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Accounting for water and its role in achieving sustainability: An exploratory study on a sample of Samarra City Citizens

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ABSTRACT

This study examines the relationship between accounting for water quality and the achievement of environmental and financial sustainability in Samarra, amid declining government-provided water quality. Using a descriptive–analytical approach, data were collected via a five-point Likert scale questionnaire from 211 employees and faculty members at the University of Samarra. Results indicate a significant positive relationship between water quality and financial sustainability, and a weaker yet significant relationship with environmental sustainability. The findings demonstrate that poor government water quality imposes direct financial burdens on citizens and promotes unsustainable bottled water consumption. The study underscores the role of water accounting in assessing such impacts and recommends enhancing water infrastructure, integrating water accounting into environmental performance reporting, and providing temporary solutions to support citizens.

Keywords: water accounting; environmental dimension; financial dimension
JEL Classification: Q25; Q56; M41

1. Introduction

Water is one of the most essential natural resources, indispensable for sustaining human life and supporting economic activities. As global water demand continues to rise and issues of scarcity and pollution intensify across many regions, the need for effective tools to manage this vital resource has become increasingly urgent. Among such tools, water accounting plays a central role by providing a systematic framework for measuring, recording, and analyzing water use, associated costs, and sources. Through this framework, water accounting supports informed decision-making aimed at achieving both environmental and economic sustainability.

The primary objective of water accounting is to generate accurate and reliable information that enables governments, corporations, and local communities to understand patterns of water consumption, identify inefficiencies or waste, and evaluate the environmental implications of water-related activities. Water accounting is also directly aligned with the Sustainable Development Goals

(SDGs), particularly SDG 6, which emphasizes the availability and sustainable management of water and sanitation for all. Consequently, integrating water accounting into environmental and financial accounting systems has become essential for strengthening water governance and balancing economic development with environmental protection.

In Samarra City, the urgency of such integration becomes evident in light of the severe shortage of potable water. Citizens increasingly rely on alternative sources—including household filtration systems, bottled water, commercially supplied water containers, and small packaged drinking water—to meet their daily needs. These practices impose considerable financial burdens, yet residents remain obligated to pay monthly government water fees despite inconsistent access to safe drinking water. This situation underscores the need to examine water-quality-focused accounting practices as a mechanism for improving sustainability outcomes in the city.

In response, the present study seeks: (1) to clarify and define the conceptual foundations of water accounting and sustainability; (2) to assess the relationship between water quality accounting and the environmental and financial dimensions of sustainability; and (3) to offer practical insights for improving water quality, reducing citizens' financial burdens, and enhancing government revenues, particularly those of the Samarra Water Directorate. By addressing these aims, the research also contributes to broader public health objectives by encouraging the provision of safe and clean drinking water. Based on these objectives, the study is guided by two research questions:

1. To what extent does the deterioration of government-supplied water quality influence citizens' consumption behavior and their reliance on commercial alternatives?
2. What financial burden do citizens bear as a consequence of depending on alternative water sources while continuing to pay government water fees?

2. Literature review

Water accounting is widely defined as an informational framework that systematically integrates hydrological data with economic and environmental information, reflecting a comprehensive accounting perspective that captures the interrelationship between people, the economy, and the environment. In the literature, it is also referred to as natural capital accounting, ecosystem accounting, and environmental–economic accounting, and within corporate settings, it appears under sustainability or ESG reporting (Vardon et al., 2023). According to the United Nations (2012), water accounting is "a systematic tool for collecting, analyzing, and disseminating data related to water in order to understand water flows, uses, and allocations among different sectors within an environmental and economic framework." Similarly, Molden (2012), through the International Water Management Institute, defined it as "an analytical process aimed at tracking the volume, use, and quality of water within a given system to support decision-making and achieve water sustainability." Burritt and Christ (2016) and Christ and Burritt (2017) further conceptualized water accounting as "the application of accounting principles to water resources to record and assess their use, costs, and environmental and social impacts, thereby improving environmental governance and supporting sustainable development" (Meurer & Bellen, 2024). Taken together, these definitions indicate that water accounting encompasses not only quantitative measures of water use but also water quality, environmental impacts, costs, and resource-use efficiency, thereby

functioning as a strategic tool for sustainability-oriented decision-making.

The importance of water resource accounting is well established in contemporary environmental management literature. It improves water management efficiency by enabling institutions and governments to track consumption, identify waste, and enhance resource-use efficiency. Water accounting also contributes to more accurate and reliable economic and environmental decision-making by assessing the true costs and impacts of water use. Transparent disclosure of water-related information strengthens accountability and public trust, especially when incorporated into sustainability reporting frameworks. Moreover, water accounting plays a central role in monitoring progress toward Sustainable Development Goal (SDG) 6, which emphasizes the sustainable management and availability of water and sanitation for all (UNESCO, 2021: 33).

The literature also positions water accounting within the broader conceptual foundation of sustainability. The Brundtland Report (1987) famously defines sustainability as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." Kuhlman and Farrington (2010) similarly conceptualize sustainability as the maintenance of well-being across long periods of time. Other scholars highlight sustainability as the ability to maintain resource availability and desired environmental conditions over the long term, emphasizing the balance between consumption and regeneration. Sustainability is commonly understood through three core dimensions: environmental, economic, and social (Hariram et al., 2023). The environmental dimension stresses the protection of natural resources and reduction of pollution; the economic dimension emphasizes improved living standards and long-term productivity; and the social dimension focuses on equity, essential services, community participation, and social stability.

A substantial body of empirical and conceptual research has analyzed water accounting from diverse perspectives. Vardon et al. (2025) conducted a global assessment of 271 water accounting systems in 78 countries using the SEEA-Water framework, examining dimensions such as data comprehensiveness, policy alignment, transparency, and updatability. Their findings indicate that robust water accounting significantly enhances sustainable decision-making and improves water governance, particularly when SEEA frameworks are implemented in developing countries.

Mahmud et al. (2022) reviewed water accounting practices among corporations and water service providers, focusing on sustainability and water reporting across four dimensions: water usage, distribution efficiency, risk reporting, and environmental policies. Their results show that transparent water-related disclosures mitigate risks and strengthen community trust. They therefore recommend integrating water accounting reports into broader sustainability reporting practices. A bibliometric analysis of 500 studies published between 2000 and 2023 by Karcıoğlu and Öztürk (2023) revealed growing global attention to water accounting as a key sustainability indicator. Using VOSviewer and SciMAT, their study mapped thematic evolution and collaboration networks, concluding that future research should more comprehensively measure the economic impacts of water consumption to strengthen the link between environmental sustainability and financial accountability. From a different theoretical perspective, Irfan et al. (2020) developed an Islamic-based conceptual framework for water accounting in peatland sustainability. Their qualitative model integrates

environmental, disclosure, control, and ethical dimensions grounded in Islamic jurisprudence. The proposed "Accounting Ihsan Model" promotes ethical responsibility, transparency, and stewardship, offering an alternative to Western-based accounting frameworks.

Mediaty et al. (2024) investigated global water sustainability through an environmental accounting approach by reviewing 64 studies published between 2019 and 2023. Their analysis centered on water consumption, pollution, environmental costs, and sustainability performance indicators. They concluded that environmental accounting plays a critical role in understanding how economic activities contribute to water crises and recommended the inclusion of water sustainability indicators in both public and private financial reports to align water management with environmental and economic objectives.

According to Prasetyo (2020), the Bedhaya Banyu Ning Kali dance reflects local wisdom in water management accounting. The study shows that this wisdom helps in identifying, reporting, and safeguarding water-related rights and obligations, emphasizing human responsibility in preserving water for future generations. These insights can also inform GRI 300 sustainability reporting, particularly GRI 303-3 on sustainable water use.

Gohari et al. (2025) found that high-efficiency irrigation can paradoxically increase water demand and groundwater depletion, reflecting "Fixes that Backfire" and "Limits to Growth" archetypes. Their analysis showed that combining high-efficiency irrigation with full wastewater reuse maximized overall benefits, while groundwater control with partial reuse most effectively reduced water stress and agricultural consumption. The study highlights the value of integrated human-water system modeling in mitigating unintended consequences and supporting sustainable water management.

Amdar et al. (2024) highlight that Water Accounting Plus (WA+) can improve water assessment accuracy and support demand management in the MENA region, particularly in Jordan. Effective use requires integrating WA+ with hydrological models, validating ground and remote-sensing data, and aligning indicators with stakeholder objectives. Case-based studies are needed to fully evaluate its effectiveness in addressing local water management challenges.

Compared with these previous studies, the present study differs in both focus and methodological orientation. While most prior research has concentrated on water quantity or resource management, the current study places water quality at the core of water accounting. Methodologically, it adopts an exploratory field-based approach using primary data from citizens of Samarra City, in contrast to earlier works that relied predominantly on literature reviews or document analyses. The study also provides a localized and citizen-centered perspective by emphasizing public awareness and satisfaction regarding the effects of water quality on sustainability—an element largely absent from previous literature. Furthermore, it offers a practical framework intended to guide local policymakers in adopting water-quality-focused accounting practices, thereby reinforcing public accountability and promoting sustainable water governance. To guide empirical analysis, the study formulates a main hypothesis stating that accounting for water quality has a statistically significant effect on achieving sustainability dimensions. Two sub-hypotheses emerge from this main premise:

1. Water quality accounting has a significant relationship and effect on the environmental dimension.

2. Water quality accounting has a significant relationship and effect on the financial dimension.

3. Research method

This study investigates the effect of water quality accounting on the achievement of sustainability dimensions within the context of Samarra City. The research problem originates from the city's severe shortage of potable water, which compels most residents to depend on alternative sources such as household water filtration devices, bottled water, commercially supplied water containers, and small purified water cups or bottles. These practices impose significant financial burdens on citizens, including the cost of purchasing and maintaining filtration systems, continually buying bottled water, and replacing water cylinders after several refills due to potential health risks associated with improper handling. Despite these burdens, residents remain obligated to pay monthly government water fees, even though the public water supply does not consistently provide safe drinking water. In light of this situation, the study seeks to address two central research questions: (1) To what extent does the decline in the quality of government-supplied water influence citizens' consumption behavior, particularly their reliance on commercial alternatives such as water filters and bottled water? and (2) What financial burden do citizens bear as a result of depending on alternative water sources while continuing to pay government water fees?

To guide the empirical investigation, the study develops a main hypothesis stating that accounting for water quality has a statistically significant effect on achieving sustainability dimensions. From this primary assumption, two sub-hypotheses are derived: the first posits that water quality accounting has a significant relationship and effect on the environmental dimension, while the second proposes that water quality accounting has a significant relationship and effect on the financial dimension. Correspondingly, the objectives of the study are to clarify and define the conceptual foundations of water accounting and sustainability, to measure the accounting relationship between water quality accounting and the environmental and financial components of sustainability, and to contribute practically to improving water quality, reducing the financial burdens borne by citizens, and enhancing government revenues—particularly those of the Samarra Water Directorate. The study further seeks to support public health by promoting the availability of clean and safe drinking water.

To achieve these objectives, the research adopts the descriptive–analytical method, which is suited to examining and interpreting the relationships among the study variables. The research population consists of the citizens of Samarra City, whereas the selected sample comprises employees and academic staff of the University of Samarra, who are considered appropriate respondents due to their direct awareness of water-related issues. The research model (presented in Figure 1) illustrates the conceptual framework of the study, depicting the relationship between the independent variable—accounting for water quality—and the dependent variables, namely the environmental and financial dimensions of sustainability.

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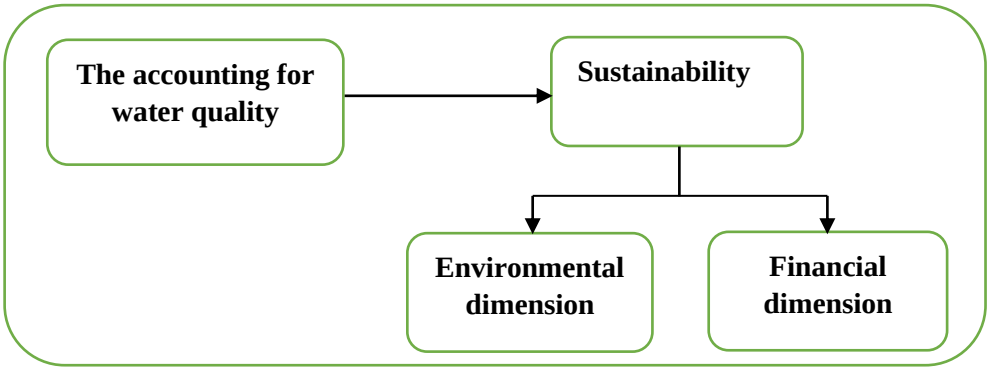

Figure 1. The research's model
Source: author

4. Result and discussion

Result

The study was conducted on a sample of 211 citizens from Samarra City, including employees and academic staff of the University of Samarra, to assess the perceived quality of government-supplied water using a five-point Likert scale questionnaire. The educational level distribution of the respondents is presented in Table 1. The data indicate that 5.2% of participants held secondary education, 62.6% had bachelor's degrees, and 32.2% possessed postgraduate qualifications, reflecting a largely well-educated sample capable of providing informed and reliable responses.

Table 1. The Educational Level Distribution

Educational Level	Percentage
Secondary	5.2
Bachelor's Degree	62.6
Postgraduate Studies (Master's/PhD)	32.2

Source: author (based on the questionnaire form)

Table 2 illustrates the main sources of water used by the participants. Plastic-bottled water was the most frequently consumed at 39.3%, followed by filtered water at 35.5%. Government-supplied water ranked third at 21.8%, while glass-bottled water accounted for 2.4%, and other sources represented 1%. These figures indicate a substantial reliance on commercial water sources, which reflects public dissatisfaction with the quality of government-provided water.

Table 2. Types of water used

Types	Percentage
Government-supplied water	21.8
Plastic-bottled water	39.3
Glass-bottled water	2.4
Filtered water	35.5
Other types of water	1

Source: author (based on the questionnaire form)

The reliability and validity of the questionnaire are summarized in Table 3. The Cronbach's Alpha coefficient of 0.833 exceeds the 0.70 threshold, indicating strong internal consistency and correlation among all items across the three axes of the questionnaire. This demonstrates the reliability of the instrument in capturing perceptions related to water quality, environmental, and financial accountability.

Table 3. Reliability test

N	211
Percentage	100
Cronbach's Alpha	0.833

Source: author (based on SPSS outputs)

Table 4 presents the measurement of the independent variable, Water Quality Accountability, based on the questionnaire. The weighted arithmetic mean for this dimension was 3.82, higher than the hypothetical midpoint of 3.00, indicating that respondents generally agree with statements highlighting problems in government-supplied water quality. The standard deviation (SD) of 0.64 was relatively low, suggesting limited variation in opinions, while the coefficient of variation (CV) of 16.7% reflects a moderate degree of dispersion. The observed variation can be attributed to differences in water quality across neighborhoods, disparities in infrastructure, and variations in service continuity.

Table 4. Descriptive statistics of accounting for water quality

Accounting for the Level of Water Quality	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean	SD	Rank	CV	General Direction
I believe that the quality of government-supplied water in my city is not good.	53	76	54	21	7	3.69	1.05	1	28%	Agree
The taste and smell of government-supplied water are unacceptable.	32	79	54	36	10	3.41	1.08	2	32%	Agree
I believe that government-supplied water may cause health problems due to impurities.	76	96	25	11	3	4.09	0.90	3	22%	Agree
I have noticed changes in the color or purity of the water provided by the government.	42	90	43	28	8	3.61	1.06	4	29%	Agree
I boil government-supplied water before drinking due to its low quality.	36	76	41	43	15	3.35	1.18	5	35%	Agree
I believe that the government does not adequately treat and purify the water.	61	93	35	18	4	3.89	0.98	6	25%	Agree
Frequent water cuts force me to use alternative water sources.	71	90	29	19	2	3.99	0.96	7	24%	Agree
I face problems with scaling or	66	82	37	23	3	3.87	1.02	8	26%	Agree

impurities in water coming from the public water network.										
The quality of government-supplied water does not meet acceptable health standards.	74	90	30	12	5	4.06	0.87	9	21%	Agree
There is an urgent need to improve the quality of water provided by the government.	99	86	16	9	1	4.29	0.82	10	19%	Strongly Agree
Weighted Mean, SD, and CV						3.82	0.64		16.7%	

Source: author (based on SPSS outputs)

Table 5 shows the measurement of the first dependent variable, Environmental Accountability. The arithmetic mean was 3.69, SD = 0.50, and CV = 13.55%, indicating that participants moderately to strongly agree with statements reflecting environmental awareness, particularly concerning plastic waste generated by bottled water consumption. The low SD demonstrates homogeneity in respondents' opinions, suggesting a shared commitment to environmental solutions such as recycling, usage reduction, legislation, and incentive programs promoting sustainable behavior.

Table 5. Descriptive statistics of environmental accountability dimension

Environmental Accountability	**Strongly Agree**	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**	**Mean**	**SD**	**Rank**	**CV**	**Overall Direction**
Using bottled water increases environmental pollution due to plastic.	57 (27%)	87 (41.2%)	41 (19.4%)	21 (10%)	5 (2.4%)	3.80	1.02	11	0.27	Agree
Do you support having designated bins or centers in your area for collecting and recycling plastic bottles?	68 (32.2%)	54 (25.6%)	23 (10.9%)	30 (14.2%)	36 (17.1%)	3.41	1.48	12	0.43	Agree
I dispose of empty bottles by throwing them with household waste.	54 (25.6%)	103 (48.8%)	19 (9%)	24 (11.4%)	11 (5.2%)	3.78	1.10	13	0.29	Agree
Plastic bottles can be replaced with glass bottles at my additional cost.	31 (14.7%)	62 (29.4%)	52 (24.6%)	49 (23.2%)	17 (8.1%)	3.19	1.18	14	0.37	Neutral
Do you support imposing fines for throwing	117 (55.5%)	65 (30.8%)	17 (8.1%)	11 (5.2%)	1 (0.5%)	4.35	0.87	15	0.20	Strongly Agree

plastic bottles and cups in public places?										
Do you think there is sufficient awareness in the community about the dangers of plastic waste?	27 (12.8%)	41 (19.4%)	32 (15.2%)	69 (32.7%)	42 (19.9%)	2.72	1.32	16	0.49	Disagree
Bottled water manufacturing companies bear environmental responsibility for their products.	48 (22.7%)	102 (48.3%)	36 (17.1%)	17 (8.1%)	8 (3.8%)	3.78	1.00	17	0.29	Agree
Do you support awareness or volunteer campaigns to collect or recycle plastic bottles?	50 (23.7%)	55 (26.1%)	43 (20.4%)	47 (22.3%)	16 (7.6%)	3.36	1.26	18	0.38	Neutral
We support legislation requiring companies to use environmentally friendly packaging for bottled water.	91 (43.1%)	92 (43.6%)	23 (10.9%)	4 (1.9%)	1 (0.5%)	4.27	0.76	19	0.18	Strongly Agree
Providing incentives (such as discounts or reward points) for returning empty water bottles to collection points.	92 (43.6%)	92 (43.6%)	20 (9.5%)	6 (2.8%)	1 (0.5%)	4.27	0.78	20	0.18	Strongly Agree
Weighted Mean, SD, and CV						3.69	0.50		13.55%	

Source: author (based on SPSS outputs)

Table 6 presents the measurement of the second dependent variable, Financial Accountability. The mean score was 3.91, SD = 0.55, and CV = 14.07%, indicating strong agreement among respondents regarding financial burdens associated with purchasing bottled water and using household filters. The results highlight that citizens experience a direct financial impact due to the low quality of government-supplied water. Many respondents reported that these costs strain monthly household budgets, and some families are unable to afford them. Participants also indicated that they would be willing to reduce reliance on alternatives if the quality of government water improved. The results emphasize the importance of government intervention and the provision of financial support, such as subsidies or discounts for household filters.

Table 6. Descriptive statistics for financial accountability dimension

Financial Accountability	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean	SD	Rank	CV	Overall Direction
I find the cost of purchasing filters and bottled water high compared to my monthly income.	33 (15.6%)	85 (40.3%)	55 (26.1%)	25 (11.8%)	13 (6.2%)	3.47	1.08	21	0.31	Agree
My spending on bottled water and filters affects my monthly budget.	38 (18%)	78 (37%)	54 (25.6%)	30 (14.2%)	11 (5.2%)	3.48	1.10	22	0.32	Agree
The cost of bottled water can be equal to or higher than government-provided water.	36 (17.1%)	100 (47.4%)	42 (19.9%)	25 (11.8%)	8 (3.8%)	3.62	1.02	23	0.28	Agree
Sometimes I have to reduce other expenses due to my spending on drinking water.	19 (9%)	59 (28%)	58 (27.5%)	62 (29.4%)	13 (6.2%)	3.04	1.08	24	0.36	Neutral
I believe bottled water should be cheaper to make it accessible to everyone.	72 (34.1%)	89 (42.2%)	37 (17.5%)	12 (5.7%)	1 (5%)	4.03	0.88	25	0.22	Agree
If government water quality improves, I will reduce purchasing filters and bottled water.	80 (37.9%)	111 (52.6%)	13 (6.2%)	5 (2.4%)	2 (0.9%)	4.24	0.75	26	0.18	Strongly Agree
I think the government should provide financial support or discounts on filters.	78 (37%)	112 (53.1%)	17 (8.1%)	2 (0.9%)	2 (0.9%)	4.24	0.71	27	0.17	Strongly Agree
There are families who cannot afford bottled water due to high prices.	97 (46%)	75 (35.5%)	30 (14.2%)	8 (3.8%)	1 (5%)	4.22	0.86	28	0.20	Strongly Agree
I believe improving water distribution networks will reduce the need to buy bottled water.	96 (45.5%)	88 (41.7%)	23 (10.9%)	3 (1.4%)	1 (5%)	4.30	0.75	29	0.17	Strongly Agree
Providing clean water is the government's responsibility, and citizens should not bear additional costs.	3 (58%)	4 (31%)	16 (8%)	65 (2%)	123 (1%)	4.46	0.72	30	0.16	Strongly Agree
Weighted Mean, SD, and CV						3.91	0.55		14.07%	

Source: author (based on SPSS outputs)

Discussion

Table 7 presents the results of normality tests for the data. For Environmental Accountability, the Kolmogorov-Smirnov test yielded a significance value of 0.049, while the Shapiro-Wilk test gave 0.203. Given that the Shapiro-Wilk test is more reliable for sample sizes below 500 (n = 211), the data are assumed to follow a normal distribution. For Financial Accountability, the Kolmogorov-Smirnov test yielded Sig. = 0.066 and the Shapiro-Wilk test yielded Sig. = 0.058, confirming the normality of the data.

Table 7. Normality test (with Lilliefors Significance Correction)

Variables	Kolmogorov-Smirnova			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Environmental Accountability	0.062	211	0.049	0.991	211	0.203
Financial Accountability	0.060	211	0.066	0.987	211	0.058

Source: author (based on SPSS outputs)

Table 8 presents the correlation analysis. The correlation coefficient between Water Quality Accountability and Environmental Accountability was r = 0.185, indicating a weak positive but statistically significant relationship (p = 0.007). This suggests that as government-supplied water quality decreases, citizens' environmental awareness regarding the impact of alternatives such as bottled water slightly increases. The correlation between Water Quality Accountability and Financial Accountability was r = 0.355, indicating a moderate and statistically significant positive relationship (p < 0.001). This demonstrates that deterioration in government water quality is associated with increased financial burdens for citizens due to reliance on alternative water sources.

Table 8. Correlation test

	Water Quality Accountability	Environmental Accountability	Financial Accountability
Water Quality Accountability		0.185**	0.355**
Environmental Accountability	0.185**		0.359**
Financial Accountability	0.355**	0.359**	

** is significant at the 0.01 level (2-tailed).
Source: author (based on SPSS outputs)

Table 9 presents the regression results of Water Quality Accountability on Environmental Accountability. The coefficient of determination (R^2) = 0.034 indicates that water quality accounts for 3.4% of variance in environmental accountability. ANOVA results (F = 7.391, p = 0.007) confirm the statistical significance of the model. The unstandardized regression coefficient (B) = 0.146, standardized Beta = 0.185, and t = 2.719 (p = 0.007) indicate a weak-to-moderate but significant effect. These results confirm that improving water quality can positively influence environmental behavior, reduce pollution, and enhance sustainability, although the explained variance remains limited.

Table 9. Regression results of water quality accountability on environmental accountability

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Constant	3.138	0.208		15.082	0.000
Water Quality Accountability	0.146	0.054	0.185	2.719	0.007
F-test				7.391	0.007
R	0.185				
R^2	0.034				
Adjusted R^2	0.030				
Std. Error of the Estimate	0.500				

Source: author (based on SPSS outputs)

Table 10 presents the regression results of Water Quality Accountability on Financial Accountability. $R^2 = 0.126$, indicating that water quality explains 12.6% of variance in financial accountability. ANOVA results ($F = 30.183$, $p < 0.001$) indicate a highly significant model. Regression coefficients show B = 0.309, standardized Beta = 0.355, and $t = 5.494$ ($p < 0.001$), indicating a moderate, statistically significant effect. These findings confirm that improved government water quality can meaningfully reduce financial burdens on citizens caused by the need to purchase bottled water or household filters.

Table 10. Regression results of water quality accountability on financial accountability

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	**Std. Error**	**Beta**		
Constant	2.732	0.218		12.523	0.000
Water Quality Accountability	0.309	0.056	0.355	5.494	0.000
F-test				30.183	0.000
R	0.355				
R^2	0.126				
Adjusted R^2	0.122				
Std. Error of the Estimate	0.524				

Source: author (based on SPSS outputs)

The results collectively demonstrate that poor government water quality not only imposes financial strain on citizens but also affects environmental behavior and awareness. These findings have practical implications for municipal authorities in Samarra. Upgrading water distribution networks, modernizing treatment facilities, and establishing official water accountability frameworks can enhance both public trust and sustainable water management. Additionally, targeted financial support for low-income households, coupled with awareness campaigns on environmental protection, can reduce reliance on alternative water sources while promoting responsible consumption. These measures align with global sustainable development goals, particularly SDG 6, which emphasizes access to safe and affordable drinking water and sustainable management of water resources.

5. Conclusion

The study revealed that the quality of government-supplied water in Samarra City is perceived as low by citizens, as evidenced by their widespread reliance on bottled and filtered water. This situation indicates a notable decline in public trust toward the municipal water supply. Furthermore, the findings demonstrate a moderate but statistically significant relationship between water quality and the financial dimension, highlighting that citizens incur additional expenses to secure safe drinking water through alternative sources such as household filters and bottled water. In terms of environmental considerations, the analysis showed a positive, albeit weak, relationship between water quality and the environmental dimension, reflecting a level of environmental awareness among citizens, particularly regarding the risks associated with plastic waste and the willingness to support recycling initiatives. Importantly, the study confirms that incorporating water quality accountability into institutional and

environmental reporting enhances the capacity of governmental bodies and the community to assess and manage environmental and financial impacts, thereby supporting informed and sustainable decision-making.

Based on these findings, several practical recommendations are proposed. First, government authorities should prioritize upgrading water distribution networks and modernizing water treatment systems to ensure that the supplied water meets health and safety standards, thereby reducing citizens' dependence on costly alternatives. Second, an official water accountability framework should be integrated into local policies, linking water quality monitoring to environmental performance reports within governmental institutions to strengthen transparency and accountability. Third, financial support programs, such as subsidies or discounts for household filtration devices, should be implemented, particularly targeting low-income households, as an interim measure until the quality of public water supply improves. Finally, awareness and community participation should be enhanced through media and educational campaigns focusing on the environmental risks of plastic use and the importance of recycling, supported by the provision of collection bins and incentives for active citizen participation in recycling programs.

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