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Determinants of Household Access to Drinking Water in Burkina Faso

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Abstract

Despite investments made by the Burkinabe government and its various technical and financial partners in the water and sanitation sub-sector, household access to drinking water remains a concern. The overall objective of this research is to analyze the main determinants of household access to these services. To this end, in addition to document analysis, we used processed and validated data from the National Water, Hygiene, and Sanitation Survey (ENEHA). These quantitative and qualitative data were collected from 11,348 households. We specified and estimated a logit model. The main findings of the study are as follows: economic, socio-demographic factors, and service delivery conditions significantly influence access to drinking water in Burkina Faso. In light of these findings, the study suggests, among other things: 1) strengthening service provision to reduce the distances travelled and the time spent obtaining drinking water, 2) the establishment of a mechanism for targeting interventions in the areas of drinking water to reduce inequalities 3) the implementation of a pricing policy that is more favourable to rural areas and disadvantaged populations in view of the high cost of drinking water in rural areas.

Keywords

Supply Choice, Drinking Water, Households, Burkina Faso

1. Introduction

Access to safe drinking water remains a major challenge worldwide. According to the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF), 2.1 billion people worldwide, or one in four, will lack access to safe, monitored drinking water in 2024. In sub-Saharan Africa, women, who are responsible for collecting water, spend more than 30 minutes a day on this task. In

Burkina Faso, ensuring safe drinking water is a priority for the authorities. As part of its responsibilities, the Ministry of Environment, Water, and Sanitation (MEEA) is working to ensure sustainable access to this service for the population. The Ministry's sectoral policy on "Environment, Water and Sanitation" covering the period 2018-2027 incorporates this mission (MEEA, 2018). The MEEA's interventions have led to progress in the water sector. The rate of access to drinking water in rural areas has increased from 64.1% in 2014 to 71.3% in 2023 (MEA, 2023).

However, this progress remains low compared to the targets set at both national and international levels. Indeed, Sustainable Development Goal (SDG) six aims to achieve "universal and equitable access to water, hygiene and sanitation by 2030, especially for vulnerable populations". Furthermore, there are socio-economic and regional disparities in terms of access to drinking water in this country. In urban areas, 29.11% of the population has safe managed access, compared to 0.66% in rural areas (MEEA, 2025). The Central region has the highest proportion of households with safe managed access (44.98%), compared to 0.47% of households in the Sahel (MEEA, 2025).

Despite investments by the Burkinabe government and partners (WHO, UNICEF, and DANIDA, for example), 16.89% of households still obtain their water from non-potable sources, such as wells, backwaters, surface water, and dams (MEEA, 2025). Additionally, the average time it takes to reach a drinking water source exceeds the WHO standard of 15 minutes. In fact, this supply time exceeds 15 minutes for 89.54% of households in urban areas and 91.47% of households in rural areas (MEEA, 2025). In addition, water shortages are also common, with an average of 15.18 days of water supply disruption per year, and a lack of drinking water facilities. Burkina Faso has 58,000 modern water points (PEM), 48,000 boreholes, and 8000 improved wells (MEEA, 2023) for an estimated population of 20,487,979 (MEFD, 2019). As a result, 11.73% of the population faces challenges related to the distance (more than 1000 meters) to drinking water supply points and the quality of drinking water (MEEA, 2025). These issues, combined with the low standard of living of households, particularly in rural areas, may explain the choice of drinking water supply.

Research has analyzed the factors that determine decisions regarding drinking water supply. In this vein, Lancaster (Lancaster, 1966) highlighted the role of attributes (factors that characterize demand for drinking water) in households' choice of water supply. Furthermore, the time required to obtain drinking water is a decisive factor in households' choice of water supply (Becker, 1985). Research has documented the influence of income on the choice of drinking water supply (Agbadi, Darkwah, & Kenney, 2019; Elena & Elshiewy, 2019; Omarova, Tussupova, Hjorth, Kalishev, & Dosmagambetova, 2019; Rimi, 2019; Perrin-Heredia, 2013). According to studies, the level of education affects household supply decisions (Sehreen, Masud, Akhtar, & Masum, 2019; Sintondji, Vissin, Dan, Yovo, & Amouzouvi, 2017; Morakinyo, Adebowale, & Oloruntoba, 2015). Household size also affects water supply choices (Arouna & Dabbert, 2010). In addition to the factors mentioned above, other factors determine households' choice of water sources. This refers to the distance travelled to reach the water source (Boone, Glick, & Sahn, 2011), cultural and religious values (Morakinyo, Adebowale, & Oloruntoba, 2015), and water quality (Nurtazin, Pueppke, Ospan, Mukhitdinov, & Elebessov, 2020).

Despite the importance of access to drinking water on household living conditions, very few nationwide studies have focused on the determinants of drinking water supply decisions in Burkina Faso. It is therefore important to analyze the factors likely to affect households' choice of drinking water supply in this country. This article seeks to answer the following question: What are the main determinants of household drinking water supply choices in Burkina Faso? In other words, it analyses the main determinants of drinking water supply choices among Burkinabe households. The study assumes that: 1) a low household standard of living reduces its chances of accessing an improved water source, 2) a large household size reduces its chances of accessing an improved water source, and 3) a long supply time (or distance) for the household reduces its chances of accessing an improved water source. To explore this topic in depth, the rest of this paper is organized into four parts: 1) a review of the literature, 2) the methodological approach, 3) analysis of the results, and 4) conclusions, followed by proposals for economic policy measures.

2. Literature Review

Studies have examined the factors that influence decisions regarding drinking water supply. One category of these studies has highlighted the influence of economic factors on water supply decisions. In line with this, the role of income and the costs of accessing drinking water is documented in the literature (Akoteyon, 2019; Elena & Elshiew, 2019; Omarova, Tussupova, Hjorth, Kalishev, & Dosmagambetova, 2019; Sehreen, Masud, Akhtar, & Masum, 2019; Xiong, Kong, Zhang, Lei, & Sun, 2018; Mulenga, Bwalya, & Chishimba, 2017; Comez, Agoïnon, Akobi, & Houssou, 2016). According to this literature, an improvement in income or, overall, in living conditions increases households' chances of accessing a source of drinking water. However, when the cost of access to water is high, the probability that households will opt for an improved source becomes low. In the municipality of Bantè, for example, Comez, Agoïnon, Akobi, & Houssou (2016) found spatial disparities in water infrastructure, with a low water supply rate (41.4%). This disparity is partly due to the financial cost, particularly the payment of compensation for the costs of constructing drinking water facilities. Similarly, wealthier households have greater access to water in both rural and urban areas (Mulenga, Bwalya, & Chishimba, 2017). Similarly, the results of Akoteyon (2019) revealed a predominance of improved water sources in middle- and high-income residential areas in Lagos (Nigeria). The price of water, the distance between the household and the water source, and the quality of the source are factors in choosing a water source (Elena & Elshiewy, 2019). In addition, wealthy households and households headed by women are more likely to choose improved public water sources (Elena & Elshiewy, 2019).

Another category of research has placed greater emphasis on the influence of socio-demographic factors in household drinking water supply decisions (Kumar, Guthi, Kondagunta, & Subash, 2024; Gurung et al., 2023; Tshililo et al., 2022; Adil, Nadeem, & Malik, 2021; Burch et al., 2020; Simelane, Shongwe, Vermaak, & Zwane, 2020; Agbadi, Darkwah, & Kenney, 2019; Sehreen, Masud, Akhtar, & Masum, 2019; Mulenga, Bwalya, & Chishimba, 2017; Sintondji, Vissin, Dan, Yovo, & Amouzouvi, 2017; Comez, Agoïnon, Akobi, & Houssou, 2016; Morakinyo, Adebowale, & Oloruntoba, 2015; Boone, Glick, & Sahn, 2011; Arouna & Dabbert, 2010). These factors include household size, neighbourhood/area of residence, household status (IDP household or not), household culture, level of education, gender, age, and marital status of the head of household. According to this literature, urban households, those in subdivided areas, those headed by women or educated individuals, and those headed by adults are more likely to obtain drinking water from a safe source. However, large households are less likely to obtain drinking water from a safe source. Indeed, household size and composition, access to water sources, wealth, and time spent collecting water are important determinants of water use (Arouna & Dabbert, 2010). Similarly, female-headed households, households whose head has at least secondary education, urban households, and non-poor households been more likely to have access to improved drinking water sources (Agbadi, Darkwah, & Kenney, 2019). According to the findings of Simelane, Shongwe, Vermaak, & Zwane (2020), households headed by individuals aged 35 to 54 and 55 were less likely to have access to improved drinking water sources than those headed by younger individuals. In addition, an increase in the number of household members is negatively associated with access to improved drinking water sources (Simelane, Shongwe, Vermaak, & Zwane, 2020). Furthermore, households in urban areas are more likely to have access to improved drinking water sources than those in rural areas (Simelane, Shongwe, Vermaak, & Zwane, 2020). The findings of Adil, Nadeem, & Malik (2021) in the context of Punjab also reveal that factors such as the level of education and ethnicity of the head of household determine households' access to drinking water. Tshililo et al. (2022) concluded that household size and water source influence household access to water and payment for water services. Using survey data from India, Gurung et al. (2023) found that large urban households belonging to affluent groups, whose head of household is married and uneducated, are more likely to have access to improved drinking water. The findings of Kumar, Guthi, Kondagunta, and Subash (2024) also reveal that households residing in urban areas, small households, and female-headed households are strongly associated with better access to improved drinking water. However, IDP households have less access to drinking water. Indeed, insecurity and associated population displacement limit some households' access to this service. In Burkina Faso, the massive influx of internally displaced persons (IDPs) is putting pressure on existing water points, which were already failing before the crisis (UNICEF, 2022). Similarly, targeted attacks on water points reduce water availability in areas affected by insecurity

(UNICEF, 2022). When displaced populations leave their localities, they are no longer equipped to meet their basic water needs (CROIX-ROUGE, 2024). In addition, climate change is negatively impacting water resources in this country, and the drying up of water sources is reducing water availability, increasing the risk of social tensions (UNICEF, 2022).

Furthermore, studies have focused more on the role of service delivery conditions and household constraints in households' decision of drinking water supply (Gebremichael, Yismaw, Tsegaw, & Shibeshi, 2021; Lazaridou & Michaillidis, 2020; Simelane, Shongwe, Vermaak, & Zwane, 2020; Omarova, Tussupova, Hjorth, Kalishev, & Dosmagambetova, 2019; Boone, Glick, & Sahn, 2011). These governance factors include the distance and/or time required for households to obtain water, the availability of drinking water facilities, and the quality, taste, and smell of the water. Since households must balance the time spent on productive activities with that allocated to domestic work, the time required to collect water can influence their decisions regarding drinking water supply. According to Boone, Glick, and Sahn (2011), certain household characteristics and distance to water sources influence the choice of water source. In rural areas of Kazakhstan, households use alternative sources due to residents' doubts about the quality of tap water, habitual use of other sources, and the availability of cheaper or free water sources (Omarova, Tussupova, Hjorth, Kalishev, & Dosmagambetova, 2019). In addition, households have a poor perception of the quality and reliability of water from wells, open sources, and cisterns (Omarova, Tussupova, Hjorth, Kalishev, & Dosmagambetova, 2019). Among urban households in north-western Ethiopia, factors such as the availability of additional facilities, cleanliness, water scarcity, and family size significantly explain households' access to safe drinking water (Gebremichael, Yismaw, Tsegaw, & Shibeshi, 2021).

3. Study Methodology

As part of this study, we estimate a logistic model. The categorical nature of the dependent variable clearly justifies this choice. We used the database from the national survey on water, hygiene, and sanitation in Burkina Faso (MEEA, 2025). In this section, we document the model specification, model variables, data sources, and statistical results. The model variables are described in Section 3.2 (see **Table 1** below).

3.1. Model Specification

As previously discussed in the literature, households' decision to obtain water from a given source (drinking water, non-drinking water, or both) depends on economic, socio-demographic, service delivery conditions, and household constraints. According to Lancaster (1966), a good can have a vector of distinct attributes. These attributes may be present and combined with others. The nature of the source, the quality of the water, and the possibility of contracting a disease are possible factors. These attributes can influence households' access to drinking water. Furthermore, in Becker's approach (1985), the time required to obtain water is likely to affect a household's decision on how to obtain safe drinking water. Households must balance the time spent on productive activities with that allocated to domestic tasks (including water collection). The time required to obtain water can therefore influence households' decisions on drinking water supply. Furthermore, the decision to obtain water from one source or another is not generally independent, as each option has advantages and disadvantages (Zoungrana, 2021). In view of the above, it is advisable to specify a logit model that describes the joint probability of sourcing from drinking-water and non-drinking-water sources. We assume that access to alternative sources is exogenous.

3.2. Model Variables and Data Source

In the table below, we present the variables used to implement the specified model.

The data for this study are from the ENEHA (MEEA, 2025). Despite the insecure situation, data collection covered the entire national territory.

Table 1. Description of model variables.

Variables	Labels (name)	Definitions	Expected signs
Sep	drinking water sources	binary variable (it takes the value 1 if the household obtains its water supply from a Private connection (tap), standpipe (BP)/autonomous water station (PEA), borehole/human-powered pump (PMH), and zero otherwise)	
Niv_vie	standard of living	calculated qualitative variable (takes the value 1 if the standard of living is high or remarkably high, two if the standard of living is average, and three if the standard of living is low or too low)	+
Tail_men	household size	quantitative variable, gives the number of individuals in the household (takes the value 1 if the household size is large, two if the size is average, and three if the household is small)	−
Sex_men	gender of head of household	binary variable (takes the value 1 if female and zero if male)	+/−
Niv_inst	level of education of the head of household	Qualitative variable assessing the level of education of the head of household (it takes the value 1 if the head of household has secondary or higher education, two if the head of household has primary education, and three if the head of The household has no education	+
Mil_res	residential environment	binary variable indicating the environment in which the household resides (takes the value 1 if the household resides in an urban environment and zero if the household resides in a rural environment.	+
Zon_res	area of residence	binary variable indicating the area where the household resides (takes the value 1 if the household resides in a developed area and zero if the household resides in an undeveloped area)	+
Age	age of head of household	quantitative variable measuring the age of the head of household in years (takes the value 1 if the head of household are elderly, two if the head of household is an adult, and three if the head of household is young)	+

Continued

Cat_soc	socio-professional category	categorical variable (it takes the value 1 if the head of household is a manager, two if the head of household is self-employed, and three if the head of household is a manual worker)	+
Sta_men	household status	binary variable (takes the value 1 if the household is an IDP (Internally Displaced Person) household and zero otherwise)	−
Sit_mat	Marital status of head of household	qualitative variable (takes the value 1 if the head of household is married, two if the head of household is widowed/divorced, and three if the head of household is single)	+/−
Tem_app	water supply time (in minutes)	quantitative variable assessing the average time in minutes of the round trip (including waiting time) taken by the household to obtain drinking water (takes the value 1 if the time is less than 15 minutes, 2 if the time is between 15 and 30 minutes, 3 if the time is between 30 and 45 minutes, 4 if the time is between 45 and 60 minutes, and 5 if the time is more than 60 minutes)	−
Dis_app	water supply distance (in metres)	quantitative variable, measures in metres the average distance travelled by the household to obtain drinking water (takes the value 1 if the distance is less than five hundred metres, two if the distance is between 500 and 1000 metres, and three if the distance is greater than 1000 metres)	−
Emp_pse	location of the household's main water source	binary variable indicating the location of the household. main water source (takes the value 1 if the main source is located on the property and zero if not)	+
Sat_con	Household assessment of the continuity (availability) of drinking water service	Qualitative variable assessing the household's level of satisfaction with the continuity of drinking water service (takes the value 1 if the household is moderately satisfied, two if the household is satisfied, and three if the household is not at all satisfied)	+/−
Sat_ode	Household assessment of the smell of water	Qualitative variable assessing the household's level of satisfaction with the smell of the water (takes the value 1 if the household is moderately satisfied, two if the household is satisfied and three if the household is not at all satisfied)	+/−
Sat_gou	Household assessment of the taste of water	qualitative variable assessing the household's level of satisfaction with the taste of the water (takes the value 1 if the household is moderately satisfied, two if the household is satisfied and three if the household is not at all satisfied)	+/−
Sat_temp	Household assessment of drinking water supply time	Categorical variable assessing the household's level of satisfaction with the time taken to supply drinking water to the household (takes the value 1 if the household is moderately satisfied, 2 if the household is satisfied, and 3 if the household is not at all satisfied.	+/−

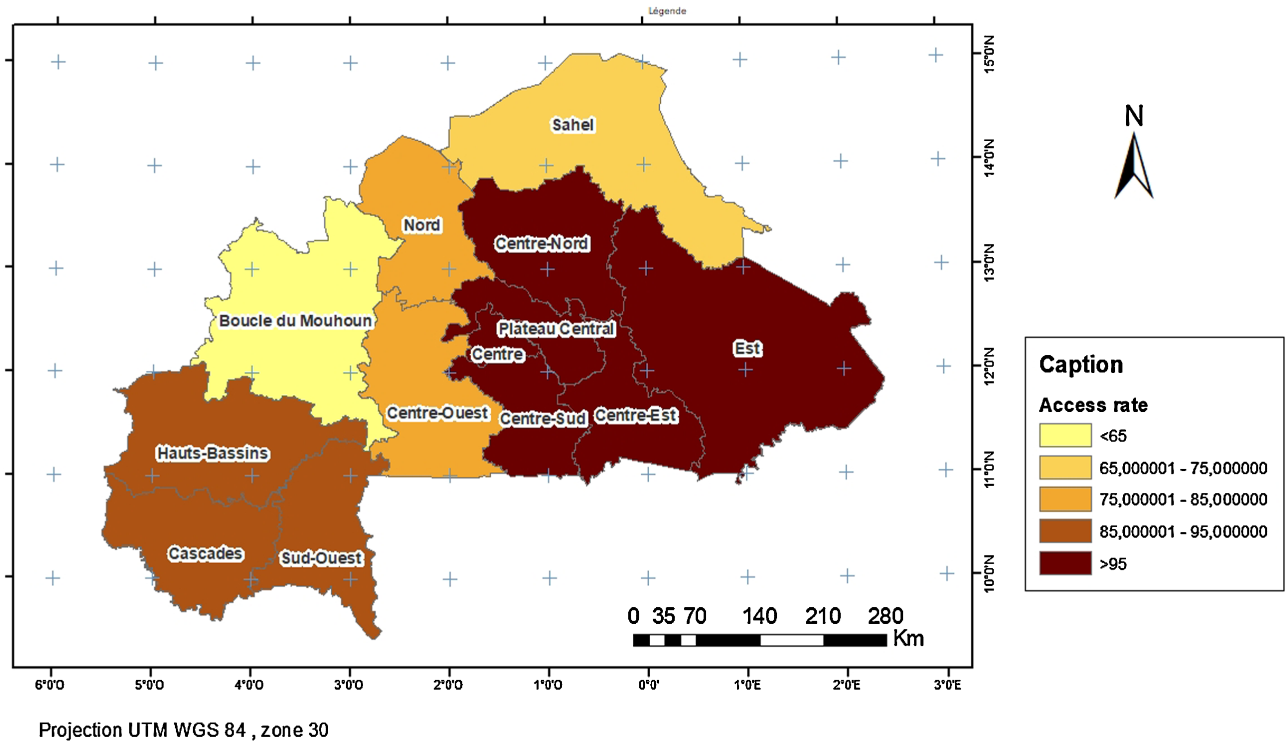
Source: Ouédraogo and Bassinga, December 2025.

4. Study Results and Discussion

4.1. Access to Drinking Water in Burkina Faso

At the national level, we estimate the rate of access to drinking water (limited, basic, and safe) at 89.74% (MEEA, 2025). Although this is high compared to previous years, it remains below the SDG target for 2030.

There are significant regional disparities in access to drinking water. Figure 1 below illustrates this situation. The Eastern region has the highest rate (99.63%), followed by the Centre-South (99.26%) and the Centre (98.96%). Access to drinking water is lower in the Boucle du Mouhoun (63.54%) and Sahel (72.21%) regions. The map below illustrates this information.



Source: Ouédraogo, January 2026, based on data from the MEEA (2025).

Figure 1. Access to drinking water by region (%) of households in Burkina Faso.

4.2. The Effect of Economic Conditions on Access to Drinking Water

The standard of living, as calculated by the ENEHA, provides insight into households' economic situation. It considers household income, living conditions, and purchasing power. The estimated coefficient for this variable is positive and significant at the 1% threshold. The standard of living is a key factor in households' drinking water supply choices in Burkina Faso. Wealthier households have easier access to drinking water than poorer households. Indeed, households with a medium or high standard of living are more likely to have access to drinking water than households with a low standard of living. This result is consistent with the findings of the study on Bantè (Comez, Agoïnon, Akobi, & Houssou, 2016). According to them, the financial cost, particularly the payment of the counterpart for the costs of constructing the works, is a source of spatial disparity in hydraulic works in the municipality of Bantè. We also observed a similar result in Zambia (Mulenga, Bwalya, & Chishimba, 2017), where the wealthiest households have greater access to drinking water and improved sanitation in both rural and urban areas. In the Nigerian context, improved water sources predominate in middle and high-income residential areas (Akoteyon, 2019). The influence of living standards on the choice of drinking water supply is also observed in Benin (Elena & Elshiewy, 2019), where the price of water and the distance between the household and the water source increase the probability of choice and the demand for water from improved and unimproved public water sources.

4.3. The Effect of Socio-Demographic Conditions on Access to Drinking Water

In addition to economic factors, certain socio-demographic factors, including household size, environment, and area of residence, gender, level of education, socio-professional status, and marital status of the head of household, influence households' choice of drinking water supply. The estimated coefficients for all these variables appear significant in the model. The estimated coefficient for household size is negative and significant at the 1% threshold. Large households (more than eight members) and medium-sized households (between 5 and 7 members) are less likely to obtain drinking water than small households. Similarly, the estimated coefficient for the gender variable is negative and significant at the 10% threshold, indicating a low probability of choosing a drinking water source in households headed by men compared to those headed by women. The coefficient for educational attainment is significant and negative for households whose head has a primary level of education. However, this coefficient is positive for households whose head has completed secondary or higher education. Households whose head has attained secondary or higher education are more likely to have access to drinking water than those with no education. The coefficient for place of residence is significant at the 1% level and positive. Households in urban areas are more likely to have access to a source of drinking water than those in rural areas. We observed a similar result in Eswatini, where households in urban areas are more likely to have access to improved water sources than those in rural areas (Simelane, Shongwe, Vermaak, & Zwane, 2020). On the other hand, the coefficient for the household's area of residence is negative, indicating a lower probability of access to a source of drinking water among households in subdivided localities compared to those in non-subdivided areas. Unplanned urbanization could explain this result. Indeed, in some subdivided areas, the construction of drinking water infrastructure lags behind urbanization. The coefficients for the age of the head of household are significant at the 1% threshold and positive for elderly and adult heads of household. These categories of households are more likely to obtain drinking water from a safe source than households headed by younger people. This result on the age of the head of household contradicts some of the conclusions of Simelane, Shongwe, Vermaak, & Zwane (2020), where, in 2010, in the context of Eswatini, households with heads aged 35 to 54 and 55 were less likely to have access to improved drinking water sources than those with younger heads. The coefficient for the socio-professional category of the head of household is significant at the 1% threshold and negative for heads of households who are self-employed. The estimated coefficient for household status (IDP household) is not significant. The various results are broadly in line with our expectations. We observe comparable results in other contexts. In Ghana, female-headed households, households whose head has at least secondary education, urban households, and non-poor households are more likely to have access to improved drinking water sources (Agbadi, Darkwah, & Kenney, 2019). The study's findings corroborate those obtained in India, where large urban households whose head of household is married but uneducated and who belong to affluent groups are more likely to have improved drinking water (Gurung et al., 2023). Kumar, Guthi, Kondagunta, & Subash (2024) also obtained results similar to those of the present study in the Indian context, where households residing in urban areas, the wealth index of the wealthiest, nuclear families, and households headed by women are strongly associated with better access to improved drinking water.

4.4. The Effect of Service Delivery Conditions and Household Constraints on Households' Access to Drinking Water

In this section, we analyze certain factors, including: water supply time, the distance households must travel to reach the main supply source, the location of the household's main water source, households' assessment of the availability (continuity) of drinking water services, households' assessment of the smell of the water, households' assessment of the taste of the water, and households' assessment of the time taken to collect water.

The supply time coefficients are significant at the 1% threshold and positive. This result does not systematically reflect a positive effect of supply time on access to a source of drinking water. It indicates that households willing to travel further are precisely those that favour improved water sources. This result is consistent with Becker's approach (1985). Water collection time affects households' decisions regarding drinking water supply. Women, who are primarily responsible for water collection in Burkina Faso, must sacrifice some of the time they devote to productive activities to obtain drinking water. The supply distance coefficients are significant and negative. Households whose main water source is far away (between 500 and 1000 meters or more than 1000 meters) are less likely to obtain drinking water than households whose main water source is less than five hundred meters away. We observe a similar result in Madagascar, where the distance to water sources influences households' choice of water source (Boone, Glick, & Sahn, 2011). The coefficient for the location of the household's main water source is significant and positive. Households whose main water source is located outside the concession are more likely to obtain their water from a potable source than households whose main water source is located within their concession. Indeed, in most cases, households' sources of drinking water are located far away, which explains these results. The coefficient for the availability (continuity) of water services is significant and negative for households that are moderately satisfied and not at all satisfied with this availability. The probability that these households will obtain their water supply from drinking water sources is therefore low compared to households that are satisfied with the continuity of the water service. The coefficient for the assessment of water odor is significant and positive. Households that consider the water from their main source of supply to be "odorless" are more likely to obtain their water from drinking water sources than households that consider the smell of the water from their main source of supply to be "unpleasant". This result is in line with our expectations. In Kazakhstan, water quality is a key factor in households' choice of water supply (Omarova, Tussupova, Hjorth, Kalishev, & Dosmagambetova, 2019). The coefficient for water taste assessment is significant and negative for households that consider the taste of water to be "poor". These households are less likely to obtain their water supply from a drinking water source than households that are satisfied with the taste of water. This result is also in line with our expectations. We observe a similar result in Kazakhstan (Omarova, Tussupova, Hjorth, Kalishev, & Dosmagambetova, 2019). These findings on water service continuity and subjective water quality (households' assessment of smell and taste) are consistent with Lancaster's analysis (1966). These attributes significantly influence access to drinking water in Burkina Faso. The coefficient for the assessment of water supply time is significant and positive for households that are moderately satisfied or dissatisfied with this criterion. These households are more likely to have access to a drinking water source than households that are satisfied with the time it takes to obtain water. This result presents a paradox in relation to our expectations. However, it is consistent with previous results on the time it takes for households to obtain drinking water and the location of the main source of drinking water for households.

However, our study has some limitations. The data used covers only one year, namely 2025, which limits the scope of the study's conclusions. In addition, the data on satisfaction variables comes from household statements and may therefore be subjective. Finally, the study took into account insecurity and associated population displacement in certain localities of the country through the variable "Sta_men", but the results have limitations. These shortcomings can be further examined in other studies.

5. Conclusion

Despite initiatives undertaken in Burkina Faso to provide drinking water to the entire population, households still have difficulty accessing safe drinking water. This research aimed to highlight the key factors influencing households' choice of water supply in this country. By estimating a logit model using data collected from a representative sample of Burkinabe households (11,348 households), the study yielded the following main results: socio-economic conditions, socio-demographic factors, and service delivery conditions explain household access to drinking water in this country. Considering these results, the study suggests combining policies to improve people's incomes, reducing the time spent collecting drinking water, improving water quality, and reducing social inequalities. It is therefore important, among other things, to: 1) Strengthen service provision by constructing additional sustainable drinking water facilities to reduce the distances travelled and the time spent collecting drinking water. 2) Establish a mechanism for targeting interventions in the area of drinking water, giving priority to rural households, poor households, and IDP households, with a view to reducing inequalities. 3) Introduce a tariff policy that is more favorable to rural areas and disadvantaged populations.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Appendix

a. Summary of estimation results

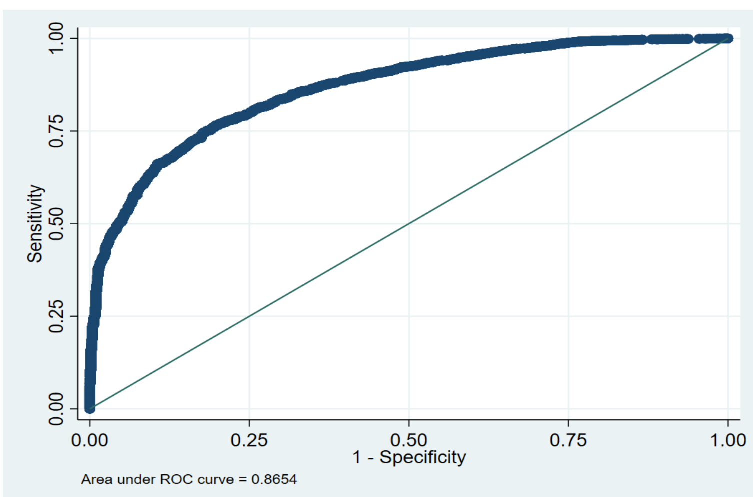
Drinking water (**Sep**)	Coef.	St. Err.	T-value	p-value	[95% Conf	Interval]	Sig
Standard of living (Niv_vie)	0	.	.	.	.	.	
Average	2,348	.121	19.41	0	2,111	2,585	***
High	6,405	.442	14.50	0	5,539	7,271	***
Household size (**Tail_men**)	0	.	.	.	.	.	
Medium size	−.282	.089	−3.16	.002	−.457	−0.107	***
immense size	−.674	.107	−6.33	0	−.883	−.465	***
Gender of head of household (**Sex_men**)	0	.	.	.	.	.	
Male	−.008	.159	−0.05	.961	−.32	.305	
Level of education of head of household (**Niv_inst**)	0	.	.	.	.	.	
Primary	−.213	.098	−2.17	.03	−.406	−.021	**
Secondary/Higher	.28	.144	1.94	.052	−.003	.563	*
Place of residence (**Mil_res**)	0	.	.	.	.	.	
Urban	.492	.104	4.72	0	.288	.696	***
Area of residence (**Zon_res**)	0	.	.	.	.	.	
Subdivided area	−.371	.124	−2.98	.003	−.615	−0.127	***
Age group of head of household (**Age**)	0	.	.	.	.	.	
Adult	.335	.097	3.46	.001	.145	.525	***
Old	.316	.117	2.69	.007	.086	.546	***
Socio-professional category (**Cat_soc**)	0	.	.	.	.	.	
Frame	.12	.351	0.34	.733	−.567	.807	
Laborer	−0.019	.183	−0.11	.916	−0.378	.339	
Self-employed worker	−.278	.101	−2.76	.006	−.475	−.08	***
Residence status (**Sta_men**)	0	.	.	.	.	.	
IDP (Internally Displaced Person)	.177	.177	1.00	.317	−.17	.524	
Marital status (**Sit_mat**)	0	.	.	.	.	.	
Single	.27	.216	1.25	.211	−.153	.694	
Divorced/Widowed	.073	.186	0.39	.694	−.292	.439	
Water supply time (**Tem_app**) (in minutes)	0	.	.	.	.	.	
Between 15 and 30 minutes	.431	.112	3.83	0	.21	.651	***
Between 30 and 45 minutes	1.277	.128	10.01	0	1,027	1,527	***
Between 45 and 60 minutes	1,526	.138	11.03	0	1,255	1,797	***

Continued

Over 60 mins	2.2	.145	15.20	0	1,916	2.484	***
Distance to water source (Dis_app) (in meters)	0	.	.	.	.	.	
Between 500 and 1,000 meters	−.334	.093	−3.59	0	−.516	−.152	***
Over one thousand meters	−.87	.16	−5.46	0	−1.183	−0.558	***
Location of water source (Emp_pse)	0	.	.	.	.	.	
Outside a dealership	2,203	.121	18.20	0	1,966	2,441	***
Assessment of water continuity (availability) (Sat_con)	0	.	.	.	.	.	
Moderately satisfied	−.299	.091	−3.27	.001	−.477	−.12	***
Not satisfied	−.674	.127	−5.31	0	−.923	−.425	***
Assessment of water odor (Sat_ode)	0	.	.	.	.	.	
Odorless	.555	.093	5.98	0	.373	.737	***
Assessment of water taste (**Sat_gou**)	0	.	.	.	.	.	
Poor	−.416	.118	−3.52	0	−.647	−.184	***
Assessment of supply time (**Sat_temp**)	0	.	.	.	.	.	
Moderately satisfied	.365	.094	3.87	0	.18	.55	***
Not satisfied	.218	.127	1.71	.087	−.032	.467	*
Constant	−1.556	.223	−6.97	0	−1.994	−1,119	***
Mean dependent var	0.893		SD dependent var		0.310		
Pseudo r-squared	0.293		Number of obs		11,348		
Chi-square	1303.987		Prob > chi2		0.00		
Akaike crit. (AIC)	5534.500		Bayesian crit. (BIC)		5761.940		

***p < .01, **p < .05, * p < .1.

b. The ROC Curve



c. The confusion matrix

Classified	True D	True ~D	Total
+	**10014**	**915**	**10929**
-	**117**	**304**	**421**
Total	**10131**	**1219**	**11350**

Classified + if predicted Pr(D) >= .5
True D defined as eau_potable != 0

Sensitivity	Pr(+| D)	**98.85%**
Specificity	Pr(-|~D)	**24.94%**
Positive predictive value	Pr(D| +)	**91.63%**
Negative predictive value	Pr(~D| -)	**72.21%**
False + rate for true ~D	Pr(+|~D)	**75.06%**
False - rate for true D	Pr(-| D)	**1.15%**
False + rate for classified +	Pr(~D| +)	**8.37%**
False - rate for classified -	Pr(D| -)	**27.79%**
Correctly classified		**90.91%**

d. The link test

```
Logistic regression                             Number of obs     =     11,350
                                                LR chi2(2)        =    2275.29
                                                Prob > chi2       =     0.0000
Log likelihood = -2733.2325                     Pseudo R2         =     0.2939
```

eau_potable	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
_hat	**.967538**	**.0470882**	**20.55**	**0.000**	**.8752468**	**1.059829**
_hatsq	**.0108655**	**.0128461**	**0.85**	**0.398**	**-.0143124**	**.0360433**
_cons	**.0074812**	**.0552979**	**0.14**	**0.892**	**-.1009007**	**.1158631**