# CULTURAL FACTORS ASSOCIATED WITH THE ADOPTION OF WATER, SANITATION AND HYGIENE PRACTICES IN TURKANA SOUTH SUB-COUNTY, KENYA

**Akolong Ikone Godfrey.**
Master of Science (Environmental Health), Kenyatta University, Kenya.
**Dr. Anthony Wanjohi Nyambura.**
Kenyatta University, Kenya.
**Dr. Isabell Wairimu King'ori.**
Kenyatta University, Kenya.

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## ABSTRACT

Cultural norms and beliefs can influence whether households accept and consistently practise recommended water, sanitation and hygiene (WASH) behaviours. This article examines cultural factors associated with household WASH adoption in Turkana South Sub-County, Kenya, drawing on a broader analytical cross-sectional study of household WASH practices. Quantitative data were obtained from 337 households, representing an 87.8% response rate from 384 households approached. Qualitative evidence was collected through six key informant interviews and five focus group discussions. Household WASH adoption was assessed across safe water practices, sanitation and excreta management, hand hygiene, environmental hygiene, personal hygiene and food hygiene. The mean overall adoption score was 48.763%; 54.9% of households were classified as having low adoption, 35.6% moderate adoption and 9.5% high adoption. Cultural influences were not uniformly restrictive. Community approval of safe WASH practices (mean = 4.662), encouragement by religious leaders (mean = 4.617) and support from elders for latrine construction and use (mean = 4.558) were prominent supportive influences. At the same time, gendered responsibility for water collection, beliefs that visibly clear water is safe without treatment, and taboos concerning shared latrines could constrain adoption. In an adjusted ordinal logistic regression model, a more supportive cultural-factor score was associated with higher WASH adoption (adjusted odds ratio [AOR] = 1.912, 95% CI [1.307, 2.796], p = .001). Because the study was cross-sectional and conducted in Turkana South, the findings indicate association rather than causation and should not be generalised uncritically to all of Turkana County. The article recommends culturally responsive WASH programming that works with trusted leaders, addresses gendered decision-making, communicates the limits of visual water assessment, and designs sanitation facilities around users' privacy and social needs.


**Keywords:** Digital Confidence; Digital Safety Training; Perceived Online Safety; Technology-Facilitated Gender-Based Violence (TFGBV); Women's Digital Participation; Nairobi, Kenya

## INTRODUCTION

Access to water, sanitation and hygiene (WASH) services does not automatically translate into consistent household use. Adoption depends on the availability and reliability of infrastructure, household resources, local knowledge, social expectations and the meanings attached to everyday

practices. Cultural norms can support safe behaviour when trusted community figures endorse it, but they may also constrain practices that conflict with gender expectations, beliefs about illness, or expectations concerning privacy and family relationships. WASH research should therefore examine not only the presence of facilities but also whether recommended practices are socially acceptable and materially feasible (Nelson et al., 2021; VerKuilen et al., 2023).

Turkana County is an arid and semi-arid setting where water scarcity, dispersed settlements, long collection times and limited sanitation infrastructure complicate household WASH practices. The parent thesis reports that the 2023 Turkana SMART Survey estimated access at 46.2% for safe drinking water and 62.8% for household sanitation. These figures require citation to the original survey in the final submitted version. Water sources may also become unreliable during dry periods, and the presence of a source does not necessarily mean that households have enough water for treatment, handwashing, cleaning and other domestic needs. Cultural expectations and household decision-making therefore operate alongside material constraints.

Previous studies have examined social norms, gender roles, water-safety perceptions and community leadership in WASH behaviour. Kenyan evidence documents variation in water access, sanitation coverage and household practices across semi-arid contexts (Kithuki et al., 2021; Waswala-Olewe et al., 2026). Evidence from other settings likewise indicates that sanitation facilities may not be used consistently when financial constraints, water scarcity and social concerns remain unresolved (VerKuilen et al., 2023). The specific gap addressed here is the limited local evidence on how a combined measure of cultural factors is associated with ordered levels of household WASH adoption in Turkana South. The study is intended to add contextual evidence, not to establish that culture is the sole or causal determinant of adoption.

## Objective of the study

The objective was to examine the association between cultural factors—including gender roles and household decision-making, sanitation taboos, beliefs about water safety and illness, and the influence of community elders and religious leaders—and household WASH adoption in Turkana South Sub-County, Kenya.

## Cultural Influences on the Adoption of WASH Practices

Socio-cultural norms, as well as formal and informal rules within communities, largely affect meaningful engagement in interventions aimed at improving WASH practices and behaviours. Cultural and local contexts, alongside the prevalence of poverty, also influence whether households accept and sustain WASH interventions (Arimoro (2020), Hovden (2020) and Tsekleves et al. (2022),).

Evidence from developed countries shows that cultural beliefs and individual perceptions continue to influence WASH behaviour even where water infrastructure is readily available. In Virginia,

United States, trust in tap water, perceived water safety and trust in water utilities are associated with the preference for tap water rather than bottled water (Kaidbey et al., 2025). A comparison between Germany and Nakuru, Kenya, similarly demonstrates that drinking-water choices are influenced by personal perceptions, emotions, trust and worldviews. In Germany, some households continue to purchase bottled water despite having access to highly regulated public water supplies (Saravanan, 2024). This evidence indicates that the provision of WASH infrastructure alone does not necessarily result in the adoption of the expected practices.

Evidence from developing countries presents comparable findings. In India, financial constraints, inadequate water, cultural beliefs, distrust of government and a preference for open defecation continue to affect consistent toilet use. Consequently, constructing toilets without addressing behavioural and cultural factors may overestimate actual sanitation adoption (VerKuilen et al., 2023). In rural Brazil, community participation in selecting and implementing household cisterns contributes to their acceptance because the technologies complement local knowledge and established water-storage practices (de Sousa Filho et al., 2025).

Cultural values and traditional practices influence how people receive and adopt information on water treatment, handling and utilization. Community perceptions that visibly clear water is safe for consumption may be misleading and may reduce households' willingness to treat their drinking water. Evidence from Kitui County shows that some households associate visible water clarity with safety, although clarity does not establish microbiological safety (Kithuki et al., 2021). Perceived contamination risk therefore plays an important role in household water treatment and storage behaviour (Kaidbey et al., 2025; Kithuki et al., 2021). Failure to meaningfully integrate local and indigenous knowledge into WASH programme design may also weaken community engagement, ownership and the long-term sustainability of interventions (de Sousa Filho et al., 2025; Tsekleves et al., 2022).

Within Sub-Saharan Africa, cultural influences interact with gender roles, livelihood activities and access to WASH materials. In north-western Ghana, households demonstrate considerable awareness of the importance of handwashing, but the absence of designated handwashing facilities, inadequate water, inability to purchase soap, gender responsibilities and long periods spent on distant farms limit the translation of knowledge into practice (Fielmua et al., 2023). In Ethiopia, women are mainly responsible for handling animal manure, often without adequate protective measures. Although awareness of the health risks associated with human faeces is relatively high, awareness of risks associated with livestock manure remains lower (Hadush et al., 2025).

A growing body of evidence further indicates that women play a central role in managing household water supply, sanitation and hygiene, particularly in rural and low-resource settings. They are commonly responsible for water collection, storage, cooking, cleaning and childcare.

Despite these responsibilities, their participation in household and community WASH decision-making structures remains limited in many settings. Gender responsibilities may also restrict the time available for women to participate in communal activities. Excluding women from WASH planning and governance may therefore reduce the responsiveness and sustainability of community water and sanitation interventions (Fielmua et al., 2023; Tsekleves et al., 2022).

Cultural values, religious beliefs and traditional practices also influence sanitation choices, household water management and perceptions of acceptable hygiene behaviour. In pastoral and semi-arid settings, close interaction between people and livestock may increase exposure to animal waste, while livelihood activities may make conventional hygiene recommendations difficult to practise consistently (Hadush et al., 2025). In Narok West, limited toilet access and cultural norms within a predominantly pastoral community influence open-defecation practices. The study recommends integrating indigenous knowledge and addressing gender and cultural barriers in WASH interventions (Waswala-Olewe et al., 2026). These findings demonstrate the importance of culturally responsive interventions that consider local perceptions, social roles and livelihood practices.

Although previous studies establish that cultural values, traditional practices, gender roles and community perceptions influence WASH behaviour, they do not determine how these factors collectively influence the level of WASH practice adoption in Turkana South Sub-County. The present study therefore examines the relationship between cultural factors and the ordered levels of WASH practice adoption within the pastoral and semi-arid context of Turkana South.

## METHODS

The parent study used an analytical cross-sectional design. Turkana South Sub-County was purposively selected because of its WASH challenges and vulnerability to water scarcity. The five wards—Kalapata, Kaputir, Katilu, Lobokat and Lokichar—were included. A multistage sampling procedure was used, with households proportionately allocated across wards and selected using household registers. The target population comprised 29,081 households. Respondents were adult household heads or other adult household members knowledgeable about household WASH practices. The household-survey sample size was determined using Fisher's formula for estimating a population proportion where the target population exceeds 10,000 households (Fisher et al., 1991).

$$\mathbf{n = Z^2pq / d^2}$$

Where: n = required sample size; Z = standard normal value corresponding to the selected confidence level; p = estimated proportion of the population possessing the characteristic of interest; q = 1 − p; and d = acceptable margin of error.

A 95% confidence level (Z = 1.96), a 5% margin of error (d = 0.05), and a population proportion of 0.5 (q = 0.5) were used. The value p = 0.5 was selected because it produces maximum variability and a conservative sample estimate where a reliable prior estimate is unavailable.

**$n = (1.96^2 \times 0.5 \times 0.5) / 0.05^2 = 384.16 \approx 384$ households**

No additional non-response allowance was added. Therefore, 384 households were selected and approached. The sample was proportionately allocated to wards using $n_h = (N_h / N) \times n$, where $n_h$ is the sample allocated to a ward, $N_h$ is the household population of that ward, N is the total household population (29,081), and n is the overall sample (384).

***Table 1: Proportionate Allocation of the Household Sample by Ward***

| Ward | Household population | Proportion of households (%) | Allocated sample |
|---|---|---|---|
| Kalapata | 5,717 | 19.7 | 76 |
| Kaputir | 3,054 | 10.5 | 40 |
| Katilu | 10,684 | 36.7 | 141 |
| Lobokat | 2,154 | 7.4 | 28 |
| Lokichar | 7,472 | 25.7 | 99 |
| Total | 29,081 | 100.0 | 384 |

The sample was distributed proportionately across the five wards according to each ward's share of the 29,081-household population. This ensured that wards with larger household populations contributed more respondents while all five wards were represented.

Quantitative information was collected using a structured household questionnaire, alongside direct observation of household WASH conditions. Qualitative data were collected through six key informant interviews and five focus group discussions. The qualitative component was used to contextualise survey findings and explore how cultural expectations and local leadership related to household practice. Data were analysed using descriptive statistics, bivariate tests and multivariable ordinal logistic regression. The dependent variable was the ordered level of household WASH adoption: low (below 50%), moderate (50.0%–74.9%) and high (75.0%–100%). These thresholds were study-defined categories, not standard WHO/UNICEF classifications.

The cultural-factor scale covered gender roles and household decision-making, sanitation taboos, beliefs concerning water safety and disease, local customs, and support from community elders and religious leaders. The study report states that negatively worded statements were reverse-coded so that higher composite scores represented a more supportive cultural environment. Because some displayed item means refer to agreement with potentially restrictive beliefs (for example, that clear-looking water is safe without treatment or that water collection is primarily women's responsibility), these item means should be interpreted as raw agreement ratings, not as

direction-adjusted measures of support. The authors should verify the item-level coding and composite construction against the original questionnaire and syntax before submission. The adjusted model included selected sociodemographic and household characteristics as control variables. Statistical significance was assessed at $p < .05$. The cross-sectional design does not establish temporal sequence or causation.

Ethical approval was obtained from the Kenyatta University Ethics Review Committee, and research authorisation was obtained from the National Commission for Science, Technology and Innovation (NACOSTI) and relevant Turkana County authorities. Participation was voluntary, informed consent was obtained, and identifying information was not recorded in the study report. Qualitative participants were represented using anonymous participant codes.

## RESEARCH FINDINGS

All 337 completed questionnaires contained sufficient information for descriptive analysis and calculation of household WASH adoption scores. The reliability results in the table indicate the internal consistency of the study scales and should be interpreted alongside the number and nature of items in each scale.

***Table 2: Reliability Scales***

| Scale | Cronbach's alpha | Decision |
|---|---|---|
| Cultural-factor scale | 0.803 | Reliable |
| Community-engagement scale | 0.871 | Reliable |

### Overall WASH adoption

The mean adoption scores differed across the five WASH dimensions. Food hygiene recorded the highest mean score at 50.890%, followed by safe water practices at 49.267% and sanitation and excreta management at 47.638%. Environmental hygiene recorded a mean score of 45.421%, while hand hygiene had the lowest mean score at 38.147%. The overall mean household WASH adoption score was 48.763%.

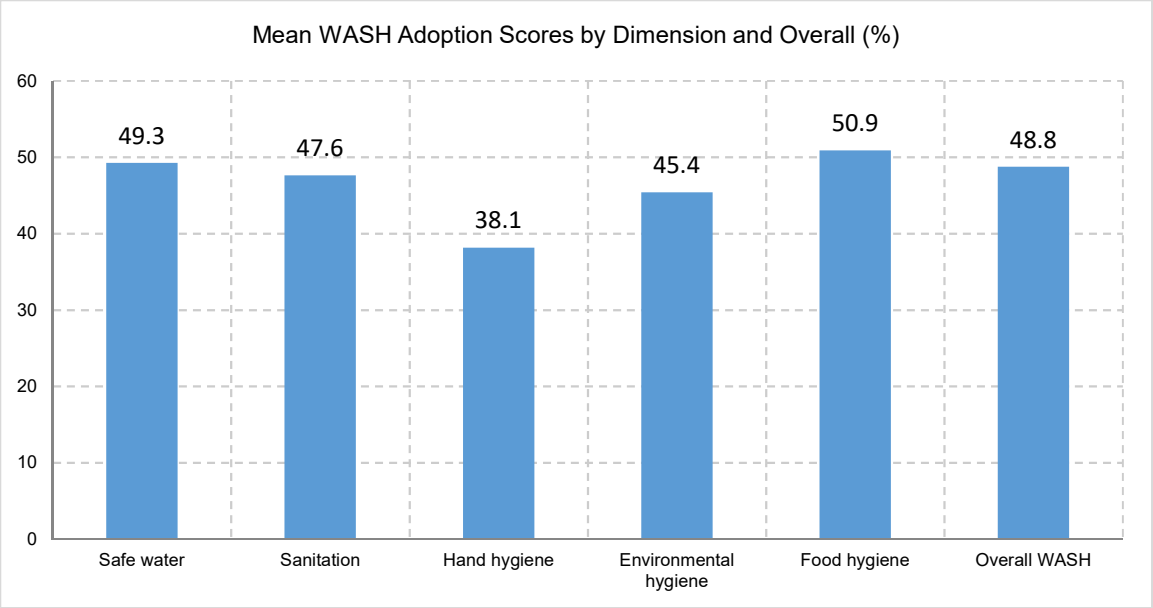



***Figure 1: Mean Household WASH Adoption Scores by Dimension and Overall Score (n = 337)***

Figure 1 shows that none of the WASH dimensions achieved a mean score substantially above 50%. The particularly low hand-hygiene score corresponds with the observed shortage of designated handwashing facilities, water, soap and ash. This suggests that household WASH adoption was constrained by both behavioural inconsistency and limited access to the facilities and materials required to practise safe WASH.

Using the study-defined thresholds, 185 (54.9%) households had low WASH adoption, 120 (35.6%) had moderate adoption and only 32 (9.5%) had high adoption.

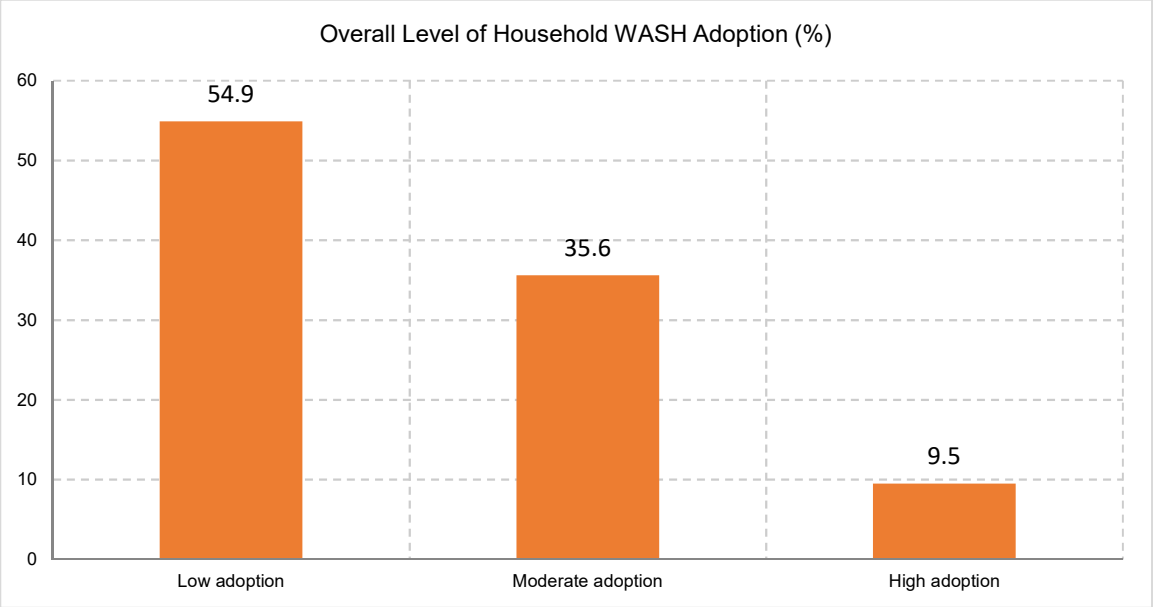



***Figure 2: Overall Level of Household WASH Practice Adoption (n = 337)***

Figure 2 demonstrates that more than half of the households were in the low-adoption category. When the low and moderate categories were combined, they accounted for 90.5% of the surveyed households. Only 9.5% achieved high adoption. The findings therefore indicate that comprehensive adoption of safe water, sanitation, hygiene, environmental and food-hygiene practices remained limited in Turkana South Sub-County. The low overall score provides the context for examining cultural influences: households were not consistently adopting the full set of safe water, sanitation and hygiene practices.

## Supportive cultural influences

The item-level response distributions below provide further detail on the cultural and community-engagement scores discussed above.

***Table 3: Cultural-factor statement responses, means and standard deviations***

| Cultural-factor statement | SD n | SD % | D n | D % | N n | N % | A n | A % | SA n | SA % | Mean | Std. dev. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fetching water is mainly the responsibility of women and girls | 3 | 0.9 | 7 | 2.1 | 15 | 4.5 | 98 | 29.1 | 214 | 63.5 | 4.522 | 0.756 |
| Women and men have an equal say in water-treatment and sanitation decisions | 25 | 7.4 | 37 | 11.0 | 45 | 13.4 | 128 | 38.0 | 102 | 30.3 | 3.727 | 1.214 |
| Household members of different ages and sexes can use the same household latrine | 30 | 8.9 | 42 | 12.5 | 46 | 13.6 | 119 | 35.3 | 100 | 29.7 | 3.644 | 1.269 |
| Some household members avoid latrines because of | 12 | 3.6 | 24 | 7.1 | 35 | 10.4 | 104 | 30.9 | 162 | 48.1 | 4.128 | 1.085 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| cultural taboos | | | | | | | | | | | | |
| Water that looks clear is safe to drink without treatment | 6 | 1.8 | 13 | 3.9 | 22 | 6.5 | 105 | 31.2 | 191 | 56.7 | 4.371 | 0.901 |
| Diarrhoea may be caused by supernatural forces rather than unsafe WASH conditions | 38 | 11.3 | 48 | 14.2 | 55 | 16.3 | 95 | 28.2 | 101 | 30.0 | 3.513 | 1.348 |
| Treating drinking water is consistent with local customs | 10 | 3.0 | 22 | 6.5 | 31 | 9.2 | 113 | 33.5 | 161 | 47.8 | 4.166 | 1.036 |
| Community elders support construction and regular use of household latrines | 3 | 0.9 | 6 | 1.8 | 12 | 3.6 | 95 | 28.2 | 221 | 65.6 | 4.558 | 0.73 |
| Religious leaders encourage safe water, sanitation and hygiene practices | 2 | 0.6 | 5 | 1.5 | 11 | 3.3 | 84 | 24.9 | 235 | 69.7 | 4.617 | 0.681 |
| People approve of households that | 1 | 0.3 | 4 | 1.2 | 9 | 2.7 | 80 | 23.7 | 243 | 72.1 | 4.662 | 0.621 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| consistently practise safe WASH | | | | | | | | | | | | |
| Women can speak and influence decisions during community WASH meetings | 15 | 4.5 | 30 | 8.9 | 38 | 11.3 | 117 | 34.7 | 137 | 40.7 | 3.982 | 1.131 |
| Local norms encourage safe disposal of children's faeces | 20 | 5.9 | 32 | 9.5 | 41 | 12.2 | 125 | 37.1 | 119 | 35.3 | 3.864 | 1.172 |

On the five-point response scale, community approval of households that consistently practised safe WASH had the highest reported mean agreement rating (4.662), followed by encouragement from religious leaders (4.617) and support from community elders for latrine construction and regular use (4.558). These item-level results suggest that respondents perceived community approval and trusted leadership as potentially supportive. Because the table reports agreement ratings and the scale includes items with different conceptual directions, item means should not be treated as directly comparable measures of overall cultural support unless the coding rules are made explicit.

One key-informant account in the study report (KII-05) indicated that WASH messages were more readily received when elders and religious leaders discussed latrine use and water treatment during community gatherings. This account illustrates one participant's perspective and is not, by itself, evidence that all community members hold the same view or that leader involvement caused improved adoption. The qualitative component would be more transparent if the final article reported participant selection, focus-group composition, language and transcription procedures, coding approach, and how themes were integrated with survey results. Programmes should avoid treating culture as uniform across households or wards.

***Table 4: Association of Cultural Factors and Community Engagement with WASH Adoption***

| Variable | Category | Low n | Low % | Moderate n | Moderate % | High n | High % | Test statistic | df | p-value |
|---|---|---|---|---|---|---|---|---|---|---|
| Cultural-factor level | Less supportive | 52 | 74.3 | 16 | 22.9 | 2 | 2.9 | $\chi^2 = 31.699$ | 4 | <0.001 |
| | Moderately supportive | 99 | 58.6 | 58 | 34.3 | 12 | 7.1 | | | |
| | Highly supportive | 34 | 34.7 | 46 | 46.9 | 18 | 18.4 | | | |
| Member of a community group | Yes | 59 | 42.4 | 59 | 42.4 | 21 | 15.1 | $\chi^2 = 17.634$ | 2 | <0.001 |
| | No | 126 | 63.6 | 61 | 30.8 | 11 | 5.6 | | | |
| Attended a WASH meeting, training or baraza | Yes | 82 | 45.3 | 76 | 42.0 | 23 | 12.7 | $\chi^2 = 15.272$ | 2 | <0.001 |
| | No | 103 | 66.0 | 44 | 28.2 | 9 | 5.8 | | | |
| Received WASH information | Yes | 156 | 52.2 | 112 | 37.5 | 31 | 10.4 | FFH exact | - | 0.018 |
| | No | 29 | 76.3 | 8 | 21.1 | 1 | 2.6 | | | |
| Contributed to a communal WASH activity | Yes | 78 | 44.3 | 73 | 41.5 | 25 | 14.2 | $\chi^2 = 19.676$ | 2 | <0.001 |
| | No | 107 | 66.5 | 47 | 29.2 | 7 | 4.3 | | | |
| Community- | Low | 37 | 78.7 | 9 | 19.1 | 1 | 2.1 | FFH exact | - | <0.001 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| engagement level | | | | | | | | | | |
| | Moderate | 76 | 63.9 | 38 | 31.9 | 5 | 4.2 | | | |
| | High | 72 | 42.1 | 73 | 42.7 | 26 | 15.2 | | | |

*Row percentages are presented. Cultural-factor and community-engagement scores were classified as low or less supportive (1.00-2.99), moderate (3.00-3.99) and high or highly supportive (4.00-5.00). The Fisher-Freeman-Halton exact test with Monte Carlo estimation was used for receipt of WASH information and community-engagement level because at least one expected cell frequency was below five.*

Cultural-factor level was associated with WASH-adoption category in the reported analysis, $\chi^2(4) = 31.699$, $p < .001$. High adoption was reported by 2 households (2.9%) in the less-supportive category and 18 (18.4%) in the highly supportive category. Community-engagement indicators were also reported as associated with adoption. Row percentages are presented, and exact tests were used where expected cell frequencies were small. These are unadjusted associations and should not be interpreted as causal effects. The test statistics, degrees of freedom, counts and percentages should be checked against the original statistical output before submission.

***Table 5: Parameter Estimates from the Ordinal Logistic Regression Model***

| **Model term** | **Category or unit** | **Sig.** | **AOR** | **95% CI for AOR** |
|---|---|---|---|---|
| Thresholds | | | | |
| Low adoption | Low versus moderate/high | 0.002 | | |
| Moderate adoption | Low/moderate versus high | <0.001 | | |
| Location parameters | | | | |
| Cultural-factor score | One-unit increase | 0.001 | 1.912 | 1.307–2.796 |
| Community-engagement score | One-unit increase | <0.001 | 2.186 | 1.463–3.267 |
| Sex | Female versus male | 0.632 | 1.125 | 0.695–1.822 |
| Age | One-year increase | 0.182 | 0.988 | 0.971–1.006 |
| Education | Primary versus none/non-formal | 0.172 | 1.454 | 0.850–2.487 |
| | Secondary/college/university versus none/non-formal | 0.011 | 2.268 | 1.207–4.264 |

| | | | | |
|---|---|---|---|---|
| Occupation | Business/salaried versus pastoralism/farming/fishing | 0.032 | 1.861 | 1.056–3.279 |
| | Casual/unemployed/other versus pastoralism/farming/fishing | 0.610 | 1.153 | 0.668–1.988 |
| Monthly household income | Above KSh 10,000 versus KSh 10,000 or less | 0.035 | 1.799 | 1.043–3.101 |
| Dwelling type | Permanent/semi-permanent versus traditional/temporary/other | 0.008 | 2.022 | 1.205–3.392 |
| Household size | One-member increase | 0.003 | 0.901 | 0.841–0.965 |

After adjustment for the covariates listed in Table 5, a one-unit increase in the cultural-factor score was associated with higher cumulative odds of being in a higher WASH-adoption category (AOR = 1.912, 95% CI: 1.307–2.796, p = .001). The community-engagement score was also associated with higher adoption (AOR = 2.186, 95% CI: 1.463–3.267, p < .001). These estimates describe adjusted associations, conditional on the variables and model specification used; they do not establish causation. Interpretation of the ordinal model depends on verification of the proportional-odds assumption and other model diagnostics, which should be reported from the original analysis output.

## DISCUSSION

The findings are consistent with the view that cultural context may be relevant to WASH adoption in more than one way. Community approval and trusted leadership were rated positively, while responses also indicated acceptance of beliefs or norms that may complicate recommended practices. The adjusted association between the cultural-factor score and adoption supports examining culture as one component of WASH programming, but its interpretation depends on the validity of the composite score and the regression model. Research on community participation similarly highlights the importance of local engagement, while recognising that material and institutional conditions remain consequential (Nelson et al., 2021; de Sousa Filho et al., 2025).

The prominence of elders and religious leaders suggests that behaviour-change activities may be more credible when developed with people whom communities already trust. Leaders can help explain the health rationale for water treatment and latrine use, publicly affirm safe practices and reduce social discomfort surrounding sanitation. However, engagement should be collaborative and evidence-based: local authority should help make accurate information understandable, not replace it. The practical implication is to co-design messages with local leaders and health

personnel, test whether they are understood, and provide opportunities for residents—particularly women and less-heard groups—to question or adapt proposed approaches.

Gendered water-collection responsibilities are important because the burden of obtaining water can limit time and availability for other hygiene practices. More importantly, the qualitative account indicates that responsibility for fetching water did not necessarily confer control over expenditure for treatment or repairs. WASH interventions should therefore involve both those who perform daily tasks and those who control household resources. Women and girls should be represented in planning and decision-making, while programmes should avoid reinforcing the assumption that water collection and hygiene are exclusively female responsibilities.

Agreement with the statement that clear-looking water is safe without treatment was high (mean = 4.371). This indicates a potentially important perception to address, although the item alone does not establish whether respondents actually left water untreated. Visual appearance cannot establish microbiological safety. Communication can explain this distinction and demonstrate feasible treatment and safe-storage methods, consistent with research on water-safety perceptions and drinking-water choices (Kaidbey et al., 2025; Kithuki et al., 2021). Messages alone are unlikely to be sufficient when households lack treatment products, safe containers or reliable water supplies.

Sanitation taboos and discomfort with sharing a latrine illustrate that facility availability and actual use are different outcomes. Sanitation designs and programmes should consider privacy, dignity, gender, age and family relationships during planning. Where possible, community consultation can identify locally acceptable options without normalising exclusion or compromising health. This is consistent with wider evidence that toilet construction does not automatically end open defecation when behavioural, financial and contextual barriers persist (VerKuilen et al., 2023).

The low overall adoption level cautions against explaining WASH practices through culture alone. The study describes long water-collection times, inconsistent treatment, limited functional handwashing facilities and resource constraints. Culture may interact with water availability, household income, infrastructure and livelihood patterns. Attributing low adoption to beliefs alone risks blaming households for practices they may lack the resources to change. A more defensible response combines reliable services and supplies with culturally responsive communication and inclusive decision-making.

## CONCLUSION

In this sample from Turkana South, the cultural-factor score was associated with household WASH-adoption category after adjustment for selected household characteristics. Respondents reported high agreement with statements about community approval and support from religious leaders and elders, while also expressing agreement with some beliefs and norms that may

complicate safe practices. These findings support culturally responsive WASH planning alongside investment in reliable water, sanitation and hygiene resources. Because the study was cross-sectional and conducted in one sub-county, the results indicate association in the study setting, not causation or countywide representativeness. The interpretation of the adjusted estimate also depends on verification of the cultural scale coding and ordinal regression assumptions.

## Recommendations

First, county health and WASH actors should work with elders, religious leaders and other trusted community figures to communicate accurate, practical messages on water treatment, safe storage, latrine use and hand hygiene. Second, household engagement should include women and girls as well as those who control household spending, so that responsibility for water collection is matched by influence over treatment and repair decisions. Third, behaviour-change communication should address the misconception that clear-looking water is necessarily safe and should be accompanied by feasible access to treatment options and safe-storage materials. Fourth, sanitation planning should consult households about privacy and culturally sensitive use arrangements while maintaining safe and equitable access. Finally, programmes should monitor observed practices and functional facilities, not only attendance at awareness sessions or reported knowledge.

## Limitations

The cross-sectional design prevents determination of temporal order or causation. Self-reported practices may be affected by recall and social-desirability bias, although direct observation was also used for relevant household conditions. Turkana South was purposively selected, so the findings should not be generalised to all of Turkana County without further evidence. The cultural-factor score combines several distinct dimensions, which may obscure differences between gendered decision-making, water-safety beliefs, sanitation privacy and leader endorsement. Future studies could examine these dimensions separately and use longitudinal or intervention designs to assess whether changes precede changes in observed WASH behaviour.

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