

Population Perception of Drinking Water Sources in Buea Municipality, Southwest Region, Cameroon



Roy Lyonga Mbua¹, Takang Cecilia Manyor¹, Tata Emmanuel Sunjo²

¹Department of Environmental Science, University of Buea

²Department of Geology, University of Buea

ABSTRACT: Drinking water sources have always contributed to water quality positively or negatively. This study assessed the perception of drinking water sources and quality on the health of residents in Buea municipality. It employed the use of questionnaires and water quality tests in six selected communities to understand residents' perceptions and potential health risks associated with drinking water quality. The study included 340 participants selected through convenience sampling across 8 communities. The findings revealed that consumer perception of public water supply quality in the study area focused on aesthetic features such as taste, color, trust in the water utility provider, and safety. Dissatisfaction with the physical appearance of water sources was reported by 32.3% of population, while 56.2% expressed satisfaction. Odor, taste, and color significantly affected satisfaction levels. A significant proportion (40.6% and 42.4%) indicated a lack of trust or partial trust in water utility providers due to limited information received. Additionally, 68.8% of participants perceived their water as unsafe primarily due to frequently experienced waterborne diseases, with health effects identified as a key indicator of water quality deterioration by 65.2% of respondents. Water samples collected from public supplies generally met WHO recommendations for physicochemical parameters, except for turbidity, which exceeded the recommended 5 NTU in all samples. Microbial contamination, indicated by the presence of total coliforms, was detected in four water samples. The health survey data revealed a high incidence (68.53%) of water-related diseases among respondents, including typhoid, diarrhea, dysentery, cholera, and stomachaches. These research outcomes enhance understanding of the relationship between residents' perception of drinking water sources, water quality, and health outcomes in Buea municipality. The findings offer valuable insights for policymakers, water management authorities, and public health officials to develop strategies that improve water quality, address residents' concerns, and safeguard public health.

KEYWORDS: Drinking Water, Water Sources, Perception, Buea Municipality, Microbial Contamination

1. INTRODUCTION

The perception of water quality by residents can play a significant role in their health outcomes, as it may influence their water consumption habits and hygiene practices. Several studies have explored the relationship between water quality, perception, and health outcomes. A study conducted in rural Bangladesh found that perceived water quality was a significant predictor of diarrhea prevalence among children under the age of five (Khan et al., 2017). Public participation in governance issues regarding water resources has been emphasized when addressing the risks posed by declining water quality and water pollution to promote better water management practices across the globe, in the last two decades. As such, local people's perceptions of water quality are an important aspect of the management of water resources as they inform the dialogue between government officials and water service providers, environmental agencies, and community leaders.

The perceptions also highlight the public's thought processes and responses to the perceived risks of drinking water (Ochoo et al., 2017). A better understanding of the processes that influence public perception can contribute to improvements in water management, consumer services, acceptability of water reuse and risk communication. Brouwer et al., (2020) in a study applying both a traditional and modern segmentation approach based on four types of perspectives ("aware and committed", "down to earth and confident", "egalitarian and solidary", and "quality and health concerned"), that people's trust in tap water is high, certain groups are more concerned about water quality and health effects than others. 90% of the respondents perceived tap water in the Netherlands as safe, and only one in a hundred respondents reported to regard their tap water as unsafe. Most of the consumers believed that the quality and safety of tap water was sufficiently controlled (78% versus 5% that do not believe water

Population Perception of Drinking Water Sources in Buea Municipality, Southwest Region, Cameroon

is controlled sufficiently), that tap water is sufficiently purified (76% versus 6%) and that there is sufficient knowledge available at drinking water companies (72% versus 5%). Customers who think they receive tap water from surface water instead of groundwater are more often concerned about the quality and safety of tap water.

Water quality is an important aspect of water provision services to ensure the water does not possess any possible threat to its consumers. Currently, water quality is a serious issue, especially for drinking water source areas in Cameroon. Provision of safe drinking water by water utilities is challenged by disturbances to water quality that have become increasingly frequent due to global changes and anthropogenic impacts (Grupper et al., 2021). The assessment of water quality is a critical activity due to current decline in freshwater quantity and deteriorating water quality of the remaining available water resources across the globe. Water quality is threatened by continuous population increase, economic developments, industrial and agricultural activities, and climate change. These activities and increased water pollution have significantly threatened the hydrological cycle (Anne et al., 2020). The source(s) of drinking water for any community is very essential. Three sources of water have been identified to include: rainwater, groundwater (wells, boreholes, and springs) and surface water (rivers, lakes, streams, and oceans). Amongst these sources, surface waters are the most exposed and consequently require careful monitoring and treatment. Rainwater essentially supplements the other sources. According to the African Ministers' Council on Water (AMCOW 2015), water supply in the whole country concerns four major sectors: rural water supply, urban water supply, rural sanitation and hygiene and urban sanitation and hygiene. This inter-ministerial council also estimated the total water supply at 102 USD million/year, while the total sanitation need is estimated at 16 USD million/year. This is a great challenge for the whole population, since Cameroon is classified among low-income countries (WHO 2013, Amrita et al., 2010). Furthermore, WHO (2004) estimated that 1.8 million people in developing countries die every year from diarrhea and cholera, and out of these, 90% are children under the age of five years. Arguably, 88% of diarrheal diseases are attributed to unsafe water supply, inadequate sanitation, and hygiene.

Water quality problems are among the top issues facing developing countries. People living in poor communities in Cameroon, where access to safe drinking water is lacking, face a lot of challenges. Several studies have revealed that there has been little examination of the role of risk perception in relation to advancing more sustainable practices in the water management of centralized and decentralized systems with multiple sources in the water sector. There is the existence of boreholes, tap water, bottled water etc. in major cities in Cameroon, with which based on their quality, costs of acquiring and perceived health risks, enables consumers to make satisfiable choices. Water supplied to the public is normally treated to ensure it meets the drinking water quality standard, thus having little or no risks to consumers. However, consumers may not always be satisfied with the water due to reasons such as the process used for water treatment, the physical state of the water or the effect that the water presents after consumption. Consumers, therefore, become doubtful about the water, subsequently affecting the usage of it.

Water quality concerns are frequently the most important component of drinking water as evaluated by physical, chemical, and bacteriological factors, as well as consumer satisfaction (WHO, 2004). Drinking water quality standards should be met and pathogens that could be harmful to people's health should not exist in any quantity. Furthermore, poor perception of water quality can prevent people from pre-treating their water prior to drinking, which may strike serious health implications. For instance, poverty, negative perception, and insecurity of drinking water cause consumers to divert to expensive sugary beverages and bottled water, which can exacerbate diseases such as obesity and diabetes in communities (Jaravani et al., 2016). Currently, water quality is a serious issue, especially for drinking water source areas in Cameroon. Provision of safe drinking water by water utilities is challenged by disturbances to water quality that have become increasingly frequent due to global changes and anthropogenic impacts (Grupper et al., 2021). Understanding the elements that affect public perceptions is essential for managing and improving water resources, ensuring that water recycling and risk communication are acceptable, and monitoring the quality of drinking water. The evaluation of the attitudes regarding water quality in Buea served as the foundation for this study.

Many concerns, including health problems (aesthetic and gastrointestinal diseases), negative impacts on plant growth, and others have been linked to low water quality in studies. The bad taste and odor, as well as the scaling of kitchenware and faucets, are examples of aesthetic issues. These variables affect how risk and quality are perceived (Jaravani et al., 2016). Bacterial pathogens that are spread through water include *Vibrio*, *Campylobacter*, *E. coli*, *Salmonella*, and *Shigella*. Most of these microorganisms are to blame for the digestive disorders that result from ingesting contaminated water. According to the WHO (2017), the presence of these microorganisms is a symptom of pollution. For instance, toxic *Vibrio cholera* in water may cause diarrhea. The fatality rate rises when it is not treated (WHO, 2017). The Buea Municipality faces multiple challenges related to water sources and water quality, leading to concerns about their impact on public health. This study seeks to investigate the perception of drinking water sources and water quality among residents and examine the potential health implications.

Population Perception of Drinking Water Sources in Buea Municipality, Southwest Region, Cameroon

2. MATERIALS AND METHODS

This study used the mixed method research approach, combining quantitative and qualitative data collection methods to gather data on the research objectives. The perceptions and health experiences of the participants were qualitatively determined through questionnaires.

2.1 Study Area

This study was carried out in Buea, found in the Southwest Region of Cameroon. Buea is a town located just at the foot of mount Fako, made up of many small villages- small Soppo, Great Soppo, Wokoko, Molyko, Muea, Tole, Bova, Bonakanda, Bwintingi, Bokova, Mile 16, Liongo, Bokwaongo, Buea town and Bwasa and Likombe. Buea is the capital or the head quarter of the Southwest Region of Cameroon and where the governor's office is located. Buea Municipality is bounded to the north by tropical forest on the slope of mount Cameroon (4100m above sea level). The mountain range extends to the beautiful sandy beaches of Atlantic Ocean. The town also share boundary with other major towns like the City of Limbe to the Southwest, Tiko municipality to the Southeast, Muyuka municipality to the East and Idenau district to the West. With an equatorial climate, temperatures are moderate with a slight seasonal variation (rainy and dry season). Buea has moderate economy with agricultural, administrative, business, tourism and the financial sector taking the central stage of the town.

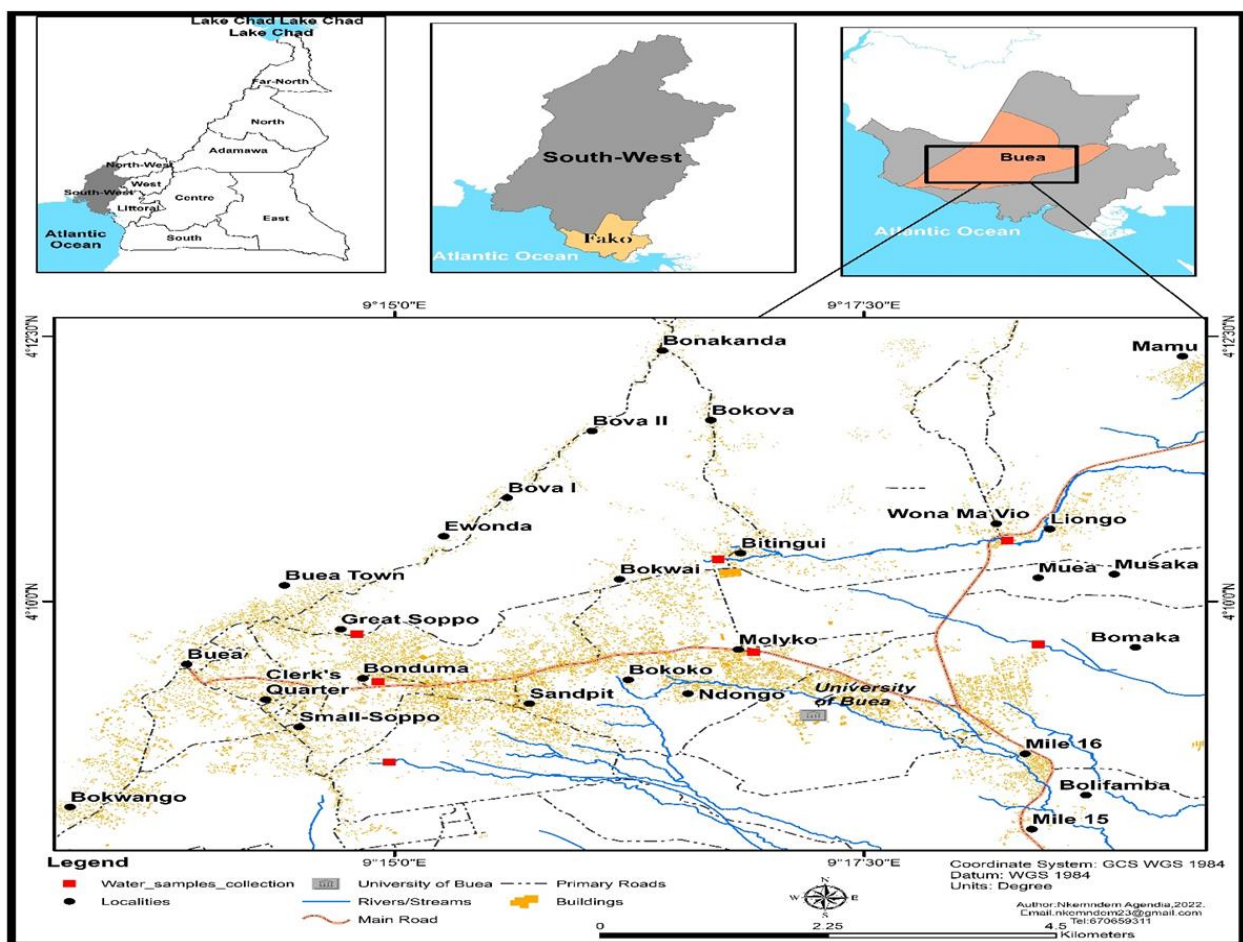


Figure 1: Map of Buea Municipality showing sample areas

2.2 Data Collection

The study was carried out in two stages namely: **the First Stage** involved administering questionnaires along having interview sessions across different communities in the Buea municipality, with major focus on areas with public drinking water supply sources (Great suppo, Bonduma, Bwintingi, Molyko, Muea, Bomaka and Mile 18(Wonya Maveo), Bolifamba). Questions focused on the user's demographic data (gender, age, highest level of education, employment status, length of stay in Buea, drinking water source), their perceptions and health implications of water quality. **The second stage** involved the collection of seven (07) water samples from selected public water supply systems of the six (06) communities: Molyko, Suppo (Great and Small suppo), Wonya mavio, Bomaka, Bwintingi and Bonduma for water quality analyses.

Population Perception of Drinking Water Sources in Buea Municipality, Southwest Region, Cameroon

2.3 Sample Population

Participants were sampled using the convenience sampling method, based on their availability during the study period. Purposive, or judgement sampling, a type of non-probability sampling, was used in determining sample units of the study. The purposive sampling was used because the researcher decided the informants to serve based on consumption of public drinking water supply systems. A total of seven (07) water sample units from six (06) communities (Molyko, Suppo, Wonya mavio, Bomaka, Bwitingi and Bonduma) were collected, and a sample size of at least 35 participants per community were considered as enough to discover and interpret core themes.

Table 1: Sample population and Size

Community	Questionnaires distributed	Response rate (%)
Bomaka	45	13.2
Wonya maveo (Mile 18)	40	11.8
Molyko	70	20.6
Bwitingi	35	10.3
Bonduma	45	13.2
Muea	35	10.3
Bolifamba (Mile 16)	40	11.8
Great suppo	30	8.8

2.4 Data collection tools

This study reviewed related literature on the perception and water quality of drinking water sources and a general topographic mapping system was employed for delimitation of the study area. This involved consultation of a base map of the area, to further delineate the sample areas.

A pre-field survey was conducted in the month of April 2023. This survey introduced the research study, its relevance and time frame to Heads of community water supplies as well as inhabitants of the selected communities, followed by a verbal approval, which further granted authority and assistance whenever and wherever needed. Visits were made to the local communities, and the authorities to get quality information on the status quo. This study was conducted in the month of April to July for comparative analysis and involved water sample collection and administering of questionnaires to the inhabitants to obtain valuable information on the perceptions of their drinking water quality and health experiences.

Questionnaire forms were tailored to achieve resourceful information with regards to the objectives of the study. A total of 340 questionnaires were administered. Sample size of 340 was used because it could provide a reasonable level of accuracy for the survey. The questionnaires were administered across various communities in the Buea Municipality, with major focus on the eight (08) selected communities (Molyko, Bonduma, Wonya mavio, Bwitingi, Bomaka, Suppo, Muea, Bolifamba). Questionnaires (predominately closed ended with few open-ended questions) following likert scale measurements were administered to an individual of each household to determine consumers' perceptions regarding their water quality and their health experiences due to the water quality. The closed-ended questions enabled respondents to choose from a list of answers, whereas open-ended questions required respondents to express their opinion independent of any influence from part of the researcher. All respondents were issued the questionnaires to fill in the presence of a research assistant or researcher/data collector, trained prior to data collection. The questionnaire consisted of section A and B.

- A) Section A of the questionnaire aimed at obtaining socio-demographic information: participants' age, employment status, gender, highest level of educational, source of drinking water, toilet facility and length of stay in Buea.
- B) Section B of the questionnaire consisted of questions aimed at assessing residents' interaction with drinking water, asking about their concerns, behaviors, and attitudes towards the quality of their water sources. The perception was based on trust in water utility provider, safety, satisfaction with the physical appearance, aesthetic properties (color, taste, and odor) of drinking water sources. Health effects experienced by the participants was included in the questionnaire.

2.5 Data analysis

Results from the physical, chemical, and microbiological water analysis were compared to the World Health Organization Drinking Water Quality Standards. Data derived from questionnaires and interviews were analyzed using the IBM SPSS Statistics version 26. The closed-ended questions were analyzed using descriptive statistics such as simple frequency and percentage. The open-ended

Population Perception of Drinking Water Sources in Buea Municipality, Southwest Region, Cameroon

questions were analyzed using thematic analysis method. The responses were coded into short phrases and themes were generated. Each code described the expression of the participants. The information was presented in tables, graphs, and charts.

2.6 Ethical Considerations

The study sought consent from the heads of community water supplies and participants, after the researcher explained the objectives and benefits of the study. Participants in the study were not requested to disclose their names to adhere to the purpose of confidentiality. Participants were made to understand that participation in the study was voluntary, and they could withdraw any time from the study without any penalty. In the same vein, due to their vulnerability, the study excluded children under the age of eighteen (18).

3. RESULTS

3.1 Drinking water Sources

Participants were asked to identify their primary sources of drinking water (Figure 1). All participants in the communities responded they had access to piped (tap) water, of which 42.6% of the participants in Buea use it as their main source of drinking water. 12.4% participants reported that they had diverted to bottled water as their primary source of drinking water. They attributed the reasons for this diversion mainly due to the poor quality of the piped water, no access to tap water during power failure, health reasons, other factors such as excess rain which may influence the color, taste of tap water from boreholes or water catchments, and their general dissatisfaction with the water. The largest consumers of bottled water were predominantly the younger and employed people. This is attributed to the fact that they may be in a better financial position to buy bottled water. Many residents in the communities of Buea are financially challenged or earn little amount of money; therefore, diverting to bottled water may be costly to them, even if the consumers feel dissatisfied with their drinking water sources. 17.1% and 27.9% of the participants used spring/streams and boreholes respectively, as their main source of drinking water.

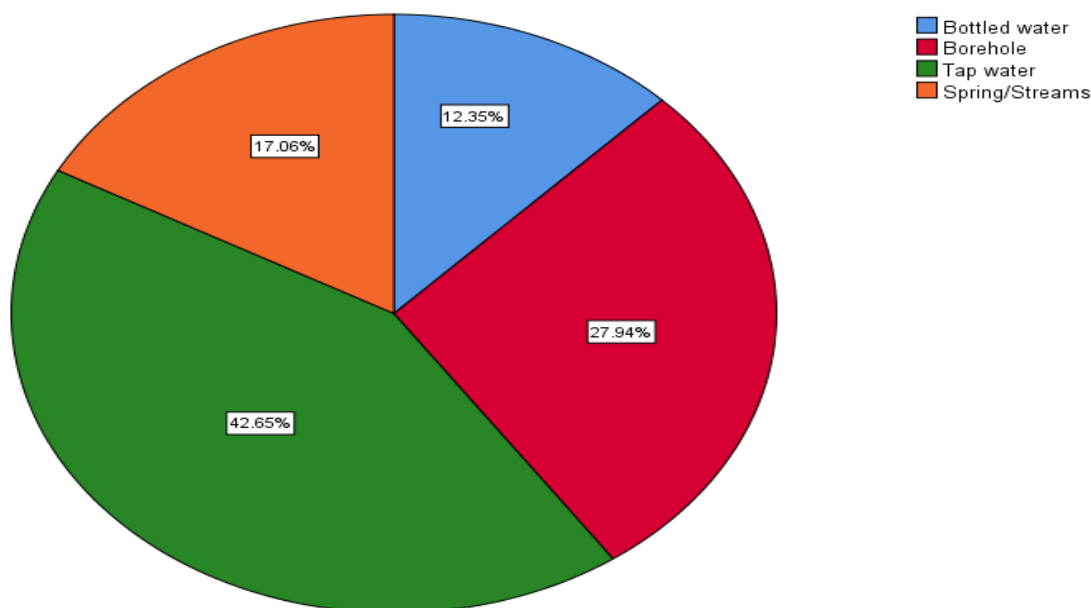


Figure 2: Drinking water sources of respondents in Buea

The study also found that the participants who have lived in the study area for 5-10 years and less than 5 years are predominantly the ones who have reverted to bottled water. This may be attributed to the negative health experiences they must have gotten from poor water quality. It was equally noticed that participants who have lived in the area for more than 10 years generally indicated they have gotten used to the quality of the water, by frequently treating it at home, despite their dissatisfaction with it. This indicates that many residents have adapted to the water they perceive as unpleasant and/or unsafe for human consumption.

3.2 Perception of residents towards the quality of drinking water sources

This segment of the questionnaire intended to discover the perception of the participants towards their drinking water quality. Participants were asked to express their thoughts regarding: satisfaction, aesthetic properties (odor, taste, color), trust in drinking

Population Perception of Drinking Water Sources in Buea Municipality, Southwest Region, Cameroon

water provider and safety of drinking water. It consisted of Likert scale questions addressing individual opinions, behavior, and attitudes towards water quality in Buea.

3.2.1 Perception based on Safety

The respondent's perception of safety of their drinking water sources were examined based on if they treat their main source of drinking water and methods used for treatment of their drinking water source.

Table 2: Perception of water quality of respondents based on safety

Do you agree that your drinking water is safe for drinking?						
		Bottled water	Borehole	Tap water	Spring/Streams	Total
Highly unsafe	Count	0	52	71	25	152
	% Total	0%	15.3%	20.9%	7.4%	44.7%
Unsafe	Count	0	29	40	12	82
	% Total	0%	8.8%	11.8%	3.5%	24.1%
Undecided	Count	2	4	6	2	14
	% Total	0.6%	1.2%	1.8%	0.6%	4.1%
Safe	Count	15	7	24	13	55
	% Total	4.4%	2.1%	7.1%	3.8%	16.2%
Highly safe	Count	23	4	4	6	37
	% Total	6.8%	1.2%	1.2%	1.8%	10.9%
Total	Count	42	95	145	58	340
	% Total	12.1%	28.2%	42.6%	17.1%	100.0%

Most of the population (68.8%) agreed that their water source was highly unsafe, with 16.2% and 10.9% of population describing their drinking water source as safe and highly safe respectively (Table 3). A sum of 32.7% of the population agreed that tap water as their main source of drinking water was unsafe for drinking, followed by 24.1% responses to borehole being unsafe for drinking. None of the participants considered bottled water to be unsafe for drinking. Fourteen of the respondents (4.1%) were unsure of the safety of their drinking water supply. This question also gave room for the participants to elaborate on their answer. In the communities, a common theme expressed by the participants who felt that their water is unsafe and/or highly unsafe is that the water gives gastrointestinal illnesses, with symptoms such as diarrhea, stomach aches, typhoid. Many (234) of the respondents indicated that the water in the area is not good but they drink it because they do not have an alternative. Many (92) participants responded that the water has not made them sick in a long time now, and that they think it has improved, indicating that the water previously made them sick.

The participants responses on safety of their drinking water source were equally examined by asking if they treated their water before drinking. As seen in figure 7, a greater percentage (61.16%) of the respondents agreed that they employed several home-based treatment methods to improve on the quality of their drinking water. This result simply justifies their complains about safety of their drinking water.

3.2.2 Public Satisfaction with drinking water quality

Participants satisfaction of water quality was examined based on overall physical appearance with the drinking water sources.

Table 3: Public Satisfaction with drinking water quality

How satisfied are you with the physical appearance of your drinking water source?						
		Bottled water	Borehole	Tap water	Spring/Streams	Total
Strongly dissatisfied	Count	0	32	24	10	66
	% Total	0%	9.4%	7.1%	2.9%	19.4%
Dissatisfied	Count	0	14	21	9	44
	% Total	0.0%	4.1%	6.2%	2.6%	12.9%
Undecided	Count	3	14	16	6	39
	% Total	0.9%	4.1%	4.7%	1.8%	11.5%
Satisfied	Count	17	26	62	20	125

Population Perception of Drinking Water Sources in Buea Municipality, Southwest Region, Cameroon

	% Total	5.0%	7.6%	18.2%	5.9%	36.8%
Strongly satisfied	Count	21	10	22	13	66
	% Total	6.2%	2.9%	6.5%	3.8%	19.4%
Total	Count	42	95	145	58	340
	% Total	12.1%	28.2	42.6%	17.1%	100.0%

Many factors, mostly organoleptic factors (taste, color, and smell), availability of water, its safety have mainly been found to be associated with the public perception of drinking water quality in the study area. Responses from the questionnaire regarding satisfaction with the physical appearance of various drinking water sources are presented in Table 4. 32.3% of the respondents were dissatisfied with the overall physical appearance of their drinking water source, most of the population (56.2%) were satisfied and 11.5% were unsure (undecided) about how they generally felt towards their water. The main reasons why respondents were dissatisfied with their water was due to sensory properties such as the color, water source environment, as few persons complained that sometimes their water gets dirty after heavy rainfall infiltrates water source (water catchments especially). Also, majority of the residents (who collectively consumed tap water as their main source of drinking water, for example Bwitingi (Koke-water), Wonya maveo and Small suppo) who agreed that they were satisfied with the physical appearance of their water indicated that the water supplies were frequently checked, cleaned, and chlorinated by community members in charge of water utilities. Results of participants' length of stay in the study area and level of public satisfaction showed that people who lived in the area longer (more than 10 years) were more satisfied with their water. This can be attributed to the fact that the longer one is exposed to the look and taste of the water, the more one gets used to it and may feel less bothered by the water. People who lived in the area for a shorter period (less than 5 years and between 5-10 years) were more dissatisfied with the water, as they have not adapted to the water.

Another common response among the participants was that they were used to the water, which means that even though some of the residents (32.3%) are dissatisfied with their water, they do not have alternatives for example, the high cost of purchasing bottled water, as such, they have gotten 'used' to the effects of the water.

3.2.3 Perception based on Trust in water utility provider

Trust in water utility provider of the respondents were examined based on 'how often they received information from their water utility provider' and 'how reliable is the quality of the water source (s) from the water utility provider?'

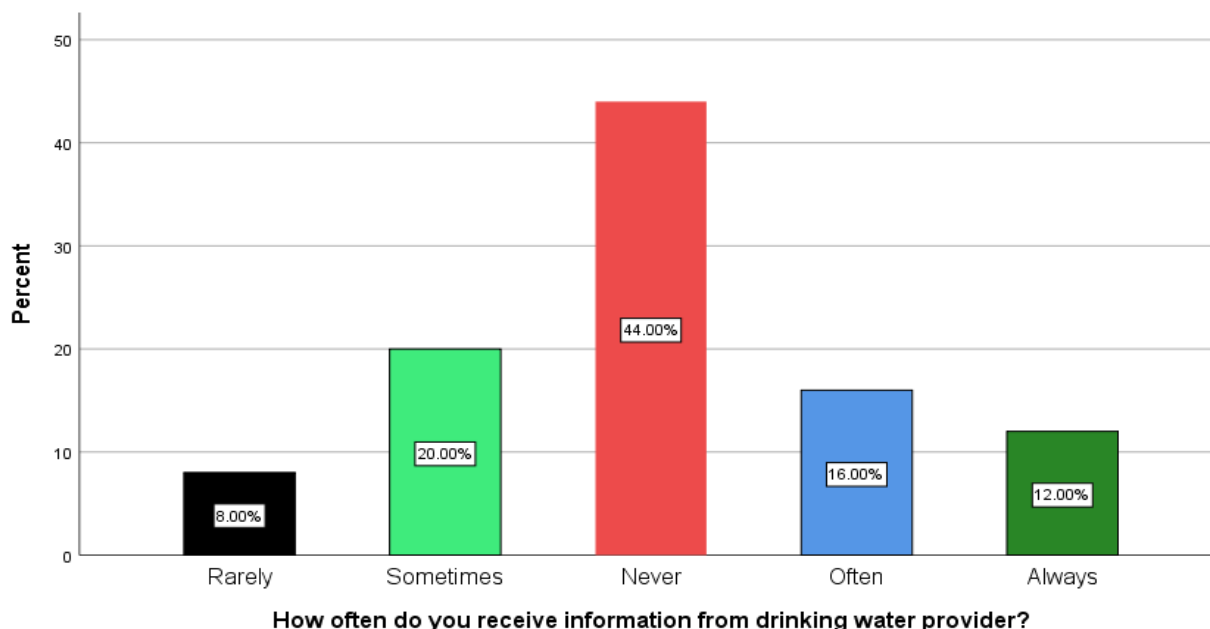


Figure 3: Information about water quality from water utility provider

Population Perception of Drinking Water Sources in Buea Municipality, Southwest Region, Cameroon

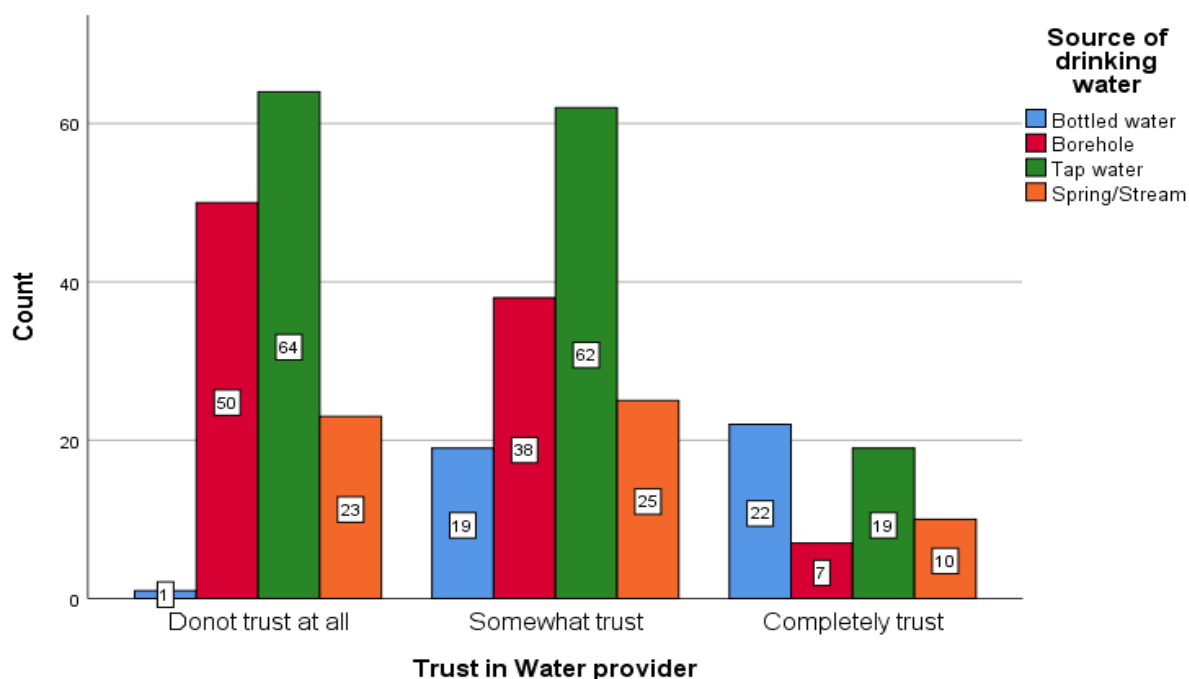


Figure 4: Trust in water utility provider

As seen from Table 5, 40.6% of the respondents indicated that they “don’t trust at all”, 42.4% indicated they “somewhat trust”, while 17.1% of the respondents “completely trust” their water provider in provider good drinking water. Results from figure 9 illustrates that residents who primarily utilize bottled water as their drinking source display higher levels of trust in their water utility than those who utilize other sources or bottled water only. A greater number of respondents (64) who utilize tap water and borehole (50 respondents) indicated that they do not trust their water utility provider in providing potable drinking water with reasons being that they experience health problems and proper hygiene with the water. Also, it was noticed that only one of the participants who consumed bottled water as their main source of drinking water indicated ‘do not trust at all’. This can be explained by the presence of taste, color or smell of the bottled water.

3.2.4 Perception based on Aesthetic properties of drinking water (taste, color, and odor)

Table 4: Perceived Taste of drinking water source

Taste of water		Bottled water	Borehole	Tap water	Spring/Streams	Total
Strongly disagree	Count	1	11	11	5	28
	% Total	0.3%	3.2%	3.2%	1.5%	8.2%
Disagree	Count	0	15	12	7	34
	% Total	0.0%	4.4%	3.5%	2.1%	10%
Undecided	Count	3	19	18	5	45
	% Total	0.9%	5.6%	5.3%	1.5%	13.2%
Agree	Count	15	35	72	29	151
	% Total	4.4%	10.3%	21.2%	8.5%	44.4%
Strongly agree	Count	23	15	32	12	82
	% Total	6.8%	4.4%	9.4%	3.5%	24.1%
Total	Count	42	95	145	58	340
	% Total	12.4%	27.9	42.6%	17.1%	100.0%

Table 4 shows participants responses about the taste of drinking water. A combined total of 68.5 % (233) of the respondents agreed that the taste of water is good, whereas 18.2% (62) disagreed that the taste of the water is good. 45 of the participants (13.2%)

Population Perception of Drinking Water Sources in Buea Municipality, Southwest Region, Cameroon

however indicated that they were unsure/undecided about the taste of their water. The study found that most of the participants were satisfied with the taste of their water.

Table 5: Perceived Color of drinking water sources

Do you agree that the color of your drinking water is good?						
Perceived color of water		Bottled water	Borehole	Tap water	Spring/Streams	Total
Strongly disagree	Count	0	10	13	6	29
	% Total	0.0%	2.9%	3.8%	1.8%	8.5%
Disagree	Count	0	13	3	5	20
	% Total	0.0%	3.8%	0.9%	1.2%	5.9%
Undecided	Count	2	18	22	8	50
	% Total	0.6%	5.3%	6.5%	2.4%	14.7%
Agree	Count	19	45	65	31	160
	% Total	5.6%	13.2%	19.1%	9.1%	47.1%
Strongly agree	Count	21	9	42	9	81
	% Total	6.2%	2.6%	12.4%	2.6%	23.8%
Total	Count	42	95	145	58	340
	% Total	12.4%	27.9	42.6%	17.1%	100.0%

On the parameter of color (Table 5), a combined total of 70.9% of the respondents revealed they agree the color of their drinking water to be good. A combined total of 14.4% of the respondents disagreed that the color of their drinking water is good. Some of the participants described the water to appear unclear especially after heavy rainfall, hence, their selection of disagreed. 14.7% were undecided about the color of their water. The responses in Table 7, indicate that color affects how the participants perceive the water.

Table 6: Perceived odor of drinking water sources

Perceived order of water		Bottled water	Borehole	Tap water	Spring/Streams	Total
Strongly disagree	Count	1	8	8	8	25
	% Total	0.3%	2.4%	2.4%	2.4%	7.4%
Disagree	Count	0	12	11	2	25
	% Total	0.0%	3.5%	3.2%	0.6%	7.4%
Undecided	Count	2	18	22	6	48
	% Total	0.6%	5.3%	6.5%	1.8%	14.1%
Agree	Count	22	50	69	30	171
	% Total	6.5%	14.7%	20.3%	8.8%	50.3%
Strongly agree	Count	17	7	35	12	71
	% Total	5.0%	2.1%	10.3%	3.5%	20.9%
Total	Count	42	95	145	58	340
	% Total	12.4%	27.9	42.6%	17.1%	100.0%

For odor, a combined total of 71.1% of the respondents agreed, 14.7% disagreed that the odor of their water was good while 14.1% were undecided (Table 6). In comparison to the other two parameters (taste and color), the respondents were more satisfied with the odor of the water. The findings revealed that most residents understood the quality of their water and can relate it to aspects such as taste, clarity, and smell.

4. DISCUSSIONS

In this study, different measures of perceptions related to water quality were examined using quantitative techniques that allowed the researcher to evaluate the combined effect of multiple factors that influence perception and to consider the potential for

Population Perception of Drinking Water Sources in Buea Municipality, Southwest Region, Cameroon

similarities in opinions within communities. This study included several different communities in the Buea municipality, where residents use a variety of tap water supplies, bottled water, streams and boreholes.

Potable Water Safety and Satisfaction

Analyzed data from the survey revealed that 68.8% of the population reported that they believed their water is not safe to drink, with 32.7% indicating that tap water as their main source of drinking water was unsafe because of the health problems experienced by respondents. This is like a study conducted by Njine et al. (2019) who investigated the perception of water quality and its impact on human health in communities across Cameroon. The study found that majority of the population perceived the water quality to be poor and unsafe for consumption. This perception was influenced by factors such as water source, availability of water treatment facilities, and knowledge of waterborne diseases. Another Case Study by Harris (2015), who conducted a study in rural Thailand (Thakhonyang, Nong Khon, and Don Man villages) to ascertain how the general populace view the quality of the drinking water. According to the survey, 50 percent of the participants in all three communities stated some amount of ambiguity about the safety of their main source during any given season, or they considered their main source as risky. The study also revealed that in both Thakhonyang and Nong Khon, 98% of homes with piped water connections do not drink from them. Only one household in Nong Khon said they drank water from their piped connection, but they first filtered it using a water filter and then strained it through a cloth before drinking it. Despite being piped water, this extra line of defense shows that consumers believe their drinking water to be unsafe because of its color, flavor, and odor. As such, safety of drinking water is frequently correlated with the experienced health effects, water treatment practices, aesthetic properties (color, taste, odor) and physical appearance according to studies on perceptions of water and water supplies.

This study also highlighted the need for improved communication and public education regarding water quality and safety. Equally, a greater proportion of the population (56.2%) were satisfied with the overall physical appearance of various drinking water sources. Compared to a recent study by Sonchieu & Tapaat (2020) which showed that 75% of respondents were not satisfied, while some are indifferent (undecided) and others declared to be satisfied (14% and 11%, respectively). Their satisfaction was emphasized by their appreciation of the physical appearance (color, presence of particles and/or living organisms), since 75% of the respondents think that the water, they fetch is impure.

Trust in water utility provider

Results of the study demonstrated that residents who primarily utilize tap water as their drinking source displayed comparatively low levels of trust in their water utility than those who utilized alternative sources or bottled water only. Groups that relied on bottled water had higher trust than the other waters sources. This result is unsimilar to the results of a previous study comparing tap water and bottled water groups which found that tap water drinkers have higher trust levels (Grupper et al., 2021). These results add to these previous findings by demonstrating how trust can increase with even partial reliance on bottled water. In that case, convenience is the most motivating factor. Similarly, Saylor et al. (2011) found that lack of convenience is a barrier to drinking tap water. Consequently, several additional factors, including convenience and marketing effort, may impact drinking water choices. Future research could explore how these additional factors interact with trust, risk beliefs, and salience to explain drinking water behavior.

Aesthetic properties (color, odor, and taste)

The aesthetic qualities of water can influence our perceptions of water quality (Doria et al., 2005; Doria, 2010), as well as water consumption pattern. In the present study, 25.3% of population indicated some aesthetic complaint (color, taste, and odor) about their tap water, be it unpleasant taste, odor, discoloration, or cloudiness. Majority of the respondents expressed satisfaction with the color, taste and odor of their drinking water sources. Previous studies have equally examined distinct aesthetic qualities (e.g., taste, color, and odor separately). 71.1% of the respondents were satisfied with the odor, 70.9% agreed to the color being good and 68.5% agreed to their drinking water source being of good taste. This result is like the results of more recent study by Shane & Hiroshi (2022), in the southern part of Yangon regarding the perception of quality of tap water, where odor and flavor satisfied 70 and 68% of the population, respectively. Color of tap water satisfied 56% of the respondents. The frequency of aesthetic satisfaction was similar in borehole and tap water users. These results simply indicate that aesthetic properties influence perception of the quality of drinking water.

5. CONCLUSION AND RECOMMENDATIONS

The aim of this study was to determine the perception of consumers towards the water and assess the water quality and its health impact on Buea residents. Majority (68%) of the population regarded their water sources to be unsafe, with emphasis on tap water and boreholes based on frequent health experiences. Most of the respondents were satisfied with physical appearance and

Population Perception of Drinking Water Sources in Buea Municipality, Southwest Region, Cameroon

aesthetic properties. 40.6% and 42.4% of respondents indicated that they do not trust and somewhat trust their water utility provider to ensure potable water respectively. In all, health effects were seen by majority of the respondents to be the most important parameter of water quality deterioration. Aesthetic properties (color, odor, and taste), health effects of water quality, and reliably (trust in water utility provider) and appearance were noticed as influencing factors on the respondent's perception of their water quality.

Based on the findings, the study makes the following recommendations:

- The study recommends the strengthening of education and public awareness about drinking water safety, water quality and health effects, by the custodians of water provision in Buea, together with the local authorities, media houses and the communities. This can be done by publishing the water quality reports through different media platforms to prevent the misinformation regarding the portability of their water. This will equip consumers with information regarding the quality of their water.
- Water utility providers and households should treat the water more effectively to remove coliforms that mostly contribute to water related diseases and discomforts, thereby improving the quality of the water and improve acceptability by the community. To achieve this, disinfection by chlorination, or other low-cost homebased treatment techniques can be implemented. Regular sampling and testing of drinking water sources should be conducted to identify potential contaminants and assess compliance with quality standards. Routine checks and cleaning of surrounding environments of water supplies should be carried out both by the consumers, community, and water utility providers.
- The study recommends further studies which includes assessing consumer perception of water quality and actual water quality of drinking water sources, epidemiological studies on water borne and related diseases.

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