The Economics of Water Scarcity:
Institutional Weakness and Public Service Delivery in Colombia

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MSc Final Thesis (RHI80436)

MCs: International development studies – Politics and governance

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May 2025

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UNIVERSITY & RESEARCH

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1| Introduction

Improving access to safe, drinkable water and adequate sanitation generates significant health, economic, and social benefits (Fotio & Nguea, 2022). Acknowledging the fundamental importance of this issue, in July 2010 the United Nations General Assembly adopted Resolution 64/292, which officially recognized the human right to water and sanitation. The resolution declares that access to clean water and improved sanitation is essential for fulfilment of human dignity. Furthermore, access to these services represents a key aspect of the UN's 2030 Agenda for Sustainable Development, since water scarcity impacts, to different degrees, the achievement of nearly all Sustainable Development Goals.

Despite significant global improvements over the last two decades, serious challenges remain over access to clean water and sanitation (Tadadjeu et al., 2020). The UN World Water Development Report notes that approximately 720 million people, about 10% of the global population, still live in countries facing high or critical levels of water stress (UN Water, 2024). While in some regions water scarcity results from environmental factors and the natural limitation of freshwater resources (IPCC, 2023), it may also stem from institutional and political failures. Recent studies underscore that water insecurity tends to decline when embedded within a stable, just, and capable institutional framework (Babuna et al., 2023).

Building on these premises, it becomes relevant to investigate water scarcity from an institutional point of view. This framing allows to examine inadequate provision through the lens of state capacity, meaning the ability of the state to deliver essential public services equitably and effectively. Institutional inability to do so not only impairs well-being but may also indicate a breakdown in the social contract, with broader implications for economic development and political legitimacy (Acemoglu et al., 2013).

According to the WHO/UNICEF Joint Monitoring Programme, as of 2022, over 13.5 million Colombians (26% of the population) lacked access to safely managed drinking water. Moreover, only 19% of wastewater was safely treated, revealing concerning gaps in infrastructure and governance (JMP/WHO, 2024). Households across the country are unequally exposed to such deficiencies: while urban centres generally benefit from functional service provision, rural areas, in particular those historically affected by the civil war, still face limited state presence and institutional fragility (Holmes & Amin Gutiérrez De Piñeres, 2014).

This thesis investigates the relationship between institutional weakness and access to public water services in Colombia. As pointed out by Fergusson et al., (2022), state weakness is rarely the result of a single issue but arises from a combination of factors, including the inability to control violence, enforce the rule of law, collect taxes, or guarantee the delivery of basic public goods. By focusing on three key contributors to institutional weakness: clientelism, tax evasion, and the monopoly of violence this thesis explores how households' access to clean water and sanitation may be shaped by broader governance fragility. Within the framework of the social contract theory, and using data from the ELCA[1] survey, this study assesses whether access to water services deteriorates in areas where the state capacity, legitimacy, or authority may be challenged.

This thesis is structured into five sections. Section 1 introduces water scarcity in Colombia and its relevance within the broader context of state capacity and service provision. Furthermore, it reviews existing research in relevant fields on which this thesis builds upon and hopes to fill current gaps. Section 2 focuses on the theoretical framework that overarches the analysis, explaining key concepts and theories that will be used to interpret the findings. Section 3 discusses the main data source and sample and introduces the model employed, and the rationale behind the selection of dependent and independent variables. Section 4 presents the research findings and discusses their implications. Finally, Section 5 offers concluding remarks, summarizing key insights from the study.

1.1| Research gap

The study draws on the work of Fergusson et al., who have analysed the deep-rooted and uneven nature of Colombia's institutional weaknesses (L. Fergusson et al., 2017b, 2017a, 2022) and aims at answering the following research question: *to what extent does a weak social contract affect the provision and accessibility of public water services in Colombia?*

The erosion of institutional trust and state capacity, is particularly relevant in countries like Colombia, where structural inequalities persist and access to basic services remains uneven (Duque et al., 2023). Keeping in mind that there can be a multiple factors that impede establishing a causal relationship between institutional strength and service provision

[1] Encuesta Longitudinal Colombiana from Universidad de los Andes, 2016

(Mcloughlin, 2015), this section reviews relevant literature to highlight existing gaps and situate this study within a broader research landscape.

Fergusson (2019) introduces the concept of the "*public goods trap*", a self-reinforcing cycle in which the state's failure to provide essential services drives individuals to seek private alternatives. This solution is typically feasible only to wealthier citizens, deepening socioeconomic inequality. Since the most influential individuals can usually meet their needs outside the public system, their incentive to demand improvements or increase in delivery from the state diminishes, which further reduces pressure on the public system to provide such services. Over time, this cycle reflects and reinforces political inequality, as marginalized groups lacking the means for private provision are also less equipped to influence policy through democratic channels (Fergusson, 2019). This "trap" highlights the crucial role of public goods in the state-society relationship as the lack of those can result is a steady erosion of state capacity and legitimacy.

Existing literature has assessed that the inability of a state to fulfil its obligations to society makes a state weak, making effective service provision a key factor to determine a government's right to rule (Loewe et al., 2021, Mcloughlin, 2015). Consequentially, improved service provision is one way to strengthen social contract in regions where state and society fail to respect mutual obligations (Loewe et al., 2021). Jawad (2021) explores the link between state legitimacy, service delivery and conflict in MENA[2] countries and identifies clientelism, religious authority and low level of trust in political leadership as key features hindering service delivery. Merat (2004), highlights the importance of public service delivery as an indicator for government accountability and shows how clientelism and weak democratic party structures lead to approach services as favours rather than universal rights. Likewise, Herrera (2017) found that in certain areas in Mexico, public service delivery is shaped by clientelism and links favouritism with decline in service quality for certain recipients, and overall trust in the government's political legitimacy.

Other papers in the context of social contract theories focus on the role of fiscal capacity as an indicator of general trust towards institutions, hence state legitimacy. Fergusson et al. (2017) explain how tax payment indicates society's compliance to the mechanism of the social contract according to which, citizens pay taxes, and the state delivers public goods to citizens.

[2] Middle East and North Africa

Acemoglu (2011), argues that a weak state struggles to collect enough resources from society, leading to little investments in public goods, infrastructure and public services. Fergusson et al. (2017) in a research on VAT avoidance in Colombia, explain how tax evasion provides an overview about the state's enforcement ability and its capacity to mobilize resources but also about citizens' resistance of the state. This relates to the concept of a state's consensual strength which refers to the condition in which a state has legitimate power, because its actions align with society's needs and demands (Acemoglu, 2005a). In his research, Besley (2020) found that tax compliance is shaped by the civic mindedness and when the state is politically weak, it struggles to impose high taxes, leading rulers to invest less in public goods.

Despite there has been significant attention to these themes, limited research has focused on how institutional weakness and the erosion of the social contract directly affect water: an essential public good, especially in the context of Colombia. Some studies have explored related issues. For example, Callejas Moncaleano et al. (2024) and Rivera et al. (2016) examine rural water access in Colombia, pointing to infrastructural deficiencies, socioeconomic barriers, and weak community management. However, these works tend to emphasize technical or localized challenges rather than framing access to water within broader issues of state capacity, legitimacy, and institutional weakness.

This thesis aims to bridge that gap by analyzing how a weak social contract, here defined by clientelism, tax evasion, and limited authority, impacts the Colombian state's ability to provide universal access to clean water. In doing so, it hopes to contribute to a more comprehensive understanding of how institutional fragility undermines serivce provision, while providing an alternative lens through which view water scarcity, going beyond physical limitations or water management practices.

2| Theoretical framework

To understand the role played by Colombian institutions in water scarcity, it is important to situate the key concepts within a theoretical framework. The following section expands on the *social contract theory*. Ultimately, the scope of this thesis is to assess households access to clean water and sanitation in relation to limited state's capacity due to a breaking in the equilibrium between society and the state. This thesis therefore approaches state capacity as a performance-based concept, meaning that the ability of the state to provide certain essential public goods and services is seen as a key state function. In this context, state

capacity is understood within the broader state-society relationship, which also includes how the state exercises such capacity.

2.1| Social contract theory

Social contract refers to the entirety of explicit or implicit agreements between all relevant societal groups and the government, defining their rights and obligations toward each other (Loewe et al., 2021). This thesis draws from the framework provided by Sobhy of "the Three Ps"[3] to refer to the three primary obligations of the state. These are: provision, participation and protection, which the state is expected to deliver in the light of a mutually binding agreement between the two sides (Sobhy, 2021).

Provision refers to the state's ability to ensure social rights like welfare or education, and more generally to all those services, goods and opportunities provided by the state to its citizens (Sobhy, 2021). In the context of service provision effectiveness is often required to justify the existence of governance institutions, particularly when they impose costs on citizens, such as taxes (Schmelzle & Stollenwerk, 2018). This suggests that the state ability to fulfil this obligation contributes to citizens considerations about legitimacy and capacity

The notion of *participation* has to do with state legitimacy which is defined here as the population's belief that its political institutions have the right to rule over them and the territory. Legitimacy is central in virtuous circle argument (Schmelzle & Stollenwerk, 2018). To be legitimate, a state must guarantee political rights, such as the right to vote, periodic elections, to belong to a political party or to engage in protest activity (Sobhy, 2021). From this perspective, state legitimacy and state capacity are tightly tied and state performance is crucial for the establishment of legitimate political institutions, especially in regions where they are currently weak (Loewe et al., 2021). These elements are critical for the lens of the social contract because perceptions of how well the state performs its role on these fronts are critical for legitimacy (Sobhy, 2021).

The last cluster of a state's obligations relates to *protection*. This is tied with the concept of state authority and refers to the state's responsibility to domestic legal protection as well as from major security threats, rebels, insurgent groups or environmental threats (Sobhy, 2021).

[3] The extended version of the framework includes a fourth P: production of hegemony. This refers to the promotion of state ideology, national identity and political values. This concept however will not be addressed in this study.

The state should also protect citizens against physical threats, such as criminality, robbery, murder, illnesses, or environmental damage; and finally, a state should have the authority to ensure the rule of law, therefore assuring legal security. Countries fail in terms of protection mainly because of a lack of state authority (Schmelzle & Stollenwerk, 2018).

The inability of a state to fulfil its obligations to society makes a state institutionally weak or dysfunctional in terms of state authority, state legitimacy, and state capacity (Loewe et al., 2021). At its core fragility is a deeply political phenomenon. It's a situation in which a *social contrac*t binding state and society is compromised or largely missing. Hence the state and society are not bound in mutually reinforcing ways. A fragile setting is one lacking effective political process that can bring state obligations and social expectations into equilibrium (Rocha Menocal, 2011).

In return for *protection*, *participation* in political activities and *provision* of services, governments expect members of society to comply with its rule which implies accepting the legitimacy of its rule (Sobhy, 2021). Governments also require citizens to pay taxes or provide national services, such as military or civil service. The social contract's central component is thus the compliance of citizens through: recognition of legitimacy, respect of the laws, tax compliance and other obligations (Loewe et al., 2021).

Institutional weakness is here approached as a situation in which a state's capacity, legitimacy or authority are compromised or challenged due to an erosion of the social contract, meaning that one of the two sides, or both, is not able to fulfil its obligations. The "*Three P*s*"* framework outlined above provides a conceptual foundation for operationalizing institutional weakness. On these premises, and to answer this thesis' research question, the following hypothesis was elaborated: ***H1:*** *A weak social contract is associated with lower household access to public water services, suggesting that institutional weakness undermines access to clean water and sanitation.* A negative relationship is expected to emerge between institutional weakness and access to water services: the availability of public water services is expected to decline in an institutional weak context.

The next section will provide a theoretical context specific to clientelism**,** tax evasion**,** and the monopoly of violence. These are three phenomena that directly undermine this state legitimacy, capacity and authority and, supposedly, the state's ability to deliver essential public services, in this case, water services. Although these issues can challenge any

democratic government, they represent a tangible threat in the Colombian institutional landscape, which is why they have been selected.

2.2| Clientelism: turning public services into particularistic benefits

Stokes defines clientelism as *"the offering of material goods in exchange for electoral support, where the sole criterion for distribution by the patron is: did you (or will you) vote for me?"* (Boix & Stokes, 2007). Unlike other forms of corruption, where benefits flow from private actors to political leaders in clientelism, particularistic benefits are provided from politicians to citizens. This exchange may also involve threats or violence in addition to material goods.

In this system, the receipt of specific benefits is dependent on political support, and these benefits can be withdrawn if such support is not maintained. Stokes refers to this as a *perverse accountability* system in which it is not citizens who hold politicians accountable when they fail to fulfil their duties but rather politicians who can penalize citizens for failing to support them at the polls (2007). In contexts where clientelism is widespread, politicians often focus their time, energy, and state resources on providing targeted benefits to a specific electoral minority, rather than designing public policies that benefit the entire population (Castaño Mesa, 2017). The particularistic benefits that are exchanged can range from material goods like cash or food to essential public services such as healthcare or housing (Boix & Stokes, 2007).

Clientelism represents a breaking in the social contract equilibrium, as it weakens the quality of democracy and creates an incentive structure for both politicians and citizens that is harmful to state capacity building. Likewise, institutional weakness creates a favourable environment to the rise of clientelism (L. Fergusson et al., 2022). Based on these premises the following sub-hypothesis is formulated to guide the investigation: ***H1a****. The presence of clientelism is related to diminished access to public water service as the allocation of resources is driven by political favouritism rather than equitable governance.*

Data from Encuesta Longitudinal Colombiana de la Universidad del las Andes (ELCA) show a persistent lack of interest in politics among Colombians and a predominance of clientelism and personalistic politics (Castaño Mesa, 2017). This may result in citizens adopting submissive attitudes, fearing that any challenge to political authority could lead to the restriction or denial of particular benefits (Merat, 2004).

2.3| Tax Evasion and the social contract. Erosion of state legitimacy and capacity

Research indicates that there is a generally poor perception of the state in Colombia, which may lead voters to rationalize tax evasion (Castaño Mesa, 2017). Fiscal compliance is central to the relationship between citizens and the state, serving as a relevant indicator of the strength of the social contract as increased levels of tax evasion may be a symptom of state weakness. Fiscal capacity reflects the state's administrative and extractive capacity, hence the ability to mobilize resources that are crucial for public investments and transfers (L. Fergusson et al., 2017a). Besley suggests that citizens' decisions about tax compliance or evasion are influenced by several factors, including their general trust in the state and adherence to an implicit *social contract*: by paying taxes, citizens fulfil their side of the contract, in exchange for public goods and services provided by the government (2020).

Addison and Murshed (2001) claim that the fiscal system is able to secure an effective social contract if the allocation of public expenditures and the allocation of taxes are judged to be fair. If this is not the case, some might find alternative ways of securing access to resources as well as lose incentive to comply to state's obligations. Acemoglu et al. (2011) argue that when a state is weak and struggles to collect enough resources from society, the leaders will have little interest in investing in public goods, infrastructure and public services. In other words, in areas where state's capacity is limited, there might be little investments in service provision and redistribution of resources. Likewise, the quality services provision and the strength of political institutions significantly impacts citizens' fiscal behaviours. A balanced distribution of power between the state and society is therefore essential to gather resources from the citizens and fostering investments form the state (Acemoglu, 2005).

Since taxation lies at the heart of the social contract between citizens and the government, perceptions of potential violations of this agreement can justify and encourage tax evasion, therefore affecting the state's fiscal capacity and overall legitimacy (L. Fergusson et al., 2017a). Tax evasion entails costs that extend beyond monetary losses, such as limited government revenues, as it also reflects widespread discontent and distrust in governmental institutions (L. Fergusson et al., 2017a).

Given these argumentations, tax evasion was selected as an indicator of citizens' compliance or resistance to governmental authority as well as a measure of state capacity and legitimacy. To answer the research question, the following sub-hypothesis will be tested: ***H1b**: Tax*

evasion decreases access to public water services, due to reduced state legitimacy and fiscal capacity.

2.4| Civil war, armed groups and the weakening of state authority

The ability to claim a monopoly on the legitimate use of violence within a given territory has been widely accepted as a fundamental criterion for the existence of a state (Weber, 1946). Fifty years of civil conflict between the government, Marxist guerillas and right-wing paramilitary groups are clear evidence of the Colombian state's struggle to successfully achieve this. As Fergusson (2019) argues, erosion of state authority perpetuates fragmented governance and weakens the social contract, making efforts towards state consolidation more difficult.

Colombia's civil war began due to poverty, inequality and an elitist government however, some findings suggest that the root cause of the conflict's duration are to be searched for in the country's institutional weakness, which is seen as the primary cause of political violence in the country (McDougall, 2009). This aligns with other research claiming that the long average duration of civil wars is a common factor in post WWII international politics and link this trend with the proliferation of politically weak state (Acemoglu, 2010).

In Colombia, the struggle for territorial dominance resulted in severe humanitarian crises, kidnapping, disappearances, and sexual violence, with over 200,000 deaths and more than eight million victims of forced displacement (Carrillo, 2009). The military strategies employed by the government focused on containment rather than eradication of guerrilla forces, prioritizing the protection of economically significant regions and urban centres (McDougall, 2009). Thoumi (2002) links it to the establishment of authoritarian regimes by guerillas and paramilitary groups, taking on roles typically held by the state in rural areas where illegal drugs like marijuana and cocaine were cultivated. In these communities the provision of, supposedly, public goods, such as education, security, and civil justice in case of controversies was instead offered by these non-state actors (Thoumi, 2002).

The 2016 peace agreement between the Colombian government and the FARC marked a pivotal attempt from state institutions to use other tools rather than military suppression to solve the conflict. The treaty aimed to achieve rural reform, promote political participation of minority groups, tackle illicit crops, and establish transitional justice mechanisms (Rettberg, 2020). However, the agreement faced significant domestic opposition, resulting in the

October 2016 referendum in which a slight majority (50.21%) voted against it, with high abstention rates above 60% (Dávalos et al., 2018). Critics argued that the agreement's ambitious aspirations exceeded the capacities of existing state institutions and the political will for transformative reforms among key social sectors (Rettberg, 2020).

Despite the challenges, the 2016 peace agreement was eventually signed and represented a step toward redefining Colombia's social contract and can be interpreted as the state's transition toward greater legitimacy and capacity (Castaño Mesa, 2017). It can be argued that the inability to fully exert control over vast territories has not only prolonged the conflict but also hindered the state's capacity to protect and provide to its citizens, undermining public trust and eroding the social contract perpetuating unequal development and challenging state legitimacy (L. Fergusson, 2019).

In the context of the previously presented framework, the presence of rebel, criminal, and armed groups represents a significant obstacle to the Colombian state's authority, legitimacy, and overall capacity to control its territory Based on these premises, one last sub-hypothesis was developed: ***H1c:*** *Weak state authority and limited territorial control negatively impact the availability of public water services*.

3| Data and methods

After outlining the theoretical framework that guided the analysis and the discussion of the finding, the next section will focus on presenting the data used in this research, the sample design and the methods chosen for the analysis.

3.1| Discussion of the main source

The source of this data is a household level surveys conducted on a three-year recurrence by Universidad de las Andes, from now on referred to as ELCA (Longitudinal survey on the dynamics of Colombian households).[4] The total ELCA sample includes 10,800 Colombian households, evenly distributed across urban regions and rural subregions, for an allocation of 1,200 households per region. This resulted in a final selection of 6,000 urban households and 4,800 rural ones. The survey's representativeness is defined at the levels of urban regions, rural micro-regions, urbanization levels[5] and socioeconomic strata[6]. The urban sample of the is representative of the urban population in socioeconomic strata 1 to 4 across six regions of the country and six levels of urbanization The rural sample, on the other hand, is representative of four micro-regions that are internally homogeneous in terms of their agrarian economy. Here, target population includes households of small-scale producers, mainly in socioeconomic stratum 1.

3.1.1| Sample design

The 10.800 households taking part in the ELCA were selected based on a probabilistic sampling design, more specifically, cluster-based by sampling units, and stratified according to variables related to the key study indicators (region, department, level of urbanization, and the Unsatisfied Basic Needs Index[7]). The process was implemented in three different steps.

[4] . Given that the data collected has been adjusted for confidentiality, making the risk identifying the individual respondents low, these data are easily accessible through email request to *datoscede@uniandes.edu.co*

[5] A minimum of 2000 habitants is required to be considered "urban municipalities". Metropolitan areas are counted as one municipality.

[6] In Colombia, households are divided into six "estratos". This categorization aims at redistributing subsidies for public services. Households in estratos 1 to 3 receive subsidies on their utility bills, those in estrato 4 pay the real cost of their consumption, and households in estratos 5 and 6 pay a rate higher than the actual cost. Over time, the estrato system has also come to represent a broader social division, often reflecting distinctions between wealthier and poorer communities

[7] The Unsatisfied Basic Needs Index measures how many basic living needs, like housing and education, are not being met in a household. It was originally developed by Economic Commission for Latin America and the Caribbean (ECLAC)

First, municipalities were selected within each region for both urban and rural samples. In a second moment, urban neighbourhoods and rural communities were selected for the urban and rural zones, respectively. Finally, specific households were chosen for interviews.

For this research, the total sample was narrowed down to 5.018 households located in both urban and rural municipalities across all nine regions. The households included were those that had provided complete and valid responses for the purpose of the research question, meaning those households that had answered all the necessary survey questions to test the hypothesis. This selection approach introduces an element of non-random selection compared to the initial whole sample, however this is balanced out by the still significant sample size and its broad geographic distribution.

The ELCA data is divided in urban and rural households. The selection of the relevant sample for this study initially followed that division and only later, the two geographical areas were merged in a final dataset. Out of the 5018 households, 2,275 households are located in 40 urban municipalities (Image 1), while the rural subsample includes 2,743 households located in 10 municipalities (Image 2).

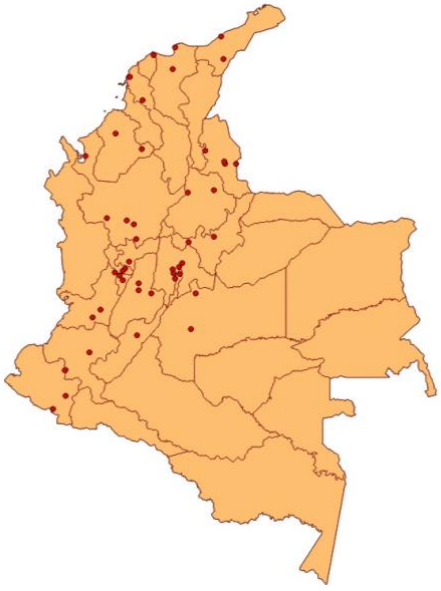

Image 1
Urban municipalities

Image 2
Rural municipalities

3.2 Model estimation

The data used for this research comes from three different types of ELCA questionnaires: one at the individual level, one at the household level, and one at the community level. These three sources were merged at the household level to create a comprehensive dataset for analysis. To estimate the relationship between institutional weakness and access to public services, an Ordinary Least Squares (OLS) regression was employed. This method allows for a straightforward estimation of the association between the key explanatory variables which in this case provide a measure of institutional weakness and the outcome of interest: access to water services. The baseline model (*equation 1*) estimates the relationship between household access to public water services and three core indicators of institutional weakness: clientelism, tax evasion, and the presence of armed groups. *Equation 2* includes a set of control variables.

1. **Equation 1**

$$y_h = \alpha_j + \beta_1 c_h + \beta_2 t_h + \beta_3 v_h + \mu_m + \epsilon_h$$

2. **Equation 2**

$$y_h = \alpha_j + \beta_1 c_h + \beta_2 t_h + \beta_3 v_h + \sum \delta_j f_h + \mu_m + \epsilon_h$$

Where y_h is the dependent variable, indicating a household's access to public water services, β_1 is the coefficient for clientelism, β_2 for tax evasion and β_3 refers to monopoly of violence. f_h is a set of control variables included in the regression while μ_m controls the municipality fixed effect, which accounts for unobserved heterogeneity across the observations. This allows to control for unobserved, time invariant factors that may influence estimates. These factors concern potential differences in infrastructure offer, institutional quality, and geography that could affect service provision and state capacity.

This model was estimated using Ordinary least squares (OLS). The simplicity of OLS allows for straightforward insights and clear communication of the average effects of institutional weakness indicators on service access. This makes it particularly useful for exploring assosiations in large datasets such as the one used for this thesis. While OLS does not permit causal claims, it is valuable to identify correlations. A key limitation of using OLS in this context is its inability to fully account for unobserved heterogeneity over time, which panel data methods could address more effectively. The cross-sectional nature of the data means that

the results should be interpreted with caution and that the findings suggest statistical associations, not proven causal relationships between the dependent and independent variables.

3.3| Variables

After introducing the model, the next section presents the chosen variables[8]. In this thesis water scarcity will be operationalized through access to clean water and sanitation which will be measured by households' connection to the public aqueduct and sewage system. Clientelism, tax evasion and monopoly of violence will be investigated respectively as individual propension to exchange their vote for personal benefits, individual propension to avoid paying VAT, and presence of illicit armed groups in rural and urban communities. These variables were selected to test the hypothesis (H1) and sub-hypothesis (H1a, H1b, H1c) elaborated on the basis of the theoretical framework.

3.3.1| Access to water services

Water scarcity is measured by using household level data from ELCA through the question: *does this household have access to the following public services?*

a. public aqueduct (yes/no)
b. sewage (yes/no)

The dependent variable is a binary variable that takes value of 1, when a household has access to the public aqueduct and to the public sewage systems and 0 when the household doesn't have access to one or both services.

While this approach is valuable for understanding the institutional aspects of water scarcity, it is not comprehensive. The measurement of water scarcity here is limited to household access to clean water and sanitation, without considering other critical dimensions of the issue. For instance, this approach does not address the quality of water provided or the price of water services or infrastructure reliability. These factors can have significant impacts on how households experience and perceive water scarcity. Therefore, while the focus on public service delivery captures the state's ability to deliver and fulfil its side of the social contract, it does not fully encapsulate the complexity of the issue.

[8] Table 7 in the appendix provides the description and source of the selected variables.

3.3.2| Clientelism

Clientelism was measured through individual level data from the ELCA that reports the answer to the following question: "*Could you tell me if for whom you vote, you kept into consideration benefits, gifts or jobs that a candidate offered to you or to a relative for your vote?*[9]*" Yes/no/ I don't'know.*

One concern for this main variable revolves round the issue of social desirability bias. Being a sensitive topic, respondents may feel compelled to provide socially acceptable answers rather than their true opinions or behaviour. This may be because of fear of judgment or potential repercussions. However, the ELCA survey is anonymous and all personal identifiers, including the municipality, department and community in which the household is located, are covered with fake IDs. This reduces the likelihood that respondents will fear exposure or can be easily identified. Furthermore, data collection is conducted by trained social workers and university researchers who have established over the years a trusty relationship with the households which encourages more honest responses.

Moreover researchers have concluded that clientelism and tax evasion are widespread practices in Colombia, and that the normalization of these behaviours may reduce the impact of social desirability bias (Fergusson et al., 2017). This suggests a political equilibrium in which clientelism and a weak state reinforce each other as normal features of the political landscape (Fergusson et al., 2017). Finally, another limitation to take into consideration is that not all benefits can or should be considered clientelism. In some circumstances it can be cases of targeted redistribution, to an ethic minority for example, or simply support for non-political reasons (Boix & Stokes, 2007; Fergusson et al., 2017).

3.3.3 |Tax evasion

The variable tax evasion, measures tax individual tendency to evade VAT. Data was collected through the answers to the question: *"Could you tell me if normally you accept buying without a receipt to avoid paying VAT?*[10] *Yes/no/ I don't know*".

Similar considerations that were addressed for the clientelism variable concerning desirability bias ought to be held into account for tax evasion. On top of those limitations, this data from

[9] This is a binary variable, coded 1 if the answer is yes and 0 if the answer is no or I am not sure.
[10] This is a binary variable, coded 1 if the answer is yes and 0 if the answer is no or I am not sure.

ELCA provides information about VAT tax evasion specifically. This means that this variable excludes other forms of tax evasion. In Colombia, VAT is the best-known and most important indirect tax, representing almost 29% of all government revenues in 2015 (L. Fergusson et al., 2017a), meaning that despite it might not be exhaustive, it still provides a relevant indicator. Finally, tax evasion can signal lower trust in the political institutions, however it is by no means the only reason people might decide to evade taxes.

3.3.4| Monopoly of violence

Monopoly of violence is measured using information collected through a question posed to community leaders, concerning the presence of armed and/or illicit groups in the community (neighbourhood/rural village). This variable was selected to identify those areas in which the state may struggle to establish a monopoly of violence due to the presence of armed groups in the territory. It aims at identifying those areas where national institutions' reach is hindered by the presence of rebels or criminal non state actors. The rationale behind this is that the presence of this groups is also linked to criminal activities such as drug trade which might lead to increase in exposure to violence, and overall threat for a given community.

Also in this case it is appropriate to consider some limitations of this variable. The data comes from the ELCA community questionnaire in which leaders are asked if "in the last three years there has been at least *one armed and/or illicit group* in the community". The question does not specify what armed group (FARC, paramilitary, drug cartels, organized crime…) and it doesn't take into account that the answer might be shaped by fear or even support of the rebel groups. Another limitation is that in this study it is assumed a condition of *aut-aut* in which armed/illicit groups are exclusively in areas where there the state isn't, which might not be always the case. Vice versa, the fact the state is not present in some areas doesn't mean that that area is subjected to the ruling of armed or illicit groups.

3.4| Control variables

In this section, I present the control variables included in the regression analysis and are grounded in the concepts of provision, participation and protection which are key elements of a stable social contract, therefore of state authority, legitimacy, and capacity. Including control variables aims to isolate the specific effects of institutional weakness measured by clientelism, tax evasion, and monopoly of violence, on access to water services.

To capture the dimension of *provision*, a set of control variables accounts for the availability of certain public services at the community level, which aims at measuring broader capacity of the Colombian institutions to deliver essential services in a given area. The variables included are presence of a *public primary school*, presence of *a public high schoo*l, presence of a *public clinic or hospital*, availability of *public transportation*. These are all binary variables, coded as 1 if the service is available in the community and 0 if not.

For *participation*, the set of control variables reflects the extent to which citizens are engaged in political and civic life as it may be a significant measure for state legitimacy and effectiveness. The variables include individuals' *reliance on the justice system*, this captures affirmative responses to the question if in case of controversies, individuals recur to the juridical system to solve it. Other variables capture the extent to which citizens mobilize around social and political issues. The variables *protest over public services*, for human rights and against the *government* reflect whether collective action took place in the community. This provides a measure of the degree of political engagement to state performance as well as the perceived state present among citizens. For protests to be meaningful, there must be a certain degree of belief that one's voice will be heard and potentially will have an impact.

Participation in elections captures individual's frequency in voting at political elections. These variables capture both formal and informal forms of civic and political participation, which can influence state legitimacy and service delivery outcomes.

Finally, for the notion of *protection*, the variables selected focus on safety and exposure to violence. These variables assess the extent to which the state provides security and enforces the rule of law, which are essential for the functioning of an effective institutional framework. The variables selected are the occurrence of *homicides* in the community, experienced cases of *kidnapping*, feeling of *safety* within the community and household-level experienced *violence*. These controls help account for the deteriorating effect of violence and insecurity on institutional functioning and service provision.

3.5| Descriptive statistics

This next section presents an overview of the data, through a first inquiry of the selected variables used to answer the research questions. The descriptive statistics are shown in *table 1*. All the variables shown are binary, taking the value 1 if the answer in the questionnaire was yes and 0 if the answer was negative or unsure[11]. The distribution of the households covers 56 municipalities across 9 regions, allowing for a significant geographical variation in the analysis.

On average, only 42% of the sample's population has access to water services, meaning access both to clean water and sanitation infrastructure, suggesting a significant gap in basic public service provision. Clientelist practices and tax evasion may seem infrequent, with means of 0.13 and 0.21 respectively. However, considering social desirability bias and other limitations presented in section *3.3.2* and *3.3.3*, as well as the detrimental effect that such behaviours have on state capacity, their impact is still relevant. The presence of armed or illicit groups is less common across the selected sample, with a mean of 0.06.

Access to broader public services vary. While: 68% of respondents report the presence of public primary schools, access drops to 29% for public high schools and to 14% for clinics or hospitals. Availability of public transport is also on the lower side, with a mean of 0.43.

Variables related to institutional trust and civic engagement show uneven trends. Reliance on the juridical system is high (mean = 0.81), as well as participation in election (mean=0.72). but informal political participation such as takin parts in protests, is generally low (protests related to public services have a mean of 0.09).

Violence-related variables show some variation, only 25% of the households consider their community to be very safe, and 56% of household located in communities that reported homicides and 15% where kidnappings have occurred. 1.6% of the households reported directly being victims of violence.

[11] Table 7 in the appendix provides the description and source of the selected variables.

Table 1
Descriptive statistics

Variables	Obs	mean	Stan. Dev.	Min	Max
Water access	5,018	0.42	0.49	0	1
Clientelism	5,018	0.13	0.34	0	1
Tax evasion	5,018	0.21	0.41	0	1
Armed/illicit groups presence	5,018	0.06	0.25	0	1
Public primary school	5,018	0.68	0.46	0	1
Public secondary school	5,018	0.29	0.46	0	1
Public transport	5,018	0.43	0.49	0	1
Public clinic/hospital	5,018	0.14	0.35	0	1
Safety	5,018	0.25	0.44	0	1
Reliance on justice system	5,018	0.81	0.39	0	1
Protests government	5,018	0.07	0.26	0	1
Protests human rights	5,018	0.02	0.15	0	1
Protests public services	5,018	0.09	0.28	0	1
Homicides	5,018	0.56	0.49	0	1
Kidnappings	5,018	0.15	0.36	0	1
Experienced violence	5,018	0.016	0.13	0	1
Participation in elections	5,018	0.72	0.45	0	1
Municipality	5,018	35.29	15.99	1	56
Region	9	5.75	3.074	1	9

A preliminary inquiry of the data also highlights disparities in access to public water services between urban and rural households. The data reveals a significant urban-rural gap. As shown in *table 2*, among households without access to public water services (public aqueduct and sanitation infrastructure), over 92% are located in rural areas. In contrast, the majority of households with access, almost 90%, are urban (*table 3*), and about 97% of the rural households represented this sample don't have access to clean water and sanitation (*table 3*).

These figures clearly demonstrate the degree to which access to water and sanitation services changes across Colombia's territory and reveals that the state's ability to deliver essential public services appears significantly weaker in rural areas, suggesting an unbalance in state capacity and an uneven redistribution of resources across the country.

Table 2

Urban vs rural access to public water services

Water services access	Urban households	Rural Households	Total households
no	229 (7.91%)	2666 (92.09%)	2895 (100%)
yes	2046 (96.37%)	77 (3.63%)	2123 (100%)
Tot	2275 (45.34%)	2743 (54.66%)	5018 (100%)

Table 3

Urban vs rural access to public water services

Water services access	Urban households	Rural Households	Total households
no	229 (10.07%)	2666 (97.19%)	2895
yes	2046 (89.93%)	77 (2.81%)	2123
Tot	2275 (100%)	2743 (100%)	5018 (100%)

4| Results

This section presents the results of the regression models used to examine the relationship between institutional weakness and household access to public water services. I begin by discussing the baseline model (*equation 1*), I then introduce the second model[12] that incorporates control variables reflecting the dimensions of provision**,** participation, and protection. Throughout all models, municipality fixed effect was included to control for unobserved heterogeneity across geographical areas.

4.1| Equation 1 estimation

To begin, I estimate a baseline model (*equation 1*) that assesses the relationship between clientelism, tax evasion, monopoly of violence and household access to public water services. This model includes three key binary indicators: whether the household reports clientelist voting behaviours, acceptance to evade VAT, and whether the household is in a community where armed or illicit groups are present. By focusing uniquely on these institutional weakness variables, the baseline model provides tests for Hypotheses *H1a, H1b, H1c* before introducing additional controls. The results of the model's estimate are presented in *table 4*. *column (1)* considers the whole sample of 5018 households, *column (2)* focuses on the ones located in urban municipalities while *column (3)* only accounts for rural households.

The results for *clientelism* reveal consistently negative coefficients across all three columns. However, statistical significance only appears in the first two columns (whole sample and urban sub-sample). These results suggest that individuals who were offered a vote-buying incentive or that see elections as an opportunity to gain specific benefits, are also less likely to have access to safe water and sanitation, pointing to a negative association between political clientelism and basic service provision. The magnitude of the coefficient may appear modest, however in the context of a limited overall access to water services, a decrease of 2.55% of access to water services shouldn't be overlooked.

In contrast, the second independent variable *tax evasion* does not show statistically significant results in any of the three samples, and the coefficients are very close to 0 which suggests that the effect of tax evasion can be overlooked as it is not significantly related to reported access to safe water and sanitation in this sample.

[12] See p.10

For the third variable of interest, *armed group presence*, the coefficients are positive for *column (1)* (0.0119) and for *column (2)* (0.0204), and negative for the rural sample (-0.00099). This implies that in certain contexts, the presence of armed actors may coincide with access to water services. However, the results are not statistically precise, concluding that the presence of armed or illicit groups is not relevant at least not in a way that is captured by this model.

Overall, these findings indicate clientelism is the most robust predictor for access to water and confirms the previously formulated H1a.

Table 4
Effects of institutional weakness (core variables) on water services

	Whole sample (1)	Urban households (2)	Rural households (3)
Clientelism	-0.0255***	-0.0359***	-0.0153
	(0.00793)	(0.0128)	(0.00964)
Tax evasion	0.000115	0.00437	-0.00587
	(0.00649)	(0.0107)	(0.00772)
Armed/illicit group presence	0.0168	0.0204	-0.000992
	(0.0119)	(0.0143)	(0.0263)
Constant	1.001***	1.001***	0.0335**
	(0.0380)	(0.0421)	(0.0145)
Municipality fixed effect	Yes	Yes	Yes
R-squared	0.865	0.560	0.0527
Observations	5018	2275	2743

Notes: *,**,*** denote statistical significance at the 10%, 5% and 1% levels respectively. Standard errors reported in parenthesis

4.2| Equation 2 estimation

The results from the estimation of the second model are presented in *table 5*. The full model introduces different control variables that include some institutional context, broader public service access, and security indicators, aiming to strengthen the interpretation of the model. This time the estimation of the model was conducted only on the whole sample of 5018 households, representatives both of urban and rural areas, to try and portrait a national overview.

Column (1) shows the coefficients when introducing controls for the availability of other public services at the community level. The results remain broadly consistent with the baseline model. *Clientelism* shows a statistically significant negative association with household access to water services (significant at the 1% level) and with a coefficient very close to the results from equation 1 (-0.0242).

Contrary to the hypothesis formulated, tax evasion and presence of armed/illicit groups are positively associated with access to public water services. Anyways, for tax evasion the coefficient is again very close to 0 (0.00103) and doesn't prove to be statistically significant. The variable armed illicit groups suggest a variation of 1.63% (0.0163), which could be meaningful in a fragile context, considering the importance of access to water services, however in both cases the coefficients are statistically insignificant.

Among the control variables, the presence of a public high school in the community and the availability of public transport are positively and strongly associated with access to water services (at 1%). With coefficients respectively of 0.0486 and 0.0186, this aligns with the assumption that broader public service provision reflects stronger institutional capacity and a higher likelihood of accessibility to basic services. In contrast, the presence of public primary schools (-0.0121) and of a public clinic/ hospital (- 0.0502) is negatively and significantly correlated with water access. These results are inconsistent and might require a different model or additional variables to understand the contradiction

Incorporating measures of citizen engagement, both institutional and informal, offers insight into the relationship between participation and access to water services. The results for the estimation of equation 2 including this set of control variables are shown in*, table 5, column (2).* Also in this model specification, clientelism confirms a negative and statistically significant relationship with access to clean water and sanitation (-0.0253), while tax evasion and presence of armed/illicit groups discourage a significant relationship with water services as the coefficient is very close to 0 and statistically not relevant.

Among the control variables, two forms of informal political participation, protests against the government and protests for human rights, are significantly associated with access to water services. The first one shows a positive coefficient of 0.0431, suggesting a 4.31% higher likelihood of having access to water services in communities that engage in this sort of manifestation. This result may reflect the presence of a functioning, however challenged,

state authority in these areas, suggesting that citizens perceive that public demonstrations could lead to government responsiveness. Protests on human rights violation show a negative and highly significant correlation with access to water services (-0.0755) suggesting a decrease of 7.5% of access to water services for households located in communities that engage in such collective actions. The fact that citizens engage in this sort of protests may suggest a state failure in protecting its citizens or providing the basic conditions for a dignified life. This could reflect a significant institutional weakness in areas where these types of protests are more frequent and could expose broader governance failures. Other forms of institutional engagement such as reliance on the justice system or participation in elections, do not appear to have a statistically significant effect on water service access in this model specification.

When introducing the dimension of protection, *column (3),* clientelism maintains its negative association with access to water services at the 1% level, with a coefficient that is very close to the one resulting from other model variations (-0.0249). This reinforces earlier findings suggesting that clientelist practices may be detrimental to service provision and provides further support for H1a. Tax evasion and the presence of armed/illicit groups continue to show a positive (but imprecise) association with the dependent variable.

About the control variables, the perception of community safety and a household's whether a household experienced violence, emerge as negative predictors of access to water services. However, they do not show a statistically relevant association. The occurrence of kidnapping in a community is positively associated access to clean water and sanitation, shows a statistical relevance and a coefficient of 0.0240 which is relatively high considering its statistical relevance at 1%. This contrasts with H3c that assumed that areas full state sovereignty implies a higher likelihood of access to water services. It is important to underline that the occurrence of kidnappings does not necessarily indicate the presence of armed groups or a lack of monopoly on violence. However, it does suggest a state's inability to provide safety and protection for its citizens against internal threats and therefore reflects a failure to fulfil one of the three core obligations of the state.

Table 5
Equation 2 estimation

	Water access (1)	Water access (2)	Water access (3)	Water access (4)
Clientelism	-0.0242***	-0.0253***	-0.0262***	-0.0249***
	(0.00788)	(0.00793)	(0.00792)	(0.00788)
Tax evasion	0.00103	-0.000782	-0.000102	0.0000440
	(0.00645)	(0.00648)	(0.00648)	(0.00644)
Armed groups presence	0.0163	0.0176	0.00627	0.00659
	(0.0118)	(0.0122)	(0.0123)	(0.0125)
Public primary school	-0.0121*			-0.0119*
	(0.00676)			(0.00678)
Public high school	0.0486***			0.0458***
	(0.00741)			(0.00743)
Public hospital/clinic	-0.0502***			-0.0501***
	(0.00848)			(0.00850)
Public transport	0.0186***			0.0184***
	(0.00712)			(0.00716)
Reliance on justice system		-0.0116		-0.00642
		(0.00726)		(0.00723)
Protests government		0.0431***		0.0386***
		(0.0118)		(0.0118)
Human rights protests		-0.0755***		-0.0689***
		(0.0200)		(0.0199)
Public services protests		-0.00456		-0.000321
		(0.00996)		(0.00991)
Election participation		-0.00260		-0.00328
		(0.00596)		(0.00592)
Safety			-0.0109	-0.0123*
			(0.00735)	(0.00732)
Homicides			0.0141	0.0112
			(0.00962)	(0.00960)
Kidnappings			0.0240***	0.0254***
			(0.00836)	(0.00836)
Experienced violence			-0.0109	-0.0115
			(0.0205)	(0.0204)
Constant	0.975***	1.022***	0.988***	0.981***
	(0.0386)	(0.0390)	(0.0392)	(0.0406)
Municipality fixed effect	Yes	Yes	Yes	Yes
R-squared	0.867	0.866	0.866	0.868
Observations	5018	5018	5018	5018

Notes: *,**,*** denote statistical significance at the 10%, 5% and 1% levels respectively. Standard errors reported in parenthesis.

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4.3| Discussion

The original assumption and hypotheses formulated on the social contract theory and the existing literature, expected a negative association between institutional weakness and water service. However, the empirical results only partially support these expectations.

Clientelism emerges as the most consistent predictor among the three indicators of institutional weakness, with a statistically significant negative relationship with availability of water services among all model variations. This suggests that particularistic voting behaviours, meaning that individual votes are exchanged for targeted benefits, may undermine the equitable distribution of essential public services. In contexts where clientelist relationships are established between voters and leaders, households may be less likely to receive access to public services. These findings resonate with broader theories on the erosion of state legitimacy and the distortion of public goods provision and governance quality in clientelist dynamics.

Tax evasion did not emerge as a significant predictor of water services access in any model specification. This result was unexpected, as the literature emphasizes tax compliance as a key component of the social contract, therefore crucial for state capacity and legitimacy. It is to be considered possible that the nature of the tax evasion variable may have limited its explanatory power. The data focuses on VAT evasion, given its significance contribution to the Colombian state revenue. Yet, as previously addressed, tax evasion is a complex issue. Although the variable aimed to capture a weakening of the social contract, reflecting a breakdown in the reciprocal relationship between citizens fulfilling their responsibilities and the government providing services, individuals may evade taxes for a variety of reasons, not only due to lack of trust in institutions. Additionally, a state's financial capacity may be compromised in ways that extend beyond individual tax compliance. Given the gap between theoretical expectations and empirical findings, this aspect may require further investigation or the identification of alternative variables that better capture the impact of tax evasion on access to clean water and sanitation.

Similarly, the presence of armed or illicit groups showed a very low coefficient and was not significantly associated with water access in this sample. Despite the theory supports the idea that the presence of illicit non-state actors can undermine the state’s authority and legitimacy, particularly in marginalized or contested territories, the positive association that

emerged and lack of a significant effect prevents from verifying H3c. These results might partly be explained by the acknowledgment that, while the presence of armed groups suggests institutional weakness and limited state sovereignty, it does not necessarily exclude the coexistence of state or non-state governance structures.

Overall, these results offer evidence that clientelism plays a role in undermining access to water services. At the same time, the findings underscore the multidimensional and context-dependent nature of state capacity and service delivery. Future research could define other variables that might provide a more accurate or richer measure of institutional weakness or employ exploring other methodologies that might better capture the relationship between variables.

4.3.1| Addressing urban and rural inequalities

Based on a preliminary inquiry of the data, this section briefly addresses some considerations regarding differences in urban and rural access to basic water services. Although the aim of this thesis is to provide a national-level overview rather than to investigate territorial variations, the ELCA survey presents data divided between rural and urban municipalities. Furthermore, Colombia-specific research reviewed in the literature section frequently highlights an urban-rural gap in service provision and overall inequality, which *Table 2* and *3* in the descriptive statistics section also reflects.

Without delving too deeply, *equation 2* was re-estimated separately for urban and rural households to explore potential differences. *Table 6* below presents these results. The purpose of this section is to prompt reflection on this urban-rural divide and to suggest possible pathways for future research.

When examining the effects of clientelism, tax evasion, and the presence of armed or illicit groups on household access to water services, clear urban-rural disparities emerge. Clientelism appears significantly more relevant in urban contexts, where it is consistently and negatively associated with access to water services. The coefficient is at least -0.0365, larger in magnitude than the one estimated for the overall sample, and statistically significant at the 1% level. This suggests that, in urban areas, clientelist practices may considerably reduce the likelihood of households accessing public water services, while in rural areas, clientelism does not show a significant effect.

Regarding tax evasion, no statistically significant relationship with water access emerges in either rural or urban areas. The coefficients are consistently close to zero across all models. However, it is interesting to note that tax evasion is always negatively associated with water access in rural areas and positively associated in urban settings. Although the broader literature suggests tax evasion can undermine state capacity and reflects a weakening of the social contract, it does not seem to directly affect household access to public water services in either context in this analysis.

Finally, the presence of armed or illicit groups shows contrasting patterns across urban and rural areas. In *column (4)*, some statistical significance at the 10% level suggests a positive association between the presence of armed groups and access to water services, capturing an increase of 2.47% in household access to water service. Although this runs contrary to H3c, it could be explained by the phenomenon of non-state actors establishing parallel governance structures that provide services in areas where the state is absent. Nevertheless, the general lack of statistical significance across the other models suggests that this variable may not fully capture the impact of institutional weakness on water service delivery.

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Table 6

Regression Results Rural vs Urban

	Water access (1) rural	Water access (2) urban	Water access (3) rural	Water access (4) urban	Water access (5) rural	Water access (6) urban	Water access (7) rural	Water access (8) urban
Clientelism	-0.0133	-0.0369***	-0.0153	-0.0365***	-0.0174*	-0.0373***	-0.0162*	-0.0392***
	(0.00963)	(0.0126)	(0.00967)	(0.0128)	(0.00959)	(0.0128)	(0.00961)	(0.0126)
Tax evasion	-0.00655	0.00852	-0.00597	0.00251	-0.00433	0.00391	-0.00483	0.00575
	(0.00770)	(0.0106)	(0.00773)	(0.0107)	(0.00769)	(0.0107)	(0.00767)	(0.0106)
Armed/illicit groups presence	0.00122	0.0223	-0.00172	0.0247*	-0.0235	0.0153	-0.0181	0.0181
	(0.0264)	(0.0141)	(0.0277)	(0.0149)	(0.0266)	(0.0151)	(0.0280)	(0.0153)
Public primary school	0.00629	-0.0342***					0.00905	-0.0346***
	(0.00809)	(0.0120)					(0.00812)	(0.0121)
Public high school	0.0448***	0.0631***					0.0432***	0.0637***
	(0.00903)	(0.0128)					(0.00907)	(0.0128)
Public clinic/hospital	-0.0290**	-0.0630***					-0.0194	-0.0642***
	(0.0131)	(0.0114)					(0.0132)	(0.0115)
Public transport	-0.00518	0.0560***					-0.0000634	0.0524***
	(0.00881)	(0.0113)					(0.00892)	(0.0114)
Reliance on juridical system			-0.00871	-0.00454			-0.00820	0.00223
			(0.00934)	(0.0114)			(0.00936)	(0.0113)
Protests government			0.0138	0.0450***			0.0153	0.0419***
			(0.0263)	(0.0143)			(0.0266)	(0.0143)
Human rights protests			0.0510	-0.0838***			0.0355	-0.0719***
			(0.0655)	(0.0230)			(0.0657)	(0.0227)
Public services protests			0.0149	-0.0118			0.0201	-0.00463
			(0.0195)	(0.0124)			(0.0194)	(0.0123)
Participation in elections			0.00132	-0.00408			0.000836	-0.00794
			(0.00749)	(0.00932)			(0.00744)	(0.00919)
Safety					-0.00823	-0.0719***	-0.00638	-0.0745***
					(0.00693)	(0.0241)	(0.00708)	(0.0239)
Homicides					-0.00845	0	-0.00872	0
					(0.00917)	(.)	(0.00930)	(.)
Kidnappings					0.0644***	0.000696	0.0657***	0.00409

					(0.0116)	(0.0120)	(0.0118)	(0.0120)
Experienced violence					-0.0368	-0.000718	-0.0316	-0.00396
					(0.0339)	(0.0268)	(0.0338)	(0.0263)
Constant	0.0287*	0.946***	0.0372**	1.021***	0.0178	1.001***	0.0135	0.963***
	(0.0159)	(0.0432)	(0.0165)	(0.0437)	(0.0150)	(0.0420)	(0.0181)	(0.0449)
Municipality fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.0622	0.574	0.0540	0.564	0.0651	0.562	0.0755	0.579
Observations	2743	2275	2743	2275	2743	2275	2743	2275

Notes: *,**,*** denote statistical significance at the 10%, 5% and 1% levels respectively. Standard errors reported in parenthesis

5| Conclusion

This thesis set out to examine how institutional weakness affects access to public water services in Colombia, a country marked by deep-rooted inequalities, a challenging state-society relationship, and long-lasting civil conflict. Water supply and sanitation are not only fundamental human rights but also key indicators of a state's ability to serve its citizens fairly and effectively. As outlined in the literature review, institutional weakness undermines state capacity and shapes how public resources are distributed, often unequally.

Drawing on the social contract theory, the analysis aimed at debunking the reinforcing cycle between low public service provision and limited state legitimacy, authority and overall capacity. To understand this institutional failure more deeply, this thesis focused on three interrelated dimensions: clientelism, tax evasion, and the lack of a monopoly on legitimate violence, all of which are particularly relevant in Colombia where mistrust in public institutions is widespread. Meanwhile, these dynamics highlight a breakdown in the state-society relationship that directly undermines the equitable provision of essential services, such as water. Finally, this approach offers a new lens to look at water scarcity that targets the core responsibility of the state in ensuring essential services and protecting basic human rights.

5.1| Recommendations

The findings of this thesis point to clientelism as a particularly significant obstacle to equitable water service provision in Colombia. As the literature suggests, clientelism in Colombia is not merely a political strategy but a socially embedded norm, deeply woven into everyday interactions between citizens and state actors. This undermines democratic accountability and perpetuates unequal access to public goods. However difficult it is to challenge and change an established system, addressing this requires a multidimensional approach aiming at strengthening the democratic mechanisms and enhancing political accountability.

Institutional reform alone is insufficient if citizens continue to engage in clientelist exchanges and politicians rely on patronage for electoral success. Therefore, long-term strategies should aim at changing both political incentives and societal expectations. Education campaigns on civic responsibility and efforts to strengthen local governance mechanisms may help rebuild trust and empower citizens to hold officials accountable without relying on personal favours.

Interventions must also tackle the structural conditions that make clientelism viable, such as socio-economic inequality, political inequality, and overall weak state presence. Social policies that guarantee minimum levels of public service provision, regardless of political affiliation or geography, could help weaken the appeal and necessity of clientelist practices.

5.2| Future Research

The complexity of Colombia's institutional landscape opens several avenues for future research. First, this thesis focused exclusively on the role of the state in service provision, leaving the role of the private sector underexplored. Given trends in privatization of essential services and the unequal access it can produce, future research could investigate how public-private partnerships affect water service equity and accessibility.

Second, the interaction between institutional weakness and inequality deserves further exploration. Wealthier citizens' ability to compensate for state deficiencies through private alternatives may delay the urgency of reform. Future studies could empirically assess how private provision of water services affects public pressure for state improvement, especially in hybrid systems where both public and private options coexist. There is also a need to examine how limited infrastructure, and geographical barriers constrain state capacity and access to essential services, especially in remote areas. Further comparative studies between rural and urban regions could provide valuable insights into persistent inequalities and inform more accurate territorial development strategies and findings.

Moreover, future research could address methodological limitations by focusing on more objective indicators and core variables less susceptible to social desirability bias. Incorporating additional control variables related to socio-economic status, and political participation would allow for more robust causal inferences.

Lastly, future studies might investigate the broader implications of limited access to clean water and sanitation in weak institutional contexts. For example, how does this affect health outcomes, economic development, or social opportunities? These deeper consequences are essential for understanding the full impact of institutional failure on development and overall individuals' well-being.

Appendix

Table 7
Description and source of variables

Variable	ELCA question	Source
Water services	Equals 1 if households have access to the following public (or municipal) services: aqueduct and sewage.	ELCA household
Clientelism	Equals 1 if individual answered "*yes*" when asked "when deciding for whom to vote, you considered benefits, gifts or jobs that a candidate offered to you, or to a family member, in exchange for your vote?"	ELCA individual
Tax evasion	Equals 1 if individual answered "yes" when asked "Could you tell me if you usually accept purchasing without a receipt to avoid paying VAT?"	ELCA individual
Armed/illicit group presence	Equals 1 if community leader answered "*yes*" when asked "In the last 3 years there has been the presence of at least one armed/illicit group in this community"	ELCA community
Public primary school	Equals 1 if community leader answered "*yes*" when asked "this community has a public primary school?"	ELCA community
Public high school	Equals 1 if community leader answered "*yes*" when asked "this community has a public high school?"	ECLA community
Public clinic/hospital	Equals 1 if community leader answered "*yes*" when asked "This community has a public clinic?"	ELCA community
Public transport	Equals 1 if community leader answered "*yes*" when asked " This community has a public transport service?"	ELCA community
Reliance on justice system	Equals 1 if community leader answered "justice system" when asked how people solve issues or controversies.	ELCA community
Protests government	Equals 1 if community leader answered "*yes*" when asked "In the last 12 months, have there been in this community social protests due to government failure in fulfilling promises/agreements? "	ELCA community

Human rights protests	Equals 1 if community leader answered "*yes*" when asked "In the last 12 months, have there been, in this community, protests to defend human rights?"	ELCA community
Public services protests	Equals 1 if community leader answered "*yes*" when asked "In the last 12 months, have there been in this community social protests due to increase in public services prices (water, electricity, transport…)?"	ELCA community
Election participation	Equals 1 if individual answered "*I always vote*" when asked "how often would you say you vote at elections?"	ELCA individual
Safety	Equals 1 if community leader answered "*very safe*" when asked "In general, would you say that this community is…?"	ELCA community
Homicides	Equals 1 if community leader answered "*sometimes*", *"often*" or "*all the time*" when asked "how often in the past 3 years, did this community experience homicides? "	ELCA community
Kidnappings	Equals 1 if community leader answered "*sometimes*", "*often*" or "*all the time*" when asked "how often in the past 3 years, did this community experience kidnappings?"	ELCA community
Experienced violence	Equals 1 if individual replied "*were victims of violence*" when asked "in the last 3 years what of the following issues was faced by this household?"	ELCA household shocks

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