Can informal water vendors deliver on the promise of a human right to water? Results from Cochabamba, Bolivia

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Abstract

We examine the role of informal water vendors in the urban poor's efforts to secure safe and affordable water in the squatter settlements of Cochabamba, Bolivia. Using an economic justice framework, we evaluate (1) how informal water markets operate, (2) differences in client and vendor perceptions of distributive, procedural, and interactional (in)justice, and (3) how cooperation among water vendors impedes or assists in achieving justice in water delivery. The research includes a comparative institutional analysis of three key data sets: long-term participant-observation in water-scarce squatter settlements; interviews with 12 water vendors; and interviews with 41 clients from 23 squatter settlements. We find that informal water vendors organize themselves to safeguard distributive justice (e.g., fair pricing, good water quality), but clients are distressed by procedural and interactional injustices (e.g., unreliable and inequitable service). Our research also shows that unionized vendors are more effective than non-unionized vendors in creating and enforcing rules that advance distributive, procedural, and interactional justice. We make concrete recommendations for improving justice in informal water markets, including a larger role for unions and community consultation. We conclude that, despite challenges, the informal economy may play an important role in advancing the human right to water.

Keywords

Informality; informal economy; water vendors; unions; privatization; small-scale; Cochabamba

Acknowledgements

This research has been supported by: the U.S. National Science Foundation (NSF) under Grant BCS-0314395, NSF Decision Center for a Desert City Project under Grants SES-0345945 and SES-0951366, Fulbright-IIE, the Tinker Foundation, Paul and Polly Doughty, the University of Florida's Center for Latin American Studies and Department of Anthropology, and Arizona State University's President's Initiative under the Late Lessons from Early History program. We thank our collaborators in Cochabamba, particularly Wilda Valencia, Richard Aguilar, and Wilfredo Valencia, for their wisdom, help, and camaraderie. We are grateful to the residents of Cochabamba's Zona Sur and the water vendors who serve them for sharing their time and experiences with us.

1. Introduction

The human right to water was established in international law in 2010, and has been increasingly adopted in national laws, as in South Africa and Bolivia (Meier et al. 2013, Harris and Roa-García 2013). This right to water ensures universal “safe, clean, accessible and affordable drinking water” (United Nations Resolution 64/292 2010). Yet, even when a right to water is recognized, there often remain practical difficulties in extending this right to citizens (Miroso and Harris 2012, Mehta 2006). In cities, 700 million people lack piped water access at home; the number of people who lack affordable, high-quality, and stable supplies of water is likely much higher (Mitlin and Satterthwaite 2013). Recent global efforts, such as the Millennium Development Goals, made considerable gains in improving urban drinking water access (United Nations 2014). Yet many squatter settlements, shantytowns, and slums are excluded from municipal water infrastructure—and are expected to remain so for the foreseeable future (Mehta et al. 2014, Fox 2014, Njiru 2004).

The informal economy has long bridged the gap between urban services delivered and those needed (Portes and Haller 2010). The informal economy was originally conceptualized as economic activities that occur outside of the purview of the government regulation, oversight, and taxation (Hart 1973). Recent research has enlarged our understanding of informality as a “mode of urban governance” (Cheng 2014: 57), in which governments allow and even encourage the development of unofficial service provision for underserved populations (Roy 2005). In squatter settlements, shantytowns, and slums, the informal economy provides the urban poor with an alternative avenue for obtaining affordable housing and urban services such as water, sanitation, transportation, and trash collection (Roy 2005, De Soto 1989). Once seen as an undesirable but temporary solution (e.g., Zaroff and Okun 1984), informal service provision is

increasingly viewed as a necessary and acceptable mode of urbanism—and one that cities must attempt to plan for and manage (Marston 2014, Gerlach and Franceys 2010, Roy 2005). In this paper, we examine the role the informal economy plays in the urban poor's efforts to secure safe, clean, accessible and affordable water in the squatter settlements of Cochabamba, Bolivia.

2. Theoretical Review

Water vendors in the informal economy are the primary source of water for the urban poor in much of the Global South (Kjellén and McGranahan 2006, Njiru 2004, Collignon and Vézina 2000) and in parts of the Global North (Jepson and Brown 2014). Informal water vending, which is well-documented in the historical record (Wutich and Brewis 2014), reemerged in the global spotlight after the World Bank's push for water privatization in the late 1990s (Goldman 2007). Since then, informal water vendors have been relabeled "small water entrepreneurs" (SWEs) or "small-scale private service providers" (SPSPs or SSWP), names that acknowledge their central role in urban water provision and privatization (Solo 1999, Snell 1998). Our focus in this article is on distributing vendors, the subset of water vendors who sell water door-to-door using tanker trucks and other transport devices (Whittington et al. 1989). Despite widespread recognition of the importance of water vending, the phenomenon historically has been understudied—both theoretically and empirically—in the academic literature, largely due to the hidden, unfixed, and unregulated nature of the informal economy (Opryszko et al. 2009, Bakker 2007).

One question that has received abundant scholarly attention is: Are the prices informal vendors charge for water fair or unfair? The high price of water sold by distributing vendors has been established indisputably; estimates for the cost of vended water typically range from 4 to 30

times the cost of municipal water (Olajuyigbe et al. 2012, Bayliss and Tukai 2011, Kariuki and Schwartz 2005, Opryszko et al. 2009, Solo 2003, Collignon 1999, Snell 1998, Crane 1994, Zaroff and Okun 1984). Early studies assumed that the high price of privately delivered water was the result of vendors' abusive pricing practices (Kjellén and McGranahan 2006). Later studies, which closely examined vendors' initial investments and operating costs, concluded that many vendors made only a relatively modest profit (Opryszko et al. 2009, Kariuki and Schwartz 2005, Collignon and Vézina 2000, Solo 1999; cf. Whittington et al. 1991). Blame for high water prices consequently shifted away from water vendors and toward the broader governance practices that exclude the urban poor from municipal water systems and subsidies (Cheng 2014, Kjellén and McGranahan 2006, Njiru 2004, Collignon 1999, Solo 1999).

Unlike pricing, questions about the quality of vended water—including its microbial and chemical content—remain largely unresolved. Several studies indicate that informally vended water poses significant human health risks and is often much lower quality than municipal water (Olajuyigbe et al. 2012, Kjellén and McGranahan 2006, Whittington et al. 1989, Zaroff and Akun 1984), particularly when water sources are unregulated or water carrying equipment is unsanitary. A few studies have found, in specific sites, that informally vended water quality was comparable to or better than other local sources of water (e.g., Collignon and Vézina 2000, Solo 1999). There have been calls for more research to determine the material and institutional conditions that assist informal vendors in accessing and distributing high-quality water (e.g., Opryszko et al. 2009), but no conclusive answers have been identified.

These questions, which have dominated the literature on informal water vendors to date, have been focused on just one dimension of a human right to water: distributive justice. Distributive justice deals with fairness in outcomes such as water costs, quantity, or quality

(Walker 2012, Schlosberg 2007). Yet, a human right to water must also address the two additional dimensions of justice: procedural and interactional (Mehta et al. 2014, Boelens and Seemann 2014, Berg and Mugisha 2010, Syme and Nancarrow 2006, Syme et al. 1999). Procedural justice addresses fairness in the rules and norms that determine distributive outcomes (Schlosberg 2007, Wutich et al. 2013). Interactional justice (also called “recognition” or “dignity”) addresses fairness in the social interactions through which procedural rules are enacted and distributive outcomes are determined (Schlosberg 2007, Wutich et al. 2013). While there has been little systematic research on procedural and interactional justice in informal water vending, the literature does contain some relevant observations.

Procedural injustices in informal water vending might stem from the political rules or economic norms that govern the availability and allocation of water. In competitive markets, informal water vendors have an incentive to create procedures that offer client-oriented solutions to water distribution problems (Solo 2003, 1999, Collignon and Vézina 2000). Informal water vendors may offer their clients, for example, choices in the timing or frequency of water delivery, different options for billing or payment plans, and the possibility of buying water on credit (Kariuki and Schwartz 2005, Njiru 2004, Solo 2003, 1999). While client-oriented procedures can improve water delivery services—potentially in socially just ways—it is unclear how common they are or which clients benefit from them. Given the lack of regulation and oversight in the informal sector, competition may not always play an adequate role in protecting clients’ rights. For example, informal water vendors have been found to commit procedural injustices such as blocking competitors from entering the market, deviating from fair pricing practices and engaging in price-gouging, and cutting off entire less-profitable communities from water service (Collignon 1999, Crane 1994, Whittington et al. 1991).

Interactional injustices in informal water vending include interpersonal experiences of discrimination, mistreatment, or denial of water service. In a competitive market, informal water vendors have a strong economic incentive to treat clients well (Kjellén and McGranahan 2006, Collignon and Vézina 2000, Solo 1999), lest they take their business elsewhere. Compared with municipal utilities—which, Collignon (1999) notes, may exclude certain people completely—informal vendors appear more likely to provide their clients with responsive, reliable, and flexible service (Bayliss and Tukai 2011, Kariuki and Schwartz 2005, Njiru 2004, Collignon and Vézina 2000, Solo 1999, Snell 1998, Crane 1994). There is also some evidence that, particularly when vendors live in the impoverished neighborhoods they serve (Kjellén and McGranahan 2006), they may be better able to build trust with clients (Kariuki and Schwartz 2005) and may be willing to engage in charitable work such as hauling water for free to local schools (Solo 2003). Yet, as discussed above, we know virtually nothing about whether these benefits are distributed equitably and which clients might be excluded. Informal water vendors have been found to commit interactional injustices, such as denying high-quality service or refusing outright to deliver to less-wealthy clients (Collignon 1999). In the absence of governmental regulation or oversight, it is difficult to know how widespread these interactional injustices might be.

In sum, the literature indicates that informal water markets pose a paradox: they have the potential to deliver water to the poor in socially just ways, but at the same time they can trap the poor in highly unjust water delivery arrangements. What might explain the success or failure of informal water vendors, in the absence of governmental regulation and oversight, to deliver water in just ways? Some observers have suggested that cooperative organizations (e.g., unions or trade associations) can help informal water vendors self-regulate water prices, monitor the

quality of water distributed, and innovate improved services (Collignon and Vézina 2000, Solo 1999). Such organizations can provide a forum for informal water vendors to cooperatively agree on just rules and norms for water delivery. Yet, there is also evidence that cooperation among informal water vendors can result in serious injustices. Some forms of cooperation among informal vendors—ranging from collusion to monopoly-formation—have been linked to distributive injustices (e.g., sale of low-quality water), procedural injustices (e.g., cutting off competitors and communities), and interactional injustices (e.g., denial of service to impoverished clients) (Collignon 1999). Thus, there is a need for empirical research that explores the role that cooperative organizations, such as unions, can play in creating socially just informal water markets.

In this study, we seek to address two major gaps in the literature on informal water markets. First, we examine how informal water markets operate, with an emphasis on distributive, procedural, and interactional (in)justice in informal water markets. Second, we explore the role of cooperation (i.e., unions) among informal water vendors in preventing or perpetrating distributive, procedural, and interactional injustices. To do so, we focus on the well-known and highly-publicized case of water delivery in Cochabamba, Bolivia.

3. Research Setting

Cochabamba's "Water War" put Bolivians at the center of a global debate about the ethics and efficacy of water privatization (Perreault 2006, Driessen 2008, Bakker 2008). When the Bolivian government granted control of Cochabamba's water system to the private consortium Aguas del Tunari, the terms of the agreement were designed to address Cochabamba's physical scarcity of water and the exclusion of wide swaths of the city from the

municipal water system (Israel 2007). Tariff increases and changes to the tariff structure preceded the planned infrastructural improvements, and enormous protests formed against the tariff changes and, ultimately, the privatization deal (Israel 2007). In 2000, the protesters convinced the Bolivian government to reverse the concession. The protesters' success has become a rallying point for anti-privatization activists globally; locally, the protesters' slogan "Water for All!" continues to animate Cochabambans in their ongoing fight for a right to water.

While Bolivians have made much progress since 2000—including recognizing a human right to water (Baer 2014)—rates of water coverage have worsened for Cochabambans at all income levels, and 74% of the poorest quintile of Cochabamba's residents lack access to municipal water service (Hailu et al. 2012). Most of the underserved communities are semi-legalized squatter settlements in the impoverished south-side of the city, where surface water is scarce, seasonal, and extremely polluted. In one such community, 72 percent of households survived on less than 50 liters of water per person daily, the minimum human requirement (Wutich and Ragsdale 2008). Nearly 60 percent of households regularly lacked water for washing and bathing; over 30 percent of households were unable to cook meals due to water scarcity. As a result of water insecurity, people in south-side Cochabamba report suffering lost income, stigma, dehydration, intestinal disease, and emotional distress (Wutich et al. 2015).

Major initiatives with significant international support have been proposed and funded to address these water inequities, but have been undermined by corruption and low civic participation (Driessen 2008, Bakker 2008, Dobson and Ramlogan-Dobson 2012). Many communities built commonly managed wells and water systems, only to have them run dry after a few years due to groundwater scarcity in the southern Cochabamba Valley (Marston 2014, Wutich 2009, Bakker 2008). Given the repeated failure of these groundwater systems,

communities have increasingly turned to a new solution: purchasing or leasing tanker trucks and collectively arranging to import water from formal and informal water sources (Njiru 2004) on Cochabamba's water-rich north side (West 2014, Mehta et al. 2014, Wutich et al. 2015). While these community-based solutions are promising, they are also relatively new and most households lacking municipal service remain partially or wholly dependent on informal water vendors. So long as informal water vendors are the main water source for these households, it is important to understand how these vendors work and what can be done to support improvement of their services for those who are so dependent upon them.

In Cochabamba's informal water market, vendors sell to businesses, communities that are unconnected from the municipal water system, and connected households with unreliable water service. In the impoverished south-side communities, there are too few vendors selling too little water to meet the needs of the ever-growing population (Wutich 2007). Distributive injustices, including high water prices and poor water quality, are reportedly common (Mehta et al. 2014). To address water quality, Cochabamba's Departmental Health Service instituted a system of registration and equipment checks; however, an unknown number of informal water vendors and water sources remain outside of this regulatory system (West 2014). Even less is known about procedural and interactional justice in Cochabamba's informal water market. A few reports indicate that wealthier buyers obtain better service, while impoverished buyers or those who live in inaccessible communities struggle to obtain even a minimal allotment of water (West 2014, Wutich 2007). Potential procedural and interactional injustices documented include clients going days without service, unable to buy water because they are too poor, being refused service because they lack large storage capacity, and being forced to beg vendors to deliver water to them (West 2014, Wutich and Ragsdale 2008). The existence of one independent union for

informal water vendors is documented (West 2014), but nothing is known about any rules or norms they may have established for water delivery.

As Bolivian water scholar Rocio Bustamante explains (in West 2014: 50), the informal water market is an “area that hasn’t been studied because it is very difficult to gain access to the sector, they [the vendors] are not very open to giving information, and usually turn away people who want to study their work.” In this paper, we study Cochabamba’s informal water sector using ethnographic methods including interviews with informal water vendors, interviews with their clients, and long-term participant-observation. Given the difficulty of studying informal water markets (and, particularly, documenting injustices committed by informal water vendors), our approach is designed to use data from multiple sources to increase the validity and reliability of our findings.

4. Research Questions and Research Design

The broad purpose of this paper is to examine distributive, procedural, and interactional (in)justice in Cochabamba’s informal water markets. Specifically, we address the following three questions:

1. How do informal water vendors operate?
2. To what extent do informal water vendors and their clients see water vending practices as delivering distributive, procedural, and interactional justice?
3. What role does cooperation, in the form of vendors’ unions, play in preventing or perpetrating distributive, procedural, and interactional injustices?

This research draws on over ten years of ethnographic research on water provision in Cochabamba’s squatter settlements. Following Bayliss and Tukai’s (2011) recommendation for

researching informal water vendors, we draw on multiple data sources. To address the first question, how informal water vendors operate, we examine data from participant-observation and interviews with clients and informal vendors. To address the second question, the role of justice in water vending, we analyze data from interviews with clients and informal water vendors. Throughout our analysis, we use long-term participant-observation to provide a check on the different perspectives and biases inherent in each dataset. To the extent possible, we have also corroborated our findings with information published by local newspapers (such as *Los Tiempos*), governmental and non-governmental agencies (such as the *Comité de Agua de Villa Israel* and *Agua para el Pueblo-Bolivia*), and research units (such as the *Centro de Documentación e Información Bolivia*).

5. Research Methods

(a) Data Collection

Ethnographic research

[First author] has conducted ethnographic research in two Cochabamba squatter settlements since 2003. Villa Israel was selected to represent less-established and poorer settlements at the city's fringe; Valle Hermoso was selected to represent long-established and better-off settlements nearer the city center. Both communities were denied municipal service; both designed, funded, and built community-based groundwater systems. Groundwater scarcity severely compromised both water systems—Villa Israel's street-side tapstands (i.e., communal faucets) suffer frequent shortages, while Valle Hermoso's residential plumbing is defunct—leaving residents of both communities dependent on informal water vendors. Participant-observation data were collected in field notes and records of open-ended interviews. The

ethnographic research also included interviews in randomly-selected households, direct observation, diary and recall reports of water acquisition and use, scales to assess water insecurity, health data, and economic experiments. These findings ([First author] 2007, 2009a, 2009b, [First author] and Ragsdale 2008, [First author] and Brewis 2014, [First author] et al. 2013, 2015) inform the interpretation of participant-observation data reported here.

Interviews with informal water vendors

[Third author] conducted interviews with 12 informal water vendors (6 non-union vendors, 6 union vendors) in Cochabamba. Respondents were recruited at water collection points, through word of mouth, and via contacts with community associations. As Whittington and colleagues (1991) and Bustamante (in West 2014) note, informal water vendors tend to be very wary of researchers; we too found this to be the case in Cochabamba. It took enormous effort to recruit these 12 participants. While our vendor sample is small, it does meet the minimum size needed to detect themes in qualitative research, which ranges from 6-14 interviews (Guest et al. 2006, Francis et al. 2010, Galvin 2014). Our interviews with informal water vendors addressed: water sources, water quality, business costs, water pricing, delivery routes, labor arrangements, union rules, and relationships with clients. For some sensitive topics, data elicited are partial (i.e., union rules for routes and timing) or missing (i.e., breaking relationships with regular customers) from the vendor dataset. For these topics, we rely more heavily on data from client interviews and our own observations.

Interviews with clients of informal water vendors

[First author] conducted interviews with 41 residents of 23 water-scarce south-side communities in Cochabamba. Recruitment was designed to ensure that residents representing as many Cochabamba squatter settlements as possible were interviewed. Selection criteria required

that respondents lack municipal water service at home. All respondents were women, as past research indicates that women are primarily responsible for water acquisition and allocation in south-side Cochabamba ([First author] 2012). This dataset is derived from a larger study that examined cross-cultural perceptions of justice in water institutions ([First author] et al. 2013). Interviews included in-depth questions on respondents' water sources, water quality, water service, water consumption, water and (in)justice, coping strategies, and demographics. In this analysis, we focus on responses that pertain to informal water vending and (in)justice in Cochabamba communities that lacked municipal water service.

(b) Data Analysis

Institutional analysis: How informal water vendors operate

To determine how informal water vendors operate, we performed an institutional analysis to identify rules and norms in informal water markets (Casson et al. 2010). According to Ostrom (2009), rules and norms are both prescriptions for behavior; rules have formal penalties for non-compliance while norms do not. Based on Ostrom's conceptual definitions, we then developed code definitions following the method of MacQueen et al. (1998). The code definitions included inclusion criteria, exclusion criteria, typical exemplars, and atypical exemplars. We pretested and revised the codes until inter-rater reliability, as measured by Cohen's kappa, was good or better ($K \geq .7$): $K = .78$ for the rules code and $K = .89$ for the norms code. We then coded the interview data collected from clients and vendors to identify the rules and norms informal water vendors used for collecting and distributing water. We supplement these results with additional information gleaned from participant-observation. Costs and measures reported reflect market conditions in 2011.

Coding and comparison: Distributive, procedural, and interactional (in)justice

To assess justice in informal water vending, we developed codes designed to identify statements, whether positive or negative, about distributive, procedural, and interactional justice. We defined distributive justice as pertaining to outcomes, procedural justice as pertaining to (un)fairness in rules and norms, and interactional justice as pertaining to interpersonal interactions (Schlosberg 2007, Walker 2012, Cohen-Charash and Spector 2001). Again, following the method of MacQueen et al. (1998), we defined codes, iteratively tested inter-rater reliability, and refined our codebook. For the final codes, inter-rater reliability, as measured by Cohen's kappa, was good or better ($K \geq .7$): $K=1.0$ for distributive justice, $K=.71$ for procedural justice, and $K=.78$ for interactional justice. Once the coding was complete, we performed a systematic comparison of coded interview segments within the same group and across groups (Boeije 2002). In the results, we report on thematic trends and provide exemplar quotes from both client and vendor perspectives (supplemented with our own observations, as appropriate) to give a complete view of justice in informal water vending.

Coding and comparison: Union vs. non-union informal water vendors

To assess the role of cooperation in shaping informal water markets, we compared coded statements about rules, norms, and justice made by informal water vendors who were and were not affiliated with unions. The union group included one union leader, three established union vendors, and two vendors who were in the process of organizing or joining unions. To compare the perspectives of union and non-union vendors, we again performed systematic comparison of coded segments within and across groups. This enables us to directly compare the different rules and norms the vendors adhere to, focusing particularly on those that were relevant to concerns

about (in)justice in water vending. Where possible, we supplement this analysis with data gleaned from participant-observation.

6. Results

Many communities in Cochabamba's *Zona Sur* (Southern Zone) are excluded from Cochabamba's Municipal Service for Potable Water and Sewage (known locally as SEMAPA), forcing residents to buy water from water vending trucks. The number of water vending trucks operating in these communities is unknown. The governmental agency charged with overseeing informal water vendors, the *Unidad de Saneamiento Ambiental* (Environmental Health Unit), estimates that there are at least 200 trucks in circulation. The vendors themselves estimate that there are 300 non-unionized vendors—also known as *independiente* (independent) or *pirata* (pirate) vendors—and 30 unionized water vendors operating in Cochabamba.

(a) How informal vendors operate

How is water distributed?

Water scarcity, both physical and economic, is a serious problem throughout south-side Cochabamba. To obtain water for vending, the truck drivers recharge their 10,000 liter cisterns from privately-owned wells located in the alluvial fan systems in the mountains that ring the north side of the Cochabamba valley. Reloading the truck costs only about 30 bolivianos in water; long travel times (30-45 minutes) needed to traverse the 15 kilometers between the north and south sides of the city make gas expenditures and wear-and-tear from rough, rocky dirt or cobblestone roads the major costs of doing business. Typically, each water vendor will reload four or five times a day.

The basic unit for water vending in south-side Cochabamba is the *turril* (barrel), which contains 200 liters of water. Over the last 10 years, the price of a *turril* of water has risen from 4 bolivianos (\$0.58 USD) to 5 bolivianos (\$0.72 USD), excepting a brief period in 2010 (called the *gasolinazo*, or gas price hike) in which the Bolivian government temporarily cancelled gas subsidies and the cost of a *turril* of water rose as high as 10 bolivianos (\$1.45 USD). Regular water prices do depend, to some extent, on the volume purchased. The most impoverished clients own only one *turril*, typically a rusty metal or reused plastic barrel. The 200 liters of water that the *turril* contains typically will last at most four or five days, and some families may buy water as often as three or four times a week. In contrast, better-off families invest in building a *tanque*, or concrete-lined underground storage tank, that stores between 2,000 and 10,000 liters of water. Households with a large *tanque* typically pre-order water once a month at a bulk rate of 12 bolivianos (\$1.74 USD) per cubic meter (i.e., 2 bolivianos (\$0.29 USD) per *turril*). Given that many south-side residents are employed in low-cost, unstable work (e.g., day labor, street vending), impoverished households often find themselves without the 5 bolivianos they need to buy water—or having to choose between water and other necessary expenditures (e.g., food, transportation to work).

In addition to water scarcity, water quality is a serious worry for south-side Cochabamba residents. Most of the vendors' clients have no idea where their water comes from and what contaminants it might contain. The water they receive is sometimes turbid or green. Vendors, however, are aware of a multi-level system of water quality checks. Cochabamba's Environmental Health Unit reportedly tests water quality regularly at the wells. Additionally, at least 150 trucks have undergone tests, administered by the Environmental Health Unit in 2011 and 2014, to ensure that they meet minimum standards for safe water transport (e.g., anti-

corrosive paint, clean water tanks, hoses in good working condition). After paying a 100 boliviano (\$14.74 USD) fee, water vendors were issued a sticker for their front windshields as proof that they passed these inspections. Historically, the system has not worked well. Clients have been largely unaware of the stickers or their significance. A large number of trucks, estimated between 50 and 150 of those in circulation, have not undergone inspections. And, reportedly, some vendors obtain water from unmonitored water sources (e.g., wells, surface water) or those that are known to pose health risks (e.g., E.coli). Thus, despite municipal programs—and vendors’ own efforts—to control the quality of water distributed in south-side Cochabamba, clients have long been at risk for consuming water that contains microbial and chemical contaminants.

How are procedural decisions about water distribution made?

For each water truck in circulation, there are as many as four men drawing a profit: the truck’s owner, the driver, and the helper(s) who manage the hoses. The incomes of owners, drivers, and helpers are all tied—under various payment schemes—to the amount of water the truck distributes, which is a function of the number of trips the truck takes in a day and the speed with which the driver and helper(s) can divest themselves of each load of water. Obviously, every driver has an incentive to sell his water and refill his tank as quickly as possible.

After refilling their tanks, truck drivers typically start their route in Villa Pagador and begin working their way southward through the communities that lack SEMAPA service. From clients’ perspective, drivers do not appear to have set routes, delivery times, days of service, or durations of distribution. Indeed, many drivers report that, “there are no rules about where you can sell” and “sales are made freely.” Yet there are some general trends; in the summer, drivers

usually begin selling water at 4 or 5 am, while in the winter many clients do not seek out vendors until 6 or 6:30 am. Nevertheless, most drivers are free to choose the delivery schedule they believe will be most lucrative. As the drivers describe, “We have to search for sales” by beeping as we drive through the streets; our clients “come out and call to us” to sell water. Each day, “we go to the same neighborhood, and if there are not sales we go on to another one.” Some vendors report that, “we have *caseros* (regular customers) that buy from us each day.”

Water prices and other procedural issues are typically determined by agreement among water vendors themselves, in periodic meetings in which they discuss the costs of gas and truck repair. Several vendors explained that they also take into account the *canasta familiar* (market basket) when setting water prices. In the case of the *gasolinazo*, for instance, the crisis necessitated that vendors quickly call meetings and discuss the impacts of gas price hikes on water vending. Within one day, the vendors agreed that the price for one *turrit* of water should be raised to 8 bolivianos. While most vendors reportedly honored this agreement, some vendors charged as much as 10 bolivianos per *turrit*. After gas subsidies were put back in place, the vendors returned water prices to 5 bolivianos per *turrit*. Despite the effort vendors expended to set affordable water prices, there are reportedly few mechanisms for enforcing pricing rules.

How do interpersonal interactions shape water outcomes?

Given the lack of enforcement for pricing rules, not all water vendors charge set water prices. As some vendors say, “there has always been competition” and water prices “depend on supply and demand.” Personal circumstances and relationships determine, to a large extent, when and why clients pay more (or less) for water. Some truck drivers report that, “if the zone is remote or dangerous, [a water delivery] is worth more” than the set rate. Furthermore, water

vendors are rarely under any obligation to sell water to less-desirable neighborhoods or clients. Clients who live far from populated areas, on rough roads that may damage trucks, or who own only one *turril* may be repeatedly refused service before they find a vendor willing to deliver water to them. Compensating a water vendor for these added risks and costs may be the only way some clients can get water.

Given the uncertainty of the water market—both for vendors who need sales and clients who need service—many vendors establish *casero* (regular customer) relationships with their clients. This kind of client-vendor arrangement is common in informal markets throughout the Andes¹ and cross-culturally². *Casero* relationships are used to personalize market interactions. Once clients and vendors become *caseros*, the client has an obligation to buy preferentially from that vendor. In turn, the vendor has an obligation to give preferential service to the client. A *casero* relationship thus can ensure that the vendors have reliable clients along their routes, and that the clients will have a vendor on whom they can depend for regular service.

The *yapa*³ (a Quechua term describing an extra gift or bonus) is, traditionally, a hallmark of the *casero* relationship. In informal markets, vendors often give their clients a *yapa*, which both signifies the special relationship between them and also creates an imbalance that obligates the customer to return to that vendor for the next purchase. In informal water vending, the customary *yapa* is “the water that is left over in the hose [after the *turril* is full]; 20 liters more or less.” Many vendors explain that all clients ask for a *yapa*, whether or not they are *caseros*. As one vendor put it, “*Yapas* are customary for Cochabambans; we just give it to them.” Between *caseros*, however, the *yapa* obligation is somewhat greater. As one vendor explained, the *yapa* “depends on the *caseros*” because “while we give [a *yapa*] to everyone, the quantity varies—generally between one *tacho* (a 30 liter bucket) or two.” Additionally, clients described

variously as “consequential” (i.e., high status or a large purchaser) and “demanding” may receive larger *yapas*, ranging from 50-60 liters to 30% of the total sale. In this way, a client’s ability to establish a *casero* relationship or obtain larger *yapas* can enable them to reduce the cost of water from 5 bolivianos per *turrit* to as low as 3.85 bolivianos per *turrit*.

(b) Distributive, procedural, and interactional (in)justice

Having established the ways in which informal water vending works, we now analyze and compare perspectives from vendors and clients on distributive, procedural, and interactional (in)justice.

Distributive (in)justice

Among both vendors and clients, there is agreement that the exclusion of south-side communities from municipal water service is a major injustice. As the vendors see it, informal water vending would not exist if distributive injustices were not built into SEMAPA’s municipal water system. One vendor explained, for example, “In the Southern Zone...there are tapstands but SEMAPA does not reach them, so the water vending trucks go everywhere...The tapstands have no supply, and so every day there is business.” Clients, too, see both the general scarcity of water and specifically their exclusion from the municipal system as distributive injustices. As clients put it, “there should be water but there isn’t any,” “there ought to be water for everyone,” and “there need to be tapstands for everyone.” These statements clearly echo the Water War slogan “Water for all!” Yet, clients also feel that informal water vendors contribute to the water scarcity problem. They observe that the water “never arrives,” “we don’t know when they [vendors] will bring the water,” and “in a week, the water [vendors] at times come only twice.”

From the clients' perspective, distributive injustices result from the confluence of their physical marginalization to water-scarce lands, their exclusion from the municipal water system, and the informal water vendors' failure to deliver water in reliable ways.

Ensuring that water pricing is fair and just, yet profitable, is a major priority for water vendors. As the vendors explain, "In our meetings we decide [on water prices], but we try to keep prices low because we are all neighbors and we know each other; we know that we are not rich." From the vendors' perspective, many clients value their efforts to keep water prices affordable. As one vendor reported, "The clients understand. We bring water where SEMAPA won't; rather [than resent us], they are grateful that we take them water." In our own interviews and observations, clients rarely, if ever, claimed that water prices were unjust. Rather, clients lamented that they did not have enough money to buy water. As one client said, water costs "money, money, and we never have enough money." The case of the *gasolinazo*, when water prices jumped to 8-10 bolivianos per *turrit*, illustrates the way both vendors and clients view justice in water pricing. As previously noted, water vendors held emergency meetings to agree upon a fair price increase after gas prices skyrocketed. After the new prices were set, we were told some vendors reacted "badly! There were people who did not want to charge" those prices. The clients, we were told, reacted "worse. They didn't want to pay. They wanted to pay the same [as before]. But they did pay." Numerous water vendors told us that, despite clients' dismayed initial responses, "they continued buying [water] because they had no other option...without water there is no life."

Both vendors and clients agree that poor water quality is a major injustice for south-side residents. Some of the vendors we interviewed were very knowledgeable and highly concerned about water quality. As one vendor explained, "At these water sources [where the vendor refilled

his truck during the interview], the Environmental Health Unit has tested for water quality. They give us seals [pointing to the stickers on his truck and others]. The unregistered trucks are of dubious quality.” Several vendors stressed that these untested, unregistered trucks posed a danger to clients and, further, shook clients’ faith in the entire industry. Indeed, in our interviews and observations we found that clients were uneasy but largely uninformed about water quality. As one explained, “we don’t know where they [vendors] bring water from.” Others noted that “we don’t know if the water is contaminated.” While water quality is also a problem in the municipal system, the unknown origin of vended water was a particular source of fear and rumor among clients. We found no evidence that clients were, at the time of our observations and interviews, aware that some vendors undergo testing and others do not.

Procedural (in)justice

The unpredictable and chaotic way in which water is distributed in Cochabamba’s south-side communities is seen by clients as a major procedural injustice—one that clients often characterize as more distressing than distributive injustices. In south-side communities, transportation and other essential services are also provided through the informal economy. These services are organized—typically by a centralized vendors’ union—in an orderly and reliable fashion; this establishes a normative expectation for high-quality informal service provision that water vendors routinely violate. The lack of regular delivery schedule makes it impossible for clients to know when they will next be able to make a water purchase. Clients explain that, “sometimes they deliver the water at 5 am” and “sometimes at 10 am we are still waiting.” People regularly spend an entire morning crisscrossing the streets of their neighborhood in search of a water vendor, missing work and desperately needed income. “We

have to wait” to buy water, some clients report. Others say, “they only deliver water for a very short time” so “we are always waiting for water but it never comes.”

Even when they can find a water vendor, clients explain that “sometimes he just won’t stop” to sell water. Others report that “the water vendor turns his back on us” and refuses to sell water. Some vendors sell only to *caseros* (regular clients), those who have large water tanks, or those who live on easy-to-navigate roads. Since “we are completely reliant on the water vendors,” clients say, “we have to run around behind the water truck” and “we have to beg” the driver to sell water. It is common, throughout the streets of south-side Cochabamba, to see people running for blocks behind the enormous water trucks, shouting for drivers to please stop, only to be ignored or rebuffed. When the truck finally stops to dispense water to another client, the pursuers plead with the water vendor, saying “we have no water” or “my children have nothing to eat or drink.” This approach is sometimes successful, sometimes not. The trend occurs often enough to be considered, by clients, a basic feature of water acquisition procedures in their communities. Such experiences are frightening and humiliating for those whose survival depends on the water vendors’ deliveries; they also profoundly violate clients’ sense of justice and trust in the water vendors. For this reason, some simply say “it is unjust that we have to buy water from the water vendors.”

From the informal water vendors’ perspective, most of these procedural issues are necessary evils. As one opined, “Some people complain at the [honking] noise we make, but those are the people who have *tanques* [and can pre-order water deliveries]. Because, for those who buy in *turriles*, this is the only way for them to know that we are coming” to sell water. Among the water vendors we interviewed, there did not seem to be widespread recognition that the procedures they used to distribute water were a cause of undue hardship or perceived as

source of injustice among clients. Rather, the water vendors were focused on the need to establish procedures for cooperation and competition among themselves. As one vendor explained, such procedures ensure “there is no *miramiento* (a term which, in Andean usage, encompasses envy, gossip, and snubbing)” among informal water vendors.

Interactional (in)justice

Casero (regular customer) relationships are typically used, in informal markets throughout the Andes, to enhance clients’ feelings of recognition and dignity (i.e., interactional justice). *Casero* relationships can enrich market transactions by creating a personal connection; they can provide secure and stable trading partners; they can lower the cost of goods for regular clients by providing a *yapa* (extra gift). Among large-volume buyers with underground *tanques*, who can call *casero* vendors for water delivery appointments, there was a solid sense of satisfaction and interactional justice.

Yet, for other clients, *casero* relationships can be a source of profound feelings of violation and injustice. One reason for this is that some clients—mainly those with few *turrones* or homes in undesirable locations—are unable to establish a *casero* relationship with any vendor. Such clients told us, for instance, “only some people get to buy water; other water vendors don’t even want to sell us water.” More distressing than the refusal to initiate a *casero* relationship is the vendors’ practice—reported to us countless times by outraged clients—of cutting off from service *casero* clients who have bought from another vendor. As clients explain, “they are jealous. If we buy from one water vendor, the other one refuses us service.” Others reported, “if we buy from a new water vendor, the other punishes us permanently and refuses to bring us water.” Yet, from the client’s perspective, the vendors’ unpredictable delivery schedules make

seeking water outside of the *casero* relationship unavoidable. As all vendors and clients are aware, “water is life” and, when a household runs out of water, its survival depends on finding water. Thus, clients see some vendors’ refusal to deliver them water—especially when this is a punishment in the context of a *casero* relationship—as an appalling violation of their dignity and right to life.

The water vendors we interviewed volunteered no information about the breaking of *casero* relationships and showed little, if any, understanding of the concerns clients had regarding refusals of service. Rather, water vendors often professed strong feelings of solidarity with their clients. For instance, some vendors refer to their buyers as *vecinos* (neighbors) rather than customers or clients—a way of showing respect and calling attention to shared economic and regional origins. Vendors also portrayed themselves, to some extent, as advocates for and protectors of their clients. For instance, we documented a case in which a vendor worked on a community contract. (In this community-based innovation—designed to improve the cost and reliability of tanker-truck water delivery—south-side neighborhood water committees build large water storage tanks and contract with a water vendor to fill the tank.) Additionally, vendors have historically volunteered to provide water in emergency situations, such as firefighting. Client education is another need vendors say they try to address. As one vendor explained, during the *gasolinazo*, “some knew about the problem. Others didn’t know, so it was explained to them” by their water vendors. Other vendors railed against the misinformation, they say, is spread to their clients: “the press is responsible for rumors like that one [that water vendors pass off rich people’s pool water as potable water]—that’s the newspaper’s misinformation.” While some clients we interviewed had strong bonds with their vendors or even saw them as protectors, the

majority of clients did not seem to share the vendors' understanding of their role as agents for social justice and client advocacy.

(c) Union vs. non-union informal water vendors

Based on our interviews with unionized and non-unionized vendors, we found a number of differences in the distributive, procedural, and interactional practices. Distributional practices addressed by unionized and non-unionized vendors included price-setting and water quality monitoring. In our interviews, unionized and non-unionized vendors all acknowledged that water prices are set by the *turrit*. The unionized vendors all told us, emphatically, that they meet collectively to discuss pricing and all charge the set prices. Adherence to set prices is high, a union leader explained, because “the union controls the members. If someone sees a union member charging more than they should, they should report him to the union.” The union leader noted that, in contrast, “The *piratas* change their prices at times.” Indeed, among non-unionized vendors, we found a much wider range of pricing practices reported. Some reported meeting to set prices; others did not. Some said that prices “don’t change. The price is at most 5 bolivianos” per *turrit*. Others reported that “it depends on the location and risks...there’s no union. It’s supply and demand...if the client agrees to pay.”

We found similar differences in unionized and non-unionized vendors' views on water quality. All unionized vendors were aware of and participated in the water quality controls overseen by the Cochabamba's Environmental Health Unit. In addition to purchasing the credentialing stickers, unionized water vendors also report that they undergo checks conducted by the Environmental Health Unit every 15 days. As the unionized vendors explained repeatedly, “water quality is well monitored” and “tanker maintenance is well monitored.” However, the

union leader stressed, “We need institutions that control water quality for everyone, including the water sources. There are more than 300 pirates; we in the union are only 30 vendors.” Most of the non-unionized vendors, too, knew that the Environmental Health Unit tests well water quality; fewer reported participating in truck maintenance controls. Unlike the unionized vendors, however, some of the non-unionized vendors asserted that they knew when water quality was acceptable, for instance, “by sight...we know. If it’s clear” and by “seeing the purity of the water. Seeing that it is clean. There are places where the water is turbid and has lead.”

Procedural practices discussed by unionized and non-unionized vendors centered on vendors’ meetings. While both unionized and non-unionized vendors reported that they held meetings to discuss water pricing, procedures differed greatly between the two groups. Unionized vendors discuss water pricing in regular meetings with the full membership present; non-unionized vendors meet irregularly to discuss pricing with a smaller number of vendors participating. Beyond pricing, unionized vendors regularly addressed a much wider array of concerns than non-unionized vendors. For instance, unionized vendors told us, “The union meets about everything: to discuss complaints, to see how things are going, how water is being delivered, and if the vendors’ *vecinos* (lit. neighbors, fig. clients) are complaining.” In contrast, non-unionized vendors say, “we don’t have a union. It’s just the community of truck owners that meets when there is a price hike or some problem that affects all of us.” These different procedural processes have observable effects at the community level. The union, we were told, “makes rules; it gives order to the trucks hauling water” so that “one group hauls in the morning and another in the afternoon.” [Efforts to elicit further detail regarding union delivery schedules were not successful.] Among non-unionized vendors, there is no such order. As a non-unionized

vendors explain, “There is no union. Each one of us is on his own” and the distribution schedule “depends on each truck.”

Interactional practices mentioned by unionized and non-unionized vendors dealt with emergency response, *casero* relationships, and *yapa* gifts. Both union and non-union water vendors respond to emergencies such as fires. However, union vendors’ emergency responses were organized and comprehensive, involving as many as 40 vendors. As one union vendor explained, “the union has always been responsible for [response to] emergencies with water, such as during fires or droughts.” In contrast, non-union emergency response tends to be more idiosyncratic, often with just one or a few vendors participating. While both unionized and non-unionized vendors mentioned *casero* relationships as a part of their interactions with clients, *casero* relationships were slightly more salient in non-unionized vendors’ narratives. Further, we found clear differences in *yapa* gifting practices between unionized and non-unionized vendors. While the quantity of *yapa* gift varied widely within both groups, maximum *yapas* given were uniformly larger among the unionized vendors. Among non-unionized vendors, for instance, *yapas* generally ranged from 10 liters to a *tacho* (30 liters). Another non-unionized vendor reported that, “the maximum is a half-*tacho*. For a full *tacho*, there is a charge of 1 boliviano.” Among unionized vendors, in contrast, *yapas* generally ranged from 20-60 liters. None of the unionized vendors reported charging for a *tacho* or when the *yapa* request was large. As previously noted, we were unable to elicit data on breaking *casero* relationships from the union or non-union vendors.

7. Discussion

Our results demonstrate that informal water vendors and their clients express concern over water injustices in Cochabamba. Both vendors and clients identify the exclusion of communities in south-side Cochabamba from municipal water service as a major distributive injustice. Water vendors see themselves not only as entrepreneurs, but also as service providers who address distributive injustices by delivering safe and affordable water service to underserved communities. The efforts that vendors make to promote distributive justice include: meeting and agreeing upon fair water prices (which depend on the current economic climate) and adhering to standards for water safety and quality set by Cochabamba's Environmental Health Unit. Vendors report that their clients value these efforts. Vendors also express feelings of solidarity with underserved communities.

Clients, on the other hand, are largely unaware of efforts made by informal water vendors to ensure affordable and safe water. Rather, clients report they are deeply distressed by the lack of fair procedural rules and interactional norms governing informal water vending. Clients identify as unjust procedures such as: vendors refusing to sell water, irregular and inconsistent delivery times, and vendors cutting off of hard-to-reach and impoverished communities. Clients' experiences of procedural injustices depended largely on their socio-economic position in south-side communities. For example, better-off clients with *tanques* (who are able to pre-order water delivery) are more likely to deplore the chaotic and noisy nature of water delivery on the streets. Poorer clients are more likely to lament the sporadic and unreliable delivery service, which forces them to waste time searching for water trucks (possibly missing work and losing income).

Clients also see inconsistent and unpredictable norms for vendors' interpersonal behavior as a source of serious injustice in water delivery. Clients reported that interpersonal institutions,

such as *casero* relationships and *yapa* gifts, can uphold interactional justice by creating solidarity and predictability in vendor-client interactions. However, when vendors violate norms for *casero* relationships and *yapa* gifts (e.g., refusing to enter *casero* relationships, punishing *casero* clients for patronizing other vendors), clients view these interpersonal relations as sources of profound injustice. Vendors, in contrast, did not report that interpersonal interactions can be a source of injustice. Rather, they portrayed themselves as advocating for and defending their clients' right to water. Vendors do recognize, however, the need to educate their clients about their efforts to deliver distributive justice (e.g., water quality) and argue that a lack of information, or misinformation, can promote client dissatisfaction.

Vendor unions, our results indicate, improve water delivery outcomes by facilitating vendor cooperation around the establishment and enforcement of rules and norms. Unions can safeguard distributive justice by agreeing upon fair prices and quality standards for water; they reportedly help ensure procedural justice by setting rules and norms for consistent and predictable water delivery; they may strengthen interactional justice through more salient *casero* relationships and larger *yapa* gifts. Furthermore, we did not find any signs of collusion among unionized vendors. Non-union vendors did not report monopoly abuses and more unions are reportedly forming, making monopoly unlikely. While non-unionized vendors reportedly follow water pricing and quality standards similar to those required by the union, no mechanisms exist to enforce this and we documented many cases in which such standards were not upheld. Non-unionized vendors do not have regularized water delivery schedules, and their *casero* relationships and *yapa* gifts appear to be more unpredictable and less norm-bound. For these reasons, we conclude that unionized vendors appear less likely to commit distributive, procedural, and interactional injustices than non-unionized vendors. Nonetheless, we find that

clients were largely unaware of the union's role in establishing distributive, procedural, and interactional rules, which ultimately limited the efficacy of unionized vendors' efforts to promote a sense of justice among their clients.

Both water vendors and their clients reportedly wish to safeguard the human right to water in Cochabamba, Bolivia. However, our results reveal mismatches in vendor and client perceptions of (in)justice: vendors largely seek to address distributive justice, whereas their clients are largely concerned with procedural and interactional injustices. Our findings make two key theoretical contributions to research on service provision in the informal economy. One contribution deals with the role of justice. Our results highlight the importance of understanding how informal institutions (unwritten rules and norms) impact clients' experiences of procedural and interactional injustice. Like the vendors themselves, academic literature on informal service provision has largely focused on distributive (in)justice. Our second contribution addresses the role that informal water vendors play in advancing distributive justice for their clients. Scholars have explored the ways that workers use the informal sector to secure economic rights and recognition for themselves (e.g., Fernández-Kelly & Shefner 2006). Our results, however, indicate that informal vendors, particularly those affiliated with workers' unions, may play an under-recognized role in securing their clients' right to safe and affordable water.

8. Recommendations & Future Directions

Our findings, when combined with the results of past research, suggest several practical applications to improve justice outcomes in informal water markets. While governments are now bringing informal water vendors under regulatory supervision to improve distributive injustices related to the safety and quality of vended water (Kjellén and McGranahan 2006, Opryszko et al.

2009, West 2014), our research indicates the need for more regulatory supervision to address procedural and interactional injustices in informal water delivery. Solo (1999) and Collignon and Vézina (2000) have suggested that vendor unions or trade associations may help address this problem. Given our findings, we believe that a bigger role for water unions—possibly including enhanced visibility, more vendor membership, and greater community engagement—may further enhance justice in water delivery. Therefore, we propose that more organized exchanges with water unions (e.g. community meetings, advisory boards) might be particularly productive for communities and unionized vendors. In Cochabamba, the florescence of community-level action around water, including through the Association of Community Water Systems of South (*ASICA-Sur*), territorial grassroots organizations (*OTBs*), and water committees (*comités de agua*) (e.g., Marston 2014, West 2014), leads us to believe that on-the-ground conditions are favorable for the initiation of more community-vendor collaborations.

We also see an urgent and unmet need for research that examines how informal market institutions can be modified to help safeguard a human right to water. Our findings highlight several fruitful avenues: (1) We encourage further research into the ways that informal vendors may fight for community rights and advance justice for underserved populations, including greater examination of informal vendor affiliations with poor communities (either as residents or through service organizations like volunteer firefighting), and how such affiliations enhance commitments to justice. (2) Our work points to the possibility that institutional hybridity—such as informal-formal partnerships (as in vendors’ use of privatized wells in the formal economy), semi-formal vending arrangements (as in Environmental Health Unit certification), and unionization—may improve outcomes in the informal sector (Gerlach and Franceys 2010). (3) We emphasize the need to better understand conditions that allow serious *injustices* to persist in

the informal water sector. In this vein, we believe it is important to better understand how vendors' economic models, the number and type of vendors operating, seasonality and climate change, and the presence of spatial oligopolies (including in service availability and price-setting) might contribute to distributive injustices. Additionally, a broader examination of distributive injustices in water provision might examine how the costs of water provision (including up-front infrastructural costs and comparisons with municipal systems) might vary across underserved communities. Finally, procedural and interactional injustices in water delivery remain poorly understood and seriously understudied.

Given that grave injustices persist in informal water markets, we underscore the need for continued research on community-based innovations for water delivery that provide alternatives or improvements to unregulated informal markets. These include community-vendor contracts, oversight boards, and community-owned water trucks and storage.

9. Conclusion

The role of informal markets in urban service provision, once considered lamentable and temporary, now is increasingly accepted and unlikely to change. Given this new reality, studying informal service providers is crucial to determine how underserved communities can use informal markets to secure access to basic resources. Our results illustrate the ways that informal water vendors organize themselves to safeguard distributive justice by ensuring that the water they deliver is safe and affordable. We also find that clients of informal water vendors stress the need for greater procedural and interactional justice in the informal water sector. While mismatches in vendor and client understandings of justice limit the efficacy of the vendors'

efforts, we conclude that the informal economy may have an important and under-recognized role in achieving global development goals such as the human right to water.

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Endnotes

1. See Mayer (2007) and Weismantel (2001) on *casero* relationships in the Andes.
2. See Mintz (1961) and Plattner (1989) on the personalization of market exchanges. More generally, see Mauss (1954) on human generosity in contexts of economic exchange.
3. See Angé (2011) for an analysis of Andean yapa practices.