

The Impact of Public Use Water and Sanitation on the Community Health of Chitwan, Nepal

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Article Info.	Abstract
Corresponding Author Mayanath Ghimire Email mayanathghimire@gmail.com Article History Received: May 12, 2026 Accepted: July 14, 2026 Cite Ghimire, M., & Mishra, A. K. (2026). The impact of public use water and sanitation on the community health of Chitwan, Nepal. <i>GS WOW: Wisdom of Worthy Research Journal</i>, 5(1), 57–72. https://doi.org/10.62078/grks.2026.v05i01.005	This study analyzed the use of public water and sanitation services and their implications for community health in Nepal. A descriptive, cross-sectional mixed-methods design incorporating both quantitative and qualitative approaches was employed. Primary data were collected through face-to-face interviews with 210 respondents using a structured questionnaire, while secondary data and relevant literature were reviewed to identify research gaps and support the findings. The study identified two principal sources of drinking water: hand pumps, used by all households (100%), and piped supply systems, accessed by 83% of households. Community members preferred hand-pump water because it remained warm during winter and cool during summer, whereas piped water was considered less acceptable due to the odor caused by bleaching powder and potash treatment. Households reported adequate water availability for personal hygiene and emphasized the need for annual water quality testing. Proper handwashing with water and liquid soap after toilet use and contact with contaminated materials was widely practiced, and child feces were disposed of hygienically. Solid waste was temporarily stored in sacks and collected monthly; however, residents favored daily or weekly collection. Municipal disposal of waste in nearby forests poses significant environmental and public health concerns. <i>Keywords:</i> community, disease, health, sanitation, water

Introduction

The researcher conducted research in Ratnanagar Municipality ward no. 12, Chitwan. The study topic was public health related water and sanitation. This study directly related citizens' daily uses of quality drinking water and use of toilet, people use hand washing after toilet use and other waste or dirt touch. The study find out health status of study are citizens health and adverse effects of water and sanitation. I have reviewed before publication Nepal related water and sanitation articles.

Sanitation and clean water ensure that 99% of homes have access to basic water supplies, that 95% of households have improved sanitation facilities, that 98% of the population uses latrines, and that all communities are free from open defecation sites. Nepal has established numerous initiatives to supply water in numerous places, achieving SDG 6. Nepal has proclaimed itself an "Open Defecation Free" nation and is aiming to provide clean water for irrigation and drinking. The SDGs are tremendously beneficial to Nepal's and the world's sustainable development. So let's hope Nepal

achieves all of its goals by 2030 (Government of Nepal, 2019).

With 95.5% sanitation coverage and 88.6% water supply coverage, Nepal has made great progress in the Water, Sanitation, and Hygiene (WASH) sector. An important milestone was reached in 2019 when the country was designated Open Defecation Free (ODF). There are still issues, nevertheless, such as operationalizing fecal sludge treatment facilities, resolving institutional and financial gaps, incorporating climate resilience into WASH infrastructure, and assuring securely managed sanitation (now only 19%). The Water Supply and Sanitation Act (2022) and the creation of the N-WASH Management Information System have improved data-driven regulatory oversight and policy-making (Chhetri, 2025).

A thorough legal and policy framework for the Water, Sanitation, and Hygiene (WASH) sector has been built in Nepal. This includes the Water Supply and Sanitation Act of 2022 and the National Water Supply, Sanitation and Hygiene Policy of 2023, as well as the constitutional recognition of clean water, sanitation, and a fresh environment as fundamental rights (Government of Nepal, 2024).

The high prevalence of diarrheal illnesses in Nepal is largely caused by drinking water quality,

which is a serious public health concern. In order to preserve and improve drinking water supply systems, it is essential to maintain natural water sources, use efficient treatment techniques, and manage water distribution effectively. Improving health and sanitation in water-safe communities requires active community participation, particularly from women. To maintain safe amounts of residual chlorine in drinking water, regular chlorination is advised (Rai & Bhatta, 2026).

Only 27% of people in Nepal have access to modern, improved sanitation, while over 42% of the country's population lives below the poverty line. In order to prevent the spread of waterborne illnesses and safeguard public health, proper water sanitation is essential. Significant issues with water sanitation in the Kathmandu Valley have a direct impact on public health (Giri et al., 2026).

In comparison to international benchmarks, the Universal Health Coverage service index is still low, indicating disparities in equality and quality. While decentralized health governance has been made possible by federalization, coordination and capacity issues have also arisen. All things considered, Nepal's health journey shows significant progress as well as persistent structural obstacles that prevent universal, high-quality coverage (Khatiwada, 2026).

Table 1

Comparison of Nepal's SDG 6 Water Supply and Sanitation Targets with Provincial Progress (Up to 2022)

SD Indicators	Nepal Target	Progress in Province's (Up to The 2022)							
		Nepal	Koshi	Madhesh	Bagmati	Gandaki	Lumbini	Sudurp.	Karnali
Basic water supply coverage (%)	99	96.4	97.1	97.4	91.3	94.1	96.1	95.4	86.1
Household with access to piped water supply (%)	90	33.3	46.7	5.2	40.8	50.4	32.9	21.3	36.1
Households using improved sanitation facilities which are not shared (%)	95	64.6	70.1	42.3	64	76.3	73.4	74.6	77.6

Source. Province Planning Commissions (2024), National Planning Commission, VNR report 2024 (Municipal Association of Nepal [MuAN], 2024).

In Nepal, there is a combination of water, sanitation, and hygiene (WASH) systems. To reach the sustainable development goals (SDGs) by 2030, some of them need to be expedited while others have made significant progress. The findings indicate that while institutionalization, policy and law, and accountability procedures have been started at the federal level, they have not yet materialized at the provincial and municipal levels. Just 10% of rural and municipalities finished their WASH plans. In terms of funding, two-thirds of the nation's WASH budget has been allotted at the federal level, in addition to a lack of resources. It was necessary to take into account the opinions of the populace about the improvement of WASH systems in Nepal (Yadav et al., 2023).

For sustainability, development, and health, access to clean water and better sanitation and hygiene practices are essential. Water, Sanitation, and Hygiene (WASH) services in Nepal show both advancements and enduring difficulties. Even though there is now more access to clean water, some people still use unimproved sources. In certain places, open defecation is still an issue, and moving up the sanitation ladder has proven difficult. Gender equality, environmental sustainability, and public health all depend on addressing these issues and encouraging good hygiene habits. The need for equitable access is highlighted by disparities in WASH services among marginalized groups. With a focus on coordinated planning, trash segregation, and community education, the integration of solid waste management with WASH is acknowledged as essential for improving the environment and public health (Government of Nepal, 2024).

Because of the high levels of salt and Chemical Oxygen Demand (COD), the release of saline textile effluent with high concentrations of organic contaminants presents serious environmental problems. Using plant growth characteristics (shoot and root length) as bioindicators, this study investigated the efficacy of halotolerant bacterial consortia in lowering COD in saline textile wastewater and determined whether the treated

effluent was suitable for agricultural reuse. In saline textile wastewater, halotolerant bacterial consortia effectively break down organic contaminants and enhance effluent quality for possible irrigation reuse. Plant bioassays combined with biological treatment offer a thorough method for assessing environmental safety and treatment effectiveness.

The model mobilized resources, created a clear goal and action plan, addressed important management issues within the alliance, encouraged cooperation among key stakeholders, and ensured that locals actively participated in the Village Development Committee's efforts to improve sanitation and hygiene (Shakya et al., 2026).

Both in Nepal and around the world, water and sanitation systems are under risk from the effects of climate change. One of the illnesses that is sensitive to climate change is water-borne sickness. Therefore, managers and organizations in the water, sanitation, and health (WASH) sector must appropriately take climate change obligations into account. Extreme weather events including floods, storms, draughts, and severe rainfall are caused by increased variability in the hydrological cycle. Water availability is less predictable, which compromises the efficiency of sanitation and water systems. Declining water quality, endangering the provision of sanitary facilities and clean drinking water (Ministry of Water Supply, 2020).

Improving household water, sanitation, and hygiene (WASH) is still one of Nepal's biggest public health issues. Due to both individual and community circumstances, household mothers are likely to have limited access to integrated WASH services. The enhanced water source, sanitary toilet, hand washing station, and soap and water availability were combined into a single system known as combined WASH.

In addition to comparing and contrasting government reports with the actual state of the sanitation industry, the researcher investigates the development trend of sanitation coverage. According to the Nepalese government, every

household in the study area has a toilet. However, it was discovered that 60% of homes lack a toilet. The 2018 Nepal government data, which indicates that the country has more than 98% coverage in the sanitation sector, is conflicting. According to a government report from Nepal, every home in these study regions has access to a toilet. Therefore, it is untrue because, according to this research report, only 44–72% of homes have access to a toilet, despite the Nepali government's assertion that 100% of households have (Limbu, 2023).

In Nepal, sanitation workers are a minority occupational group that frequently faces hazardous working conditions, physically taxing jobs, and other risks. Due to a combination of occupational and lifestyle variables, hypertension is disproportionately common among Nepalese sanitation workers (Khatri et al., 2026).

There is limited evidence of the efficacy of interventions aimed at improving unsafe child faeces disposal (CFD) practices in the Asia-Pacific area, despite abundant evidence of the detrimental health effects of CFD. In order to give communities the infrastructure required to modify harmful CFD practices, large-scale programs and hardware interventions are crucial. However, these interventions could be enhanced by include a behavioural change component. Future research should concentrate on how behaviour modification models in conjunction with hardware treatments affect hazardous CFD, as there is currently limited data regarding the efficacy of behavioural interventions in lowering dangerous CFD in the Asia-Pacific area (Sprousea et al., 2022).

The strain on sanitation workers (SW), whose work is crucial to public health and prevents environmental contamination by ensuring efficient waste disposal, has increased due to the rapid rise in global consumption and waste production. Pickers reported the highest risk of tooth issues and wounds. Skin wounds and musculoskeletal issues were more common among collectors. Additionally, pickers reported having less access to water, sanitary supplies, and personal protective equipment (PPE), but collectors reported having

more access to pertinent vaccines. These results show that all forms of SW have unequal access to prevention interventions (Kragh et al., 2026).

A child's right to a healthy and high-quality education is largely determined by the availability of drinking water, sanitation, and hygiene (WASH) at schools. Limited WASH facilities, including separate sanitary facilities for girls, were present in the majority of schools in Nepal. Students' health is directly hampered by careless behaviors brought on by inadequate WASH facilities, contaminated drinking water, and poor sanitation and hygiene practices (Sharma & Adhikari, 2022).

This study assesses the state of water, sanitation, and hygiene (WASH) in Nepal's community schools. WASH is essential for nutrition, academic success, and overall health. According to data, the majority of community schools lack three-star ratings, have only rudimentary WASH facilities, and are critically vulnerable in terms of disaster risk management and hygiene facilities. In comparison to other schools and provinces, secondary and urban schools, as well as schools from provinces like Bagmati and Koshi, do exceptionally well on WASH indices. Schools from provinces like Madhesh, Karnali, and Sudurpaschim, as well as basic and rural schools, fall well short. To address discrepancies in WASH indicators, strengthening WASH indicators through focused intervention, infrastructure development, routine maintenance, behavioural change, a robust monitoring system, teamwork, and community involvement (Acharya et al., 2025).

In order to improve sanitation planning and policy, Nepal, Ethiopia, and Uganda should identify characteristics associated with poor sanitation outcomes brought on by flooding. Correlations between household and sanitation system features and (1) sanitation system failures and (2) the adoption of open defecation after floods were investigated using logistic regression. Household sewage system failures are greatly increased by flooding, and there is a correlation between these failures and the standard of sanitation facility construction and upkeep. Open

defecation after flood damage to home sanitation systems was linked to living in rural areas, utilizing subpar latrine slabs, and finding solace in using a neighbor's toilet (Kohlitz et al., 2026).

In England, traveling abroad is considered to be a significant risk factor for gastrointestinal disease. It is believed that countries with inferior sanitation, less access to clean water, and lower food hygiene standards are more prone to experience transmission. However, a lot of research is done in travel clinics, which could skew the results. Here, we report a case-control study on gastrointestinal disease cases reported to the UK Health Security Agency (UKHSA) among returning English tourists in the community. The WHO "Attributable fraction of diarrhea to inadequate WASH" information was used to create a destination water, hygiene, and sanitation score (Kragh et al., 2026).

Bananas are grown commercially and in greater quantities in the Terai area of Nepal. the more reliable and significant benefit between September and February. Nepal imports more than 60–70% cheaper Indian goods throughout the winter. The banana farming area of Nijgadh uses pesticides and insecticides seven to twenty-four times a day. Compared to sugarcane and cereal crops, banana planting offers twice as many advantages. Soil degradation due to poisoning and decreased output following decomposition. It should be demonstrated after a prolonged period of use and harm to human life as well. Farmers in the Nijgadh area must be informed in a timely manner to avoid severe problems. It will soon be necessary to begin producing and supplying organic goods to Nepal's central, regional, and local markets (Ghimire et al., 2024).

Parents and children in the Chepang community should be aware of their health condition in relation to other communities. One of Nepal's remote tribal communities, the Chepang are an indigenous ethnic group that reside in Central and Southern Nepal, particularly in the districts of Chitawan, Gorkha, and Dhading. Although they speak a language called Chepang, the locals refer to it as Chyo-bang. The Chepang village is frequently

inaccessible, unfertile, and situated on extremely steep terrain. Compared to other communities, Chepang are more likely to seek medical attention. 100% of mothers said they had given birth to their first child before turning 20. However, Chepang children's health was determined to be better than that of children from other communities (Ghimire, 2014).

The characteristics of foreign employment as returnee workers, such as leadership abilities, employment prospects, accountability and responsibility, and teamwork in entrepreneurship development, may have an impact on the degree of entrepreneurship among returnee participants (Mishra et al., 2023).

Due to the high summer precipitation rates, Nepal is particularly vulnerable to floods, landslides, drought, forest fires, and hot and cold waves of virus diseases each year. Due to the intense monsoonal rain that falls during the summer (June to September), landslides are more common in Nepal's river hills and Terai area. Flooding is more common in the up-stem area of rivers, while dipping is a problem in the down-stem area. Homes, crops, and human life are all negatively impacted by sedimentation. The study uses weight, height, and mid-upper arm circumference (MUAC) to identify nutritional differences between children under five who have experienced flooding and those who have not.

Compared to youngsters in sane social neighbourhoods that were not harmed by the flood, the children are more malnourished. Unimaginable floods in the Karnali River end human life. Nearly all dwellings are evacuated for one to four weeks during the flood and remain as rubbish in community structures (community housing, schools, and Godam buildings). This situation happens one to three times a year, according to the Karnali River floods. It costs a lot of money to maintain their house, toilet, and hand pump after each flood before they can resume their regular lives (Ghimire et al., 2023).

The effects of chicken farming on employment and income in Nepal's mid-Terai area. In the mid-

Terai region, raising chickens is a very lucrative business. In remote locations, broiler farming in particular has been found to be a profitable short-term farming practice. According to the study, raising 100 broiler chickens can bring in between NPR 800,000 and NPR 900,000 a year, with a net profit of NPR 320,000. Furthermore, two people can find work in poultry farming (Timilsina et al., 2014).

With frequent earthquakes, floods, landslides, droughts, hot and cold waves, and vector-borne illnesses, Nepal is an extremely disaster-prone nation. Every year, the most vulnerable populations in the lowlands and hills are impacted by monsoonal floods and landslides. The purpose of the paper is to review how children's nutrition is affected during floods. In Nepal, the floods had an impact on women, children, and senior citizens. In Nepal, the primary monsoon months are June through September. Houses, food, crops, cattle, poultry, and clothing are all harmed by floods. The Terai region of Nepal is affected by flooding. Floods have been reported to have impacted children aged three to five in Bangladesh, Bhutan, India, and Nepal (Ghimire, 2025)

Based on perspective, the study compares and evaluates child nutrition in flood-affected and non-affected households. Malnutrition was discovered in both areas, however it was more prevalent in the flood-affected area than the non-flood area. Karnali, Nepal's deepest river, is impacted one to three times a year. It affects society by forcing people to spend one to four weeks (7 days to 30 days) a year in secure locations such community centers, school buildings, and Godam (Ghimire et al., 2023).

The way neighbourhood schoolchildren currently snack, as well as the long-term, economical, and significant effects of snacks on eating patterns and health. Children's attachment to school, enrolment, and consistent attendance are all aided by the School Day Snacks. A lot of parents wish to send their kids to school without snacks during the day. It views hunger as a chance for worthy kids to get an education.

In Central Hills and possibly other places, midday lunches are a challenge for schoolchildren's nutrition. In a similar vein, to increase children's access to nutrient-rich foods and nutrition awareness. Additional fruits and vegetables for children's growth, health development, and illness detection.

Adolescent pupils in both public and private schools consume extremely large amounts of junk food. The Day Snacks Management Guidelines 2020 state that each child should have 150–200 grams of fruits, green vegetables, cereals, and gedagudi (peas, grains, pulses, etc.). 50–60 grams of foods high in animal protein were also required. In Nepal, it is believed that “Harek bar Khana char” (every four distinct meal categories, such as rice, vegetables, animal-related dishes, and pulses) must (Ghimire et al., 2024).

The dietary habits and health status of community school students' snacking behaviors. Mangal Secondary School, Kirtipur-10, Kirtipur, Kathmandu, had severe wasting total (1) 4.5%, moderate wasting (1) 4.5%, and normal (20) 90.9%, while Mahendra Adarsha Secondary School had moderate wasting (3) 11.1% and normal (24) 88.9%. Based on height-for-age Z-score, the frequency of stunting by age at Mangal Secondary School, Kirtipur-10, Kirtipur, Kathmandu, was 9.1% for children aged 42–53 months, 13.6% for mild stunting, and 77.3% for normal height.

In a similar vein, the overall prevalence at Mahendra Adarsha Secondary School, Mahalaxmi-4, Imadol, Lalitpur, revealed normal height at 66.7% and mild stunting in children aged 42–53 months at 33.3%. Mid Upper Arm Circumference (MUAC) is used for screening and emergency situations to evaluate children's nutritional status (Ghimire et al., 2024).

In Nepal, access to proper sanitation and hygiene is still a major issue due to low water quality, infrastructure damage from floods and slides throughout the summer, and the lack of working people. The community school has a WASH issue since the available restrooms are not

managed in accordance with the number of boys and girls enrolled, and there is no filter drinking water available. Every member of the community uses drinking water that is not routinely tested and does not occasionally run awareness campaigns.

Research Objective

To examine the effects of water and sanitation on the health of the local population in Nepal's Chitwan district.

Methodology

The researcher looked up comparable topics on Google, created reports and conducted interviews with respondents. Descriptive, cross-sectional, and mixed methods (qualitative and quantitative) are used in research design. Ratananagar Ward No. 12 in Chitwan, Nepal was chosen for the study because the locals did not maintain a water supply system. Research subjects 210 (11%) of the total households are included in the

sample. collected primary data using standardized questionnaire techniques and conducted in-person interviews with respondents from specific families. Households were chosen using the random sample approach for data selection. SPSS software was used to analyze the collected data. Maintaining privacy and ethical considerations (maintaining privacy, contributing, and not directly harming any members of the community)

Results and Discussion

Gender significantly influences sanitation, as women and girls mainly manage household water, cleaning, and waste, affecting their health, safety, and time. Men are more often employed in formal sanitation jobs, while women frequently perform undervalued cleaning and caregiving roles. Promoting gender equality through equal access to training, protective equipment, fair wages, and leadership opportunities strengthens sanitation services, public health, and community resilience.

Table 2

Gender and Occupation Cross Tabulation

Catagory		Statistic	Occupation				Total
			Agriculture Labour	Government & Private	Business	Other	
Gender	Male	Count	44	57	21	2	124
		% within occupation	42.3%	68.7%	100.0%	100.0%	59.0%
	Female	Count	60	26	0	0	86
		% within occupation	57.7%	31.3%	0.0%	0.0%	41.0%
	Total	Count	104	83	21	2	210
		% within occupation	100.0%	100.0%	100.0%	100.0%	100.0%

There were 210 persons in all, according to the data. Of these, 124 (or around 59%) were men. Forty-four of the males, or roughly 42.3%, were employed in agriculture. 71 men, or roughly 68.7% of the total, worked for the government or private sector, while 21 men owned their own enterprises

and two held other positions. There were a total of 86 women. Sixty of the women, or roughly 57.7%, were employed in agriculture. Twenty-six women, or roughly 31.3%, held positions in the public or private sectors.

Table 3*Source of Water Cross Tabulation*

Catagory		Statistic	Source of water		Total
			Tap	Hand pump	
Gender	Male	Count	102	22	124
		% within source of water	58.0%	64.7%	59.0%
	Female	Count	74	12	86
		% within source of water	42.0%	35.3%	41.0%
	Total	Count	176	34	210
		% within source of water	100.0%	100.0%	100.0%

According to the table, out of the 210 respondents, 124 (59%) were men, 102 (58) were tap resources, and 22 (64.7%) were hand pumps. In a similar vein, 86 (41%) of them were female, 74

(42%) had a tap, and 12 (35.3%) had a hand pump.

This village has a good supply of hand pumps, so everyone in the community doesn't need to utilize the government supply system tap.

Table 4*Test of Drinking Water Cross Tabulation*

Catagory		Statistic	Test of Your Water		Total
			Yes	No	
Gender	Male	Count	104	20	124
		% within test of water	58.4%	62.5%	59.0%
	Female	Count	74	12	86
		% within test of water	41.6%	37.5%	41.0%
	Total	Count	178	32	210
		% within test of water	100.0%	100.0%	100.0%

The water source test is displayed in the table. Of the 210 respondents, 124 (59%) were men. The results of the drinking water test were 104 (58.4%)

yes and 20 (62.5%) no. In a similar vein, of the 86 (41%) females, 74 (41.6%) had a drinking water test, while 12 (37.5%) did not.

Table 5*Filter & Use Drink Water Cross Tabulation*

Catagory		Statistic	Filter Water Drink		Total
			Yes	No	
Gender	Male	Count	104	20	124
		% within drink filter water	57.8%	66.7%	59.0%
	Female	Count	76	10	86
		% within drink filter water	42.2%	33.3%	41.0%
	Total	Count	180	30	210
		% within drink filter water	100.0%	100.0%	100.0%

The table shows that of the 210 respondents (59%), 104 (57.85%) said they used filter water, and 20 (66.7%) said they did not. These respondents were all men. Similarly, 86 (41%) of the total were female, 76 (42.2%) said they used filter water, and 10 (33.35%) said they did not.

The ward chairwoman claims that the tap water supply system complies with ISO standards. It can be used immediately and does not require filtering. People in the neighbourhood also consume hand pump water directly because they trust it to taste cool and be drinkable.

Table 6

Available Sufficient Water Cross Tabulation

Catagory		Statistic	Available Sufficient Water	Total
			Yes	
Gender	Male	Count	124	124
		% within 2.4 Have you available sufficient water	59.0%	59.0%
	Female	Count	86	86
		% within 2.4 Have you available sufficient water	41.0%	41.0%
	Total	Count	210	210
		% within 2.4 Have you available sufficient water	100.0%	100.0%

The table indicates that there was enough water available from the water source. Of the 210 respondents, 124 (59%) were men. 100% of male

females said, "Yes, there is enough water available around-the-clock."

Table 7

Filter Water Use or Direct Use Drinking Water Cross Tabulation

Catagory		Statistic	Filter or Use Direct Water		Total
			Boil Used	Direct Used	
Gender	Male	Count	10	114	124
		% within filter or direct drink water	71.4%	58.2%	59.0%
	Female	Count	4	82	86
		% within filter or direct drink water	28.6%	41.8%	41.0%
	Total	Count	14	196	210
		% within filter or direct drink water	100.0%	100.0%	100.0%

The table shows that filter water use or direct used drinking water, total respondents 210, Of those, 124 (59) were men. Of those, 114 (58.2%) use water directly, while 10 (71.4%) boil and

use water. In a similar vein, 86 (41%) female respondents said they boiled water, 4 (28.6%) said they used it directly, and 82 (41.8%) said they used it.

Table 8*Type of Toilet (Permanent/Attached) Cross Tabulation*

Catagory		Statistic	Permanent or Attached Toilet	Total
			Yes	
Gender	Male	Count	124	124
		% within permanent or attached toilet	59.0%	59.0%
	Female	Count	86	86
		% within permanent or attached toilet	41.0%	41.0%
	Total	Count	210	210
		% within permanent or attached toilet	100.0%	100.0%

100% of men and women utilized permanent restrooms, according to the table. While some have

attached, others have not. Every respondent, both male and female, has a toilet.

Table 9*Hand Washing After Toilet Use or Dirty Touch Cross Tabulation*

Catagory		Statistic	Hand Washing After Toilet or Dirty Touch	Total
			Soap or Liquid Soap Water	
Gender	Male	Count	124	124
		% within washing	59.0%	59.0%
	Female	Count	86	86
		% within washing	41.0%	41.0%
	Total	Count	210	210
		% within washing	100.0%	100.0%

All the respondents hand wash after toilet use or dirty touch with soap (cake/liquid) & water. At

the closed discussion time researcher saw every house used liquid soap with sufficient water.

Table 10*Children Stool Disposal Cross Tabulation*

Catagory		Statistic	Children Stool Disposal		Total
			Toilet	Open Thrown	
Gender	Male	Count	111	13	124
		% within children stool disposal	57.8%	72.2%	59.0%
	Female	Count	81	5	86
		% within children stool disposal	42.2%	27.8%	41.0%
	Total	Count	192	18	210
		% within children stool disposal	100.0%	100.0%	100.0%

According to the table, out of the 210 respondents, 124 (59%) were men, and 111 (57.8%) of them disposed of their waste in the toilet and 13 in the open. Similarly, 81 (42.2%) of the 86 (41%) female respondents disposed of their waste in the

toilet, whereas 5 (27.5%) disposed of it outdoors.

All of the respondents—male and female—have good wisdom and bury their waste in the dirt. However, not on an open field.

Table 11

Sufficient Water Available for Personal Hygiene Cross Tabulation

Catagory		Statistic	Sufficient Water Available for Personal Hygiene		Total
			No		
Gender	Male	Count	124	0	124
		% within sufficient water available for personal hygiene	59.6%	0.0%	59.0%
	Female	Count	84	2	86
		% within 2.9 Have sufficient water for personal hygiene	40.4%	100.0%	41.0%
	Total	Count	208	2	210
		% within 2.9 Have sufficient water for personal hygiene	100.0%	100.0%	100.0%

The table indicates that there is enough water accessible for personal hygiene. Of the 210 responders, 124 (59%) were men. Yes, there is enough water available for personal hygiene, according to male respondents. In a similar vein, 84 female participants (40.4%) indicated that there was enough water for personal hygiene, whereas 2 said there wasn't enough water in the hand pump.

In the winter, there is a difficulty with the amount of water accessible from the hand pump, although the supply water tap is not scarce.

This village has a good resource of water and easily accesses hand pumps. Previously, the best source of water was hand pumps. Now, every household has a hand pump, and they do not want to replace it with the government water supply tap.

The finding indicates that households have developed a strong dependence on private hand pumps due to their accessibility, reliability,

and convenience. Since groundwater is readily available, households perceive little need to connect to the government-operated piped water supply system. This reflects that users tend to prefer water sources that provide uninterrupted and immediate access, regardless of whether they are community-managed or government-managed.

This finding is consistent with Mishra et al. (2024), who reported that the performance and acceptance of water supply systems depend largely on reliability, adequacy of supply, and consumer satisfaction. Where existing sources adequately meet household demand, users show little motivation to shift to alternative systems. Similarly, Yadav and Silwal (2023) observed that households in the Dharan Water Supply System often relied on alternative water sources such as private wells and hand pumps when these were perceived as more dependable than the piped supply.

Likewise, Mishra et al. (2019) found that many rural water supply systems in Sunsari District remained only partially functional because beneficiaries continued to rely on existing groundwater sources instead of community water schemes. Their study emphasized that user preference is strongly influenced by service reliability and accessibility.

The government water supply connection is expensive, requiring approximately Rs. 20,000 for installation, which is difficult for middle- and low-income households.

The high installation cost serves as a significant financial barrier preventing households from connecting to the government water supply system. Although piped water offers year-round availability, the initial investment discourages adoption, particularly among economically disadvantaged households. Consequently, residents continue using relatively inexpensive hand pumps.

This finding agrees with Mishra (2019), who emphasized that financial affordability is one of the most important determinants of sustainable drinking water services. His assessment of water financing demonstrated that high capital investment and connection charges reduce participation in improved water supply systems, especially among low-income communities. He recommended affordable financing mechanisms and subsidies to increase household connections.

Similarly, Mishra and Karna (2019) found that effective management transfer of water supply systems requires not only institutional strengthening but also financial arrangements that encourage community participation. When connection costs are high, community ownership and willingness to adopt government systems decline.

Every Household Uses Liquid Soap With Sufficient Water

The finding reflects satisfactory hygiene practices among households. The availability of

adequate water enables regular handwashing and use of liquid soap, which contributes to better public health outcomes by reducing waterborne and hygiene-related diseases.

Although the primary focus of Mishra et al. (2024) was the technical performance of water supply systems, the study highlighted that reliable and adequate water supply significantly improves domestic water use, sanitation, and hygiene behaviors. Continuous water availability encourages households to practice proper hygiene.

Similarly, Mishra et al. (2019) noted that functional water supply systems contribute to improved sanitation and household cleanliness because users have sufficient water for daily domestic activities, including handwashing and personal hygiene.

All respondents (both male and female) dispose of children's feces safely in toilets or by burying them in the soil rather than disposing of them in open fields.

The finding demonstrates high community awareness regarding sanitation and environmental hygiene. Safe disposal of children's feces minimizes environmental contamination and reduces the transmission of diarrheal and other waterborne diseases. The behavior indicates successful sanitation awareness within the community.

This finding supports the observations of Mishra et al. (2019), who reported that communities with functional water supply systems generally exhibit better sanitation practices because improved water availability supports hygienic behaviors. The study emphasized that water supply and sanitation are complementary components of public health improvement.

Furthermore, Mishra and Karna (2019) highlighted that successful community management of water supply systems often strengthens sanitation awareness through user committee mobilization and community participation, leading to improved environmental health practices.

Sufficient water is available throughout the year. However, hand pumps experience some problems during winter, whereas the government piped water supply provides water throughout all 365 days.

This finding suggests that although hand pumps remain the preferred source, their performance is affected by seasonal fluctuations, particularly during winter. In contrast, the government piped water supply offers a more reliable and continuous service throughout the year. The finding demonstrates the technical advantage of properly managed piped water systems over individual groundwater sources.

This finding closely agrees with Mishra et al. (2024), who concluded that one of the principal indicators of a well-performing water supply system is continuity of service throughout the year. Their study showed that uninterrupted water supply significantly enhances system performance and consumer satisfaction.

Similarly, Yadav et al. (2023) reported that reliability and continuity are major concerns in urban water supply systems, and ensuring year-round service is essential for sustainable water management. Their study emphasized that communities often depend on alternative sources when piped water becomes unreliable.

In addition, Mishra et al. (2019) found that fully functional water supply systems provide more dependable services than partially functional or seasonal sources. Their research recommended regular operation and maintenance to ensure continuous water availability and reduce reliance on seasonal groundwater sources..

Conclusion

The study concludes that although households have adequate access to water through hand pumps, several challenges remain regarding drinking water quality, sanitation, and solid waste management. Most households prefer hand pump

water because it is perceived to be cooler, better tasting, and readily available, despite the year-round reliability of the government piped water supply. The high installation cost of government water connections discourages many middle- and low-income households from adopting the piped system. Furthermore, concerns regarding water quality, including unpleasant odor, iron content, and occasional bleaching powder or potassium-related taste and color, highlight the need for regular monitoring and treatment.

The findings also reveal that the community demonstrates good sanitation practices, particularly in the safe disposal of children's feces and the use of soap for handwashing. However, solid waste management remains a significant concern. Waste is collected only once a month in many areas, requiring households to store waste for extended periods, which creates foul odors, attracts flies, and increases the risk of contamination of nearby water sources. Improper disposal of municipal waste in environmentally sensitive areas such as the Barandabhar Buffer Zone raises additional environmental and public health concerns.

Based on these findings, the study has several practical implications. Water supply, sanitation, and solid waste management should be implemented as integrated community development programs rather than as separate interventions. Municipalities should conduct regular awareness programs on safe drinking water, sanitation, hygiene, and proper waste management practices. Annual water quality testing should be mandatory to monitor iron concentration, microbial contamination, and the safety of water treatment chemicals. Continuous access to safe and potable drinking water should be ensured through regular operation and maintenance of the water supply system.

To encourage greater use of the government water supply, municipalities and concerned authorities should introduce subsidies or financial

support for middle- and low-income households to reduce connection costs. In addition, municipal waste should be collected at least once a week rather than monthly to minimize health risks and environmental pollution. Waste disposal sites should be scientifically managed and located away from forests, rivers, and residential areas to prevent contamination of natural resources.

Finally, municipalities should adopt the concept of “Waste to Wealth (Phohor Bata Mohor)” by promoting waste segregation, recycling, composting, and resource recovery. Such an approach would not only improve environmental sanitation but also create economic opportunities, contribute to sustainable urban management, and reduce the likelihood of waterborne disease outbreaks, such as the cholera incidents reported in parts of Nepal in recent years. Long-term planning, effective governance, and active community participation are essential to achieving sustainable water, sanitation, and waste management services.

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