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How Representatives of Community-Based Water Organisations Navigate Gaps in Colombia's National Drinking Water Co-Production Strategy

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ABSTRACT: Community-based water provision in Colombia's rural areas represents a form of collective resource supply that has historically developed as a countermovement to state fragility and remains the countryside's only alternative to organised water supply. The Colombian state has legally recognised these water communities to meet constitutional and international commitments to universal drinking water access. However, integration occurs through a control-oriented approach, and is accompanied by administrative demands that most community-based providers cannot meet, which leaves them in a persistent informal status. Findings show that co-production practices reproduce governance fragilities and undermine the very social values the water communities are assumed to embody, even as state institutions depend on their work. The implemented co-production model not only requires constant informal negotiation but also fosters clientelism, corruption, socially harmful practices, and conflicts that cannot be resolved within existing structures. Based on qualitative case studies of seven community-based water providers, this article examines how volunteer representatives of these water communities navigate these contradictions, applying improvised strategies to individually sustain functionality. Meanwhile, these community-based water providers form wider networks and try to shape the public discourse around water co-production in order to achieve inclusion in the policy design process and improve collective support structures.

KEYWORDS: Community-based water supply, rural water supply, drinking water co-production, Colombia

INTRODUCTION

In Colombia, as in many other countries worldwide, community-based water management (CBWM) is a common practice in rural areas. While urban centres are often supplied by public or private companies, volunteers in more remote areas of Colombia have been managing the distribution of water for decades. An estimated 90% of all rural residents in Colombia are supplied with domestic water by community-based providers (Gómez Rey, 2023; Domínguez-Rivera et al., 2016; Cadavid Giraldo, 2009).

In this article, CBWM includes both the physical provision of water to community members and the administrative services and community organising tasks that are conducted alongside it. For this study, seven rural community-based water suppliers in the Cundinamarca department were analysed as case studies. While these *acueductos comunitarios* (AC) are not representative of all ACs in Colombia, they share many similarities. They all consist of a technical system in which surface water is channelled into a water treatment plant and from there through pipes into individual members' homes. The members of the water community are also the owners of the installation and decide together on all important water-related issues. They employ a plumber to continuously operate and maintain the network and a secretary

to perform invoicing and accounting tasks. To legally represent the AC, the members elect a board of volunteers headed by a president.

Over the last few decades, the circumstances of many water communities in Colombia and around the world have evolved due to factors such as industrial and agricultural pollution, as well as increasing technological requirements. In most cases, this has brought solely volunteer-based water provision to its limits. Tasks such as monitoring and treating water quality according to updated standards are no longer possible without external support (Hutchings et al., 2015). The term 'community management plus' is used by some scholars to refer to community-based water provision with state support (Cunningham et al., 2019). The 'plus' encompasses external assistance in the form of professional training, funding for improvements, technical support for major construction projects, and water quality testing. It aims to enable communities and build capacities for better water management (Dobbin and Sarathy, 2015; Engler et al., 2021; Marks et al., 2018; Yakubov and Hassan, 2007).

The concept has been adopted by many nation states (see, for example, Shields et al., 2021; Le Gouais and Wach, 2013; Naves and Varela Álvarez, 2021; Nicolas-Artero, 2016; Dhoba, 2020). It is a popular strategy for multiple reasons. The research and theory building on common pool resource management, especially by Ostrom (1990) and the Bloomington School, has shown that community-based resource organisation can be a successful, long-lasting and sustainable endeavour (Ostrom, 2010; Engler et al., 2021). Case studies of successfully operating community-based water providers around the world show that they share similar characteristics (Hutchings et al., 2015); that is, they often have organisational structures based on principles of direct democracy, and they also have an increased sense of responsibility as their owners are also their members and the recipients of the service (Romano, 2016; Tantoh and McKay, 2020). Successful water communities often have installations that are well adapted to the local environment and provide water at a lower financial tariff than public and private suppliers (Cleaver, 2000; Tobar Salazar, 2015).

At the same time, CBWM support not only has the potential to foster water communities; it can also help national governments to ease their share of responsibility (Urueña, 2012). As the standards set by the international community increase, nation states face continuously mounting international political pressure to provide safe drinking water. In addition to the Sustainable Development Goals 2030 (DNP, 2024a), the recognition of drinking water as a human right at the United Nations General Assembly in 2010 resulted in member states being obliged to grant this right within their national territories (Botero-Mesa and Roca-Servat, 2019); however, many countries like Colombia have neither the financial nor the physical means to provide drinking water in rural areas. Supporting communities instead of executing the water provision allows states to indirectly improve drinking water accessibility. It allows public planning and environmental authorities to obtain the necessary local information as they have a place-based partner to implement strategies and monitor their execution (Ramírez et al., 2011; Acevedo Guerrero et al., 2016).

When Colombia adopted a new constitution in 1991, it guaranteed the right to drinking water to all people in Colombia and identified three categories of provider of public services: public providers, private companies and organised communities. One of the main benefits for community-based providers was the recognition of collective property rights that created the opportunity to obtain a tangible legal title (Velasco, 2016). This potentially enabled them to act as a legal entity and claim or defend their rights. Having a clearly defined legal position as a collective entity also granted them a high degree of autonomy in how they acted within this position. They would be able to continue operating according to local customs, while maintaining space for alternative community-based decision-making and responsibility sharing (Boelens, 2008). It also allowed ACs to participate in state-funded support programmes and receive expertise and/or financial support and subsidies for their most economically vulnerable members. It also, however, obliged water communities to legalise, forcing them to be recognised by the state, share internal data, be evaluated, and receive orders.

That is where an additional concept applied. If communities were involved in the fulfilment of their basic legal rights, the overall structure of collaboration was no longer support but co-production, as it entailed different dynamics due to its long-term binding nature (Hutchings, 2018). As stated by Joshi and Moore (2004: 31),

> Institutionalised co-production is defined as: the provision of public services (broadly defined, to include regulation) through a regular long-term relationship between state agencies and organised groups of citizens, where both make substantial resource contributions.

The mutual obligations involved caused a response to the commons research school that had been promoting the possibility of successful co-production of shared resource management (Ostrom, 1996). Critical commons scholars such as Agrawal (2001) and Boonen et al. (2019) have drawn attention to the shortcomings of the traditional approach, which does not pay sufficient attention to, among other issues, historical context, power imbalances, agency and mechanisms of exclusion. These dynamics can occur between the group and external actors, as well as within the group itself. According to Fabinyi et al. (2014), traditional analysis of collective action regards groups as homogeneous communities rather than as a heterogeneous, hierarchical mass in which continuous contestation takes place.

The collision of the different approaches to commons organisation and water co-production becomes particularly evident in Colombia when the historical background is taken into account. The strong social organisation in the Colombian countryside is not merely a cultural heritage of resource provision. Kaplan (2017) investigated how social organisations in the rural areas protected their members from the consequences of civil war.[1] Although protecting the group from outside intrusion and aggression was not the initial intention, it became the most important side effect. The more apolitical and socially tight-knit these groups were, the more they aided rural residents' survival. The retreat into autonomy led to clearer internal communication and rule-setting, creating a high level of cohesion and solidarity. This cohesion provided the group with the ability to settle internal conflicts and act as one entity externally, or to consciously opt out of potentially risky cooperations. In conflict situations, these groups served to maintain the conflict between armed groups and the community, rather than against individuals. The Colombian tradition of community organisation is therefore not just a strategic pooling of resources towards a common goal or good, it is also a social and political defence mechanism.

Community-based water organisations likewise have a wider range of functions besides their name-giving focus. The common pool resource at stake is not limited to water, but encompasses a range of other resources. By setting up a water community, group members pool their individual resources including time, capital, expertise and personal networks. Perhaps most importantly, collective action enables the community to pool their human right to access water. That grants them protection and legitimacy, even in cases of legal informality that could impede legal or physical actions that might harm the water supply. This intentionality of community-based water organisations, however, is partially contrary to the basic idea of collaborating with external parties for drinking water co-production. The Colombian state also lacks the capacity to fulfil its water co-production responsibilities due to a shortage of resources. Restrepo-Medina and Nieto-Rodríguez (2020) mention the yearly gap of approximately US$125 million (calculated by a Colombian National Planning Department consultancy) between the planning and implementation of national water management and governance.

The community-based water network is a complex system that is open to influences by, among others, technical, climatic/hydrological, social, political, legal and financial constraints. It can be assumed that organising the continuous provision of a critical good such as drinking water is a demanding task for volunteers. The involvement of state representatives has the potential to help ease the burden by

[1] Between 1948 and 2016, Colombia experienced an internal armed conflict with several phases which was finally concluded by an official peace agreement. Especially in rural areas, however, there is still some ongoing conflict between guerrillas, paramilitaries and the civilian population.

supporting the volunteer office bearers with resources; but it also carries the threat of being an additional duty and an open gate for harmful intrusion. This article analyses the structural consequences of the contradictory premises of drinking water co-production in Colombia and the strategies that volunteer representatives of water communities develop to bridge these gaps and overcome these contradictions. The analysis includes the campaigning of the national network of ACs to influence the public discourse on water co-production, as their aim is to become more equal partners in policy design and resolve the structural deficits of current implementation through collective action.

There is a substantial body of literature on the fragile co-production of water worldwide (Hutchings, 2018; Shields et al., 2021; Popovici et al., 2020) which, particularly in the context of Latin America, overlaps with the situation in Colombia (Dobbin and Sarathy, 2015; Nicolas-Artero, 2016; Pareja-Pineda et al., 2022; Pareja-Pineda, 2025; Romano, 2016). For Colombia specifically, the literature addresses several key issues including the impact of support on water communities (Smits et al., 2013), on the capacity to provide drinking water (Galezzo and Rodríguez Susa, 2021; Johnson et al., 2009), on the potential of CBWM organisations to improve water governance (Restrepo-Medina and Nieto-Rodríguez, 2020; Andrade-Ayala et al., 2019), and on the capacity of ACs to adapt to climate change (Murtinho, 2016; Andrade-Ayala et al., 2019). It is noteworthy, though, that instances of corruption, clientelism and other informal behaviour are referenced in several descriptive case studies but that researchers often do not pursue them further in the subsequent analysis (Domínguez-Rivera et al., 2016; Euler, 2020; Ramírez et al., 2011). In cases where informal practices are investigated, they are usually seen to be imposed on the group by an external agent (Boelens et al., 2021; Velasco, 2016). If informal practices within the group are analysed, the focus is limited to bargaining (Gómez Rey, 2023). These analyses usually do not address illegal or illegitimate strategies within the group, nor those between water community members and rural civil society actors. This article thus contributes to the political science discourse on the threats posed by the partial implementation of water co-production. It alters the scope by including how strategic behaviour of water community representatives in the execution of drinking water co-production can have adverse effects, harming community-based water organisations and weakening the mechanisms of collective action.

METHOD

The empirical field research was conducted in April 2023 in three different municipalities in the Sumapaz region of the department of Cundinamarca, south of Bogotá. The fieldwork was initiated through the second author's personal contacts with community-based water providers and later evolved via a snowball method of personal recommendation and information sharing.

The empirical investigation consisted of interviews and field visits to the AC`s offices and technical facilities and to their surroundings. It included the inspection of all natural and built components of the supply system such as water sources, treatment plants, tanks and pipes. We installed water quality monitoring stations in five supply systems, conducted microbiological water sampling, and examined documents such as statutes, socio-economic studies, concessions and phytosanitary permits. The strategic aim during field work was to collect as much field material as possible to capture the water community's complex exposure to diverse influences. We interviewed a total of 19 members of 7 ACs, with one water provider consisting of two physically separated supply systems. Six of our interview partners were current or former presidents of their water community. The interviews were recorded with the permission of the interviewees, whose anonymity we maintained. The introductory interviews were semi-structured; in some cases, they evolved into conversations over the course of several visits. The interviews were mostly conducted either in the organisation's office, people's private homes, or while on site.

The interviews were transcribed and coded by the first author using the software MAXQDA, following the guidelines of Saldaña (2013) and Charmaz (2006). As the interviews included a range of information,

the content was thematically categorised during the initial coding. After all the provided information was bundled, the first author gathered tasks (for example the reporting of particular data, invoicing, water pipe repair and group meetings), involved state-holders (including presidents, board and community members, representatives of public institutions and local farmers) and descriptions of the interactions. The aim was to create different versions of maps of the ACs settings in order to get an overview of the multiplicity of tasks. The first author then conducted a second axial coding that was focused on gaps and contradictions in the stories told. The intention was to gather samples of explicit gaps, that is, moments when interview partners mentioned difficulties, what they did not know, what they could not achieve, and/or explanations for non-compliance. Based on this, the first author tried to identify implicit missing elements such as differences in the description of the interviewee's own water community's work compared to that of others, and statements about the corrupt or clientelistic behaviour of state institutions and their representatives. The reasons for conflicts between all stakeholders were also analysed.

Since it did not become clear during the evaluation of the interviews which obligations community-based water suppliers did have towards which public institution and how they were authorised, the first author began to analyse official publications from governmental institutions and national AC networks. The intention was to gather and systematise fact-based information and to identify potential contradictions among them. That led to an additional focus on the mode of representation of both sides, which proved useful in explaining the divergence between the perception in the public representation and the everyday descriptions of our interview partners.

RESULTS AND DISCUSSION

The investigated water communities

All the investigated ACs in our study conceptually represented common pool resource management organisations. They featured characteristics identified as advantageous in the social science approach regarding the involvement of community-based water providers; however, they could guarantee neither the broad access of all rural residents nor the access to safe drinking water for their members, even though they had been able to general improve water access.

The technical supply system

Favourable environmental conditions enabled the ACs to provide a generally reliable water supply, but their systems fell short of standards for safe and universal access. The community-based water providers in our study ranged in age from 15 to 60 years and provided water to between 100 and 650 access points. Multiplying this figure by 3 as an estimate of average household size, it can be concluded that they served between 300 and 1950 people. Most also supplied water to at least some industrial or agricultural producers. The ACs benefited from a consistently humid climate, moderate temperatures year round, and abundant freshwater resources originating from the mountain reservoir Páramo de Sumapaz. These natural advantages created a setting in which scarcity pressures were softened and supply continuity could be maintained with modest technology. Through resource pooling, centralised abstraction and the relocation of intake points upstream to avoid agricultural contamination, most providers were able to improve security of provision in everyday operations. Even though the physical systems were rustic and pipes frequently broke due to landslides, on-call plumbers carried out repairs promptly, maintaining long-term usability and limiting downtime for users.

Despite this reliability, none of the ACs met the basic WHO standards for potable water (WHO, 2024). While some improved quality through basic treatment or filtration, none possessed the facilities, monitoring routines or trained personnel to guarantee potability.

Coverage also remained incomplete. Households in technically difficult or costly locations were left unconnected as ACs lacked the resources and did not view universal coverage as their responsibility. We interviewed one family that relied solely on rainwater; for such excluded residents there was no alternative provider and no institutional channel through which to claim their legal right to water or their inclusion in collective provision.

The account illustrates how natural endowments and community resource pooling sustained basic provision but also masked systemic weaknesses. The absence of professionalisation, the persistent gaps in coverage, and non-compliance with safety standards together highlight the limits of informal, community-based provision in guaranteeing a universal right to safe drinking water, even where everyday reliability is comparatively high.

The community-based organisational structure

The ACs displayed a formally democratic structure but member participation was limited, thus weakening transparency, deliberation and accountability. All households connected to the water system automatically became members of their AC and important decisions of the water organisation had to be taken by the whole member community. Members held a regular meeting once a year and could call additional meetings on special occasions. Attendance at these meetings was compulsory in most organisations, but members did not always fulfil this obligation. In some cases, fines were introduced to punish non-attendance, yet in many instances members responded with a 'show up, sign and leave' behaviour that curtailed meaningful debate. During the regular meetings, the community would elect a board of representatives. This board usually consisted of a president, vice-president, spokesperson and treasurer, with the option of including additional neighbourhood representatives. Board members served on a voluntary and unpaid basis for two to four years, and in most cases they were eligible for one re-election. Although the board functioned as a committee, the main responsibility lay with the president as latter represented the AC to external actors. The board presented the annual balance of income and expenditures, actions taken, forthcoming projects and necessary investments, and answered questions from members at the community meeting. As most ACs had problems finding members who were willing to take up a position on the board, the actual board members tended to stay in their post for a long time, and if bylaws prevented re-election to the same position it was common practice to rotate positions among themselves. This pattern further dampened participation by entrenching a divide between a small circle of active office-holders and the larger group of mostly passive users.

The financial arrangements

The ACs sustained their technical water systems through low monthly fees and innovative community-based financing mechanisms; this made them cost-effective and inclusive for members. High connection fees and irregular state support, however, created barriers to universal access and impeded financial long-term stability.

Members contributed a nominal monthly fee that was designed to cover operations, routine maintenance and minor repairs, rather than to generate profit. To keep contributions low, ACs relied partially on collaborative labour; they required members to assist with tasks such as laying pipes, but in some cases members' work was accepted in lieu of monetary payments. Some ACs also raised funds through raffles, bazaars and other community events to finance exceptional expenditures. They sometimes provided financial assistance for other initiatives or the construction of infrastructure that benefited the wider rural community. For larger projects, ACs depended on two main sources. First, connection fees paid by new members were saved to create reserves for larger repairs or new construction; these fees typically amounting to approximately two months of minimum wages (about US$520). This mechanism ensured the possibility of significant works but also caused a form of exclusion by imposing a high entry barrier on poorer households. Second, most ACs had received public funds at

some point, although such support was sporadic, inconsistent in amount and purpose, and frequently a one-off payment. One AC disclosed the confirmation of 872 million pesos (about US$225,000) for the construction of a new water treatment plant, a sum beyond the capacity of the association to raise internally.

The co-production tasks with state institutions

To be legally recognised and eligible for state support, ACs are required to fulfil a complex set of legal and administrative obligations that aim to standardise water provision; however, most water communities operate in partial compliance because of limited resources, knowledge gaps and resistance to perceived interference.

A central prerequisite for legal operation is the water concession, which is granted by the *Corporación Autónoma Regional de Cundinamarca* (the departmental environmental authority, or CAR) and valid for 10 years. The concession authorises the derivation of a determined amount of water, set as a fixed per-user volume. It also contains the obligation to conduct annual water samplings and requires the creation of a sustainable development plan every five years under the programme for the efficient use and saving of water (*Programa de Uso Eficiente y Ahorro del Agua*). Because the concession is based on a fixed per-user consumption allotment, ACs are required to install household water meters and record their consumption. This measure caused disagreements in several ACs as it was perceived by the members as undue interference in their autonomy of supply. In one AC, for example, some of the members prohibited the plumber and the president from entering their properties in order to prevent the installation work.

Other prerequisites for legalisation include registration with the Chamber of Commerce, with subsequent changes of representatives and statutes also reported there. ACs need a phytosanitary permit from the Ministry of Health, and the providers must register with the *Superintendencia de Servicios Públicos Domiciliarios* (Superintendency of Domestic Public Services, or SSPD) and upload their cash-flow data every billing period. This task is intended to verify the accuracy of the water community's financial flows and serves as the basis for their taxation. If they comply with these requirements, the water communities are eligible to participate in governmental programmes and receive support. To receive tariff-supporting subsidies, ACs are further supposed to register with the *Comisión de Regulación de Agua Potable y Saneamiento Básico* (Commission of the Regulation of Drinking Water and Basic Sanitation, or CRA) (Blanco, 2008; Restrepo-Medina and Nieto-Rodríguez, 2020; Alcaldía Mayor de Bogotá D.C.; 2022).

The multitude of obligations is one reason why most ACs are unable to comply fully and why they therefore operate in a state of partial compliance and partial recognition. During interviews, many representatives could not provide a comprehensive account of the full scope of their officially requested responsibilities. In our case studies, all ACs had applied for a concession and were registered with the Chamber of Commerce, but only four held a valid licence at the time of investigation. Those whose concession had expired attributed this to a lack of financial resources, insufficient understanding of renewal requirements, or an unwillingness to share data. Four ACs reported to the SSPD, while only one was completely legalised and received tariff subsidies. Our sample, with one AC out of seven fully legalised, is consistent with national estimates of approximately 8% of all community water providers being legally recognised (Botero-Mesa et al., 2020).

The gaps in community-based drinking water co-production in Colombia

Community-based water provision in Colombia relies almost entirely on voluntary work, yet regulations are applied as if water communities were professional utilities. This mismatch places disproportionate burdens on volunteers and shifts co-production from a framework that should enable communities, to one that controls them. None of our AC interview partners were trained professionals in the water sector. All but one president, who was retired, were simultaneously employed in other fields. Under these

conditions, effective cooperation with state institutions requires constant and easily accessible support. Volunteers need training in how to supply safe drinking water, where to find information and technical assistance, and which legal and administrative procedures they are expected to carry out. This is not necessarily insurmountable as most interviewed presidents held academic degrees in agriculture, veterinary science, law or related fields, any of which could serve as a basis for further water-related education.

As the Colombian government lacks the economic resources for comprehensive implementation, it distributes its limited funds in a targeted way that entails advance checks of quality control and compliance. The design of co-production around compliance rather than support therefore creates barriers rather than opportunities, and it undermines the long-term sustainability of volunteer-based provision. It also fails to consider the human resources available to communities in terms of both knowledge and time. The current implementation, which involves extensive registration, reporting and application requirements, mirrors public administration more than community organisation. It leaves volunteers with the burden of translating collective processes and decisions into administratively editable data as a precondition for interaction with governmental institutions (Red Nacional, 2017).

The deliberations recorded in interviews reflected these tensions. The administrator of the largest water community recounted that the membership had discussed applying for subsidies but decided against it because the requirements and reporting would compel them to raise tariffs in order to employ an accountant, only to lower them again through the subsidy, while at the same time accepting the long-term burden of continuous reporting (Interview: Administrator AC5, 14 April 2023). This perspective was corroborated by the experience of another AC. Its secretary outlined the extensive prerequisites of the application, which they pursued only because they were already planning to apply for the construction of a new treatment plant and anticipated the need for flawless administration for this process anyway. The secretary confirmed that the subsidies would significantly affect only the most economically vulnerable members; however, they also mentioned a sudden additional tax quote imposed by the government during the COVID-19 pandemic that was designated to "relieve hydric stress". This indicates that the apprehension about possible governmental arbitrariness due to extensive data-sharing was not entirely unfounded. The same interviewee recounted that when they were president of the AC the time required of them for completing the application process had made it difficult to sustain their livelihood; relief had come only when the previous secretary retired and the board suggested exchanging roles, allowing the president to instead assume the salaried secretarial post at not much more than the minimum wage (Interview: Secretary AC2, 12 April 2023). In essence, if all state-required conditions of the current drinking water co-production framework are to be met, taking responsibility for a water community in most cases cannot realistically be managed as a purely voluntary role.

The Colombian state's perspective

From the government's perspective, drinking water co-production is framed through international discourses of universal access, efficiency and sustainability, which are then translated into national development plans. Nevertheless, behind official statistics and promotional campaigns state support remains ad hoc, politically expedient and detached from the lived realities of community-based providers. This reveals a gap between discursive inclusion and the absence of genuine participatory mechanisms.

In consideration of the legal obligations and the prevailing discourse at the international level, the Colombian government has a strong incentive to present a positive image of the country's progress. Governmental public campaigns are characterised by the expressed intention to secure safe access to drinking water for all Colombian residents while protecting the environment and natural water resources. Promotional initiatives are thus published in line with the anticipated growth in access to water supply. According to the *Ministerio de Vivienda, Ciudad y Territorio* (Ministry of Housing, City and Territory), 93%

of the Colombian population had access to a drinking water supply network in 2021 (Minvivienda, 2021), with the objective being to reach 100% coverage by 2030 (DNP, 2024b). The extant national development plan for water is valid from 2018 to 2030 and thus spans several legislative periods (Minvivienda, 2018). It contains a multitude of tools and instruments approved by the international political and scientific discourse including financial support, knowledge transfer, and state-of-the-art technology implementation. According to the Ministry of Housing (Minvivienda (2024),

> We reached municipalities that have never received any investment in drinking water and basic sanitation, such as Lloró (Chocó), Calamar (Guaviare), Puerto Leguízamo (Putumayo), Carurú (Vaupés), Totoró (Cauca), Pueblo Rico (Risaralda), Barranco de Loba (Bolívar), and others (…). In Chocó 8 projects were brought forward. The department had been without any initiative for 10 years.

Even so the public campaign referred to above is intended to show support and rural development, the number of first-time supported communities and the mention that one state department had been without any support at all for a decade demonstrate the lack of structured distribution processes. It also questions the government's own publication (Minvivienda, 2021) on access to drinking water coverage.

Aggregate figures and promotional narratives sustain a perception of linear progress but the uneven distribution of projects, the lack of long-term reliable support for (water) communities, and the absence of structured channels for participation point to a state-led model that imposes rules without mutual obligation. In the absence of bilateral agreements or institutionalised feedback mechanisms for community representatives, co-production functions less as a collaborative framework and more as a rhetoric that legitimises central objectives while leaving gaps in the support available to rural organisations.

Making water communities navigate between legality and informality

The informal legal status of most community-based water providers means that the official planning of co-production remains largely on paper, while on the ground it produces a vicious circle of informality. Unable to apply legally for support or claim resources, ACs seek alternative strategies through opaque networks of informal contacts and individualised transactions with uncertain outcomes. The AC representatives described a dual pressure to recognise and ward off potential threats and to proactively seek individually granted support. Their defensive position towards the state was visible both in accounts of everyday routines and in their general suspicions. While community representatives lacked both specialised expertise and time, they had to face trained employees who could draw on professional networks. This inequality sometimes enabled state employees to exploit their position by, for example, not carrying out assigned tasks, processing them very slowly, or 'losing' documents in the mail. They also sometimes referred ACs to external specialists such as lawyers or hydro engineers, thereby further disempowering community representatives. Many interviewees recounted incidents of non-cooperative behaviour by state representatives. One president recalled being prevented from participating in a local resource planning initiative on the grounds of not belonging to the governing party. Another president remembered a mayor offering to gift pipes for the technical system while claiming a value for them that was many times higher than the estimated purchase price, leading them to refuse the mayor's offer. The last president described applying for a treatment plant only to have the application first confirmed and then withdrawn, prompting them to threaten resignation until the project was reinstated. The unpredictability of outcomes led to rumours and to a perception of being under general threat. Interview partners in all municipalities, for example, expressed concerns that their AC might be prevented from legalising on purpose, so that claims could be revoked in the event of a resource conflict with the growing downstream cities of Fusagasugá and Bogotá.

The reason why most ACs chose not to opt out of this potentially harmful network was that, without legal access to formal support they had to create alternative paths into the cash flow. Their marginalised position left little room for strategies that might risk the community being further deprived of resources.

Field data showed that all investigated ACs had received public funding regardless of their legal status. Given that more than 90% of national ACs fail to meet official prerequisites, it is clear that almost all financial transactions in water co-production rely on non-formalised processes that inextricably intertwine formal and informal spheres. Even the legalised AC of our study could not avoid clientelistic transactions, as interviewees noted that ACs often depended on intermediaries to be attended by public institutions at all. While such arrangements could facilitate funding, they also carried the risk that those intermediaries would, in return, ask the AC for political favours. These experiences reflected not isolated incidents but a broader pattern of administrative gatekeeping. The result was a systemic dependence on patrons and personalised mediation which was deliberately reinforced through state design. This blurs the line between bureaucratic procedure and political exchange and keeps ACs in a state of constant vigilance, their access to resources tied to tacit reciprocities rather than transparent rights.

Causing harm to the rural social network

Informal agreements are a prerequisite for state support, yet participation in such exchanges may harm both the community and the reputation of its representatives. As a result, few people are willing to admit to them, which turns these practices into an open secret that everyone knows but nobody confirms. This ambiguity seeps into the fabric of rural social life, fuelling conjecture, rumours and suspicions within ACs and among the wider population. The uncertainty of informal arrangements and the widespread perception that resources depend on hidden negotiations gradually disintegrate social cohesion by undermining trust within and among ACs and by aggravating conflicts with neighbours. Several board members recalled being publicly attacked at AC gatherings on the basis of such suspicions.

Distrust was not confined to relations within a single AC. It extended between water communities, particularly where they competed for scarce resources. Every major approval risked provoking rumours about hidden participants and the terms of informal agreements behind successful applications. These rumours were repeated in several interviews and even led some interviewees to refuse to cooperate with other water communities.

The weakening of social cohesion and transparency also spilled over into individual behaviour. AC members were heterogeneous in occupation, socio-economic background and lifestyle, and did not necessarily share many overlapping social institutions. This diversity, combined with low participation in meetings, inevitably undermined control mechanisms and hampered communication within the group. Interviewees provided diverse examples; they included the sudden achieving of significant savings after moving finances to a bank account, a plumber charging meters without installing them, members sharing access points to avoid payments, and a president resigning, leaving the water community without a legal title or treatment plant but burdened with high debt.

Relations between water communities and other rural residents also proved neither inherently peaceful nor mutually beneficial. Several ACs reported disputes over agricultural practices that threatened their water sources. Despite efforts to raise awareness of these issues, the disputes remained unresolved. In one case, an AC's springs and installations were located on private land. While the heirs of the former landowner wanted the installations dismantled, they could not altogether deny the community's right to water. Unable to stop usage directly, they let cattle graze around the springs, contaminating the community´s water source. Despite clear evidence of microbiological contamination, the AC continued using the water without filtration because the springs provided a rare continuous flow of crystal clear water. Another AC was asked to support the creation of an upstream AC but abandoned the plan when neighbours violently resisted the installations. A third AC discovered an illegal intake near their own installations but withdrew their complaint after receiving threats. These cases illustrate how rural residents were unable to request or obtain external assistance in disputes concerning their access to potable water, thus leading to their subjugation to the unfavourable circumstances.

In general, the interviews were characterised by descriptions of complex negotiation processes and considerations. The AC representatives articulated these with emotional intensity. Some respondents cited the well-documented low participation rate (Engler et al., 2021; Dobbin and Sarathy, 2015) as evidence of the inherent contradictions of community-based water management initiatives. While the respondents described the rewards of community work, they also highlighted the demands it placed on them. The president's position in particular was found to be almost unavoidably conflictual, as presidents were personally responsible for the management and administration of the water network and also for the ambiguous, power-ridden negotiations for social and economic resources inside and outside the community.

In one of the ACs studied, the perception emerged that functional local organisation and national drinking water co-production were mutually exclusive. In that case, the municipal government claimed to have transferred funds that never appeared in the AC's bank account; this caused the AC to disengage entirely from interactions with state institutions as the incident gave rise to rumours that its representatives had misappropriated the missing funds for personal gain. Although unsubstantiated, these suspicions created a climate of mistrust that led the board to conclude that withdrawing from formal co-production was the only way to preserve the organisation's internal stability. The AC therefore returned to its original autonomous structure, as members felt that the community's social functionality could be safeguarded only through close-knit interactions and a renewed sense of shared responsibility among all members (Interview: Secretary AC4, 13 April 2023).

Water communities' strategies for changing the rules of drinking water co-production

Withdrawal from co-production may offer a decentralised solution, but it does not fundamentally improve the position of water communities. Recognising this, Colombian ACs, much like their counterparts in other countries (Romano, 2016; Hutchings, 2018; Hoogesteger et al., 2023; Nicolas-Artero, 2016; Naves and Varela-Álvarez, 2021), have formed a representative network that acts as a unified counter-voice to the state in public discourse. Pareja-Pineda's (2025) conceptualisation helps to explain this strategy. He identifies two key dimensions of participation in co-production, that is, communication and empowerment, and suggests that both of these can be measured by their intensity and consequences. In the Colombian case, ACs lack institutionalised mechanisms that would enable meaningful participation in co-production, specifically communicative and empowering channels within implementation spaces. As a result, they resort to political campaigning, a strategy that allows them to expand their communicative reach and strengthen their collective capacity in order to reshape the political and legal framework governing water provision.

The mobilisation and activation of public support is framed around an idealised set of values that is attributed to community-based water organisations (Cunningham et al., 2019). In bridging the gap between their strength of unity and the necessity for openness and collaboration, the water community network bases its legitimacy on what we refer to here as "civic values". This networked, homogeneous civic-values frame supplies a credible public identity with which to confront the state. As stated in *Red Nacional* (2017: 5), "We are ancestral heritage and cultural construction and one of the richest expressions of participative environmental management that exists in our country".

In Colombia, this framing alters the scope of public debate. By presenting themselves as committed to "peace-building practices" that are grounded in democratic negotiation within the group and in public life, water communities simultaneously visualise marginalisation and empower marginalised groups through self-representation. The result is a discursive intervention that places basic resource provision within a broader civic and rights-based agenda.

This symbolic convergence is politically effective but analytically distinct from the heterogeneity of rural dwellers whose practices and interests are more varied than permitted by this unified image. By foregrounding unity and civic virtue, the framing limits how much internal contestation can be voiced

without undermining the foundation of public legitimacy. This unity-centred representation makes it difficult to address complex behavioural issues that emerge under resource scarcity, such as clientelism or favouritism, because these practices contradict the civic values the movement claims to embody. As a result, such contradictions are largely absent from public debates where inclusion, transparency and cooperation are presented as guiding principles. The publications of the *Red Nacional de Acueductos Comunitarios* illustrate this pattern. Their 2017 report mentions corruption only once and the questions of clientelism and political favouritism are absent. In the 2020 report, they are referred to obliquely but never explicitly addressed. This selective omission reflects not a blind spot, but a deliberate strategy of communication that is designed to avoid self-discrediting disclosures while the movement consolidates its role. Public campaigning thus creates opportunities to gain a more central place in shaping co-production, while postponing engagement with internal contradictions until conditions for open discussion are more favourable.

Analysing the gap: The social science perspective

While the homogenising self-representation of water communities in political activism is strategically expedient, a parallel dilemma is visible in the scholarly literature. We suggest that this stems from the preconditions that shape research design and case selection. Commons scholarship tends to privilege functioning arrangements and positive deviance, precisely because such cases are rarer and analytically richer. As a result, social cohesion is often overrepresented in accounts of community-based management (Llano-Arias, 2015; Euler, 2020; Cadavid Giraldo, 2009). This helps to explain the discrepancy between the results from our literature research and what our informants reported. Across interviews, AC representatives emphasised conflict and exhausting day-to-day negotiation, even as they described largely successful service delivery. The Colombian ACs studied here are unlikely to be exceptional in this respect; indeed, comparable sentiments are noted by Nicolas-Artero (2016) for Chilean water communities. In Costa Rica, Dobbin and Sarathy (2015) show that representatives of water associations lack the time and resources to meet community requirements, while Kuzdas *et al. (*2016) analyse why disputes over water there escalated violently among civil society groups.

A second explanation concerns the difficulty of verifying implementation gaps and seldom-debated practices under conditions of data scarcity. In Colombia, communities, state agencies and researchers often rely on the same limited evidentiary base. A striking example is the oft-cited estimate that approximately 12,000 community-based providers supply water to rural Colombia (Domínguez-Rivera et al., 2016; Bernal et al., 2014; Llano- Arias, 2015; Ramírez et al., 2011; Delgado-Serrano et al., 2017; Cadavid Giraldo, 2009). The rounded character of this figure, repeated for decades, renders it self-referential and weakly grounded empirically; this is particularly true since the SSPD receives data from fewer than 1000 providers (Minvivienda, 2018). Where official reporting is thin and research must lean on reiterated numbers, blind spots about everyday frictions and informal adaptations are likely to persist.

A third factor is ethical and practical. Researchers engaged in fieldwork often empathise with their study subjects and try to avoid exposing them to harm or jeopardising relationships. This tendency is amplified in Colombia, where social organisation is officially risky yet indispensable for marginalised groups (Holmes and Gutiérrez de Piñeres, 2022). Such protective postures may contribute to the scarcity of analyses that foreground contradictions in community-based provision. Gómez Rey (2023) illustrates this dilemma. In *Derecho Regateado*, he traces how representatives of a Colombian AC negotiate legal frameworks, and he explicitly situates himself sympathetically after extended participant observation. His account privileges negotiation while omitting discussion of legal violations, civil conflicts and the contentious interactions that co-produce those negotiations. He notes, for instance, repeated damage to AC pipes by new residents not connected to the network and acknowledges that some conflicts are inaccessible to AC representatives because potentially armed actors are involved, but he does not treat these situations as central to analysis (Gómez Rey, 2023*:* 252 ff.).

Precisely because *both* drinking water co-production partners in Colombia have strategic reasons to avoid airing the full complexity of rural water supply in public, there is a risk that research will reproduce these silences. Our position is that rigorous analysis need not expose or endanger community representatives; rather, by tracing how informal and 'declared illegal' practices intersect with formal provision, scholarship can document the side effects that heighten the vulnerability of volunteers and deepen rural marginalisation. In this sense, systematic attention to the shadowed zones of implementation can mitigate risks by offering communities an evidentiary base and a shared language with which to articulate their constraints in political discussions and propose reforms that recognise both their needs and capacities.

CONCLUSION

The article analysed the findings of a case study examining seven community-based water providers (ACs) in Cundinamarca, Colombia. While ACs are indispensable for achieving universal access to water in rural Colombia, they are incorporated through a compliance-oriented framework that undermines their operational realities, social cohesion and long-term sustainability. Our case studies show that most ACs operate in a space of partial legality as a result of high bureaucratic hurdles, inconsistent support and an institutional logic that values formal reporting over lived functionality. Although the Colombian government offers support to community-based water providers in its official communications, the implementation fails to address the root causes of marginalisation and the unique features of collective water provision and organisation. Initially, most ACs attempt to fulfil the established procedures for interacting with government institutions, but they often fail due to restricted access to support. Representatives, who are often volunteers with limited resources, must act simultaneously as administrators, negotiators and political intermediaries, which are roles that carry personal and collective risks. While informal political trade-offs sometimes secure short-term resources, they also erode trust within and between communities, weakening the very mechanisms of transparency and participation that underpin effective common pool resource management.

National policy framing reinforces these tensions by presenting water co-production as a technical success story, obscuring both the uneven distribution of support and the exclusion of community voices from policy design. Governmental reliance on aggregated figures further perpetuates a planning process that is disconnected from the lived realities of rural provision. In an effort to counteract this dynamic, ACs have joined forces to establish a national network. This network advocates water communities' policy positions in public discourse, as they aim not only to execute the national drinking water co-production strategy, but also to participate strategically in its implementation design. Taken together, the findings recast Colombian drinking water co-production less as a settled institutional design than as an ongoing, improvised equilibrium, built and maintained by volunteers who must constantly balance technical provision, administrative demands, local politics and social relations. Thus the central policy implication is that if the Colombian state intends ACs to be durable partners in guaranteeing the human right to water, the architecture of co-production must shift from control to capability and away from front-loaded compliance and towards predictable, accessible, capacity-building support that matches the realities of volunteer-run organisations.

Further research is needed, not only on the consequences of informality in community-based resource provision, but also on potential pathways to gradually overcome it. This includes exploring how state/community resource co-production can operate at varying levels of intensity while respecting communities' aspirations for autonomy and identifying institutional arrangements that can function as effective transparency mechanisms.

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