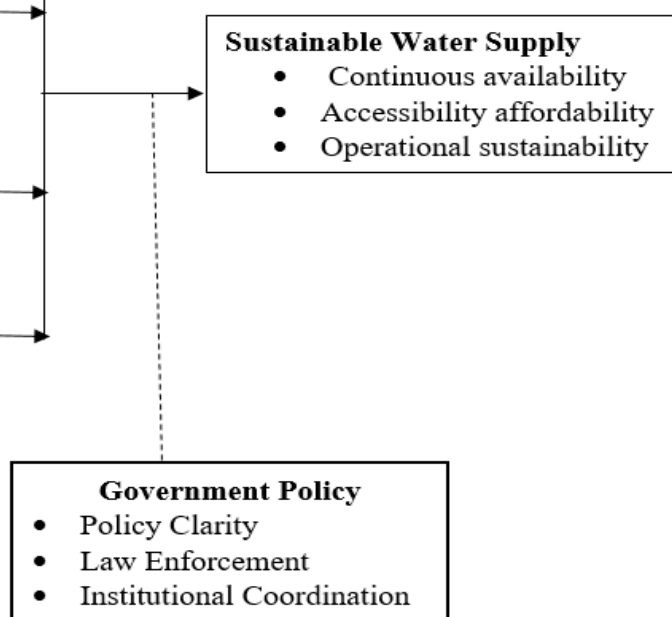


Figure 1: Conceptual Framework

3. Research Methodology

The type of research philosophy that was used in this investigation is pragmatism research philosophy, which is based on the objective measurement as well as qualitative data. The research design used is mixed method research, with the aim of examining causal link between variables. The study targeted 1,260 community members, 35 water project committee members, 25 technical staff, and 20 government officers. The key informants comprised purposively selected representatives from development partners or donor agencies, County or National Government, project management, Water Service Providers, non-governmental organizations (NGOs), and Water User Associations. The sample size for the investigation of 308 respondents was determined using Yamane's (1967) formula. Structured questionnaire and key informant interview guides are used as the main data collection tools in this investigation. The structured questionnaires were used to collect quantitative data, which was coded and entered into the SPSS software version 24 and statistically assessed. Descriptive and inferential statistics were used in the analysis. Interpretations based on the thematic analysis of qualitative data collected via interviews were used to reveal patterns associated with stakeholder collaboration and sustainability of projects.

4. Results

Response Rate

A total of 308 questionnaires were given out to the participants. However, 224 participants fully filled and returned questionnaires, representing a response rate of 72.7%, which is considered reasonable for a research investigation. With regards interviews, all the 6 respondents participated in the study representing 100% response rate.

Descriptive Statistics

Descriptive Results for Community Participation

Table 1: Descriptive Results for Community Participation

	SD	D	N	A	SA		S De v
	N %	N %	N %	N %	N %	M	
I actively participate in meetings and forums regarding Chebara Dam water projects.	25 11.2%	23 10.3%	26 11.6%	85 37.9%	65 29%	3.6	1.3
The project team seeks and considers my opinions when planning water supply initiatives.	21 9.4%	25 11.2%	23 10.3%	104 46.4%	51 22.8%	3.6	1.2
I feel that my community's input affects decisions about the water projects.	25 11.2%	24 10.7%	29 12.9%	75 33.5%	71 31.7%	3.6	1.3
I don't feel a strong sense of ownership over the water supply services from Chebara Dam.	34 15.2%	67 29.9%	20 8.9%	85 37.9%	18 8%	2.9	1.3
The project leaders regularly consult the community before making important decisions.	20 8.9%	19 8.5%	30 13.4%	85 37.9%	70 31.2%	3.7	1.2

From the results, 85(37.9%) of the respondents concurred that they actively take part in meetings and forums regarding Chebara Dam water projects. 65(29%) received a strong concurrence with the question while 26(11.6%) were neutral concerning the question with an average of 3.6 and a respective SD of 1.3 meaning that on average, the responses were in concurrence. On whether the project team seeks and considers my opinions when planning water supply initiatives, the responses postulated that 104(46.4%) of the responses concurred, 23(10.3%) being neutral and 51(22.8%) receiving a strong concurrence with an average and SD of 3.6 and 1.2. Additionally, 75(33.5%) of the responses were in concurrence that they feel that their community's input affects decisions about the water projects. 71(31.7%) recording strong agreement and 29(12.9%) were neutral with an average of 3.6 and a corresponding SD of 1.3 meaning that on

average, there was agreement among the responses. 20(8.9%) of the responses were neutral on whether they don't feel a strong sense of ownership over the water supply services from Chebara Dam. However, 85(37.9%) were in concurrence with 18(8%) strongly concurring with an average and SD of 2.9 and 1.3. This means that the responses were neutral on average. Finally, 85(37.9%) of the participants concurred that the project leaders regularly consult the community before making important decisions while 30(13.4%) were neutral and 70(31.2%) pointing to a strong concurrence with an average of 3.7 and SD of 1.2 in that order.

The key informants revealed that community participation in the Chebara Dam Water Supply Project was inadequate, particularly during the planning, implementation, and management stages. Most key informants indicated that local residents were rarely consulted before major project decisions were made, with Respondent 1 noting that *"many of us were never consulted before major decisions about the project were made."* Another key informant observed that *"ELDOWAS did not involve the community members in the project,"* highlighting limited stakeholder engagement during project implementation. Although the project had created employment opportunities, the key informants reported that these were mainly casual and security positions, while most technical and permanent jobs were occupied by non-local personnel. As Respondent 2 stated, *"the staff working at the treatment plant and the dam are not locals apart from the watchmen."* However, another key informant acknowledged that the project provides domestic water to nearby communities and employs local residents where possible, although technical positions require specialized competencies. Overall, the key informants perceived that limited community participation, inadequate local employment opportunities, and unequal distribution of project benefits have weakened community ownership and pose a challenge to the long-term sustainability of the Chebara Dam Water Supply Project.

Descriptive Results for Information Sharing

Table 2: Descriptive Results for Information Sharing

	SD	D	N	A	SA		S
	N %	N %	N %	N %	N %	M	Dev
I receive regular updates about Chebara Dam water project activities.	17 7.6%	33 14.7%	21 9.4%	87 38.8%	66 29.5%	3.7	1.3
Information on project challenges, progress, and developments is shared clearly with the community.	17 7.6%	25 11.2%	26 11.6%	86 38.4%	70 31.2%	3.7	1.2
The project team is not transparent about how water resources are managed.	18 8%	77 34.4%	22 9.8%	95 42.4%	12 5.4%	3.0	1.1
Lessons learned from the water projects are shared with local stakeholders like me.	20 8.9%	28 12.5%	17 7.6%	89 39.7%	70 31.2%	3.7	1.3
Timely information sharing makes it easier for me and others to participate in the project.	20 8.9%	18, 8%	41 18.3%	76 33.9%	69 30.8%	3.7	1.2

From the results, 87(38.8%) of the respondents agreed that they receive regular updates about Chebara Dam water project activities. However, 66(29.5%) recorded a strong concurrence with the question while 21(9.4%) were neutral concerning the question with an average of 3.7 and an SD of 1.3 meaning that on average, the responses were in concurrence. Regarding whether information on project challenges, progress and developments is shared clearly with the community, 86(38.4%) of the responses concurred, 26(11.6%) being neutral and 70(31.2%) receiving a strong concurrence with a mean and SD of 3.7 and 1.2. In addition, 95(42.4%) of the responses were in agreement that the project team is not transparent about how water resources are managed while 12(5.4%) pointing out strong concurrence and 22(9.8%) were neutral. The mean of the responses was 3.5 and SD was 1.3 meaning that on average, there was concurrence among the participants. 17(7.6%) of the participants were moderately in agreement with regards the statement ‘Lessons learned from the water projects are shared with local stakeholders like me’. However, 89(39.7%) were in concurrence with 70(31.2%) strongly concurring with a mean and SD of 3.7 and 1.3. Finally, 76(33.9%) of the respondents concurred timely information sharing makes it easier for me and others to participate in the project while 41(18.3%) taking a neutral position and 69(30.8%) indicating a strong concurrence with an average of 3.7 and SD of 1.2 in that order.

The key informants indicated that information sharing in the Chebara Dam Water Supply Project was inadequate, resulting in limited transparency and weak stakeholder engagement. Most key informants reported that the host community was not adequately informed about project decisions, employment opportunities, benefit-sharing arrangements, and project implementation. Respondent 3 observed that *"ELDOWAS did not involve the community*

members in the project," while another emphasized that *"the major concern from residents is that the water is supplied to Eldoret while the local community receives very little."* Similarly, a community key informant stated that *"the water from this dam benefits Uasin Gishu and Eldoret more than the people living here,"* reflecting dissatisfaction with the perceived distribution of project benefits. Respondent 4 noted that *"the management of the dam has never initiated or financed community projects such as scholarships and other community development initiatives,"* suggesting limited communication and corporate engagement with the host community. However, Respondent 5 explained that *"the project helps the community with domestic water supply where a local pump and tank exists"* and that *"water is pumped into the tank and circulated to locals at the same rates charged in Eldoret."* Importantly, the key informants agreed that more regular communication, timely feedback, and transparent information sharing would strengthen trust, improve stakeholder relationships, and enhance the long-term sustainability of the Chebara Dam Water Supply Project.

In an interview with one of the key informants in the study, Respondent 6 had this to say, *'The community are informed about the project through community meetings held occasionally to inform them on the progress of the project, the challenges if any and the expected benefits of the project. The community and stakeholders also get informed through our officials who disseminate information on regular basis.'*

Descriptive Results for Capacity Building

Table 3: Descriptive Results for Capacity Building

	SD	D	N	A	SA		S
	N %	N %	N %	N %	N %	M	Dev
I have received training or guidance on managing or using water resources at Chebara Dam.	19 8.5%	24 10.7%	29 12.9%	83 37.1%	69 30.8%	3.7	1.2
The skills I have gained help me support the maintenance of water supply systems.	23 10.3%	18 8%	23 10.3%	72 32.1%	88 39.3%	3.8	1.3
Workshops and technical support sessions have improved my understanding of the water project.	22 9.8%	20 8.9%	24 10.7%	90 40.2%	68 30.4%	3.7	1.3
I feel encouraged to learn new skills to contribute to the sustainability of Chebara Dam.	14 6.2%	27 12.1%	29 12.9%	80 35.7%	74 33%	3.8	1.2
Capacity-building initiatives have negatively impacted how I participate in water project activities.	22 9.8%	73 32.6%	23 10.3%	86 38.4%	20 8.9%	3.0	1.2

As per the results, 83(37.1%) of the participants were in concurrence that they have received training or guidance on managing or using water resources at Chebara Dam. However, 69(30.8%) recorded a strong concurrence with the question while 29(12.9%) were neutral concerning the question with a mean of 3.7 and a corresponding SD of 1.2 an implication that on average, the participants were in concurrence. Concerning whether the skills they have

gained help them support the maintenance of water supply systems, 72(32.1%) of the responses concurred, 23(10.3%) being neutral and 88(39.3%) pointing to a strong agreement with a mean and SD of 3.8 and 1.3 pointing out to a concurrence among the responses. In addition, 90(40.2%) of the responses were in tandem that workshops and technical support sessions have improved their understanding of the water project while 68(30.4%) recording strong agreement and 24(10.7%) neutral. The average of the answers was 3.7 and SD was 1.3 meaning that on average, the responses were in tandem. 29(12.9%) of the participants were neutral with regards the statement that I feel encouraged to learn new skills to contribute to the sustainability of Chebara Dam. However, 80(35.7%) were in concurrence with 74(33%) strongly in tandem with an average and SD of 3.8 and 1.2, meaning that responses were in concurrence. In conclusion, 86(38.4%) of the responses concurred that capacity-building initiatives have negatively impacted how they participate in water project activities while 23(10.3%) taking a neutral position and 20(8.9%) indicating a strong concurrence with an average of 3.0 and SD of 1.2 in that order.

The key informants indicated that capacity-building initiatives under the Chebara Dam Water Supply Project remain inadequate despite some efforts to promote local employment and environmental conservation. Although respondents acknowledged that *"the project has employed locals,"* they emphasized that *"the project requires technical staff with diverse competencies,"* limiting access to skilled positions for many community members. Several key informants noted that environmental initiatives such as *"planting trees around the dam and establishing a tree nursery"* have contributed to knowledge transfer, but structured training programmes remain limited. Many key informants observed that *"the project has created employment opportunities, but they are not enough for the local people,"* and stressed that *"most technical jobs are given to people from outside the community"* because *"we have not received adequate training to qualify for skilled positions."* Others emphasized that *"employment alone is not enough; we need skills that can help us benefit from the project"* and that *"young people should be trained so that they can secure employment and create businesses linked to the project."* Generally, the key informants agreed that expanding technical training, leadership development, environmental education, and institutional capacity-building programmes would strengthen local participation, improve employment opportunities, and enhance the long-term sustainability of the Chebara Dam Water Supply Project.

In an interview with one of the key informants in the study, Respondent 4 had this to say, *'Among capacity building initiatives provided to the community and stakeholders by the project include training or guidance, workshops and technical support sessions. The training the community receives especially regarding providing labour force in the project goes along way and is helpful to those who participate even beyond the lifespan of the project.'*

Descriptive Results for Stakeholder Collaboration**Table 4: Descriptive Results for Stakeholder Collaboration**

	SD	D	N	A	SA		S
	N %	N %	N %	N %	N %	M	Dev
I feel that local leaders, government officers, and community members work together effectively.	16 7.1%	26 11.6%	29 12.9%	84 37.5%	69 30.8%	3.7	1.2
Stakeholders collaborate to solve challenges in water supply at Chebara Dam.	19 8.5%	26 11.6%	24 10.7%	79 35.3%	76 33.9%	3.7	1.3
The project planning process includes all stakeholders' voices, including mine.	20 8.9%	24 10.7%	29 12.9%	79 35.3%	72 32.1%	3.7	1.3
Partnerships with NGOs and government agencies have not improved water services.	23 10.3%	89 39.7%	22 9.8%	83 37.1%	7 3.1%	2.8	1.1
Cooperation among all stakeholders contributes to the long-term success of Chebara Dam projects.	23 10.3%	18 8%	35 15.6%	78 34.8%	70 31.2%	3.7	1.3

According to the results, 84(37.5%) of the respondents concurred that they feel that local leaders, government officers, and community members work together effectively. On the other hand, 69(30.8%) recorded a strong concurrence with the question while 29(12.9%) were neutral concerning the question with an average of 3.7 and a corresponding SD of 1.2 meaning that on average, the participants were neutral. With regards to whether stakeholders collaborate to solve challenges in water supply at Chebara Dam, 79(35.3%) of the responses were in concurrence, 24(10.7%) being neutral and 76(33.9%) recording a strong concurrence with an average and SD of 3.7 and 1.3 postulating that the participants were in tandem. On whether the project planning process includes all stakeholders' voices, including theirs, 79(35.3%) of the participants were in concurrence, 72(32.1%) attracting a strong opinion with 29(12.9%) being neutral. The average and SD attracted by the statement were 3.7 and 1.3 sequentially an implication that, on average the responses were in concurrence. 83(37.1%) of the respondents pointed out a concurrence that partnerships with NGOs and government agencies have not improved water services, while 7(3.1%) concurred strongly with the question and 22(9.8%) being neutral with an average of 2.8 and SD of 1.1 indicating that the responses were neutral. To conclude, 78(34.8%) of the participants concurred that cooperation among all stakeholders contributes to

the long-term success of Chebara Dam initiative while 35(15.6%) taking a neutral position and 70(31.2%) pointing to a strong concurrence with a mean of 3.7 and SD of 1.3 in that order.

The key informants indicated that stakeholder collaboration has contributed to the implementation and operation of the Chebara Dam Water Supply Project through partnerships among ELDOWAS, government agencies, local leaders, and community institutions. The key informants acknowledged that *"the project helps the community with domestic water supply where a local pump and tank exists"* and that *"the project has brought about a level of peace because they interact with the community."* However, many key informants observed that collaboration has not adequately involved the host community, noting that *"ELDOWAS did not involve the community members in the project"* and that *"the project has created employment opportunities, but they are not enough."* Several key informants further stated that *"the major concern is that the water is not being supplied to the local community compared to Eldoret,"* while others emphasized that *"the water from this dam benefits Uasin Gishu more than the people living here,"* *"there is little collaboration between the management and local residents,"* and *"we should be involved in decisions because this project is located in our community."* The key informants also stressed that *"greater collaboration with civil society organizations would strengthen community participation and accountability,"* *"Water User Associations should be actively involved in project planning, implementation, and monitoring,"* and that *"strong partnerships among all stakeholders improve project ownership and long-term sustainability."* Overall, the key informants agreed that stronger collaboration, inclusive decision-making, and equitable sharing of project benefits are essential for enhancing the long-term sustainability of the Chebara Dam Water Supply Project.

Descriptive Results for Government Policy**Table 5: Descriptive Results for Government Policy**

	SD N %	D N %	N N %	A N %	SA N %	M	S Dev
The government's policies provide adequate guidance for community participation in ensuring the sustainability of the Chebara Dam water supply project.	17 7.6%	28 12.5%	30 13.4%	75 33.5%	74 33%	3.7	1.3
Relevant government authorities consistently enforce laws and regulations that protect the sustainability of the water supply project.	22 9.8%	24 10.7%	28 12.5%	91 40.6%	59 26.3%	3.6	1.3
Compliance with water resource management laws is effectively monitored and enforced by government agencies.	26 11.6%	17 7.6%	35 15.6%	81 36.2%	65 29%	3.6	1.3
Government agencies responsible for the Chebara Dam water supply project coordinate effectively with one another to support project sustainability.	21 9.4%	25 11.2%	29 12.9%	75 33.5%	74 33%	3.7	1.3
There is effective collaboration between government institutions and the local community in implementing policies that promote the sustainability of the water supply project.	15 6.7%	26 11.6%	36 16.1%	80 35.7%	67 29.9%	3.7	1.2

From the outcomes outlined, 75(33.5%) of the participants concurred that the government's policies provide adequate guidance for participation of society in ensuring the sustainability of the Chebara Dam water supply project. On the other hand, 74(33%) recorded a strong concurrence with the question while 30(13.4%) were neutral concerning the question with a mean of 3.7 and a corresponding SD of 1.3 meaning that responses were in concurrence. Concerning whether relevant government authorities consistently enforce laws and regulations that protect the sustainability of the water supply project, 91(40.6%) of the respondents were in tandem, 28(12.5%) being neutral and 59(26.3%) indicating a strong agreement with an average and SD of 3.6 and 1.3 pointing out to concurrence among the participants. In addition, 81(36.2%) of the responses were in concurrence with the question 'Compliance with water resource management laws is effectively monitored and enforced by government agencies' while 65(29%) attracting strong concurrence and 35(15.6%) neutral. The average of the responses was 3.6 and an SD was 1.3 postulating that the responses were in agreement. 29(12.9%) of the participants were neutral with regards the question 'Government agencies responsible for the Chebara Dam water supply project coordinate effectively with one another

to support project sustainability, 75(33.5%) were in concurrence with 74(33%) strongly agreeing with an average and SD of 3.7 and 1.3. This means the responses were in concurrence. Finally, 80(35.7%) of the participants concurred that there is effective collaboration between government institutions and the local community in implementing policies that promote the sustainability of the water supply project while 36(16.1%) being neutral and 67(29.9%) recording a strong concurrence with an average of 3.6 and a SD of 1.2 in that order.

The key informants acknowledged that government policy and regulatory frameworks have provided important guidance for the implementation, environmental management, and governance of the Chebara Dam Water Supply Project. However, most key informants emphasized that policy implementation and enforcement have been inadequate, limiting the realization of benefits by the host community. While some respondents observed that *"the dam management is managing the environment by planting bamboo trees around the dam and starting a tree nursery"* and that *"the project has brought about a level of peace because they interact with the community,"* many expressed concern that *"the project at the community is not enough, especially in terms of employment."* Several key informants further indicated that *"the community feels that the water from the dam benefits Uasin Gishu and Eldoret more than the local community,"* and that *"the management of the dam (ELDOWAS) has never initiated or financed any community projects in Chebara, such as dams, scholarships, and other community development initiatives."* Other key informants reported that *"staff working at the treatment plant and the dam are not locals apart from the watchmen"* and that *"in 2024, ELDOWAS retrenched staff who were from the Chebara community and who had been on contract since 2011."* Therefore, the key informants calls for stronger enforcement of community participation, equitable benefit-sharing, local employment provisions, and continuous government oversight is necessary to enhance the long-term sustainability of the Chebara Dam Water Supply Project.

Descriptive Results for Sustainability of Water Projects

Table 6: Descriptive Results for Sustainability of Water Projects

	SD	D	N	A	SA		
	N %	N %	N %	N %	N %	M	S Dev
Chebara Dam water projects consistently meet the needs of our community.	21 9.4%	24 10.7%	31 13.8%	78 34.8%	70 31.2%	3.7	1.3
The project is managed in a way that ensures long-term water supply.	26 11.6%	23 10.3%	33 14.7%	73 32.6%	69 30.8%	3.6	1.3
Financial and environmental resources are used sustainably in the project.	19 8.5%	26 11.6%	37 16.5%	74 33%	68 30.4%	3.7	1.3
Community involvement strengthens the continuity of water services.	25 11.2%	19 8.5%	29 12.9%	81 36.2%	70 31.2%	3.7	1.3
The project does not adapts well to challenges such as droughts, pollution, or other local issues.	21 9.4%	55 24.6%	35 15.6%	91 40.6%	22 9.8%	3.2	1.2

From the results presented, 78(34.8%) of the respondents were in concurrence that Chebara Dam water projects consistently meet the needs of their community, 70(31.2%) strongly agreed whereas, 31(13.8%) were neutral with an average and SD of 3.7 and 1.3 respectively. Further, 73(32.6%) of the responses were in tandem that the project is managed in a way that ensures long-term water supply, 69(30.8%) strongly concurred whereas, 33(14.7%) were neutral with a mean and SD of 3.6 and 1.3. 74(33%) of the respondents were in concurrence that financial and environmental resources are used sustainably in the project, 68(30.4%) agreed strongly whereas, 37(16.5%) were neutral with an average and SD of 3.7 and 1.3 respectively. The outcomes also indicate that 81(36.2%) of the responses were in concurrence that community involvement strengthens the continuity of water services, 70(31.2%) strongly concurred whereas, 29(12.9%) were neutral with a mean and SD of 3.7 and 1.3 sequentially. The outcomes further indicate that 91(40.6%) of the responses agreed that the project does not adapts well to challenges such as droughts, pollution, or other local issues, 22(9.8%) strongly agreed whereas, 35(15.6%) were neutral with an average and SD of 3.2 and 1.2.

The key informants generally agreed that the Chebara Dam Water Supply Project has made a significant contribution to improving regional water supply, environmental conservation, and socio-economic development. However, they emphasized that its long-term sustainability depends on stronger community ownership, equitable benefit-sharing, effective stakeholder collaboration, and consistent government support. Several key informants observed that *"the project helps the community with domestic water supply where a local pump and tank exists"* and that *"water is pumped into the tank and circulated to locals at the same rates charged in Eldoret."*

Despite these achievements, many key informants indicated that *"the major concern from residents is that the water is supplied to Eldoret while the local community receives very little,"* and that *"the community feels that the water from the dam benefits Uasin Gishu and Eldoret more than the local community."* Other key informants further noted that *"the project has created employment opportunities, but they are not enough,"* while *"the management has never initiated or financed community projects such as scholarships and other community development initiatives."* Overall, the key informants agreed that improving community participation, information sharing, capacity building, stakeholder collaboration, and effective policy implementation would strengthen community ownership and ensure the long-term sustainability of the Chebara Dam Water Supply Project.

Inferential Statistics

Correlation Analysis

Table 7: Correlation Results

		Sustai nabilit y	Community Participation	Informati on Sharing	Capacity Building	Stakeholder Collaboratio n	Governm ent Policy
Sustainabilit y	Pearson Correlatio n	1					
	Sig. (2-tailed)						
Community Participation	Pearson Correlatio n	.561**	1				
	Sig. (2- tailed)	0.000					
Information Sharing	Pearson Correlatio n	.557**	.411**	1			
	Sig. (2- tailed)	0.000	0.000				
Capacity Building	Pearson Correlatio n	.549**	.342**	.329**	1		
	Sig. (2- tailed)	0.000	0.000	0.000			
Stakeholder Collaboratio n	Pearson Correlatio n	.547**	.440**	.356**	.324**	1	
	Sig. (2- tailed)	0.000	0.000	0.000	0.000	0.000	0.000
Government Policy	Pearson Correlatio n	.540**	0.334	0.234	0.301	0.433	1
	Sig. (2- tailed)	0.000	0.000	0.000	0.000	0.000	
	N	224	224	224	224	224	224

The association between community participation and sustainability of Chebara Dam water supply project was positive (0.561) and statistically significant ($0.000 < 0.05$). The correlation

between information sharing and sustainability of Chebara Dam water supply project was positive (0.557) and statistically significant ($0.000 < 0.05$). The association between capacity building and sustainability of Chebara Dam water supply project was positive (0.549) and statistically significant ($0.000 < 0.05$). The correlation between stakeholder collaboration and sustainability of Chebara Dam water supply project was positive (0.547) and statistically significant ($0.000 < 0.05$). The correlation between government policy and sustainability of Chebara Dam water supply project was positive (0.540) and statistically significant ($0.000 < 0.05$).

Regression Analysis

Table 8: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.765a	0.585	0.578	0.68069

From the outcomes, the estimated model explains to a tune of 58.5% of the total changes in sustainability of Chebara Dam water supply project. The value of R Squared (0.585) in the model provides evidence. Hence, community participation, information sharing, capacity building and stakeholder collaboration are significant in explaining sustainability of Chebara Dam water supply project.

Table 9: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	143.156	4	35.789	77.24	.000b
	Residual	101.473	219	0.463		
	Total	244.629	223			

The outcomes of analysis of variance point out that the estimated model is significant as provided for by the significance value of $0.000 < 0.05$ and the calculated F value of 77.24 which is greater than critical F value in the F Tables under the same degrees of freedom.

Table 10: Multiple Regression Coefficients

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	0.067	0.204		0.327	0.744
Community Participation	0.226	0.049	0.238	4.608	0.000
Information Sharing	0.276	0.05	0.273	5.492	0.000
Capacity Building	0.293	0.047	0.298	6.18	0.000
Stakeholder Collaboration	0.256	0.052	0.249	4.943	0.000

The dependent variable was Chebara Dam water supply project sustainability. The independent variables included community participation, information sharing, capacity building and stakeholder collaboration. From outcomes, the coefficient for community participation was statistically significant ($0.000 < 0.05$) and positive (0.226). Hence, raising in community participation by the water supply project under study by a unit leads to significant 0.226 units rise in its sustainability. Therefore, community participation determines significantly sustainability of Chebara Dam water supply project. The findings of Rwechungura (2025) provided strong support to the importance of demographic factors, economic factors and the institutions in the context of determining community involvement, thus emphasising the complexity of the issue of participation in planning of rural water projects and its effects on the sustainability of initiatives.

The coefficient for information sharing was positive (0.276) and significant ($0.000 < 0.05$). Therefore, enhancing in information sharing by the water supply project under study by a unit yields significant 0.276 units rise in its sustainability. Thus, information sharing determines significantly sustainability of Chebara Dam water supply project. The findings of Mwanzia et al. (2025) showed that the sharing of project assessment reports positively impacted sustainability.

The coefficient for capacity building was significant ($0.000 < 0.05$) and positive (0.293). Therefore, enhancing capacity building by the water supply project under study by a unit yields significant 0.293 units rise in its sustainability. Hence, capacity building determines significantly sustainability of Chebara Dam water supply project. The findings of Odhiambo, Rambo and Catherine (2025) pointed out that organizational capacity made a positive and significant influence on project outcomes but there was a limitation on long-term sustainability due to the lack of M&E.

The coefficient for stakeholder collaboration was positive (0.256) and significant ($0.000 < 0.05$). Therefore, raising stakeholder collaboration by the water supply project under study by a unit yields significant 0.256 units increase in its sustainability. Therefore, stakeholder collaboration determines significantly sustainability of Chebara Dam water supply project. The findings of Waiharo and Otieno (2025) showed that stakeholder involvement had a great influence on sustainability and the social inclusion raised the chances of sustainability.

Moderation Analysis

The study sought to examine the moderating influence of the government policy on the association between community engagement and the sustainability of the Chebara Dam water supply project in Elgeyo Marakwet County, Kenya.

Table 11: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.785a	0.616	0.6	0.66278

Before moderation, the estimated model explains to a tune of 58.5% of the total changes in sustainability of Chebara Dam water supply project. After the introduction of the moderating variable, the model explains to a tune of 61.6% of the total changes in the sustainability of Chebara Dam water supply project. This means that government policy has a positive moderating influence on the association between community engagement and the sustainability of the Chebara Dam water supply project in Elgeyo Marakwet County, Kenya.

Table 12: ANOVA Results

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	150.624	9	16.736	38.099	.000b
	Residual	94.005	214	0.439		
	Total	244.629	223			

The outcomes of analysis of variance point out that the estimated model is statistically significant as provided for by the significance value of $0.000 < 0.05$ and the calculated F value of 38.099 which is greater than critical F value in the F Tables under the same degrees of freedom. In this study, regression analysis is used to determine how community participation, information sharing, capacity building, stakeholder collaboration, and government policy affect the sustainability of the Chebara Dam Water Supply Project.

Table 13: Regression Coefficient Results

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.431	0.598		2.393	0.018
Community Participation	0.384	0.166	0.189	2.313	0.018
Information Sharing	0.282	0.119	0.28	2.37	0.016
Capacity Building	0.412	0.155	0.418	2.664	0.008
Stakeholder Collaboration	0.532	0.163	0.517	3.268	0.001
Government Policy	0.604	0.19	0.657	3.176	0.002
CPGP	0.103	0.044	0.016	2.341	0.033
ISGP	0.108	0.041	0.043	2.634	0.009
CBGP	0.098	0.042	0.308	2.333	0.021
SCGP	0.092	0.044	0.516	2.09	0.04

From the outcomes, the coefficient for community participation was statistically significant ($0.018 < 0.05$) and positive (0.384). Thus, increasing community participation by the water supply project under study by a unit leads to significant 0.384 units increase in its sustainability. Thus, community participation determines significantly sustainability of Chebara Dam water supply project. The outcomes of Wanderi (2025) found that the climate-resilient technologies adopted by communities, the use of indigenous knowledge, and good policy delivery had a positive impact on climate action, whereas weak policy coherence, insufficient funding and poor government-community partnerships hindered the process.

Information sharing received a significant ($0.016 < 0.05$) and positive (0.282) coefficient. Hence, raising information sharing by the water supply project under study by a unit leads to significant 0.282 units increase in its sustainability. Therefore, information sharing determines significantly sustainability of Chebara Dam water supply project. The findings of Ali and Kamraju (2024) showed that community participation leads to better adaptive management,

resilience, and sustainability, but the issues of power imbalances, representation, and low capacity still remain.

The coefficient for capacity building was significant ($0.008 < 0.05$) and positive 0.412. Hence, raising capacity building by the water supply project under study by a unit leads to significant 0.412 units increase in its sustainability. Therefore, capacity building determines significantly sustainability of Chebara Dam water supply project. The findings of Ligombi, Kyando and Mgeni (2025) identified financial constraints, political interference, poor institutional capacity, and technological limitations as the key barriers and leveraging local knowledge, building partnerships, and using adaptive management strategies as opportunities.

Stakeholder collaboration attracted a statistically significant ($0.001 < 0.05$) and positive (0.532) coefficient. Hence, enhancing stakeholder collaboration by the water supply project under study by a unit yields significant 0.532 units improvement in its sustainability. Thus, stakeholder collaboration determines significantly sustainability of Chebara Dam water supply project. The findings of Gwapedza et al. (2024) indicated that stakeholder collaboration, satisfaction, and active participation were enhanced through the engagement approach, which enhanced a shared catchment vision.

Government policy received a significant ($0.002 < 0.05$) and positive (0.604) coefficient. Thus, enhancing government policy by the water supply project under study by a unit leads to significant 0.604 units increase in its sustainability. Thus, government policy determines significantly sustainability of Chebara Dam water supply project.

The coefficient of the interaction term between community participation and government policy was positive (0.103) and statistically significant ($0.033 < 0.05$). This means that government policy has a positive and significant moderating role on the association between participation of community and sustainability of Chebara Dam water supply project. The coefficient of the interaction term between information sharing and government policy was positive (0.108) and significant ($0.009 < 0.05$). This means that government policy has a positive and significant moderating influence on the link between information sharing and sustainability of Chebara Dam water supply project. The coefficient of the interaction term between capacity building and government policy was positive (0.098) and significant ($0.021 < 0.05$). This means that government policy has a positive and significant moderating role on the association between capacity building and sustainability of Chebara Dam water supply project. The coefficient of the interaction term between stakeholder collaboration and government policy was positive (0.092) and statistically significant ($0.040 < 0.05$). This means that government policy has a positive and significant moderating effect on the link between stakeholder collaboration and sustainability of Chebara Dam water supply project. The findings of Faundez, et al., (2023) showed that positive impacts were mainly associated with environmental and economic sustainability, while the negative impacts were mainly related to the environmental and social pillars.

5. Conclusions and Recommendations

Conclusion

The investigation concluded that community participation, information sharing, capacity building, and stakeholder collaboration all have positive and statistically significant relationships with the sustainability of the Chebara Dam water supply project. These practices enhance community ownership, accountability, transparency, informed decision-making, technical capacity, coordinated planning, resource mobilization, and effective management of project resources and infrastructure. The study further established that government policy has a positive and statistically significant moderating influence on the relationship between community engagement and project sustainability, indicating that supportive policies, effective enforcement, and institutional coordination strengthen the contribution of community engagement to the project's long-term operational, social, environmental, and financial sustainability.

Recommendations

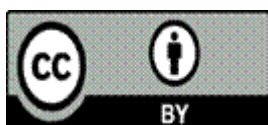
The study recommended that the County Government of Elgeyo Marakwet, water sector agencies, project managers and other stakeholders strengthen community participation, information sharing and stakeholder collaboration throughout the Chebara Dam water supply project cycle. This should involve regular stakeholder consultation forums, effective communication through accessible channels, continuous capacity-building on water resource management, infrastructure operation and maintenance, environmental conservation and governance, as well as stronger community-based water management committees. Stakeholders should also establish clear roles and responsibilities, promote joint planning and decision-making, and enhance coordination in project implementation, monitoring and maintenance to improve the project's sustainability.

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