A Factor Analysis Approach to Exploring the Role of Knowledge, Attitudes, and Perceptions in Sustainable Water Management in Epe LGA, Nigeria

Olayemi Soladoye*, Modinat Olamide Anifowose

Department of Geography & Planning, Lagos State University, Ojo, Lagos, Nigeria

***Corresponding author**

DOI : https://dx.doi.org/10.47772/IJRISS.2024.8120019

Received: 28 November 2024; Accepted: 03 December 2024; Published: 27 December 2024

ABSTRACT

Water shortages and poor management techniques continue to pose challenges for communities across the world, particularly in developing countries such as Nigeria. This study is designed to investigate the community knowledge, attitudes, and perceptions (KAP) in sustainable water practices in the Epe Local Government Area (LGA), Lagos State, Nigeria through the use of factor analysis in order to identify underlying variables driving water management behaviors. The study used a cross-sectional sampling method in the selection of respondents. With the aid of a structured questionnaire, data was collected from 200 respondents and subjected to both descriptive and inferential analysis. Using the Multiple Likelihood extraction method of Factor analysis, six components that impact water conservation behaviors; namely knowledge of conservation methods, motivation and value perception, demographic factors, household dynamics, government participation, and community leadership; were extracted. The findings also revealed that respondents had an understanding of basic water conservation technologies, such as rainwater harvesting and water storage, but had a low adoption of sophisticated methods. Also, the findings highlight the need for focused educational campaigns, policy interventions, and participatory governance in encouraging community adoption of sustainable water practices. The study concluded that government assistance and community leadership are crucial in promoting sustainable behaviors. The findings have practical implications for enhancing water sustainability in Epe and other comparable locations throughout the world.

Keywords: Sustainable water practices, KAP, Lagos, Sustainability, Community engagement.

INTRODUCTION

Water is the cornerstone of life since it supports human health, promotes economic activity, and protects life on Earth. However, water resource management is a huge global concern, as urbanization, climate change, and population growth exacerbate water scarcity and degrade water quality. According to the UN Environment Programmed (2024), by 2025, two-thirds of the world's population will be under water stress, emphasizing the importance of sustainable water practices. Water resource difficulties are exacerbated in developing nations such as Nigeria, where growing urbanization, along with inadequate infrastructure, has resulted in unequal access to potable water, increasing reliance on unsustainable practices. Rural and peri urban regions are more vulnerable to such unsustainable practices. In such areas, natural water resources are commonly overexploited, and people lack knowledge, infrastructure, and institutional support to do otherwise. Sustainable water practices address these issues by encouraging the efficient, equitable, and environmentally responsible use of water resources. Rainwater harvesting, wastewater recycling, efficient irrigation, and behavior-based interventions to reduce consumption are all examples of such strategies. However, effective implementation involves a detailed understanding of community-level factors influencing water management, such as knowledge, attitudes, and perceptions (KAP).

Knowledge, attitudes, and perceptions are interconnected and have a substantial impact on sustainable water management. Sustainable water management is built on a solid understanding of water resources and conservation strategies. According to Dean et al. (2016), those who are more knowledgeable about water are more inclined to support water conservation legislation. Also, education and awareness efforts are important in increasing community knowledge about water conservation. Cadmus et al. (2024) also posit that education programs can considerably boost the adoption rates of conservation practices. For example, Aduro & Ebenso (2019) investigated local knowledge of water purifying procedures in Niger State, Nigeria, and discovered that focused educational interventions dramatically enhanced understanding and implementation of home-based water conservation strategies.

Furthermore, perceptions of water availability and shortage influence water-related actions. Perceptions help people go from awareness to action by analyzing barriers, including cost, practicality, and institutional support (Ahmad et al., 2020). Research has shown that perceptions of water shortage and pollution have a direct influence on behavior. For instance, Piacentini and Rossetto (2020) observed that perceived shortage frequently drives families to use water-saving practices. Barriers like perceived high costs, lack of faith in infrastructure, and cultural views regarding water ownership have also been identified as contributing to resistance to sustainable practices (Kansal et al. 2018).

The Knowledge, Attitudes, and Perceptions (KAP) framework is a systematic approach to analyzing water resource management behaviors and practices. Salas-Zapata & Ríos-Osorio's (2018) considers three dimensions, namely knowledge (understanding of activities and their benefits), attitudes (values and beliefs about water resources), and perceptions (interpretations and perceived barriers to sustainable practices). Knowledge is the foundation, and knowing about water scarcity, conservation techniques, and the environmental repercussions of wasteful behaviors fosters informed decision-making. Cultural and cultural conventions influence people's views on conservation. Positive attitudes are often related to proactive engagement, whereas negative attitudes or apathy may hamper long-term activities (Renaud, 2022). Gondo et al. (2019) stressed the importance of cultural beliefs, pointing out that certain tribes view water as a supernatural gift, preventing the use of conservation methods. Cultural perceptions of water as a plentiful and heavenly resource impede conservation efforts. This assumption encourages unsustainable activities such as excessive water withdrawal and waste (Idowu, 2020).

The KAP framework is commonly used in water management research to provide focused interventions. Understanding community-specific knowledge gaps and addressing negative views have increased water usage efficiency in a variety of scenarios (Mkude et al., 2021). Focusing on these linked factors allows policymakers to develop successful measures for promoting sustainable water usage and ensuring fair distribution of the resource. KAP studies are very important in the understanding of how people and communities interact with water resources. Having positive information and attitudes can motivate conservation practices, while being unaware or cultural barriers might impede progress. As observed by Msaki et al. (2022) and Akpabio (2011), cultural attitudes and socioeconomic variables had a major impact on water conservation initiatives in Africa. These findings emphasize the need for localized methods that take into account the distinct social, economic, and environmental conditions of different localities.

This research focuses on Epe LGA, a location known for its reliance on natural water supplies and a mix of rural and peri-urban communities. This study aims to identify the barriers and possibilities for improving water sustainability in the study area by assessing the KAP of the community toward sustainable water practices. The findings will be useful in policy interventions and community-driven initiatives and also add to larger efforts that are being made to achieve the Sustainable Development Goal 6: Ensure the availability and sustainable management of water for all.

STUDY AREA

Geographically, Epe lies approximately between latitude 6°33′N and 6°48′N and longitude 3°45′E and 4°05′E in Lagos State, Nigeria. It has a land area of approximately 965 square kilometers and a projected population of 487,485 residents in 2019 (Lagos Bureau of Statistics, 2020). It is bordered to the north by Ogun state and to the south by Ibeju-Lekki and the Atlantic Ocean while the Lagos lagoon cuts across the local government area.

The study area experiences a tropical monsoon climate, which is characterized by two distinct seasons: the wet season (April to October) and the dry season (November to March). The annual rainfall varies between 1,500 mm and 2,000 mm, while temperatures range from 25°C to 30°C, with relative humidity high all through the year. Epe is rich in natural water bodies, including lagoons, rivers, and streams. The Epe Lagoon, a major feature of the area, serves as a source of water for domestic use, fishing, and agriculture. The vegetation of Epe falls within the rainforest and mangrove swamp ecological zones, though deforestation and urban expansion have led to significant habitat loss in recent decades. Soils in the area are predominantly sandy and loamy. The local economy is driven by activities that are dependent on water resources, namely agriculture, fishing, and small-scale trading, but limited infrastructure and financial constraints hinder the adoption of sustainable practices. Generally, access to potable water is limited, so many households rely on wells, boreholes, rainwater.

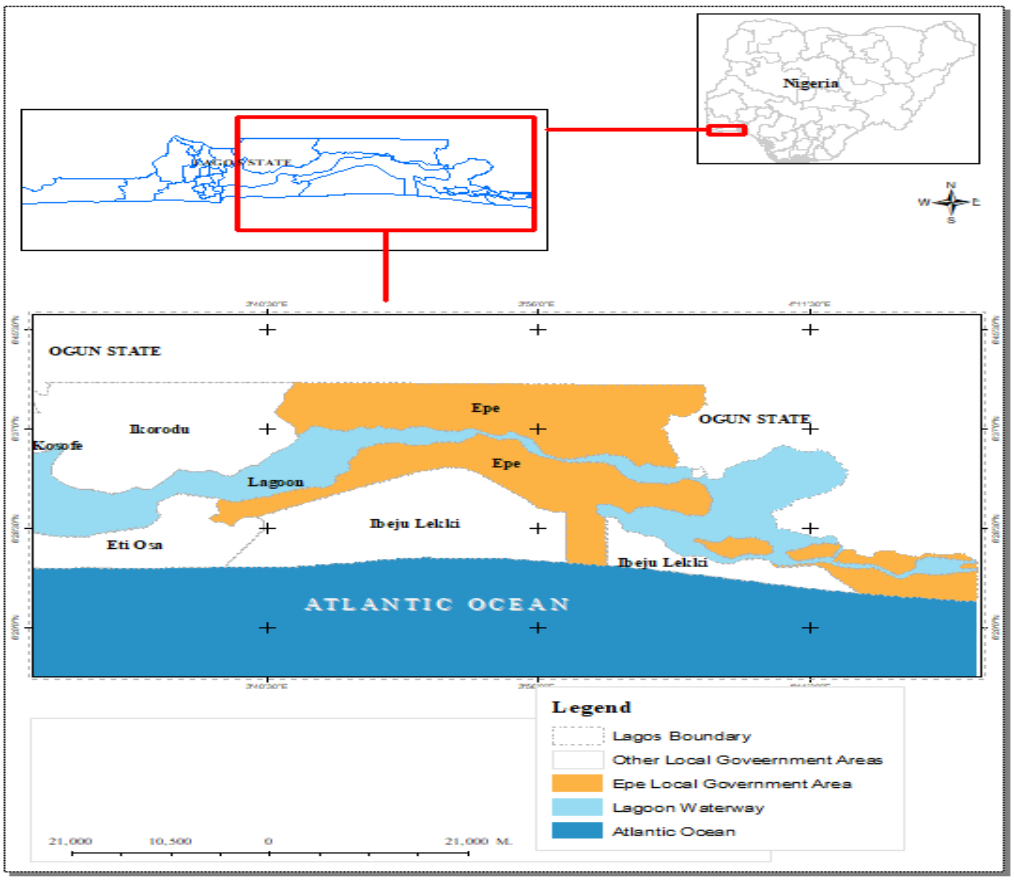

Figure 1: Map showing the location of Epe Local Government Area

MATERIALS AND METHODS

A multi-stage cluster sampling technique was employed, dividing Epe LGA into clusters to ensure broad representation. Surveys were administered to households in selected neighborhoods. A structured questionnaire covering socio-demographic data, awareness levels, and behavioral patterns related to water use and conservation was administered to 200 selected respondents. The descriptive analysis was first carried out using frequencies and percentages, the results of which were presented in tables.To achieve the aim of assessing contributory factors to observed attitudes and factors, the data was further subjected to the factor analysis procedure using the Maximum Likelihood extraction method based on the R statistical package. After screening and correcting for the errors, one column was found to include outliers and was eliminated with the Mahala Nobis approach. Similarly, all the theoretical assumptions were verified and were found to be in order. Further from this preliminary analysis preparation, data was subjected to exploratory factor analysis using the R statistical package. A correlation test based on the Bartlett approach was significant at χ^2 (df [496]) = 1793.238, p-value = 5.20298e-146, invariably suggesting correlations are large enough to perform exploratory factor analysis (EFA). Kaiser-Meyer-Olkin (KMO) sampling adequacy yielded a value of 0.71 as overall MSA. Furthermore, a parallel analysis suggests 6 factors were adequate, while the old Kaiser criterion of greater than 1 suggested 3 factors, and the new criterion of greater than 0.7 suggested 4 factors are enough. At the end of

the day, the maximum likelihood method was used with the oblimin rotation method, thus resulting in six-factor extraction. With the psych library, internal consistency reliability of the scores was estimated using Cronbach's alpha. The raw alpha value of the extracted factors, for instance, Factor 1 has a raw alpha of 0.073 with (m = 2.7, SD = 0.56); Factor 2 has a raw alpha of 0.64 with mean = 3, Sd = 0.87; Factor 3 has a raw alpha of 0.4 and mean = 2.9, SD = 0.97. The root mean square of the residuals (RMSR) = 0.04, the Tucker Lewis Index of factor reliability = 0.902, the RMSEA index = 0.035, and the 90% confidence intervals are 0.021 and 0.047, and a value of 0.9418928 was determined for the critical factor index (CFI).

FINDINGS AND DISCUSSIONS

Characteristics Of Study Respondents

Table 1: Socio-demographic characteristics of respondents

Variable	Options	Frequency (n)	Percentage (%)
Community	Pooka	31	15.5
	Epe	83	41.5
	Odomola	66	33.0
	Eredo	15	7.5
	Imokun	5	2.5
Gender	Male	104	52.0
	Female	96	48.0
Age	Under 18	6	3.0
	18-24	42	21.0
	25-34	57	28.5
	34-44	44	22.0
	45-54	23	11.5
	55-64	16	8.0
	65 and above	12	6.0
Educational Level	No formal education	3	1.5
	Primary education	3	1.5
	Secondary education	45	22.5
	Diploma/Certificate	59	29.5
	Bachelor's degree	75	37.5
	Master's degree or higher	15	7.5
Occupation	Employed part-time	47	23.5
	Self-employed	20	10.0
	Unemployed	74	37.0
	Student	9	4.5
	Retired	33	16.5
	Other	17	8.5

Monthly Household Income	Below ₦50,000	35	17.5
	₦50,000 - ₦100,000	48	24.0
	₦100,001 - ₦200,000	40	20.0
	₦200,001 - ₦500,000	43	21.5
	Above ₦500,000	33	16.5
Marital Status	Single	80	40.0
	Married	90	45.0
	Divorced	7	3.5
	Widowed	10	5.0
	Separated	13	6.5

The socio-demographic profile of respondents reveals a diversified population, of which 41.5% lives in Epe Town with a gender distribution of 52% male and 48% female. From the results on the age of respondents, 67% of respondents were economically active (18-44 years), with 18% being over 55 years old. Respondents had quite high educational levels, with 67% possessing tertiary credentials. The income distribution shows a significant discrepancy, with 17.5% earning less than ₦50,000 and 16.5% earning more than ₦500,000.The observed high literacy rate shows that there is potential for enhanced understanding, which might explain the adoption of sustainable water practices via focused educational initiatives. However, economic disparities suggest financial restrictions that may limit access to improved water-saving technology. Gbadegesin and Olorunfemi (2007) found similar economic barriers in their study in rural areas in Nigeria.

Residential Characteristics of Respondents

The data collected on household sizes, housing types, and principal sources of drinking water are summarized in Table 2. The results show that there is a majority of small to medium-sized households with about 3–4 people (44.5%). This implies that nuclear families or small extended groups are common in the area. This is followed by 27.5% of households with 5-6 persons, indicating somewhat bigger family groupings that may include extended family. A lower proportion of respondents (23%) live in one- to two-person homes, which might include single people, couples without children, or small family units. Large households are uncommon in the sample, with just 4.5% of respondents living in homes with 7-8 individuals and 0.5% reporting more than 8 persons. This distribution implies that most respondents live in modestly large family units, which is typical of modern urban family structures.

Table 2: Residential characteristics of respondents

Variable	Options	Frequency (n)	Percentage (%)
Household Size	1-2	46	23.0
	3-4	89	44.5
	5-6	55	27.5
	7-8	9	4.5
	More than 8	1	0.5
Type of Dwelling	Apartment	98	49.0
	Single-family house	71	35.5
	Multi-family house	31	15.5
Primary Source of Drinking Water	Piped water	50	25.0

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS |Volume VIII Issue XII December 2024

	Well water	16	8.0
	Borehole	97	48.5
	River/stream	2	1.0
	Rainwater	1	0.5
	Bottled water	34	17.0

Usually, the type of housing reflects the living arrangements and social class of the respondents. 49.0% of the study sample lives in shared apartment compounds, while single-family houses account for 35.5%, reflecting a significant portion of households that may enjoy more space and privacy. The 15.5% of respondents living in multi-family houses suggests that a smaller group resides in shared housing units. This can indicate either lower-income housing situations or communal living. On the primary sources of drinking water, the results reveal a mixed picture. The most common source is boreholes (48.5%) suggesting a reliance on privately-sourced or community-installed water sources. Piped water (25%) source indicates that a quarter of the respondents have access to a municipal or centralized water supply system. Next is bottled water (17%) which implies the reliance on commercially processed drinking water. Fewer people rely on well water (8%), while only 1% and 0.5% rely on river/stream and rain water respectively.

Perception Towards Sustainable Practices

Table 3 highlights the results on residents' perceptions of sustainable water practices, valuable insights into community awareness, the importance placed on conservation, and personal efforts to address water scarcity.

Table 3: Respondents' perception of sustainable water practices

Variable	Options	Frequency (n)	Percentage (%)
Awareness of Sustainable Water Practices	Yes	143	71.5
	No	57	28.5
Rating of Current Water Conservation Practices	Excellent	44	22.0
	Good	74	37.0
	Average	54	27.0
	Poor	28	14.0
Importance of Sustainable Water Practices	Reduce water shortage	72	36.0
	Marine conservation	24	12.0
	Socio-economic development	39	19.5
	Energy and money saving	65	32.5
Personal Steps to Conserve Water	Yes, consistently	66	33.0
	Yes, occasionally	63	31.5
	Rarely	43	21.5
	No, not at all	28	14.0
Reason for Water Conservation Practices	Cost saving	31	15.5
	Time saving	31	15.5
	Energy conservation	41	20.5
	Availability of sustainable	95	47.5

	water		
	Other	2	1.0
Water Conservation Practices	Usage of water storage containers (buckets, etc.)	102	51.0
	Stockpiling water in underground reservoirs	11	5.5
	Purchasing water from commercial vendors	52	26.0
	Collecting and storing rainwater in tanks	35	17.5
Value of Water Conservation Practices	Cost saving	56	28.0
	Time saving	33	16.5
	Energy conservation	23	11.5
	Availability of sustainable water	88	44.0
Government Support for Community Water Practices	Strongly support	78	39.0
	Support to some extent	68	34.0
	Neutral	49	24.5
	Do not support	5	2.5
Government Role in Promoting Water Practices	Policy making	41	20.5
	Ensure adequate availability of water	110	55.0
	Wastewater recycling	10	5.0
	Support financially	39	19.5
Likelihood to Support Sustainable Water Practices	Very likely	59	29.5
	Likely	57	28.5
	Neutral	48	24.0
	Unlikely	19	9.5
	Very unlikely	17	8.5

It was observed from the survey that 71.5% of respondents were aware of water-saving techniques. While the most common techniques were the use of water storage containers (51%), followed by rainwater collection (17.5%), the modern solutions, such as greywater recycling (11%) and the use of smart water meters (26%), were less common. Also, while basic conservation measures are widely understood, the limited adoption of sophisticated methods shows that there are inequalities in access to infrastructure and technical competence. Ayeni et al. (2014) and Nwankwoala (2011) have previously identified the need for inexpensive and accessible solutions to address these gaps. Addressing these hurdles might considerably enhance Epe's water sustainability.

The most prevalent reason respondents participate in water conservation is to ensure the supply of water (47.5%), highlighting the community's worry about access to water resources. Other factors include energy conservation (20.5%) and cost savings (15.5%), implying that financial and resource-saving goals influence behavior. Interestingly, 15.5% of respondents indicated time savings, implying that some conservation efforts are considered time-efficient. The majority of respondents (51%) reported utilizing water storage containers such as buckets, indicating a frequent and low-cost conservation method. Purchasing water from commercial

vendors is the next most prevalent method (26%), showing that some homes rely on external sources for water. 17.5% reported collecting rainwater, while 5.5% store water in underground reservoirs. This is a demonstration of a variety of basic water conservation strategies.

Furthermore, respondents place the highest importance on water conservation methods for the availability of sustainable water (44%), implying that access to water is the most important problem for them. Other options, such as cost savings (28%) and time savings (16.5%), are also key advantages, while energy conservation (11.5%) is placed lower. Again, this suggests that the members of the community may not notice or value the environmental consequences of their actions. Most of the respondents saw government engagement positively, with 39% citing considerable government support for water conservation and 34.0% recognizing some level of support. However, 24.5% were uncertain, while 2.5% believe there is no support, and this shows that there is the need for improvement in government participation and visibility in supporting sustainable water practices.

Also, economic concerns tend to generate favorable attitudes toward water conservation, but ecological incentives are less important. This indicates the necessity for awareness campaigns emphasizing the environmental benefits of sustainable activities. Msaki et al. (2022) found that clear communication of environmental advantages improves attitudes toward conservation.

Local Water Conservation Practices

Data was also collected from the respondents concerning the day-to-day water conservation methods and practices in their locality.

Table 4: Local water conservation practices

Variable	Options	Frequency (n)	Percentage (%)
Awareness of Traditional/Local Water Conservation Practices	Building dams	8	4.0
	Basins and bowls	82	41.0
	Collecting and storing rainwater	63	31.5
	Water tanks	112	56.0
	Earthen pots	28	14.0
Adoption of Modern Technology/Practices	Installing low-flow faucets and showerheads	108	54.0
	Using drip irrigation systems	18	9.0
	Implementing greywater recycling systems	22	11.0
	Utilizing smart water meters	52	26.0
	Adopting water-efficient appliances	67	33.5
Effectiveness of Water Conservation Practices	Very effective	64	32.0
	Effective	51	25.5
	Neutral	73	36.5
	Ineffective	7	3.5
	Very ineffective	5	2.5

Table 4 describes local water conservation practices, encompassing awareness of traditional methods, adoption of modern technologies, and perceptions of effectiveness. The results show that there are varying levels of awareness regarding traditional and local water conservation practices among the people in the community. The most common practice is the use of water tanks (56%), implying that a strong understanding of the need for storage solutions to manage water effectively exists. The use of basins and bowls follows closely (41%), showing that it is a common practice in households. In comparison, the knowledge of techniques like collecting and storing rainwater (31.5%) and the usage of clay pots (14%) are substantially lower. This might suggest that while some inhabitants are aware of both methods, they are not commonly adopted, possibly because of the seasonality of the rains and the difficulty of access to earthen pots accordingly. The building of dams ranks lowest with only 4%, indicating that larger-scale water conservation strategies would not be possible for them in the community.

The adoption of contemporary water-saving technologies demonstrates a proactive approach among homeowners. A considerable 54% of respondents had installed low-flow faucets and showerheads. The usage of smart water meters (26%) and water-efficient appliances (33.5%) was noted. However, other modern approaches, such as employing drip irrigation systems (9%) and establishing greywater recycling systems (11%), were not so popular. These demonstrate that the respondents may be constrained in their abilities to accept more advanced solutions. When examining the efficacy of the water conservation techniques in place, the results varied, as 57.5% of respondents assessed the practices as either extremely effective (32%) or effective (25.5%). However, 36.5% of respondents remained neutral. The tiny percentages of respondents who deemed the activities unsuccessful (3.5%) or very ineffective (2.5%) show that just a few believed that the conservation initiatives are failures.

The Use of Old and New Techniques of Conservation

The data reported in Table 5 offers insight into the community's historical and current efforts toward sustainable water management. The research of previous water conservation measures demonstrates that homeowners have participated in diverse practices to regulate their water use. The most frequent strategy is to minimize water use in daily activities (40%). This demonstrates that there is a purposeful effort among community members to decrease their daily water use. Next is the repair of leaks immediately (25.5%) to prevent water loss. Both alternatives of utilizing water-efficient fixtures and gathering rainfall were acknowledged by 21% of respondents each, while the reusing of greywater is considerably lower at 13.5%.

Table 5: Description of Old and New Water Conservation Practices

Variable	Options	Frequency (n)	Percentage (%)
Past Water Conservation Methods	Using water-efficient fixtures	42	21.0
	Harvesting rainwater	42	21.0
	Reusing greywater	27	13.5
	Fixing leaks promptly	51	25.5
	Reducing water usage in daily activities	80	40.0
Improved Methods of Sustainable Water Practices	Using advanced irrigation systems	27	13.5
	Participating in water conservation programs	48	24.0
	Installing rainwater harvesting systems	39	19.5
	Upgrading to water-efficient appliances	80	40.0

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS |Volume VIII Issue XII December 2024

	Educating others about water conservation	39	19.5
Effectiveness/Convenience of Water Conservation Methods	Traditional methods	30	15.0
	Modern methods	86	43.0
	Both equally	74	37.0
	Neither	10	5.0
Frequency of Practicing Water Conservation Methods	Always	40	20.0
	Often	48	24.0
	Sometimes	71	35.5
	Rarely	28	14.0
	Never	13	6.5
Awareness and Education Needed in Community	Addressing overuse	42	21.0
	Confronting pollution	55	27.5
	Informational pamphlets	36	18.0
	Public awareness campaigns	67	33.5
Motivation to Conserve Water	Environmental concerns	58	29.0
	Cost savings	73	36.5
	Community initiatives	43	21.5
	Legal requirements	12	6.0
	Personal beliefs	53	26.5
Usefulness of Water Conservation Programs/Workshops	Very useful	41	20.5
	Useful	71	35.5
	Neutral	78	39.0
	Not useful	6	3.0
	Very not useful	4	2.0
Interest in Learning More About Water Conservation Techniques	Yes	126	63.0
	No	74	37.0

When considering the improved methods for sustainable water practices, 40% of respondents reported they upgraded to water-efficient equipment. Additionally, involvement in water conservation programs was noted by 24%, which suggests community engagement in government endeavors to promote sustainability. The installation of rainwater collection equipment (19.5%) and educating others about water conservation (19.5%). Conversely, the utilization of contemporary irrigation systems was low at 13.5%.

The evaluation of efficacy and convenience reveals a preference for present treatments, since 43% of respondents perceive them as more successful compared to past approaches (15%). However, 37% responded that both strategies are equally important. Regarding the frequency of using water conservation strategies, 35.5% of respondents reported applying these tactics sometimes, while 24% did so routinely. This suggests a fair participation in conservation measures, although the proportion of responders who frequently apply these techniques is at 20%. The existence of 14% of inhabitants who infrequently exercise conservation and 6.5% who never do suggest that there are opportunities for progress in promoting sustained engagement in water-saving efforts.

The data shows areas where education and awareness are necessary within the community, the most important identified being combatting pollution while about 27.5% of respondents, expressed worry concerning the status of water sources. Public awareness programs were recommended by 33.5% of respondents. It was observed that families preserve water for different reasons. Cost savings emerged as the primary motivator, cited by 36.5%, while environmental concerns were acknowledged by 29% of respondents. This implies that economic reasons play a key role in encouraging water conservation behavior, although personal beliefs (26.5%) and communal activities (21.5%) also greatly contribute. On the other hand, legal responsibilities were the least motivating of the reasons, with just 6% of respondents saying that this influenced their conservation efforts.

The feedback on water conservation programs and seminars suggests a favorable reception, with 35.5% of respondents finding them advantageous and 20.5% believing they are highly important. However, 39% remained neutral, indicating probable ineffectiveness of such programs. The result showed a strong demand for education on water conservation methods (63%) showing that the respondents are eager to study more sustainable methods and gives a viable opportunity for teaching initiatives that may lead to increased water saving efforts.

Barriers to Sustainable Practices

The data from Table 6 presents a picture of the problems faced by people in implementing sustainable water practices. The research reveals that the most important hurdle to implementing sustainable water practices is a lack of awareness, as reported by 37% of respondents. This underscores the crucial need for educational initiatives geared at informing the community about sustainable water management techniques and technologies. Following this, insufficient infrastructure was noted by 27% of respondents as a barrier, which implies systemic difficulties within the community's water management framework. The high cost of implementing water-saving devices was observed by 24%, suggesting that financial limits pose a considerable hurdle for many houses attempting to adopt more sustainable practices. Cultural or social norms also featured as a challenge, identified by 12% of respondents. This research shows that the incorporation of cultural beliefs into water management policies and educational activities is necessary in order to encourage higher acceptance and implementation of sustainable approaches.

Table 6: Barriers to Sustainable Water Practices

Variable	Options	Frequency (n)	Percentage (%)
Obstacles to Implementing Sustainable Water Practices	Lack of awareness	74	37.0
	Insufficient infrastructure	54	27.0
	High cost of implementing water-saving technology	48	24.0
	Cultural or social norms	24	12.0
Challenges in Accessing Clean and Reliable Water Sources	Long distances to water sources	19	9.5
	Poor water quality	49	24.5
	Seasonal availability	27	13.5
	High cost of water	34	17.0
	Infrastructure issues (e.g., broken pipes, lack of wells)	84	42.0
Government Support for Sustainable Water Practices	More than adequate	34	17.0
	Adequate	59	29.5
	Inadequate	93	46.5

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS |Volume VIII Issue XII December 2024

	Completely lacking	14	7.0
Government Actions to Address Water Issues	Conserve rivers	12	6.0
	Replace wastewater infrastructure	61	30.5
	Sanitation and hygiene services	80	40.0
	Sustainable water management	44	22.0
	Other	3	1.5

Barriers noted by respondents include lack of awareness (37%), infrastructure inadequacies, such as damaged pipes and unstable water supplies (42%), high costs of installing sophisticated conservation systems (24%), and cultural opposition to adopting contemporary techniques (19%). The findings show systemic difficulties that inhibit the implementation of sustainable practices. Similar difficulties were observed by Kola-Olusanya et al. (2024), who cited infrastructural limitations and budgetary restrictions as significant obstacles in Nigerian rural communities. To address these concerns, a multi-pronged approach incorporating public-private partnerships and community-driven initiatives is advocated. Respondents viewed the government as the major actor responsible for assuring water supply (55%), with expectations of financial help (19.5%) and policy enforcement. However, 46.5% expressed unhappiness with government initiatives. Also, community leaders were identified as significant facilitators (38.5%), which sheds light on their role in mobilizing resources and initiating awareness campaigns. These findings show that the combined relevance of government policy and community leadership is important in improving water sustainability. Effective governance systems must include local leadership to increase policy execution and create confidence. This corresponds with Pahl-Wostl et al. (2008), who underlined the need for participatory governance in water management.

Role of Community in Sustainable Water Practices

The data from Table 7 provides insights into the sustainable water practices in the community, especially concentrating on awareness, support mechanisms, cultural influences, the role of community leaders, and private sector contributions. Overall, 32% of respondents reported that the degree of community knowledge about sustainable water practices was low, and 23% described it as extremely low. This lack of awareness shows that a major percentage of the community may not be informed about the necessity and advantages of sustainable water practices. Only a combined total of 17% of respondents evaluated awareness as very high or high, while 28% reported modest knowledge. This shows that there is the need for community outreach activities and educational programs to promote knowledge and comprehension of sustainable water practices among communities.

Table 7: Community and sustainable water practices

Variable	Options	Frequency (n)	Percentage (%)
Community Awareness of Sustainable Water Practices	Very high	18	9.0
	High	16	8.0
	Moderate	56	28.0
	Low	64	32.0
	Very low	46	23.0
Support for Adopting Sustainable Water Practices	Educational programs and workshops	60	30.0
	Financial subsidies or incentives	56	28.0

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS |Volume VIII Issue XII December 2024

	Improved infrastructure	53	26.5
	Technical assistance	48	24.0
	Community-led initiatives	41	20.5
Cultural/Social Norms Impact on Adoption	Preference for traditional methods	24	12.0
	Resistance to change	90	45.0
	Lack of community leadership	34	17.0
	Misconceptions about new technologies	87	43.5
Role of Community Leaders in Promoting Practices	Leading by example	19	9.5
	Organizing educational initiatives	39	19.5
	Facilitating access to resources and funding	77	38.5
	Encouraging community participation	37	18.5
	All of the above	28	14.0
Private Sector Contribution to Sustainable Practices	Investing in water infrastructure	70	35.0
	Providing affordable water-saving technologies	71	35.5
	Partnering with local communities for projects	57	28.5
	Offering educational programs	61	30.5

Support systems for implementing sustainable water practices are vital for encouraging change. The data suggest that 30.0% of respondents felt that educational programs and seminars are vital for encouraging sustainable behaviors. This reflects the community's acknowledgment of the benefits of knowledge-sharing and capacity-building efforts. Financial subsidies or incentives were considered significant by 28.0% of respondents, indicating that financial support might play a crucial role in removing obstacles to adopting water-saving devices. Improved infrastructure, noted by 26.5%, alludes to the necessity for investments in dependable water systems to assist sustainability initiatives. Moreover, technical help and community-led projects are also substantial, with 24.0% and 20.5% support, respectively. These findings show that a holistic strategy, involving education, financial assistance, and infrastructure development, is important to stimulate the adoption of sustainable water practices within the community.

It was observed in the findings that cultural and societal norms strongly impact the adoption of sustainable water practices. As shown in the results, 45% of respondents reported a reluctance to change as a critical hurdle, which implies that existing patterns and habits may limit the acceptance of new technology and procedures. Additionally, misunderstandings regarding new technology were observed by 43.5%, further underlining the need for educational initiatives to remove disinformation and develop trust in innovative practices. Also, 12% of respondents stated a preference for conventional techniques, while 17% mentioned a lack of community leadership as a hindrance. These characteristics may contribute to a reluctance to accept change and innovation, underlining the significance of community participation and leadership in supporting sustainable water practices.

The findings imply that community leaders play a critical role in encouraging sustainable water practices. Facilitating access to resources and money was seen by 38.5% of respondents as an important step that leaders may perform. This shows that strong leadership is vital for mobilizing resources and support for sustainable

ventures. Additionally, coordinating educational efforts (19.5%) and promoting community participation (18.5%) demonstrate the potential for leaders to achieve good change via active involvement in education and community engagement. However, just 9.5% of respondents stressed the value of leading by example, indicating that more effort may be needed to inspire others via visible dedication and action. The involvement of the commercial sector in promoting sustainable water practices is also notable. Providing inexpensive water-saving devices had the highest score of 35.5%, which implies a significant demand for accessible and cost-effective alternatives. Additionally, investing in water infrastructure was supported by 35.0% of respondents, demonstrating the necessity for private investment in key water management systems. Other major contributions included delivering educational programs (30.5%) and engaging with local communities for projects (28.5%). These also highlight the potential for collaboration between the corporate sector and community organizations to strengthen sustainability initiatives.

Assessment of Factors Influencing Water Sustainability Practices in Epe LGA

The results from the factor analysis carried out are shown in Tables 8 to 13, indicating the six variable groups extracted in the investigation of variables impacting water sustainability practices in the Epe local government area of Lagos State. Captioning the components, the first group in Table 8 assesses the community's core understanding of water conservation. This group consists of four things where, for instance, understanding of sustainable water techniques has the highest eigenvalue. The consequence comes in the fact that having the awareness and knowledge of finite resources in the environment and the effect of regulating variables plays a vital part in the involvement of an individual in sustainable water practices.

Table 8 showing Factor 1 Variable Group: Knowledge of Conservation Practices

Variables	Variable Code	ML4
Awareness of Sustainable Water Practices	Q11	0.82
Personal Steps to Conserve Water	Q14	0.71
Rating of Current Water Conservation Practices	Q12	0.65
Frequency of Practicing Water Conservation Methods	Q27	0.61

Taking personal steps to conserve water, which comes next with an eigenvalue of 0.71, indicates that the individual takes deliberate personal steps and makes efforts to engage in water conservation, which buttresses their foundational knowledge and understanding of the need for water preservation. The rating of current water conservation practices comes next, with an ML4 value of 0.65, implying the ability of an individual to assess the prevailing environment and resources within it. Also in this group is the frequency of practicing water conservation methods, which indicates that water conservation must have been a lifestyle of the respondents. Educational campaigns should focus on reinforcing awareness and demonstrating practical water-saving actions. The existing knowledge base can be built on to drive behavioral change.

A second factor group was extracted and labelled motivation and value perception and has four variables (Table 9). This factor captures intrinsic and extrinsic motivations, linking financial considerations and perceived value to water conservation efforts. It highlights the role of socioeconomic status and the desire for further learning. It includes reasons for water conservation practices, which are the benefits sought after by the individual engaging in the conservation of water. It is the benefits that dictate the value placed on water conservation, which ranks second in this group. Monetary considerations in terms of affordability due to the income status and interest in learning more about conservation techniques were included in the group.

Table 9 showing Factor 2 Variable Group: Motivation and Value Perception

Variables	Variable Code	ML4
Reason for Water Conservation Practices	Q15	0.67
Value of Water Conservation Practices	Q17	0.66

Monthly Household Income	Q6	0.61
Interest in Learning More About Water Conservation Techniques	Q31	0.51

The group offers an explanation to the effect that with better financial means, a premium will be placed on environmental issues and be instrumental in their ability to manage environmental resources better in addition to their willingness to acquire better innovative ideas and knowledge of water conservation techniques. Going by these considerations, subsidized programs can be put in place to alleviate financial barriers for low-income households, thereby encouraging wider adoption of sustainable practices. The third factor group is the demographic influences. The variables and loadings are shown in Table 10. The group comprises only two variables, age and marital status.

Table 10 showing Factor 3 Variable Group: Demographic Influences

Variables	Variable Code	ML3
Age	Q3	0.92
Marital	Q7	0.7

This factor shows demographic aspects that may affect attitudes and behaviors toward water conservation. The older generations and married people may be more cautious about water consumption due to life experiences and responsibilities in the home. Factor 4 is classified as household dynamics, and the two variables with their related loadings are provided in Table 11. This component group reflects household variables that impact water use habits. Larger households may suffer more water stress, which requires customized conservation strategies. Programs encouraging efficient appliances and water reuse systems can be devised for high-water consumption families.

Table 11 showing Factor 4 Variable Group: Household Dynamics

Variables	Variable Code	ML1
Household Size	Q8	**0.99**
Type of Dwelling	Q9	**0.53**

Factor 5, labelled as Government Engagement, reflects the perceptions of government involvement in supporting sustainable water practices (Table 12). A single, high-loading variable suggests that the effectiveness of government programs is a significant driver of community attitudes.

Table 12 showing Factor 5 Variable Group: Government Engagement

Variables	Variable Code	ML2
Government Support for Community Water Practices	Q18	0.99

Government-led initiatives could be promoted through infrastructure improvements, water sustainability grants, and community involvements accompanied by an accountability framework to build trust and engagement.

Factor 6, labelled as Community Leadership and Collaboration, has four variables, and the loadings are shown in Table 13. This factor represents the synergy between government actions and community leadership in promoting sustainable practices.

Table 13 showing Factor 6 Variable Group: Community Leadership and Collaboration

Variables	Variable Code	ML6
Government Support for Sustainable Water Practices	Q34	0.52
Community Awareness of Sustainable Water Practices	Q36	0.51

Role of Community Leaders in Promoting Practices	Q39	0.36
Government Actions to Address Water Issues	Q35	0.33

It can be inferred that the moderate loadings suggest that collaborative efforts are needed to maximize impact. The leaders in the community can be empowered to serve as intermediaries between residents and government programs.

CONCLUSION AND RECOMMENDATIONS

This study examined community knowledge, attitudes, and perceptions (KAP) as it affects sustainable water practices in Epe Local Government Area (LGA), Lagos State, Nigeria, using factor analysis to identify key variables influencing water conservation behaviors. The findings revealed that variables such as knowledge of conservation practices, motivational and demographic influences, household dynamics, government engagement, and community collaboration do influence conservation practices in the study area.

The results also showed that the people are generally aware of basic water conservation practices but the use of advanced and efficient methods remains limited and unknown to them. Socio-economic constraints, cultural resistance, and lack of infrastructure emerged as significant challenges to the adoption of sustainable water practices. Furthermore, the role of government and community leaders in promoting water conservation is recognized, though gaps in their engagement and support persist.

Key points identified in this paper include the fact that knowledge is a basic driver of water conservation practices, since informed individuals are more likely to engage in sustainable behaviours. Also, economic motivations are shown to be stronger drivers of sustainable behaviors more than environmental concerns. As a result, this points out the need for campaigns emphasizing ecological benefits. Furthermore, demographic characteristics, were found to shape attitudes toward conservation. The study noted that effective government support and community leadership are important in addressing systemic barriers. The study also emphasized the importance of integrating community-specific insights into broader water management strategies to achieve the Sustainable Development Goal 6.The study therefore recommends educational campaigns to raise awareness about advanced conservation methods and their environmental benefits. The government should adopt strategies in policy formulation that aligns with the aspirations of the communities so as to ensure equitable access to water resources. The local leaders should be empowered to drive Behaviour change and foster trust in conservation efforts. Investment in reliable water supply systems and affordable conservation technologies cannot be over emphasized.

REFERENCES

1. Aduro, A., & Ebenso, B. (2019). Exploration of local knowledge, attitudes, and use of Moringa oleifera seeds for home-based water purification and diarrhea prevention in Niger State, Nigeria. Journal of Water, Sanitation and Hygiene for Development, 9(2), 300–312.
2. Ahmed, M. F., Mokhtar, M. B., & Alam, L. (2020). Factors influencing people's willingness to participate in sustainable water resources management. Journal of Hydrology: Regional Studies, 28, Article 100664.
3. Akpabio, E. M. (2011). Water and people: Perception and management practices in Akwa Ibom State, Nigeria. Society and Natural Resources, 24(4), 234–246.
4. Ayeni, A., Soneye, A., & Badru, F. (2014). Adaptation to water stress in Nigeria derived savanna area: The indigenous knowledge and socio-cultural nexus. Journal of Management Policy & Practice. Vol. 15(3) Accessed from
5. Cadmus, E.O., Wasaya, E.J., Adesokan, H.K., Akinseye, V. O., Olaleye, F.E., Morenikeji, O.A., Fawole, O.E. Ansumana, R., Ayinmode, A.B. Oluwayelu, D.O. & Cadmus, S. (2024). Innovative approaches to improve knowledge of zoonoses among wildlife hunters and traders in Epe, Lagos, Nigeria. PLOS ONE, 19(3), Article e0300237.

6. Dean, A. J., Fielding, K. S., & Newton, F. J. (2016). Community knowledge about water: Who has better knowledge and is this associated with water-related behaviors and support for water-related policies? PLOS ONE, 11(6), Article e0159063.
7. Gbadegesin, A. S., & Olorunfemi, F. (2007). Assessment of rural water supply management in selected rural areas of Oyo State, Nigeria. African Technology Policy Studies Network Working Paper Series, 49.
8. Gondo, R., Motsholapheko, M. R., Kolawole, O.D. & Mbaiwa, J. E. (2019). Stakeholders' perceptions on water resources management in Nigeria. Transactions of the Royal Society of South Africa, 74(3), pp. 283–296
9. Höllermann, B., & Evers, M. (2017). Perception and handling of uncertainties in water management—A study of practitioners' and scientists' perspectives on uncertainty in their daily decision-making. Environmental Science & Policy, 70, 38–46.
10. Idowu, I. M., & Van Staden, M. (2020). Innovative solutions to waste management: A case study of Lagos State, Nigeria. Rhein-Waal University of Applied Sciences. Retrieved from KOBV Portal
11. Kansal, A., Sharma, P., & Tarannum, F. (2018). Understanding public perception, knowledge, and behavior for water quality management of the river Yamuna in India. Water Policy, 20(2), 266–280.
12. Kola-Olusanya, A., Oyeyemi, E., Adewale, P. S., & Omo Buwa, O. (2024). Role of environmental education in water pollution prevention and conservation in Nigeria. Water Supply, 24(2), 361–370
13. Lagos Bureau of Statistics (2020) Abstract of Local Government Statistics 2020, Ministry of Economic Planning and Budget, Ikeja, Lagos
14. Mkude, I. T., Gabrielsson, S., & Kimwaga, R. (2021). Knowledge, attitudes, and practices on fecal sludge resource recovery and reuse in Dar es Salaam, Tanzania. Journal of Water, Sanitation and Hygiene for Development, 11(5), 758–770.
15. Msaki, G. L., Njau, K. N., Treydte, A. C., & Lyimo, T. (2022). Social knowledge, attitudes, and perceptions on wastewater treatment, technologies, and reuse in Tanzania. Water Reuse, 12(2), 223–236.
16. Nwankwoala, H. O. (2011). The role of communities in improved rural water supply systems in Nigeria: Management model and its implications for Vision 20:2020. Journal of Applied Technology in Environmental Sanitation, 1(1), 15–22.
17. Paneque, P., Lafuente, R., & Vargas, J. (2018). Public attitudes toward water management measures and droughts: A study in Southern Spain. Water, 10(4), Article 369.
18. Pahl-Wostl, C., Tàbara, D., & Bouwen, R. (2008). The importance of social learning and culture for sustainable water management. Ecological Economics, 64(3), 484–495.
19. Piacentini, S. M., & Rossetto, R. (2020). Attitude and actual behavior towards water-related green infrastructures and sustainable drainage systems in Mediterranean regions. Water, 12(5), Article 1474.
20. Rim-Rukeh, A., Irerhievwie, G., & Agbozu, I. E. (2013). Traditional beliefs and conservation of natural resources: Evidence from selected communities in Delta State, Nigeria. International Journal of Biodiversity and Conservation, 5(10), 634–642.
21. Renaud, S. S. (2022). Knowledge, attitudes, and practices (KAP) of a vulnerable coastal community in Trinidad about ecosystem-based approaches for disaster risk reduction. Caribbean Catastrophe Risk Insurance Facility Foundation.
22. Salas-Zapata, W. A., & Ríos-Osorio, L. (2018). Knowledge, attitudes, and practices of sustainability. Journal of Teacher Education for Sustainability, 20(1), 5-18.
23. UN Environment Programme (2024) As shortages mount, countries hunt for novel sources of water. Accessed from