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Socio-Economic Inequalities and Implications for Drinking Water Supply Strategies in the Undeveloped Areas of the Town of Koudougou

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Abstract

This study analyses the dynamics of drinking water supply and economic inequalities in the non-parcelled areas of Koudougou, Burkina Faso. Using a mixed method, the study reveals that low-income households, which rely on community water points, incur high costs, travel long distances and face significant health risks linked to water quality. Wealthier households, on the other hand, enjoy more regular and secure access to drinking water thanks to their private installations. This disparity accentuates social inequalities, keeping vulnerable households in precarious situations.

Keywords: Drinking water supply; Economic inequalities; Social disparities; Undeveloped areas; Koudougou.

Introduction

In developing countries, rapid urbanisation has led to the emergence of informal neighbourhoods, commonly referred to as 'unparcelled areas' in Burkina Faso. Home to a significant proportion of the urban population, these areas have become an inescapable reality in many large African cities (Dos Santos, 2005; Sanchez, 2014; Sekpe, 2019). Unfortunately, this accelerated urban growth often exceeds the capacity of public authorities to provide basic services, particularly access to drinking water, especially in undeveloped areas (Desjardins 2017).

This lack of public services forces households to develop various water supply strategies adapted to their socio-economic conditions (Akpabio & al., 2021; Angoua & al., 2018). This situation exacerbates economic disparities and places the most vulnerable households in a vicious circle where their low incomes further limit their access to essential services (Baron & al., 2016; Yameogo & al., 2022). The work of Donfack & al., (2020) et Silué & al., (2012) shows that inequality in access to water is a form of social injustice that makes the poorest households even more vulnerable. In Koudougou, Burkina Faso, well-to-do households in undeveloped areas often resort to autonomous solutions, such as building private boreholes, while poorer households remain dependent on costly and unreliable community sources. Given this situation, this study examines the implications of economic disparities on drinking water supply strategies in the unparcelled areas of Koudougou. The central question guiding this research is as follows: What are the socio-economic consequences of inequalities in access to drinking water supply strategies in the unparcelled areas of Koudougou? The main objective of this study is therefore to analyse the impact of socio-economic inequalities in access to drinking water supply strategies in the unparcelled areas of Koudougou. The study is structured along several lines. First, we present the methodological framework. Next, we will analyse inequalities in access to drinking water supply strategies. We will then examine their socio-economic consequences before concluding with a discussion.

Literature review

Unequal access to water in informal settlements has been studied by many authors. In Abidjan, Angoua & al. (2018) have shown that the lack of coverage by water distribution networks in these areas forces households to resort to alternative private solutions that are often costly. Similarly, Rouamba & al. (2016) et Dos Santos (2005b) point out that in Ouagadougou, the lack of adequate infrastructure in unparcelled areas increases the precariousness of households, forcing them to obtain supplies from private vendors or to use water sources of uncertain quality. This phenomenon has also been observed in Cameroon, Côte d'Ivoire, Senegal and Nigeria (Akpabio & al., 2021; Donfack & al., 2020; Kouiye, 2020; Ngounou & al., 2007; Sokegbe & al., 2017).

One of the major consequences of the political authorities' inability to provide drinking water to unserved areas is the gradual transfer of responsibility for water supply from the public authorities to households and the private sector. Sokegbe & al. (2017) show that in many African cities, the lack of investment in public infrastructure is forcing households to rely on alternative solutions, which are often expensive and unsuitable for the poorest people. This de facto privatisation of water reinforces inequalities, with the poorest populations most exposed to health and financial risks. However, in Ouagadougou, Burkina Faso, the dynamic is slightly different. Compaoré (2018) highlights the fact that the state has delegated water management to private companies, thereby improving access to this resource in several undeveloped areas of the city. This approach has improved drinking water supply in some localities. However, this government initiative remains partial and does not cover all of the country's precarious neighbourhoods, leaving a fringe of the population still facing major supply difficulties.

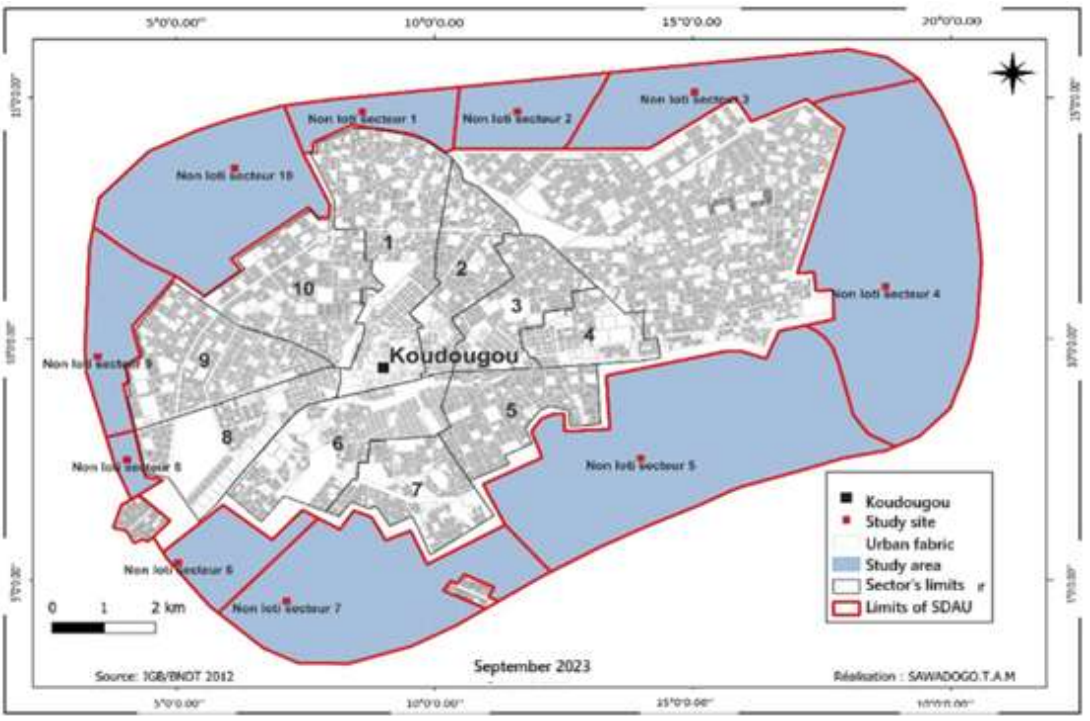
Limited access to drinking water in unserved areas has major repercussions for public health and the well-being of the population. In West Africa, a number of studies, including those by Baron & al. (2016), Coulibaly & al. (2020), Silué & al. (2012) et Yameogo & al. (2022), show that the poorest households are caught in a vicious circle: their economic vulnerability prevents them from accessing safe water sources, which exposes them to water-borne diseases, increases their health costs and exacerbates their insecurity. There is also a question of social justice, because according to Coulibaly & al. (2020), inequality of access to drinking water exacerbates the disparities between rich and poor households and accentuates the marginalisation of the most vulnerable. While affluent households can afford alternative solutions, disadvantaged households spend a disproportionate share of their income on buying water.

Against this backdrop, this study aims to gain a deeper understanding of inequalities in access to drinking water in the unparished areas of Koudougou, by focusing on the vulnerability of poor households to these disparities. It looks at the dynamics of marginalisation linked to water governance and the strategies adopted by the population to cope with these challenges.

Methodology

Study area

The research was carried out in the town of Koudougou, capital of the Boulkiemdé province and the Centre-Ouest region of Burkina Faso. According to the 2019 General Census of Population and Housing (RGPH), Koudougou is the country's third-largest city and home to 3% of the national urban population. In the midst of rapid demographic and economic growth, the city is facing major challenges in terms of urban infrastructure, particularly in the drinking water, energy and housing sectors. These challenges are exacerbated by accelerated and often informal urbanisation. Map 1 shows the town of Koudougou and the surrounding undeveloped areas.



Map 1. Undeveloped areas of Koudougou

Research design

A mixed method combining a qualitative and quantitative approach was used to ensure the highest quality of the data collected.

Type and source of data

Two types of data were collected and processed as part of this study. These were primary data and secondary data. The secondary data came from reports, scientific studies and relevant institutional documents, which we used to establish a solid theoretical basis and contextualise the problems associated with water supply in undeveloped areas. The primary data came from a field survey of households in the unparcelled areas of Koudougou, supplemented by semi-structured interviews to explore the qualitative aspects in greater depth. The data was collected between August and December 2023. To determine the target sample, a demographic approach was adopted using Cochran's (1977) formula, which is as follows:

$$n_0 = \frac{Z^2 P(1-P)}{e^2} \quad (1)$$

Where:

n0 = is the size of the target sample.

Z= is the confidence threshold set at 95%, corresponding to a value of 1.96.

e = is the margin of error estimated at 5%, corresponding to a value of 0.05.

P= represents the proportion of the population presumed to have the desired characteristics, i.e. the 62% cited by (WHO and UNICEF, 2014). By applying this formula, we determined a target population of 362.03 households to be surveyed in the undeveloped areas of Koudougou. The field survey, which was carried out between August and December 2023, enabled us to collect data from 335 households in the 10 undeveloped areas of the town.

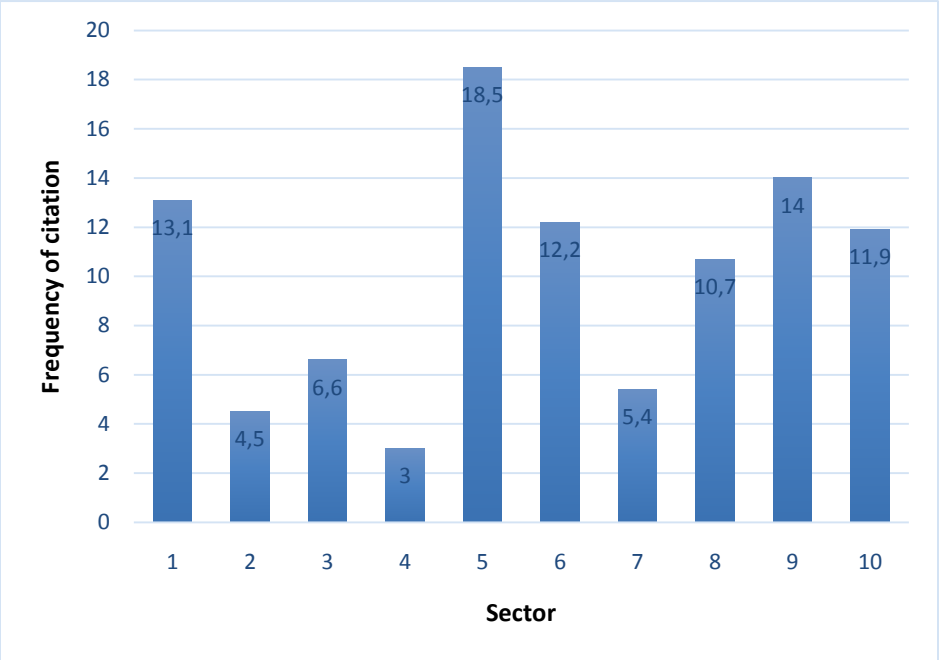


Figure 1. Breakdown of households surveyed by non-developed area
Source: Field survey August 2023

Figure 1 above shows the distribution of households surveyed in each non-housing area. The coverage rate in relation to the initial sample was 92.54%, which is deemed sufficient to guarantee that the results are representative of the target population. This estimate is reinforced by the recurrence of responses provided by participants, which indicates consistency of information.

Data analysis techniques

Various tools were used to process and analyse the data collected, in order to ensure rigorous and reliable use. Several methods were used to analyse the data, as follows:

Citation frequency

The data was analysed using basic measures such as frequencies, sums and averages. The formula used is as follows:

$$F_c = \frac{Number\ \ of\ quotes\ \ from\ respondent}{Total\ number\ \ of\ respondents} \times 100 \quad (2)$$

Linear regression

This was used to understand the impact of distance on the volume of water consumed per day. The regression formula is as follows:

$$R = un + bx \quad (3)$$

Where:

- R is the dependent variable (the variable we are trying to predict),
- x is the independent variable (the explanatory variable),
- *un* is the intercept, i.e. the value of R when x=0x = 0x=0,
- b is the slope (the regression coefficient), which indicates the variation in R for a variation of one unit in x.

Chi2 statistical test and Cramer's V

This test was used to study the link between respondents' socio-economic characteristics and drinking water supply strategies. Its formula is as follows:

$$Khi^2 = \sum_{i,j} \frac{\left(n_{ij} - n_{ij}^*\right)^2}{n_{ij}^*} \text{ Or, } n_{ij}^* xn = n_{i.} xn_{.j} \text{ hence } Khi^2 = n\left(\sum_{i,j} \frac{n_{ij}^2}{n_{i.} n_{.j}} - 1\right) \quad (4)$$

Where n_{ij} is the number of employees in the cell marked by row i and column j ;

$n_{i.}$ the marginal number in row i;

$n_{.j}$ the marginal number in column j;

n is the total number of employees

A Chi2 value of less than 0.05 indicates that there is a link between the variables studied, while a Chi2 value of more than 0.05 indicates that there is no link between the variables.

Cramer's V was used to determine the strength of the association after the chi-square had determined significance. In the study, Cramer's V is interpreted as follows:

$V \leq 0.2$ Association is weak*.

$0.2 < V \leq 0.6$ Association is moderate**.

$V > 0.6$ Association is strong***.

Multivariate ordination

Principal Component Analysis (PCA) was used in this study. It was deployed to create a socio-economic index (SES) from variables reflecting household living standards. This method made it possible to reduce the dimensionality of the data while retaining the essential variations. The variables selected to assess the level of wealth are made up of :

- Ownership of durable goods (e.g. household appliances, motorbikes),
- Type of housing (cement, banco),
- Occupation (farmer, shopkeeper, teacher),
- Source of water (private borehole, standpipe, well).

The variables were then standardised using the standardisation formula:

$$Z = \frac{X - \bar{X}}{\sigma} \quad (5)$$

where

X is the initial value of the variable,

$\bar{X}$ is the mean,

and σ is the standard deviation.

The SSE index is calculated by combining the variables weighted by the coefficients obtained in the PCA: SSE=a.L+b.E+c.D+d.R (6)

where: L is the type of housing; E is the possession of durable goods; D is the level of education; R is the income; a, b, c, d are the coefficients obtained from the PCA. This made it possible to classify households according to the thresholds (Table 1).

Table 1. Categorisation of households according to the SSE index

Category	Threshold value	SSE index condition
Rich class	Rich threshold:1	SSE≥ 1
Middle class	Between 0 and 1	0 <SSE< 1
Poor class	Poor threshold: 0	SSE≤ 0

Results

The unhoused areas of the town of Koudougou: an area with strong economic inequalities

The undeveloped areas of Koudougou represent a rapidly expanding urban space, marked by major economic disparities, as shown in Figure 2.

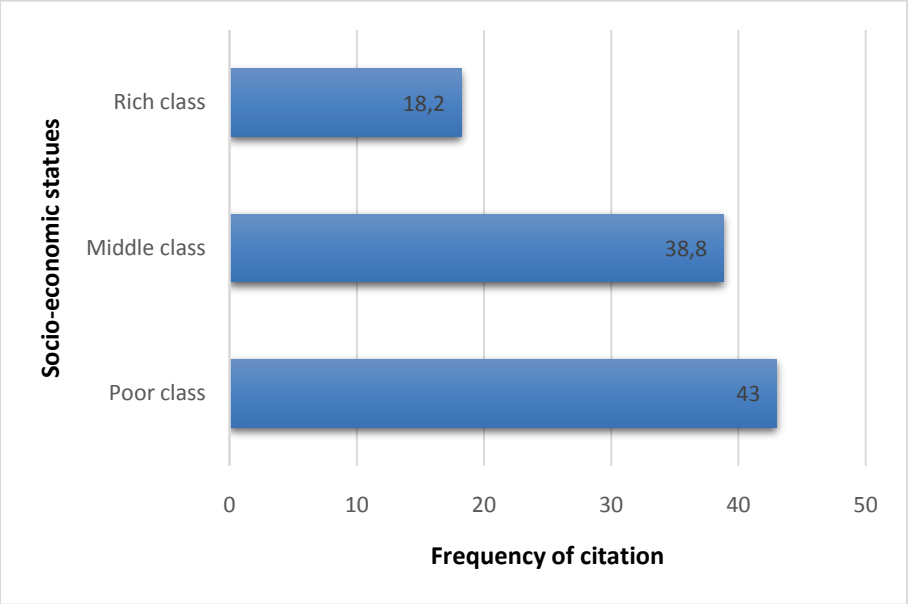


Figure 2. Socio-economic status of households in non-developed areas
Source: Field survey, August-December 2023

Figure 2 shows that almost half of urban dwellers in the undeveloped areas of Koudougou are poor. This social class represents 43% of the households surveyed. This is followed by moderately wealthy households, which represent 38.8% of our sample. Finally, rich households, which are in the minority, represent 18.2% of the population surveyed. These results not only demonstrate the existence of multiple social strata in the non-zoned areas, but also highlight the level of poverty in these areas.

Drinking water supply strategies and their socio-economic implications

In the non-parcelled areas of Koudougou, households of different social categories use several strategies for supplying drinking water. Moreover, the strategies are appreciated in different ways. Private boreholes are highly regarded because of the comfort and permanent availability of water at home. Community boreholes are well regarded because of the quality and availability of the water. However, the time it takes to fetch water means that it is less appreciated than the private well. In the case of standpipes, although the quality of the water is controlled by ONEA, the fact that it is cut off, particularly during hot spells, means that it is less popular than the community borehole. The physical effort involved in using a hand pump means that it is moderately preferred to other sources of supply. Both private and community wells are little appreciated by the population because of the dubious quality of the water. However, we note that water supply strategies change according to social class. To verify this observation, a chi-square statistical test (Table 2) was performed between socio-economic category and drinking water supply strategies.

Table 2. Chi-square test

Test	Value	ddl	Approximative meaning
Pearson chi-square	116.037	10	**0.000**
Likelihood ratio	110.343	10	0.000
Cramer's V	**0.416**		0.000

Source: Field survey, August-December 2023

Analysis of the results of the chi-square test to examine the association between socio-economic category and choice of water source shows a p-value of 0.000 (below the 0.05 threshold). This indicates that the relationship between income level and choice of water source is statistically significant. The strength of this relationship is measured using Cramer's V test. Indeed, interpretation of symmetrical measures based on Cramer's Phi and V statistics indicates a strong association, with a correlation of 0.589.

On the basis of these results, we proceeded to an analysis of drinking water supply strategies and their implications according to different socio-economic categories.

Drinking water supply strategies of wealthy households

Figure 3 below shows the drinking water supply strategies of wealthy households in the undeveloped areas of the town of Koudougou.

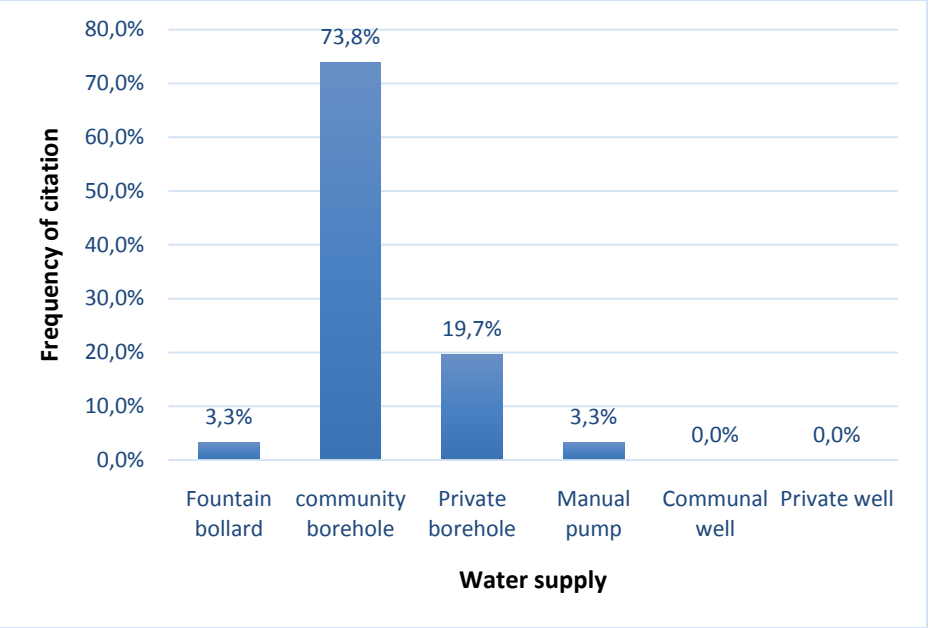


Figure 3. Drinking water supply of wealthy households
Source: Field survey, August-December 2023

Analysis of figure 3 reveals that wealthy households mainly use standpipes, community boreholes and handpumps, but also private boreholes. Community boreholes and private boreholes are used by 73.8% and 19.7% respectively. Fountain bollard and manual pumps are each used by 3.3% of households. These strategies are marginal among wealthier households, likely due to their demanding nature (long queues, physical effort, limited availability). On the other hand, no wealthy household uses wells as a supply strategy. This is undoubtedly related to the questionable quality of

well water, often perceived as non-potable water. This shows that affluent households have the means to opt for supply strategies that better meet their needs. The wealthiest households invest in private boreholes equipped with motorized pumping systems. These infrastructures guarantee them complete autonomy. They enable them to avoid the constraints associated with supplying water from community sources, especially in a context where collective infrastructures do not always meet the needs of the population, and are also in short supply. In addition to private boreholes, some wealthy households also consume bottled or sachet water. Mainly used for drinking in a few wealthy households, bottled water is more often used for ceremonies, and in some cases to welcome foreign guests.

Photographic Panel 1. A community borehole and a packed of sachet water
Source: SAWADOGO Antoine, Field survey, August-December 2023

Strategies for supplying drinking water to the middle class

Drinking water supply strategies for middle-income households include public boreholes, standpipes, hand pumps, private and community wells.

Middle-income households adopt a variety of water supply strategies. The most widely used strategy is community drilling, which accounts for 61.5% of water sources used. This strategy offers a compromise between "affordability" and "reliability" for middle-income households. On the other hand, the lack of use of private boreholes is linked to the insufficient financial means of households in this social category. Standpipes are another significant source (17.7%). However, due to long interruptions, especially during hot periods, and the long distances involved, standpipes are little used, despite the good quality of their water. These obstacles generally force households to resort to hand pumps (8.5%) and traditional wells (3.8%). Bottled or sachet water is little used. It is less of a priority for this category, probably due to the high cost in relation to their purchasing power. This analysis shows that moderately wealthy households vary their water supply strategies according to the constraints they face. Distance and water availability are the main factors conditioning the choice of strategies by households in this category.

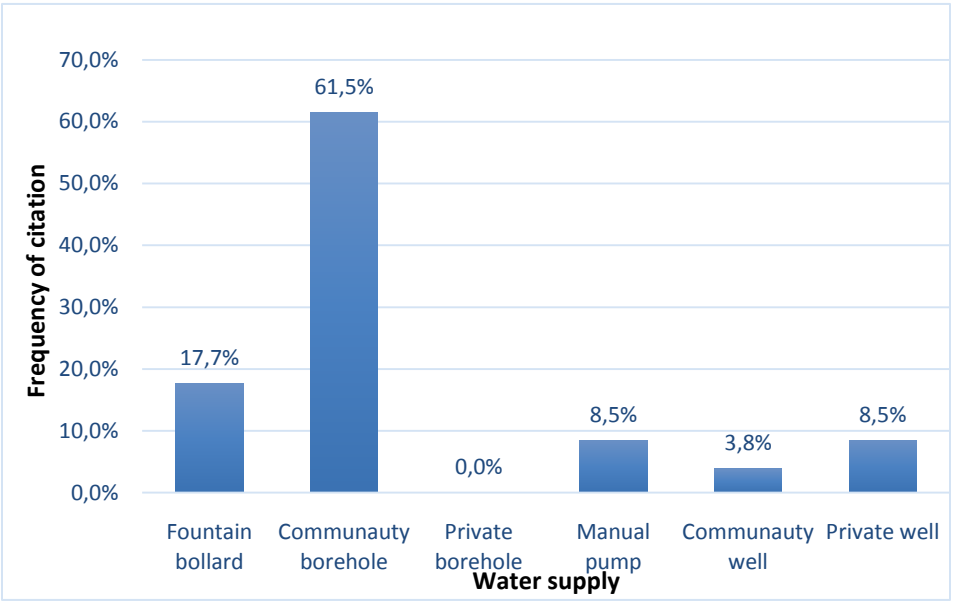


Figure 4. Drinking water supply of middle-income households
Source: Field survey, August-December 2023

Strategies of poor households

The fountain bollard is used by 22.9%, the hand pump by 16.0%, the private well by 11.8% and the community well by 10.4%. (figure 5).

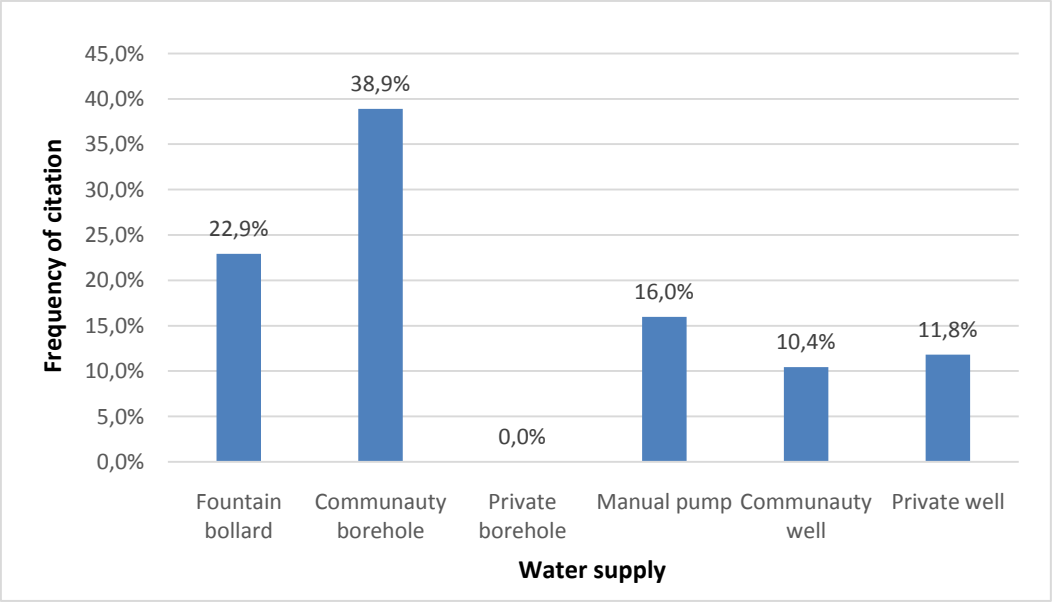


Figure 5. Drinking water supply strategies of poor households
Source: Field survey, August-December 2023

In this social category, there is less concern for water quality, and households obtain their water from the most accessible sources in terms of cost and distance. While in the other categories,

wells (private or community) are used very little or not at all, in this category they are used a lot by households. The construction of home wells, although rudimentary, represents an accessible and economical strategy for some households. Nevertheless, this solution, although financially accessible, deserves to be promoted in order to safeguard public health. This analysis highlights the fragility of poor households in terms of water security, and their recourse to supply strategies that are often precarious due to their low purchasing power.

Social and economic implications of the various strategies adopted

Water supply strategies in Koudougou's undeveloped areas have significant social and economic repercussions.

Social implications of the strategies adopted

From a social point of view, supplying water from communal water sources, often far from homes, not only increases the burden of fetching water, but also influences people's health through the gradual reduction in the quantity of water consumed. A linear regression (table 3) reveals a significant inverse relationship between distance from the water point and the quantity of water consumed daily by households.

Table 3. Linear regression between distance and quantity of water consumed

Model	**Non-standardised coefficients**		**Standardised coefficients**	**t**	**p-value**
	B	**Standard error**	**Beta**		
(Constant)	449.822	69.767		6.448	0.00
Distance to water point	**-0.390**	0.095	-0.220	-4.115	**0.000**
a. Dependent variable: Quantity of water consumed per day					

Source: Field survey, August-December 2023

Analysis of Table 3 reveals that a 100-meter increase in distance to the water point reduces the amount of water consumed per day by 39 litters (B = -0.390; p-value = 0.000). Added to this are recurrent water cuts, especially during hot periods, lengthening the time spent fetching water. Faced with these limitations, households have to prioritize their use of water, concentrating mainly on vital needs such as drinking, preparing meals and, to a lesser extent, washing up.

On the other hand, hygiene practices such as frequent hand-washing, upkeep of the living environment, regular laundry and even daily washing are often relegated to second place. These health risks are exacerbated by transport and storage methods that expose water to pollution. Exposure to dust during the journey and prolonged storage of water in often inappropriate containers diminish its quality and increase the risk of contamination and water-borne diseases. However, some wealthy households, thanks to their financial resources, mitigate these impacts by opting for private drilling. In fact, private boreholes are an autonomous and reliable solution for water supply, enabling stable and sufficient water consumption, far from the constraints imposed by the use of community water points that are often remote or unstable. This promotes better domestic hygiene and frees households from time-consuming travel. Private boreholes enable wealthy households to avoid the difficulties associated with water shortages and the failure of public services.

The water supply strategies adopted by households in non-parcelled-out areas also influence the activities of women and the schooling of their children, especially young girls.

Table 4. The water chore

Players	Fre-quency (%)	Average distance (in me-ters)	Daily consumption (in litters)	Frequency		
				Every day (%)	Every 2 days (%)	Every 3 days (%)
The women	33	696.42	119.13	70	3	4
The girls	14	865.33	137.36	79	16	3
Women and girls	37	885.61	188.60	82	17	2
Other	16	597.36	138.18	51	44	5

Source: Field survey, August-December 2023

The chore of fetching water, generally carried out by women and girls, is a handicap to girls' academic success. With an average distance of 865.33 meters to cover each day to carry around 137 litters of water, girls suffer physically, often arrive exhausted at school and have less time for study. All of which compromises their academic success and personal development. For women, the chore of fetching water limits the development of their income-generating activities. This situation hinders women's financial empowerment and tends to perpetuate gender inequalities.

Photograph 2. Carrying water by a young girl
Source: SAWADOGO Antoine, August-December 2023

In affluent households with private wells, the chore of fetching water becomes virtually non-existent. Women can engage in income-generating activities and become financially independent. Children, especially girls, have more time and energy to devote to their studies. This undoubtedly contributes to their success at school. Freedom from the chore of fetching water means a better quality of life, diversified sources of income and a more favourable socio-economic dynamic for these households. This further accentuates the economic inequalities between well-off and poor households.

Economic implications of the strategies adopted

The water supply strategies adopted imply significant expenditure for households in non-parcelled-off areas. Households using community water sources spend an average of FCFA 2,381.7 per month on water. This expenditure varies between a minimum of 320 FCFA and a maximum of 8,050 FCFA. The amount spent on water varies according to the size of the household and the type of source chosen. This expense represents a significant proportion of the budget, particularly for vulnerable households, where it can absorb up to 16.1% of family resources. Such a financial burden compromises their ability to meet other essential needs such as food, healthcare and education, exacerbating their economic insecurity. In wealthy households with private wells, this expense is virtually non-existent. However, they have to bear other costs (table 5) linked not only to the initial construction of the borehole but also to the ongoing maintenance of the infrastructure.

Table 5: Cost of building and maintaining a borehole

Costs	**Drilling**	**Annual maintenance costs**
Average cost (FCFA)	2 166 666	66 428
Maximum cost (FCFA)	3 000 000	250 000
Minimum cost (FCFA)	2 000 000	25 000

Source: Field survey, August-December 2023

Households that have opted for private boreholes as a drinking water supply strategy initially invest between FCFA 2,000,000 and FCFA 3,000,000 in their boreholes. In addition to this initial investment, annual maintenance costs of around 66,428 FCFA, linked to breakdowns and regular maintenance of the infrastructure, must be covered. Although this strategy enables these households to reduce the recurring costs associated with community water sources, these costs still represent a significant investment, even for so-called well-off households. However, in some cases, the private borehole is also used as a community supply point, with a connection enabling the water to be sold outside the home. This strategy generates substantial revenue, often sufficient to cover the annual maintenance costs of the borehole, and is a source of income for the households concerned.

Discussion

The study showed that drinking water supply strategies in the undeveloped areas of Koudougou vary according to the different socio-economic categories. Well-to-do households, thanks to their financial resources, are able to equip themselves with private infrastructure, in particular private boreholes. These facilities give them regular and secure access to water, which improves their quality of life and reduces their exposure to health risks. In contrast, low-income households, who do not have sufficient resources to access private boreholes, rely on community water points, including standpipes, public boreholes, hand pumps and wells. Our results are similar to the findings of several studies, including those by Adams, (2018), Angoua & al. (2018) and Gomis & Thior (2020),

which show that affluent households in precarious urban areas tend to circumvent public infrastructure failures by investing in private solutions.

The study also reveals that the different strategies adopted by households in the unparished areas of Koudougou have both social and economic implications. The distance from water sources leads to a reduction in the quantity of water consumed by poor households. They are also exposed to health risks aggravated by transport, storage containers and the length of time the water is stored. The resulting health problems only exacerbate the vulnerability of these households. According to the study by Compaoré (2017), in Ouagadougou, factors related to transport, containers and storage time most often contribute to degrading water quality. Transport in open containers exposes the water to dust and microbes. In addition, the distance travelled and hand contact with the water during transport increase the risk of contamination. This influence of distance on water quality has also been observed in Cameroon, Côte d'Ivoire and Nigeria by Akpabio & al. (2021), Kouiye (2020) and Ngounou & al. (2007). They found that the remoteness of water sources pushes disadvantaged households to favour alternative sources that are closer but unfortunately of dubious quality. This increases their vulnerability to water-borne diseases. With regard to containers, Compaoré (2017) adds that poor-quality plastics can release chemicals when heated, metal containers can rust and alter the water, while uncovered containers are more exposed to external contaminants. Prolonged storage also increases bacterial proliferation, especially as chlorine levels fall after 24 hours and become virtually non-existent after 72 hours. Moreover, the chore of fetching water has a major social impact, particularly on women and girls, who are mainly responsible for this task in low-income households. According to Rouamba & al., (2016), fetching water limits women's productivity and their contribution to local economic development.

Finally, in economic terms, households in non-parcelled-in areas are affected differently depending on the water supply strategies they adopt. Well-to-do households, who have opted for private boreholes, face high costs for their construction and maintenance, which take up a large part of their budget. For poor households that use communal water sources, the regular purchase of water reduces their ability to invest in income-generating activities. This situation keeps them in a vicious circle of poverty. These findings are consistent with those of Angoua & al. (2018) and Dos Santos (2005), who argue that the purchase of water has a significant impact on the quality of life of people living in deprived neighbourhoods. The cost of water exerts major financial pressure on households, which devote a significant proportion of their income to purchasing water. Yameogo & al. (2022) point out that the financial burden of water reduces the overall purchasing power of city dwellers and limits their ability to meet other essential needs, such as food, education and healthcare.

Conclusion

This study on the supply of drinking water and social inequalities in the undeveloped areas of Koudougou has highlighted the complex dynamics linking access to drinking water, economic insecurity and social marginalisation. The results clearly show that low-income households are the most affected by limited and irregular access to drinking water. These inequalities manifest themselves in dependence on community water sources that are often distant, costly and of uncertain quality, thus reinforcing the vulnerability of these already marginalised populations. The study also revealed that women and children are particularly affected because of the unequal distribution of domestic tasks, including water collection, which exacerbates gender inequalities. In addition, the disproportionate financial burden of water costs on low-income households limits their ability to meet other basic needs, such as education, health and nutrition, exacerbating their precariousness. The socio-economic implications of these inequalities are profound. Access to drinking water in

these underserved areas directly affects households' quality of life, health and economic activities. Nevertheless, the development of a policy to integrate undeveloped areas, through the urban planning of Koudougou, could reduce the social and economic inequalities of resident households.

References

Adams E. A. (2018), Intra-urban inequalities in water access among households in Malawi's informal settlements : Toward pro-poor urban water policies in Africa. *Environmental Development*, *26*, 34-42. https://doi.org/10.1016/j.envdev.2018.03.004

Akpabio E. M., Wilson N. A. U., Essien K. A., Ansa I. E. & Odum P. N. (2021). Slums, women and sanitary living in South-South Nigeria. *Journal of Housing and the Built Environment*, *36*(3), 1229-1248. https://doi.org/10.1007/s10901-020-09802-z

Angoua E. L. E., Dongo K., Templeton M., Zinsstag J., & Bonfoh B., (2018), *Barriers to access improved water and sanitation in poor peri-urban settlements of Abidjan, Côte d'Ivoire*. *8*, P1-13. https://doi.org/10.1371/journal. pone.0202928

Baron C., Bonnassieux A., & Bontianti A., (2016), 8 Urban water, sanitation and precarity – contrasting realities in Ouagadougou (Burkina Faso) and Niamey (Niger). Technical reports, *19*, 277.

Compaoré N., (2017). *Access to Drinking Water in Sectors 1, 14 and 23 of Ouagadougou* [Sole Thesis Submitted for the Degree of Doctor of Geography]. University of Ouaga 1 Pr JOSEPH KI-ZERBO.

Compaoré N., (2018). *Drinking Water Supply in the Informal Settlements of Ouagadougou*. WIIRE Journal of Languages, Literature, Arts, Humanities and Social Sciences. N7, pp 237-263

Coulibaly M., Coulibaly, M., & Diomandé, S. (2020). Analysis of Water Access Methods, Water Storage, and Waterborne Disease Risks in a Working-Class Neighborhood: The Case of Kennedy Clouetcha in the Abobo Commune (Ivory Coast). *Journal of Social Sciences of the University Peleforo Gon Coulibaly, Special Issue, pp. 122–141*.

Desjardins X., (2017), Peri-Urban Spaces: An Urban Fringe to Nurture or a New Territorial Banality? *Bulletin of the French Association of Geographers. 94*(3), https://doi.org/10.4000/bagf.2154

Donfack N. T. S., Sa'a M. P., Anehmbom G., Ruth T. E., Aloysious K. L., Ngouanet C. & Yemmafouo A., (2020), Challenges in Accessing Drinking Water in the Spontaneous Neighborhoods of the City of Bafoussam, Cameroon. *International Journal of Innovation and Applied Studies*, *30*, 215‑229.

Dos Santos S., (2005), *Koom la viim : Socio-Health Issues of the Quest for Water in Ouagadougou (Burkina Faso)*, Thesis for the Third-Cycle Doctorate. Montreal, University of Montreal. 182p

Gomis J. S. et Thior M., (2020), Access to Drinking Water and Sanitation in the Informal Settlements of the Municipality of Ziguinchor (Senegal): The Case of Nema 2 and Coboda, *Larhyss Journal*, *41*, 27‑46.

Kouiye G. J., (2020), Challenges of Access to Drinking Water in the City of Ngaoundéré and Its Peri-Urban Area, *Geographer's Notebooks*, *14*,P1-6 https://doi.org/10.4000/cdg.5331

Ngounou N. B., Lewa S. & Ekodeck G. E., (2007), Challenges of Access to Drinking Water in the City of Ngaoundéré (North-Central Cameroon), *European Journal of Scientific Research*, *18*(2), 223‑230.

Rouamba J., Nikiema D. E. & Rouamba S. J., (2016), Access to drinking water and health risks in Zongo, an outlying district of Ouagadougou. *Journal of Geography of the University Ouaga I Prof. Joseph KI-ZERBO, 2*(5), 287‑303.

Sanchez J. A. A., (2014), *The Path of Water: Urban Practices Surrounding Water Supply in Informal Settlements*, Master's Thesis, Nantes, Nantes School of Architecture, 100p, https://dumas.ccsd.cnrs.fr/dumas-01281677

Sekpe G., (2019), *Access to Drinking Water in Unplanned Neighborhoods of African Cities According to the Human Rights-Based Approach (HRBA): The Case of Ouagadougou and Houndé Cities in Burkina Faso*, Master's Thesis in Water and Sanitation, Ouagadougou, 2IE, 61 p.

Silué B., Cissé G., Koné B., Zurbrügg C. & Savane I., (2012), Equity of Access to Drinking Water in the Context of Diverse Supply Methods: The Case of the City of Bouaké (Ivory Coast). *European Journal of Scientific Research, 2*, 298‑310.

Sokegbe , O. Y., Djeri, B., Kogno, E., Kangnidossou, M., Mensah, R. T., Soncy, K., & Ameyapoh, Y. (2017). Health Risks Associated with Drinking Water Sources in District No. 2 of Lomé Municipality: The Case of the Adakpamé Neighborhood. *International Journal of Biological and Chemical Sciences, 11*(5), Article 5. https://doi.org/10.4314/ijbcs.v11i5.31

Yaméogo J., Yanogo P. I. & Ndoutorlengar M., (2022), Drinking Water Supply in Urban Areas of the Informal Settlements of Boromo (Burkina Faso): Between Local Accommodations, Socioeconomic Issues, and Health Risks, *Annals of the University of Moundou*, 9(1), 57‑91.