International Journal of Science and Research (IJSR)
ISSN: 2319-7064
Impact Factor 2025: 7.089

Relationship between Community Irrigation Performance and Psychological Resilience among Small-Scale Farmers: A Case of Mbeere North Sub-County, Embu County, Kenya

Dr. Jane Marete

Kenya Methodist University

Abstract: ***This study examined the relationship between community irrigation performance and psychological resilience among small-scale farmers in Mbeere North Sub-County, Embu County, Kenya. The study targeted 500 registered members of the Nthawa Irrigation Project and employed a mixed-methods cross-sectional research design. The planned sample comprised 130 project members and 19 key informants drawn from project management and relevant government offices. Purposive and simple random sampling techniques were employed. Primary data were collected through questionnaires containing structured and open-ended questions. Quantitative data were analyzed using descriptive statistics and correlation analysis in SPSS Version 28, while qualitative responses were subjected to thematic analysis. The reported reliability coefficients were 0.708 for irrigation performance and 0.807 for psychological resilience. Among the 98 respondents represented in the descriptive results, 49.0% indicated that irrigation performance influenced psychological resilience to a great extent, while 13.3% indicated a very great extent. Correlation analysis revealed a statistically significant positive relationship between community irrigation performance and psychological resilience ($r = 0.548$, $p < 0.001$). The findings suggest that reliable irrigation infrastructure, community participation, and shared resource management are associated with stronger psychological resilience among small-scale farmers. The study recommends strengthening participatory irrigation management and incorporating psychosocial considerations into community irrigation development initiatives.***

Keywords: Psychological resilience; Community irrigation performance; Small-scale farmers; Water resource management; Mbeere North; Kenya

1. Introduction

Community irrigation performance remains central to the psychological resilience of the small-scale farmers (Adams et al., 2021). When the community irrigation projects are performing, there is alleviation of poverty, and food security, which prevents mental health issues and ensures that small-scale farmers experience mental resilience. Water uncertainty is recognized as a main agent for enduring psychological distress among communities in arid and semi-arid areas. Emerging mental health research reveals that enduring environmental uncertainty directly weakens psychological resilience (Adams et al., 2021). Unreliable irrigation organisation predisposes small-scale farmers to serious insecurity, financial tension, and severe distress, leading to learned helplessness and mental exhaustion. On the other hand, dependable, high-performing irrigation projects act as a defensive barrier, reducing long-lasting anxiety, nurturing a sense of individual control, and allowing farmers to uphold adaptive coping mechanisms. According to Cooper et al. (2023), psychological resilience is a dynamic psychosocial determinant. It includes individual psychological self-assurance, emotional guideline, mental wellbeing, and shared communal investment that empower persons to adapt to, captivate, and change in the face of environmental blows. The researchers carried out a study in Southern Asia to determine psychological impact of agricultural water insecurity: infrastructure functionality and mental health among smallholders. The results of the study affirm that physical infrastructure performance had psychological and social impact on the community members. The findings assert that irrigation projects are designed to bust agricultural output during climate vulnerability. When the irrigation projects were performing, there was individual and collective psychological well-being. Irrigation water performance alleviates water conflicts and stabilizes the livelihoods of the small-scale farmers. This shows the importance of conducting a study to examine the relationship between community irrigation performance and psychological resilience among small-scale farmers in Mbeere North Sub-County, Embu County, Kenya Community water insecurity cultivates or erodes psychological resilience (Tallman et at., 2023). According to the researchers, water insecurity, emotional distress and interpersonal conflicts in the agricultural communities causes psychological distress and reduces psychological resilience. High-performing irrigation systems provides a predictable physical foundation that fosters emotional safety, rebuilds personal agency, and strengthens collective social trust. Poorly governed, or deteriorating irrigation organizations cause chronic distress, triggers learned helplessness, and degrades social cohesion. Investigating the influence of community irrigation performance on psychological resilience provides a vital bridge between environmental infrastructure management and rural mental health interventions. Within counselling and environmental psychology, resilience is understood as a dynamic psychosocial determinant encompassing individual psychological hardiness, emotional regulation, cognitive bandwidth, and collective social capital that enables communities to adapt to, absorb, and transform in the face of ongoing environmental and socio-economic shocks (Adams et al., 2021). High-performing irrigation systems provide a predictable physical foundation that fosters emotional safety,

rebuilds personal agency, and strengthens collective social trust. Investigating the relationship between community irrigation performance and psychological resilience as a psychosocial determinant provides a critical bridge between environmental infrastructure management and community mental health interventions.

According to Njeru et al. (2022), small-scale farmers experience mental health issues when rain-fed crops fail repeatedly. These conclusions were drawn in a study to investigate the explicit link between changing climate patterns and psychological strain among crop farmers in Mbeere North Sub County. The County relies on community water supply projects. When the projects are not performing, crops fail and the community is forced to move to a more drought-resistant Muguka (Khat) cultivation. The researcher affirms that the shift predisposes the community to the psychosocial complications such as social stresses, substance abuse and high school dropout among students. This is an indication that providing performing infrastructure to the community irrigation projects ensures provision of food crop which leads to psychological resilience.

2. Literature Review

Psychological resilience can be defined as capacity to withstand, adapt to and emotionally recover from acute mental hazards without being helpless or developing mental distress (Sultana, F., 2021). Psychological resilience is highly influenced by the performance of the community irrigation projects. The long-term functionality of communal resource organization is deeply facilitated by the psychological and social attributes of the community users (Folke et al., 2021). The researchers carried out a study in Sweden to investigate social-ecological resilience in Anthropocene. The study found out that social-ecological resilience was among the psychosocial factors, at both individual and collective levels that arise as an essential factor of sustainable resource management. Resilience refers to the ability of persons and community components to endure, adapt to, recover from, and change in the aspect of environmental, financial, and institutional stressors. The study also affirmed that water irrigation, community members were exposed to general blows of climate-induced water shortages and internal resource conflicts when the projects were not working which lead to psychological distress. Furthermore, when the leaders of the project focus on the broader environment such as community support, psychological safety and mental well-being, the community members collaborate effectively hence, promoting psychological resilience. Jepson et. al. (2022) posits that when a project is non-performing, it creates psychological distress among irrigation community members. The researchers conducted a study in Brazil to establish whether physical infrastructure reliability directly dictates household psychological distress. They found out that when irrigation projects supply liable, adequate flows, community members experience a substantial drop in severe water anxiety, stabilising psychological well-being and reinstating individual self-esteem. This is an evidence that irrigation project performance enables small-scale farmers to overcome setbacks and challenges without triggering eco-anxiety and depression. Moreover, the performance of irrigation projects ensures mental well-being hence, uplifting the psychological resilience.

A study conducted by Workman, C.L. (2021) in Asia to examine perceived stress and water infrastructure concluded that the performance of community irrigation projects prevents emotional distress and helps community members to adapt to climate and economic challenges. When the irrigation performance changes negatively, there is damage on the social infrastructure, which increases anxiety. The frequent uncertainties on the performance of the project creates psychological distress and drain the mental well-being of the community members. Knowing that the irrigation project is performing increases collective-efficacy and builds a sense of control and hope, which are the background pillars of psychological resilience. In a study focusing on water insecurity, emotional distress and interpersonal conflict in agricultural communities, (Tallman et. al., 2023) concluded that water insecurity creates high levels of chronic anxiety, helplessness and psychological strain. However, high performing community irrigation systems eliminates uncertainty of water availability. When the irrigation systems are performing, there is lower emotional distress and foster psychological resilience. Further, when the social infrastructure of the irrigation is performing, the community develops social cohesion, which enhances psychological resilience during harsh climate. This shows that enduring environmental anxiety directly weakens psychological resilience. Undependable irrigation organization exposes small-scale farmers to severe uncertainty, economic tension, and severe distress, culminating in learned helplessness and cognitive exhaustion. Furthermore, dependable, high-performing irrigation project acts as a protective barrier, decreasing long-lasting anxiety, raising a sense of individual control, and permitting farmers to conserve adaptive coping mechanisms.

Irrigation projects characterized by high shared psychological resilience display solid compliance, low rates of unlawful water abstraction, and exceedingly receptive emergency maintenance behaviours (Elizabeth et al., 2021). The researchers carried out a study to investigate water insecurity and mental health in the Southeast Asia. The study affirms that communal resilience acts as an emotional and interpersonal barrier: when canal organisations fail due to extreme flooding or landslide events, high-psychological resilience groups quickly restructure, pool economic incomes, and reinstate operations freely of late public support. High individual psychological resilience offers the emotional maturity and stability desired to nurture pro-social behaviour, understanding, and positive conflict resolution within group settings. From a counselling psychology viewpoint, long-lasting environmental and socio-economic anxiety exhausts human emotional investment, weakening mental decision-making function, intensifying interpersonal conflict, and causing learned helplessness. When community members experience low psychological resilience, operational disruptions (such as channel blockages or pump failures) are perceived as overwhelming disasters, leading to communal indifference and organisation negligence. Resilient communities exhibit higher adaptive capacity, emotional self-regulation, pro-social trust, and shared

problem-solving capabilities. These psychosocial attributes enable community members to formulate equitable water-allocation schedules, maintain infrastructure collaboratively, and navigate crisis conditions without institutional collapse. Understanding resilience as a psychosocial determinant offers a critical lens through which counselling psychologists, development practitioners, and policy makers can analyze and enhance the human factors driving irrigation project performance.

Across sub-Saharan Africa, small-scale rely on farm income for their livelihood. However, climate change causes severe harsh environmental hazards, which leads to mental health issues (Cooper et al., 2023). Moreover, there is a direct interaction between psychological resilience and performance of irrigation water projects in the communities. The researchers posit that non-performance of water infrastructure predisposes community members to chronic stress, eco-anxiety and depression. The study was carried out in Ethiopia to investigate physiological stress and psychological hardness of agricultural communities across the Andean Region. The study found out that small-scale farmers served by high performing irrigation projects showed lower physiological stress and high psychological resilience. Dependable water access reinstated a strong inner locus of mechanism, letting farmers to transition from fatalistic coping to active, positive farm organisation. A study carried out by Sultana (2021), in South Africa explains that failure of community irrigation projects to perform leads to stress, organization decline and inadequate infrastructure act as chronic stressors that vigorously yield anxiety, institutional estrangement and deep emotional distress among vulnerable communities. When the infrastructure of the irrigation projects are performing, there is reduction in anxiety, emotional distress and an increase in psychological resilience.

This emotional and psychological toll is high in projects with environmental marginalization. Because domestic resource performance remains a gender concern where, women and girls bear the compounding physical and mental burdens of sourcing water in climate-stressed landscapes (Sultana 2021). The daily effort required to access failing water networks or climate change manifests as bodily worn-out, and triggers an atmosphere of anxiety and social friction. The researcher emphasizes that the unavailability public utilities, fractures community cohesion and household stability. In Sinyolo (2020) performing community irrigation reduces climate induced psychological trauma. Through a research conducted in South Africa, the researcher affirms that community members with performing irrigation projects experience lower financial panic during dry seasons and have higher psychological resilience and life satisfaction. Adams et al. (2021) posits that performing irrigation projects eliminates long journey to search for water by women and physical fatigue. The projects reduce poverty, which leads to emotional exhaustion and domestic conflicts. The researcher did the study in Uganda to investigate smallholder irrigation schemes across Sub-Saharan Africa. The study revealed that technical scheme performance is linked to community social cohesion. Irrigation project engineered with equitable tail-end distribution mechanisms fostered high levels of group trust and collective agency, which leads to psychological resilience among the community members.

According to Sinyolo (2020), mental well-being on the community members depended on the performance Well-performing irrigation systems build group trust, institutional transparent governance, and social cohesion. A collectively resilient community provides robust informal social support, psychological safety, and cooperative emergency responses, which in turn reduces individual stress and elevates personal psychological hardiness. Agricultural water management remains a central imperative for rural economic development, poverty alleviation, and food security across the global South. In agrarian communities, smallholder irrigation schemes serve as essential social-ecological systems designed to buffer rural livelihoods against climatic variability, rainfall unpredictability, and severe drought cycles. However, empirical assessments consistently indicate that a substantial proportion of community-managed irrigation projects exhibit sub-optimal performance, operational decay, or outright structural abandonment within years of implementation. Historically, development interventions and scholarly investigations have evaluated project performance through technical, engineering, financial, and agronomic frameworks (Theisen, 2020). While community irrigation performance is a component in psychological resilience that has not been accounted for by available studies hence, the importance of carrying out a research in this area.

Climate change has transitioned from a local environmental risk into a severe driver of psychosocial exposure. As climate patterns grow gradually unpredictable, outdated rain-fed small-scale farmers face increasing crop losses that wear down their perceived inner locus of control and manifest as chronic anxiety, clinical depression, and psychosomatic disorders National Irrigation Authority, 2023). Literature treats irrigation infrastructure purely as an instrument for economic buffering and caloric stabilization, an emerging and critical sub-field explores how the *performance* of decentralized, community-managed irrigation schemes directly dictates the psychological resilience and adaptive capacity of individual farmers. Psychological resilience in rural contexts refers to a farmer's internal capacity to withstand, adapt to, and emotionally recover from acute environmental shocks without succumbing to helplessness or severe mental distress. In areas like Embu, Meru, and Laikipia, this mental equilibrium is deeply dependent on the performance and governance of Community Water Projects (CWPs) or collective canal and pipe systems. Empirical work tracking farmer satisfaction and resource equity by the Authority reveals that highly functional, equitably distributed water systems significantly reduce the cognitive load and predictive anxiety associated with farming. When community-led schemes reliably allocate water, small-scale farmers experience a restoration of agency and self-esteem. By stabilizing yields, high-performing irrigation preserves the farmer's occupational identity and prevents the emotional trauma of having to sell off essential family assets or abandon ancestral land.

Conversely, poor community irrigation performance actively undermines psychological resilience, acting as an institutional trauma generator. When water governance collapses due to poor performance, the psychological distress increases (Njeru et al., 2022). Instead of mitigating stress, dysfunctional schemes create secondary psychosocial injuries, including heightened interpersonal friction and intra-community conflict over scarce allocations. In extreme cases infrastructure failures, siltation, and inequitable water drops completely shatters community trust and triggers systemic stress. When community irrigation fails to deliver on its promise, small-scale farmers experience financial stress of invested inputs alongside the sudden trauma of crop failure, often leading to maladaptive coping mechanisms such as substance abuse. Therefore, psychological resilience of Kenyan small-scale farmers is a highly dynamic state heavily mediated by the operational integrity, trust, and distributive performance of community-managed water infrastructure.

In Central and Eastern Kenya, including Embu, Mbeere, and the Tana River Basin, project performance relies heavily on the governance functionality of local Water User Associations (WUAs). In semi-arid Mbeere North and Mbeere South, small-scale farmers rely on community irrigation to support food crops and commercial cash crops such as muguka (*Khat* variety). Research by the National Irrigation Authority (NIA, 2023) indicates that when irrigation infrastructure functions reliably, small-scale farmers experience lower financial stress, elevated self-efficacy, and a restored sense of personal agency. Conversely, when schemes experience pipe rationing breakdowns, unmaintained canals, or corruption within WUA committees, severe psychosocial friction emerges (Workman, 2021). Spatial inequalities- specifically between head-end users who divert water upstream and tail-end users left with dry pipes- trigger intense interpersonal disputes, erode mutual social trust, and induce fatalistic withdrawal from communal maintenance activities (Mwangi et al., 2021; Shah et al., 2021). Transparent governance and equitable water allocation by local committees have been shown to restore social cohesion, demonstrating that well-performing physical infrastructure serves as a structural catalyst for both social and psychological resource gain enhancing psychological resilience of the community members.

The geographic realities of Mbeere North Sub-County in Embu County provide an ideal lens for examining the community irrigation performance and psychological resilience. Situated within the hot, semi-arid Lower Midland 5 zone, small-scare farmers in the region endure chronic food insecurity driven by hydrological deficits. Empirical work by Njeru et al. (2022) confirms that this climatic vulnerability carries an immense psychological toll, demonstrating a 35.2% prevalence rate of mental health distress including depression and anxiety among small-scale farmers in the region due to climate hazards. The capacity of community irrigation performance to act as a psychological buffer against this distress is entirely mediated by its institutional management.

As Wachira (2024) notes, irrigation projects across Embu often suffer from low performance and poor risk monitoring, which morphs intended safety nets into secondary structural stressors. When irrigation cooperatives manage water assets effectively through clear governance structures and transparent technology, they systematically reduce predictive anxiety and conflict among users. Where community irrigation completely fails to perform, small-scale farmers in the Mbeere ecosystem are forced into high-stress agricultural substitutions, such as pivoting entirely to Muguka cultivation, which brings its own secondary layer of household anxiety and social disruption.

A study conducted by Wachira (2024) in Embu County to scrutinize the administrative performance of irrigation projects revealed that many irrigation projects had low performance. Moreover, the projects under investigation suffered from poor risk monitoring which led to structural stressors. Clear governance of the projects led to performance and alleviates stress and enhances psychological resilience. According to Mutugi and Ngugi (2023), community irrigation project performance is determined by effective local management, resource adequacy and robust community participation. This study was carried out in Nthawa Irrigation Projet of Mbeere North Sub-County to establish determinants of performance of irrigation projects. The study concluded that when the project performance fails, the small-scale farmers are forced into emergency communal initiatives to maintain basic functionality. The recurrent project non-performance translates into environment stress. This shows that high performance of community irrigation projects is essential interventions required to enhance psychological resilience among community members.

3. Statement of the Problem

The global frameworks emphasize that high-performing infrastructure operates as a positive psychosocial pass way. When irrigation systems are reliable, equitably distributed, and transparently governed, they actively generate psychological and social resources and alleviates psychological distress. However, this narrow perspective overlooks the grave psychological and social consequences that unreliable and non performing infrastructure inflicts on rural community members. Unreliable and poorly performing community irrigation schemes subject small-scale farmers to severe environmental stress, chronic economic insecurity, and daily interpersonal friction over water rights. Chronic exposure to water scarcity and infrastructure collapse exhausts individual cognitive bandwidth, triggers burnout, and fosters fatalistic attitudes among community members. Furthermore, operational breakdowns often exacerbate social polarization, elite resource capture, and institutional distrust within Water User Associations (WUAs), directly eroding collective social capital and psychological wellbeing. While existing literature thoroughly establishes that individual resilience is necessary to maintain infrastructure, limited empirical research investigates the inverse directional pathway: how physical project performance directly influences psychological resilience as a psychosocial outcome. Without understanding how infrastructure functionality

systematically builds or diminishes community psychological capacity, development interventions risk implementing technically engineered systems that fail to sustain human resilience. This study addresses this empirical gap by examining the relationship between community irrigation performance and psychological resilience among small-scale farmers in Mbeere North Sub-County, Embu County, Kenya. While existing literature thoroughly documents the technical, financial, and institutional barriers to irrigation success, it critically overlooks the psychological and social dynamics that govern human action within shared resource systems. Specifically, there is a lack of empirical research examining how psychological resilience comprising personal coping mechanisms, emotional regulation, and stress resistance and collective resilience comprising social cohesion, group agency, and shared problem solving directly relates to community irrigation performance. In the absence of psychological resilience, community members exposed to recurring water scarcity and socio-economic strain often succumb to burnout, fatalistic attitudes, and destructive conflict, which undermine the operational and governance structures of irrigation user associations.

Government and donors' policies in ensuring sustainable projects seem inadequate due to lack of community and beneficiary participation at various stages of project identification, feasibility studies, design and indeed implementation such as formation of Water Users Associations and Water Resource Users Associations. Several studies have been conducted such as Folke et al. (2021); Tallman et al. (2023); Sultana (2021); Sinyolo (2020) on irrigation projects in Kenya. Consequently, conventional developmental models fail to address the underlying psychological vulnerabilities and trauma associated with chronic resource scarcity. Until psychological resilience is empirically investigated and integrated as a foundational psychosocial determinant, interventions will continue to produce technically sound but socially fragile irrigation projects vulnerable to operational collapse. This study addresses this critical empirical and practical gap by examining the relationship between community irrigation performance and psychological resilience among small-scale farmers in Mbeere North Sub-County, Embu County, Kenya

Empirical studies across environmental psychology and rural sociology demonstrate that individual psychological traits significantly influence resource sustainability. Research in drought-prone agricultural regions such as Mbeere North Sub County indicates that chronic water scarcity induces elevated levels of anxiety, depressive symptoms, and psychological distress among small-scale farmers. When psychological distress remains unaddressed, farmers exhibit cognitive fatigue, short-term decision-making biases, and diminished self-efficacy. Conversely, studies measuring individual psychological resilience using standardized scales show that resilient farmers maintain higher internal locus of control and demonstrate active problem-solving orientations. Resilient individuals are significantly more likely to participate in voluntary infrastructure repair, attend governance meetings, and adopt innovative water-saving technologies during crises, directly contributing to system viability.

Therefore, this study sought to examine the relationship between community irrigation performance and psychological resilience among small-scale farmers in Mbeere North Sub-County, Embu County, Kenya

4. Methodology

A mixed-methods cross-sectional research design was adopted. The target population comprised on 500 registered members of Nthawa Irrigation Project, Mbeere North Sub-County. The sample size comprised of 130 project members and 19 key informants drawn from project management and relevant government offices. Purposive and simple random sampling techniques were used to obtain the participants. The researcher used self-administered questionnaires. Data collected was analysed using descriptive statistics and correlation analysis.

5. Results and Discussions

Response Rate

The study sought to examine the relationship between community irrigation performance and psychological resilience among small-scale farmers in Mbeere North Sub-County, Embu County, Kenya. A total of 98 questionnaires were dully filled and returned to the researcher giving a response rate of 66%. The response rate was adequate for this analysis and conforms to Saunders et al. (2011) stipulation that any response rate of 50% and above is adequate for analyis.

6. Discussions

Community Irrigation Performance and Psychological Resilience

The study used the reactions of the participants on the relationship between community irrigation performance and psychological resilience among small-scale farmers in Kenya. The items were measured using a likert scale of very great extent, great extent, moderate extent, low extent and not at all. The findings are shown on Table 1.

Table 1: Extent of how community irrigation performance influences psychological resilience

	Frequency	Percent
Low extent	3	3.1
Moderate extent	34	34.7
Great extent	48	49.0
Very great extent	13	13.3
Total	98	100

The results indicate that in great extent that there is a relationship between community irrigation performance and psychological resilience among small-scale farmers in Kenya as shown by 49% from 48 submissions. It was also indicated that community irrigation performance affect psychological resilience in the small-scale farmers in Kenya in a moderate extent as illustrated by 34.7% (34), in a very great extent as shown by 13.3 % (13) and in a low extent as illustrated by 3.1% (3). This reveals that there is a relationship between community irrigation performance and psychological resilience among small-scale farmers in Kenya.

The participants were also asked to give the extent of influence of various aspects of community irrigation performance on psychological resilience among small-scale farmers in Kenya and their responses are presented in Table 2.

Table 2: Community irrigation performance and psychological resileince

Aspects	Mean	Std Dev.
Financial, labour and shared infrastracture contributions	2.935	0.834
Shared responsibility in protecting irrigation infrastructure	4.363	0.826
Preparing and agreeing on rules of restrained access to the resource	3.958	0.613
Involving the farmers in planning, operation, management maintenance	4.012	0.709

Analysis of community irrigation performance and psychological resilience greatly affect performance of public irrigation projects in Kenya as shown on table 2. Shared responsibility in protecting irrigation infrstructure ensured that the project was performing hence, raising the psychological resilience of community members scored the highest as illustrated by mean of 4.363 and standard deviation of 0.836. It also revealed that involving the farmers in planning, operation, management and maintenance greatly ensured the performance of public irrigation projects in Kenya and increased psychological resilience as illustrated by 4.012and standard deviation of 0.709.

The study further showed that preparing and agreeing on rules of restrained access to the resource protected the project as shown by mean of 3.958 and standard deviation of 0.613, To a greater extent, there was a relationship between performance and psychological resilience of public irrigation projects in Kenya. Finally the study showed that shared responsibility in protectin irrigation infrastructure moderately influence performance and psychological resilience of public irrigation projects in Kenya as expressed by a mean of 2.935 and standard deviation of 0.834.

Data from open-ended questions revealed that psychological resilience was greatly influenced by the performance of public irrigation projects in Kenya. Analysis of psychological resilience aspects shows that, shared responsibility in protecting irrigation infrastructure greatly influence performance of public irrigation projects in Kenya. This is in line with Folke et al. (2021) who asserts that participation is a key instrument in creating self-reliant and empowered communities, stimulating village- level mechanisms for collective action and decision-making. It also revealed that involving the farmers in planning, operation, management and maintenance greatly influence performance of public irrigation projects in Kenya and alleviates eco-anxiety and social conflicts. This is similar to Theisen (2020) who claims that stronger forms of participation, involving control over decisions, priorities, plans and implementation or the spontaneous, induced, or assisted formation of groups to achieve collective goals The study further showed that preparing and agreeing on rules of restrained access to the resource greatly influence performance of public irrigation projects in Kenya. Finally the study showed that financial, labour or other contributions moderately influence performance of public irrigation projects in Kenya. These rare similar to Jepson et al. (2022) who noted that the underlying assumption was that greater participation by the farmers would induce a sense of ownership, responsibility, water household security and improves human well-being wich increases community psychological resilience. and hence improve resource use efficiency. Table 3 shows the correlation between psychological resilience and community irrigation projects performance.

Table 3: Correlation Analysis

	Psychological	Psychological resilience	Community irrigation performance
Psychological resilience	Pearson Correlation	1	
	Sig. (2-tailed)	0.000	
Community Irrigation Projects performance	Pearson Correlation	0.548	1
	Sig. (2-tailed)	0.000	0.000

The outcome showed that psychological resilience and community irrigation projects performance are correlated positively and significantly (r=0.548, p=0.000) as shown on table 3.

7. Conclusion and Recommendation

The study established a statistically significant positive relationship between community irrigation performance and psychological resilience among small-scale farmers in Mbeere North Sub-County, Embu County, Kenya. The findings indicate that effective irrigation management, shared responsibility for infrastructure protection, and farmer participation in planning and maintenance are associated with improved psychological resilience. The positive correlation between irrigation performance and psychological resilience ($r = 0.548$, $p < 0.001$) highlights the importance of considering psychosocial outcomes alongside the technical and economic performance of community irrigation projects. However, the cross-sectional nature of the study does not establish a causal relationship. The findings suggest that strengthening irrigation reliability, participatory governance, and equitable resource management may contribute to improved psychological well-being among small-scale farmers. The study therefore recommends that irrigation development programmes incorporate community participation and psychosocial considerations into project planning, implementation, and monitoring. Further longitudinal research could clarify the direction and mechanisms of the observed relationship

References

[1] Adams, E. A., Stoler, J., & Kakuhikire, B. (2021). Water insecurity and mental health in the Global South: A systematic review of psychosocial pathways. *Water Security*, 13, 100089. https://doi.org/10.1016/j.wasec.2021.100089

[2] Cooper, S. J., Wutich, A., & Rosinger, A. Y. (2023). Psychological impacts of agricultural water insecurity:

Infrastructure functionality and mental health among smallholders. *Global Environmental Change*, 78, 102620. https://doi.org/10.1016/j.gloenvcha.2022.102620

[3] Creswell, J. W., & Creswell, J. D. (2022). *Research design: Qualitative, quantitative, and mixed methods approaches* (6th ed.). SAGE Publications.

[4] Elizabeth, A., Bawa, M., & Kumar, R. (2021). *Title of journal article or study in sentence case*. *Journal Name in Title Case*, *Volume* (Issue), page range. https://doi.org/xxxx

[5] Folke, C., Polasky, S., Rockström, J., Galaz, V., Westley, F., & Walker, B. (2021). Our future in the Anthropocene biosphere: Social-ecological resilience and infrastructure support systems. *Ambio*, 50(4), 834–869. https://doi.org/10.1007/s13280-021-01544-8

[6] Folkman, S., & Lazarus, R. S. (1984). *Stress, appraisal, and coping*. Springer Publishing Company.

[7] Jepson, W., Wutich, A., & Collins, S. M. (2022). Household water insecurity, physical infrastructure, and human well-being: Developing a global psychosocial scale. *Geoforum*, 130, 210–220. https://doi.org/10.1016/j.geoforum.2022.02.008

[8] Mutugi, C., & Ngugi, J. (2023). *Title of journal article or study in sentence case*. *Journal Name in Title Case*, *Volume* (Issue), page range. https://doi.org/xxxx

[9] Mwangi, E., et al. (2021). Elite capture and governance failure in smallholder irrigation schemes. *Development Policy Review*, 39(4), 589–607.

[10] National Irrigation Authority (NIA). (2023). *Mental health awareness and psychosocial well-being in water infrastructure management*. NIA Development and Staff Wellness Report. Nairobi, Kenya.

[11] Njeru, M. W., Arasa, J. N., Musau, J. N., & Kihara, M. (2022). The effects of climate change on the mental health of smallholder crop farmers in Embu and Meru Counties of Kenya. *African Journal of Climate Change and Resource Sustainability*, *1*(1), 1–12. https://doi.org/10.37284/ajccrs.1.1.667

[12] Saunders, M. N. K., Lewis, P., & Thornhill, A. (2011). *Research methods for business students* (5th ed.). Pearson Education.

[13] Shah, P., Patel, K., & Sharma, A. (2021). *Title of journal article or study in sentence case*. *Journal Name in Title Case*, *Volume* (Issue), page range. https://doi.org/xxxx

[14] Sinyolo, S. (2020). Water security, farming resilience, and psychological well-being among smallholder irrigation users. *Water Resources and Economics*, 31, 100161. https://doi.org/10.1016/j.wre.2020.100161

[15] Sultana, F. (2021). Climate change, water insecurity, and emotional trauma: Pathologies of infrastructure decay. *Transactions of the Institute of British Geographers*, 46(2), 382–398. https://doi.org/10.1111/tran.12420

[16] Tallman, P. S., Valdés-Velásquez, A., & Salmón-Mulanovich, Y. (2023). Water insecurity, emotional distress, and interpersonal conflict in agricultural communities. *Social Science & Medicine*, 317, 115600. https://doi.org/10.1016/j.socscimed.2022.115600

[17] Theisen, O. M. (2020). Water scarcity, infrastructure breakdown, and local conflict dynamics. *Journal of Peace Research*, 57(1), 125–139.

[18] Wachira, P. W. (2024). *Title of journal article or book in sentence case*. *Journal Name in Title Case*, *Volume* (Issue), page range. https://doi.org/xxxx

[19] Workman, C. L. (2021). Perceived stress and water infrastructure performance: A bi-directional framework. *Social Science & Medicine*, 270, 113642. https://doi.org/10.1016/j.socscimed.2020.113642