Disaggregated Service Modalities Beyond Formality-Informality: Through Everyday Practices around Water Kiosks in Visakhapatnam[1]

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The present article situates water kiosks within the water infrastructure of post-colonial cities. Further, it examines the role, agency, and everyday practices of water kiosk operators responsible for operating the water kiosks within the heterogeneous water infrastructure in Visakhapatnam, a post-colonial Indian city. By exploring the role of the kiosk operators, this research seeks to understand how these operators, through their lived space, produce informality, thereby reconfiguring the urban waterscape. Two distinct urban water kiosks (the NTR Sujala Plant, Mustapha Colony and Atmospheric Water Generator (AWG), Ramkrishna Beach) were studied during 2020-2022 to get an ethnographic account of the everyday practices in and around the kiosks. Our research findings challenge the traditional formal-informal dichotomy by highlighting the agency exercised by kiosk operators in their daily operations. Rather than strictly categorising services like water kiosks as formal or informal, we contend that there is a breakdown of traditional distinctions, which we understand through the disaggregation of services as the activities within a single service modality may possess elements of both to varying degrees. Also, we find that informality is not inherent but produced within formal structures through the everyday practices of these operators.
Keywords: Water Kiosks, heterogenous water infrastructure, informality, disaggregation, lived space, India

Introduction

With a target of achieving the Sustainable Development Goals (SDGs) of providing universal and equitable access to safe and affordable drinking water by 2030, decentralised and stop-gap neoliberal solutions such as the "water kiosks" emerged with the assistance received from international funding agencies like the World Bank and Asian Development Bank. Although the government plays a key role in water governance that interacts with citizens through water provisioning, the kiosk-based water delivery system relies heavily on the operators who manage these kiosks, making them crucial actors in water governance. According to mainstream global water kiosk narratives (Meran et al. 2020, Falcone et al. 2024), water kiosks are supplementary to piped water supply as filling the supply gap. Water kiosks received substantial scholarly attention, especially in post-colonial cities (Sarkar and Chaudhary 2020, Schmidt 2020, Sarkar 2022) as a prominent low-cost intervention providing water at cheaper rates to the urban poor and to marginalised people living in the under-served areas of the city where piped water supply

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is yet to be extended. This model has significantly altered the waterscape in many cities, adding complexity to water infrastructure and access configurations (Sarkar and Chaudhary 2020, Amankwaa et al. 2022). However, the apolitical nature of the technology has the consequence of camouflaging the uneven and half-hazard outcomes, informality and the everyday negotiations for basic needs like water. Hence, adopting techno-politic solutions like water kiosks that transform urban waterscapes must be examined meticulously. In this article, we contextualise water infrastructure in post-colonial cities, explore the formality and informality debate, discuss how the everyday state and the operators' lived space produce informality, and position water kiosks within water infrastructure. We then outline the research methodology and site selection. Finally, we present our findings and conclusion.

Contextualising Water Infrastructure in Post-colonial Cities

In post-colonial cities, exclusionary mechanisms (Truelove 2019, Bakker 2012) have persistently accompanied the expansion of the water access networks, resulting in the purposeful exclusion of certain sections of society from access to water services. The historical context of inequities and the unequal distribution of water resources is elaborated in the scholarly works of Truelove (2019) and Furlong and Kooy (2017). Scholars have shed light on differential access (Truelove 2019) favouring the affluent colonial suburb population and the exclusion of the native population. These exclusionary practices have produced unequal water flows and networks for the privileged and marginalised, worsening pre-existing inequities (Smiley 2020). Further, Bakker (2003) claims that urban water systems in the Global South are highly fragmented, resembling a scattered "archipelago" rather than a homogenous network. Graham and Marvin (2001) explain the fragmented water services using the concept of "splintering urbanism', which they believe results from globalisation, technological advancements and neoliberal policies. Several authors have highlighted that urban infrastructures are more effectively understood in specific local contexts (McFarlane 2008, Coutard and Rutherford 2015) using relational and hybridised terms rather than functional-linear concepts (Gandy 2004). Additionally, critics argue that splintering urbanism emphasises the modern infrastructure ideal, overlooking the significance of non-networked alternative water providers in developing societies. While these providers may be perceived as contributing to fragmentation, they could benefit these communities by promoting spatial equity in water access (Bousquet 2010).

Regarding the urban infrastructure configurations of southern cities, scholars like Furlong (2014) have highlighted the limitations of the theoretical framework in understanding the intricacies of these cities. Some have started to examine the urban infrastructure in these cities using post-colonial perspectives (Kooy and Bakker 2008, Truelove 2019). The various kinds of water service provisions in these urban areas have been categorised as hybrid socio-technical configurations (Coutard and Rutherford 2015). Challenging traditional notions of uniformity and centralisation in infrastructure provisioning, technological bricolage aptly captures the amalgamation of networked and non-networked infrastructures, integrating public and private ownership and planned and spontaneous structures (Lemanski 2021). Adding to diversity and heterogeneity, the water kiosks emerged as one of the delivery mechanisms of hybrid water infrastructure in some of the cities in the

Global South. However, the cities are not labelled as failures. Instead, the heterogeneity offers an opportunity to understand the diverse delivery systems that contribute to their functionality (Jaglin 2014). Consequently, scholars have approached the study of hybrid water service delivery systems by employing the concepts of formality and informality.

Formality and Informality in Water Infrastructure

The formal-informal dichotomy has been widely used across various contexts, disciplines and perspectives. This has led to the identification of less explored economic processes that are hidden (Harding and Jenkins 1989) and casual (Bromley and Gerry 1979), uncovering the ambiguities and inconsistencies in the definition, theoretical limitations and application (Portes et al. 1989). This dichotomous classification has also received criticism for its rigid separation of the two categories by oversimplifying and overlooking potential overlaps, interrelations, co-existence and complementary exchanges. Through in-depth ethnographic research, the oversimplified categorisation of formal and informal is questioned by Pardo (2012, 1996) Medina-Zárate (2018) and Kouzas (2022). In the water literature, the word "formal" typically refers to systems officially recognised by the law, often involving supply networks managed by state or private entities. Conversely, "informal" arrangements lack legal acknowledgment and encompass various modes, including Self-Help Groups (SHG), community provisions, small-scale vendors and private retail businesses. However, in the absence of a universally agreed definition of informality, frequently conflicting descriptors, such as ineffective, innovative, costly, complex, traditional, unsustainable, unlawful, a survival tactic for the underprivileged, dynamic enterprises, and so on (Ahlers et al. 2014) have emerged as accepted features of informality.

In the policy discourse, characteristics of informality are associated with the private sector rather than the inherent informality of operations (Ahlers et al. 2014), thereby gathering admiration for its positive outcomes. However, critical perspectives challenge this binary view, emphasizing the political nature of informality and its integration with state power (Roy 2009, Roy and AlSayyad 2004), while recognizing the diverse agency of actors in co-producing informality (Ahlers et al. 2014). Blurring the binary view further, the rise in neo-liberal policies has altered the state-society relations, resulting in the increased prominence of non-state actors in water provisioning, and converting the state from being a direct provider to a facilitator and regulator. "Market environmentalism', as outlined by Bakker (2014: 474), emerged in response to the financial constraints faced by the local government in infrastructure provisioning. Market environmentalism involves a reconfiguration of governance and encourages the involvement of non-state actors in initiatives such as corporate social responsibility, participatory approaches and public-private partnerships (Bakker 2014, Sarkar and Chaudhary 2020). Further, transnational networks were formed worldwide through private sector investments and engagement of multilateral aid agencies and market-oriented policies, leading to a global water governance regime (Birkinshaw 2017). Innovative solutions like social entrepreneurship and corporate social responsibility-led infrastructure provisioning are being sought to address cost recovery issues and access. This has created new institutional entities, organisational structures and hierarchical power relations (Sarkar and Chaudhary 2020). These transformations in governance have also reshaped the notion of citizenship, moving it away from the traditional

association with participation in the public sphere towards a focus on consumption in the private domain, effectively transforming citizens into customers (Walsh 1995, Pardo 2023: 51). In this section, we have covered the discourse on formality and informality through the involvement of non-state actors in the water infrastructure and governance. In the next section, we turn to how informality is produced through the everyday practices of these non-state actors.

Everyday State, Lived Space and Informality in Water Infrastructure

Diverging from the traditional Western political science view of the state as a singular and cohesive entity, post-colonial theorists and anthropologists have advanced a nuanced interpretation of the state as a flexible and multi-layered entity. Post-colonial cities have emerged as spaces where various state mechanisms facilitate access to water infrastructure, especially for individuals unable to obtain these resources through official channels (Gandy 2008). In such circumstances, citizens often engage with brokers and similar figures between the state and the citizens. These intermediaries maintain complex relationships, exploiting citizens through various tactics. Ranganathan's (2014) study on water provision to the peripheralised middle class in Bangalore exemplifies this, shedding light on the unique authority wielded by water tankers. In spite of operating outside conventional governmental structures, informal water providers possess a certain kind of everyday public authority intertwined with the state. They navigate the blurred boundaries between state and non-state realms, engaging in activities typically associated with the state, such as lobbying and service delivery. This reconceptualisation challenges the notion of informal urban water as opposed to formal systems, revealing its historical integration with formal processes of urban governance and its reliance on public authority.

The diverse and intricate nature of everyday activities and encounters offers valuable insights into the generation of "lived space" (Lefebvre 1991) and the perpetuation of economic structures. Lived space encompasses representational aspects, often manifested through the actions and habits of inhabitants. These actions involve employing diverse methods, including customary practices, formal protocols and people's engagement with interest groups in order to shape their surroundings according to their preferences (Lefebvre 1991). Daily interactions concerning water access entail various strategies from the perspective of citizens, including bargaining, negotiating, offering bribes, seeking assistance from intermediaries, participating in protests, engaging in insurgency and resorting to quiet encroachments (Bayat 2000, Holston 2009, Anand 2017). Through the gradual and incremental use of these methods in their relations with lower-level bureaucrats and politicians, citizens can secure necessities and assert citizenship (Pardo 1996, Anand 2017). These negotiations and navigations are part of everyday practices and are integral to understanding urban water access (Misra 2014, Ahlers et al. 2014, Björkman 2015, Anand 2017). Thus, understanding everyday practices enables us to connect governance mechanisms, social interactions, infrastructure design and the biophysical aspects of water supply and usage.

Situating Water Kiosks within Water Infrastructure

Water kiosks embody the notion of "the promise of infrastructure" (Anand et al. 2018, Schmidt 2020), a concept that captures their potential to address future water needs by catalysing present social action. In Sub-Saharan Africa, Amankwaa et al. (2022) and Klawitter et al. (2009)

projected the positive impact of water kiosks on poor urban communities, particularly in underserved areas on the outskirts of major metropolitan centres like Nairobi, Mombasa, Khartoum and Accra, to name a few (McGranahan et al. 2006). However, the introduction of water kiosks necessitates a critical reflection on their role in perpetuating urban inequalities, as evidenced in the Indian context by Sarkar and Chaudhary (2020). Comparing Nairobi and Delhi, Sarkar (2022) asserts that water ATMs are not a miraculous solution, being neither explicitly pro nor anti-poor, and requiring careful assessment and effective management systems, along with attention to socio-cultural context as pressed upon by Schmidt (2020). The diversity of water kiosk models reflects variations in ownership, service delivery processes and technological applications (Schmidt 2020). Factors such as production capacity, purification technologies, installation costs and pricing structures are tailored to meet the specific needs and challenges of each urban setting. However, water kiosks play a significant role in local economic empowerment by offering employment opportunities and fostering community stewardship (Sarkar and Chaudhary 2020). Often operating under a public-private partnership model, they are positioned as innovative solutions to bridge gaps in public utilities and ensure equitable access to safe and affordable water, extending their reach to underserved areas and contributing to sustainable development initiatives (Sarkar 2019).

Our exploration of the existing literature reveals the enduring presence of heterogeneity within water infrastructure, particularly in post-colonial cities. Scholars across disciplines have commonly employed the formal-informal framework to analyse this diversity within non-networked infrastructure. Among these, water kiosks have emerged as a significant focal point, receiving conceptual and empirical attention globally. They have been characterised as pop-up infrastructure (Schmidt 2020), socio-technical systems (Amankwaa et al. 2022) and temporary stop-gap neoliberal solutions (Kumar 2018, Sarkar 2019) that establish new models of governance. Studies have assessed their impact on users residing in low-income neighbourhoods (Sarkar 2019, Sarkar and Chaudhary 2020) and from the perspectives of kiosk owners. However, little consideration has been given to the intermediaries (operators) who manage these water kiosks and their everyday practices which influence the functioning and development of these kiosks. This gap in the literature provides a scope for examining the agency of the kiosk operators.

Research Methodology

Our research largely derives from the data collected through ethnographic inquiry during 2020-2022 in the Indian city of Visakhapatnam. We combined non-participant observation with semi-structured interviews and informal interviews. The aim is to place the water kiosk within the broader context of water infrastructure. As we have mentioned, while the issues discussed in the literature review are crucial, research exists on intermediaries like water tanker owners (Ranganathan 2014), there is a notable gap in exploring other intermediaries, particularly water kiosk operators' everyday practices and lived space. These intermediaries play a significant role between the government and the public, yet their experiences remain unmapped and ignored. Due to their sensitive nature, routine practices may not be documented and statistical data could be unreliable. Additionally, interviews might merely echo official accounts rather than provide genuine insights. Moreover, aspects of daily life that are mundane or deemed too obvious to

mention may only become apparent to researchers present over an extended period. Achieving nuanced insights into how water networks adapt to evolving environments necessitates a qualitative approach involving a prolonged time in the field.

Visakhapatnam, in the southern Indian state of Andhra Pradesh, is a compelling and apt site for our study, as it mirrors the heterogeneous nature of water supply in Indian cities. It is one of India's fastest-growing cities, spanning an area of 682 square kilometres, divided into 8 zones and 98 wards with a population of around 20 lakh residents. The rapid urbanisation has outpaced the provision of infrastructure, with only 54.9 percent of the households having access to the piped water supply by the Greater Visakhapatnam Municipal Corporation (GVMC). In spite of boasting a daily water supply of 285 million litres per day (MLD), with 74 MLD allocated to bulk consumers, there is a stark disparity between supply and demand, resulting in a staggering gap of nearly 66 MLD. The city has one of the highest proportions of residents living in informal settlements, with approximately 741 slums. Water access challenges are particularly acute in slum areas, where over two-thirds of households lack individual connections, relying instead on community tap water or alternative sources such as public tankers, stand posts, private vendors and bottled water. This has enabled non-state entities to step in and address the city's water service provision gap. While many notable alternative water sources exist, water kiosks have gained significant attention from diverse stakeholders and have got their footing in Visakhapatnam.

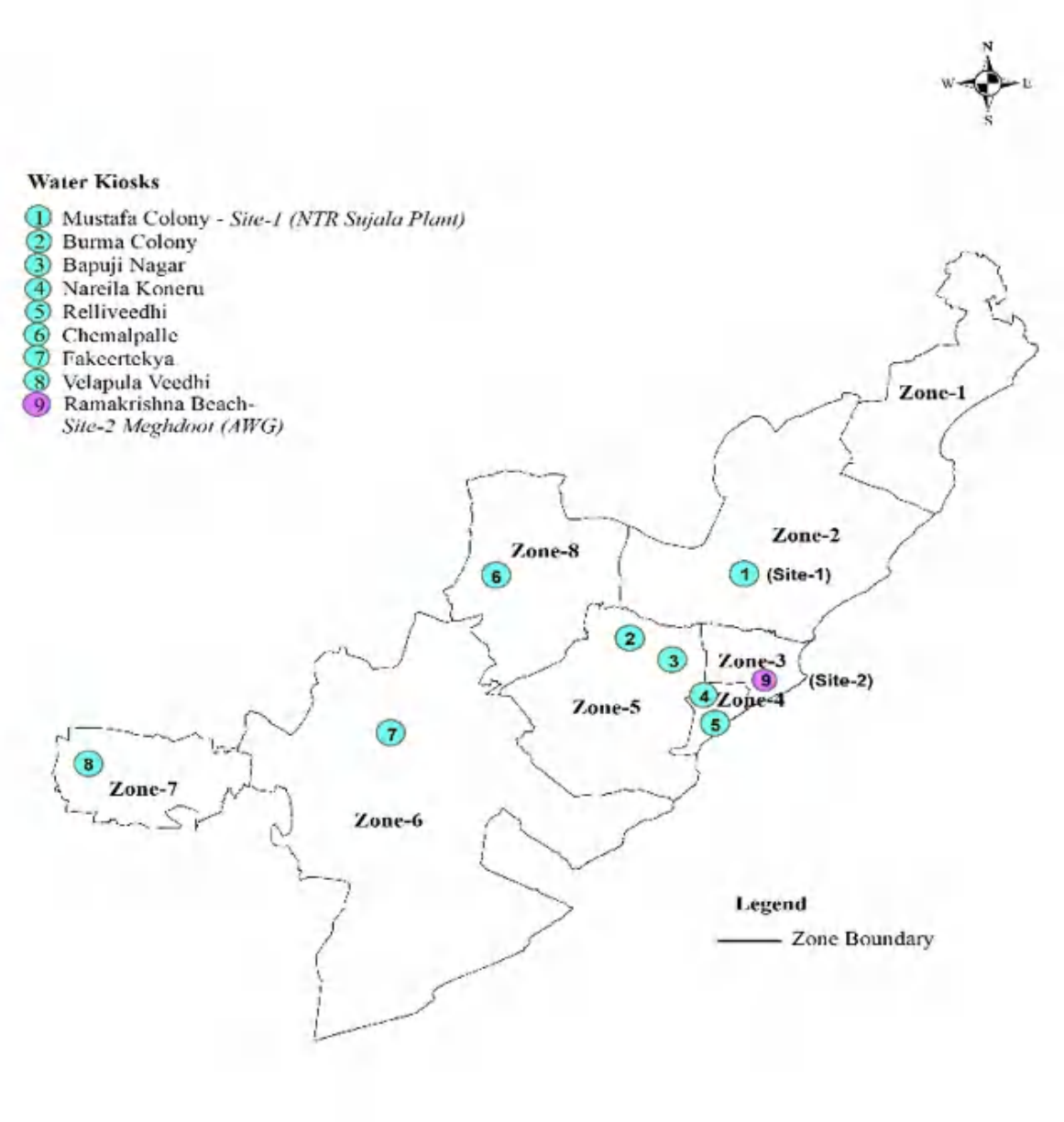
Further, Andhra Pradesh stands out as the sole state to have implemented a public scheme, *NTR Sujala Pathakam* to set up kiosks named "Sujala Plant" in underserved areas, framed as a commitment to infrastructure advancement during the 2014 elections to offer water at reduced rates. We chose one of the NTR Sujala plants as our first site. We opted for our second site, which claims to be the only site with the Atmospheric Water Generator (AWG) water kiosk globally at its inaugural. The Maithri Aquatech introduced this pioneering AWG kiosk, "Meghdoot", in Visakhapatnam. These two sites were chosen because each kiosk possesses distinctive characteristics regarding its operational aspects, assertion of ownership, installation objectives, user demographics, scale, technology, pricing, employment arrangements, location and, most importantly, unique governance structures.

Site 1- NTR Sujala Plant

The NTR Sujala Plant, though an initiative by the government, presents complexities regarding ownership. This is because multiple stakeholders and intermediaries were involved in the governance process. The responsibility for the execution of the scheme was entrusted to the GVMC and Municipal Administration and Urban Development, Government of Andhra Pradesh, by facilitating the small water enterprises operated and maintained by non-government organisations/SHGs/firms. The initial plan that did not work out was for the scheme to be financed through corporate social responsibility, leading to funding of all the kiosks by the GVMC.

The GVMC embarked on a preliminary endeavour, following deliberation with members of the legislative assembly, installing eight kiosks across eight legislative wards. They aspired to have 25 kiosks installed by the fiscal year 2014-15. Zonal GVMC officials assumed the task of meticulously identifying 3 to 4 suitable locations. These sites were characterised by a GVMC community hall, access to electricity and a dependable water supply sourced from groundwater

or municipal reservoirs. However, only 13 kiosks were installed (Safe Water Network 2015). Out of these 13 kiosks, we could only identify eight kiosks, shown in Map 1. Denizens seemed clueless about the scheme and consistently directed us to the nearby privately owned and managed water plants where the 20-litre water bubbles were sold: "*meeku konchem munduke road paina kanapadutundi aa shop'.* (The water shop is ahead on this road). The NTR Sujala Plant from Mustafa Colony, Arilova, located in the low-income neighbourhood of the northernmost Visakhapatnam, was purposively selected for our study because the other kiosks under the scheme were either closed or inactive during our visits.



Map 1: NTR Sujala Plants and AWG Kiosks in Visakhapatnam (prepared by the Author)

During the relocation of families in 1984-85 from the informal settlements to Arilova, water infrastructure was abysmal. Over the past four decades, Arilova has witnessed a shift in its water infrastructure with the expansion of piped water supply sourced from the Mudasarlova

reservoir and other supplementary water sources. Adding to its reconfiguration of the water landscape, the selected water kiosk started operating in 2014. It shares its premises with the ward office and the shelter (Photo 1). The kiosk was operated and maintained by the Mother Teresa SHG, which was formed by women from Arilova. Mr MVV Satyanarayana, the then member of the legislative assembly, appointed this SHG for its operation and management. It served two objectives: first, promote employment opportunities for women and, secondly, ensure a non-profit motive for kiosk operation. The kiosk initially obtained water from a government borewell, purified through reverse osmosis (RO) filters. Upon depletion of this water source, the kiosk operator drilled another bore at her own expense. However, as neither of these boreholes is currently operational, the kiosk relies on treated municipal water, which undergoes additional treatment through RO filters and then is provided to the citizens. Initially, the scheme priced INR 2.00 per 20 litres. However, the current price for the same quantity has increased to INR. 4.00. Initially, around 400 to 500 cans were sold daily, but the sales have declined to 20-30 cans.

Photo 1. NTR Sujala Plant, Mustafa Colony and the ward community office; sharing the same roof. (by the Author).

Site 2- Meghdoot- Atmospheric Water Generator (AWG)

The second site is an AWG kiosk named "*Meghdoot*" at Ramakrishna Beach, owned and maintained by a social enterprise, Maithri Aquatech start-up, under the "Make-in-India" initiative of the central government of India operating since 2021 (Photo 2). The kiosk also serves as a Water Knowledge Resource Centre (WKRC), established as part of the SEWAH project (Sustainable Enterprises for Water and Health), wherein one of the responsibilities of the kiosk operator is to conduct awareness sessions on water use practices in the nearby under-served communities, schools, informal settlements like Pedajalaripeta and customers. This initiative is a collaboration between the Safe Water Network and the United States Agency for International Development (USAID). *Meghdoot* is the only AWG approved under Jal Jeevan Mission by the Ministry of Jal Shakti through the Dr Mashelkar Committee and supported by the GVMC. This effort by national and international stakeholders promotes innovative solutions through a multi-stakeholder approach to water access. Maithri Aquatech operates and manages this kiosk through an operator hired by a security outsourcing company based at Naval Armament Depot (NAD), Visakhapatnam. Currently, there is only one AWG kiosk in Visakhapatnam. Therefore, this was also purposively selected.

Photo 2. Meghdoot Air to water generator kiosk, YMCA, Beach Road, Visakhapatnam Picture 1 Inauguration photo and the second one Make in India policy highlight (by the Author).

Ramakrishna Beach is one of the city's most famous tourist attractions; it stretches up to four kilometres from the large port area to the south of the town, overlooking the Bay of Bengal. *Meghdoot* is installed in this location primarily to provide drinking water for tourists and passersby (INR 15/1L/per day). Located in the Central Business District, this area is characterised by its affluent and upscale status and boasts excellent connectivity to the piped water network. However, the sale is around 1000 litres daily. This sale results from tourists flowing to the area and water through monthly cards (INR 1/1L/per day) to low-income citizens (GVMC workers, auto drivers and others).

The kiosk can produce at least 1 million litres daily, meeting the quality standards of both the World Health Organisation and Indian potable water standards. The input for the water generator is atmospheric moisture mediated through an alternative technology where the air is used as a source to generate water. The machine has two air filters of 12 microns and 1 micron to remove the suspended particles in the air. AWG has no water wastage, unlike the RO or a desalination plant. Besides being eco-friendly, it is economical and cost-effective as 1 litre of water is produced using only 0.3 units of energy, costing less than Rs.2.

Unveiling Informality in Water Kiosk Operations: Insights into Disaggregated Services

Instead of having a centralised water network, Visakhapatnam demonstrates diversity through various alternative service providers, including the widespread use of water tankers, water kiosks and the reliance on 20-litres water containers. This diversity is explained by what scholars have termed a "splintered infrastructure pattern" (Graham and Marvin 2001, Kooy and Bakker 2008, Coutard 2008) and "infrastructure archipelagos" (Bakker 2003). In contrast to the various interpretations found in economic literature regarding the formal and the informal, the distinction between formal and informal systems is generally implicit and understood in water provision based on legal recognition. In water provision, similar to the dynamics observed in other economic activities, the demarcation between formal and informal systems proves interwoven (Pardo 2012), revealing a symbiotic relationship characterised by significant interdependencies between the two modalities (Jaglin 2002). Ahlers et al. (2014) suggesting that a dichotomic classification overlooks the intricacies of service provision processes. They advocate for

understanding these complexities through the concept of disaggregation, which examines how a single service delivery mechanism integrates formal and informal activities. While size, technology, capital intensity and skills play a role, legality is the primary distinguishing feature between formal and informal water provision systems (Misra 2014). However, legality presents conceptual challenges because it relies on socio-political negotiation processes, meaning that formality is contingent and lacks specific patterns (Pardo 2012). Scholars such as Anand (2011) have demonstrated that formality is a status assigned through contestation and negotiation. Despite the limitations associated with these descriptors, they provide a starting point to analyse different aspects and activities of water service provision.

Photos 3. Water Kiosk infrastructure Mustapha colony: RO candles, storage, sump and foundation stone (by the Author).

We find the disaggregation of service modalities to be a useful concept in understanding informality. Our field observations show that the water source is constantly changing in the first site. Initially, the NTR Sujala Plant accessed water from a borewell dug by the GVMC. However, the kiosk operator (Photos 3) decided to dig another borewell in anticipation of increased sales and revenue and the potential drying up of the government-dug bore. Justifying her actions, the kiosk operator, Ms Jyothi, said:

> "Allow me to share the money I invested in the kiosk with you. I put in a huge amount, approximately INR 1.5 to 2 lakhs, to improve the facility and boost sales. I take special pride in the bore I dug, although it is not functioning now. I did not receive any external support. My duty as a responsible citizen is to assist those in need, and not everyone can be like me" (Interview, 13 November 2021).

The additional bore dug by Ms Jyothi was undertaken without following any formal protocol and lacked documentation available on how she obtained authorisation. This bore also dried up, forcing her to access the municipal piped water supply. Due to the intermittent nature of the municipal water supply, Ms Jyoti, like any resident in the locality, stored water in a sump. Although

this was treated water, it was treated again through RO filters before being sold with a sticker highlighting the scheme information (Photo 4). In this context, we observe that the process of sourcing water through the first borewell and later through the municipal water supply is formal, due to adherence to rules, protocols and consultation with the government, while see as informal the second instance, where Ms Jyothi acted independently without any form of consultation.

Photo 4. Sticker on NTR Sujala scheme 20 liter cans, Visakhapatnam (by the Author).

We could effectively apply this concept of disaggregation by focusing on water sourcing in the NTR Sujala Plant. However, while examining our second site, *Meghdoo*t, we encounter a different scenario: atmospheric moisture is sourced and utilised to generate water. Consequently, we see this disaggregation concept as constraining, particularly in understanding the sourcing of air, which represents unique difficulties and challenges. This difficulty lies in the nature of air, which is intangible and not-supplied, unlike water. This prompts us to question how we gauge formality and informality in such contexts.

Photo 5. Interview of Water Inspector, Arilova, Visakhapatnam. Photo by: Author

In addition to procurement, we observed that the water distribution process at site 1 is an informal activity. Over time, we sought to gain further insights into the sales trends and the users. However, the operator keeps no documentation of sales records over the years, thereby allowing enough opportunity for sleaze and sidling cash. During our interview with Mr Chandrasekher (Photo 5), the Water Inspector from the Arilova Water Supply Department corroborated this observation by saying:

> "It seemed that the kiosk operator did not bother to inquire about the backgrounds of the consumers. Whether they were from below the poverty line, above it, or were financially well-off, it held no significance to the kiosk operator. It became evident that water was being sold to anyone willing to pay, irrespective of their eligibility status, without any verification of ration cards. This realisation struck me as deeply troubling, as it undermined the very purpose of the scheme' (Interview, 8 June 2021).

Thus, in the distribution process, the disaggregation reveals that when untrained and unskilled operators provide service, this leads to a disconnect between the policy and the intended beneficiaries. Further, while explaining the distribution process, Ms Jyothi positions herself as a non-profit-oriented operator who offers water without discrimination. In support of this claim, she stated:

> "Arilova experiences severe water shortages in the peak summer, leaving residents without sufficient water for everyday domestic tasks. To address this need, I offer the wastewater produced through reverse osmosis (RO) systems for sale, explicitly instructing customers to use it only for non-drinking purposes. This approach has proven beneficial, particularly amid declining sales, as selling the wastewater for INR 2 per 20 litres has provided some relief' (Interview, 8 June 2021).

On the contrary, the distribution process in *Meghdoot* was meticulously planned, incorporating both profit motives and welfare considerations due to its nature as a social enterprise. Maithri Aquatech had a strategic pricing model where water costs INR 15 for those purchasing it with a container, INR 10 for refills, and only INR 1 for marginalised customers utilising monthly cards. This thoughtful price differentiation was planned, and the kiosk operator had no authority to alter it despite declining sales.

In conclusion, our field observations and interviews revealed that disaggregation offers a more nuanced understanding of formality and informality in the context of water kiosks. We refrain from asserting that kiosks are inherently informal or that they inherently generate informality by serving as an alternative water supply mode. Instead, we find that the activities undertaken at these kiosks often exhibit elements of both formality and informality. Additionally, it can be challenging to categorise certain activities as strictly formal or informal, as evidenced by the example of sourcing atmospheric moisture in *Meghdoot*.

Informality and Lived Space of Water Kiosk Operators

Based on legal criteria, the NTR Sujala Plant and *Meghdoot* kiosks are formal and established by the local government and an incorporated private entity, respectively. Nevertheless, despite their formal status, the kiosk operators' daily routines and lived space give rise to informality in both establishments. However, due to variations in their operations and management, we observed stark differences in the two operators' daily practices and lived space, resulting in distinct forms of informality. Considering the positioning of kiosk operators within the kiosk's governance structure, it is evident that the NTR Sujala Plant installation scheme was intentionally crafted to foster co-production, aiming to engage diverse non-state actors in a decentralised and adaptable manner and facilitating power sharing and collaboration. In contrast, the second kiosk results from market environmentalism, wherein a social enterprise endeavours

to offer water through innovative technological solutions that produce water from the air. We look at different lived spaces by delving into these operators' personalities, contrasting realities, experiences, challenges and strategies.

Operators' Personality

The narrative of Ms Jyothi, the NTR Sujala Plant kiosk operator, unfolds as a compelling tale of resilience, negotiation and unyielding determination. Ms Jyothi is a 60-year-old woman with two daughters and a granddaughter whose vibrant personality leaves a lasting impression. Her demeanour exudes a sense of dynamism, portraying her as a resourceful entrepreneur and dedicated social worker. Through our interactions, we understood her as a passionate and determined person with strong leadership qualities and active involvement in political affairs. In one of the interviews, Mr Anand, Community Officer at the Ward Office of Arilova, recalling an incident where Ms Jyothi had to give up the kiosk space for the new ward secretariat office, he said:

> "We all presumed that the ward secretariat office would replace the kiosk, given that the orders were issued directly by the newly elected state government and the kiosk was established under a scheme implemented by the previous administration. However, Ms Jyothi resisted this change, engaging in a battle with the local government. Despite lacking support, even from her SHG members, she took the authorities into confidence and pursued legal action, ultimately securing a stay order against the order issued by the state government. This remarkable victory is noteworthy, considering she challenged the state government and influential political figures single-handedly' (Personal Interview, 4 June 2021).

This reflected how Ms Jyothi, who owned the space, negotiated with the state and local government to keep the kiosk running. However, juxtaposed against Ms Jyothi's unwavering spirit is the contrasting figure of Mr Diwakar, the operator of the *Meghdoot* kiosk (Photo 6). Hailing from rural Bobbili, Mr Diwakar is a 24-year graduate who migrated to Visakhapatnam for employment. Mr Diwakar seemed indifferent, scared and under-confident. He embodies a mechanical presence devoid of agency or ownership, producing a disengaged space.

Photo 6. The *Meghdoot* kiosk (by the Author).

Family Support

The image of the NTR Sujala Plant highlighted a clear hierarchy, with the water kiosk positioned as subordinate within the state bureaucracy, as affirmed by Ms Jyothi's lack of support from local authorities, ward officials and fellow SHG members. Consequently, she heavily relied on her husband for assistance, underscoring the emergence of informality in the kiosk's operations amidst the withdrawal of formal support systems. Another indication is Ms Jyothi's disclosure that her husband took on the role of managing the kiosk also staying on-site during evenings, as she candidly said:

> "My husband helps me a lot so I can focus on the kiosk and my family. He takes care of the kiosk when I am busy and provides financial assistance. Unlike me, other women struggle because their husbands drink and ill-treat them. Also, I get enough returns to keep the kiosk running, but some women do not have the skills or family support I do." (Personal Interview, November 13, 2021)

Unlike Ms Jyothi, Mr Diwakar did not have to rely on his family for the kiosk operations. But the striking aspect is his recruitment, as he replaced his cousin, who was previously the operator. He was given one month-long training to bring him into the formal process. This reflects how, directly or indirectly, both operators relied on or continue to rely on familial support in sustaining a livelihood.

Operating Hours

The NTR Sujala Plant was frequently left unattended, with irregular operating hours. We encountered this issue, as we often had to wait for the operator. Moreover, without prior communication, the kiosk remained closed on certain national holidays and Sundays, resembling a government office schedule. Initially, we were told that the kiosk operated daily from morning to night, as the operator's husband lived there, and they served customers late into the night. However, in the Meghdoot case, the operator adhered to formal schedules, underscoring the private entity's operational efficiency. Regular inspections by the GVMC and weekly inspections by the Maithri Aquatech team ensured formal operation, giving no scope for informal arrangements or upkeep of the kiosk.

Training and Sales

While Ms Jyothi demonstrates resourcefulness in various aspects, she lacks proper training in maintaining purification filters, and often relies on external assistance when problems arise. During our discussions, she expressed concerns about how excessive chlorine in municipal water affected the filter, leading to low-quality water and declining sales. In spite of repeated appeals to ward officials and the local government, she has not received additional support for the RO plant. Discussing this, she stated:

> "If, from somewhere, I received financial support of INR 50,000 or even some training on how RO filters could be repaired or maintained, I would have returned

> the kiosk to its former glory. I would become a billionaire overnight through my business prowess and networking. There must be at least ten small private plants that provide door-to-door service. However, I never looked at them as my competitors or found them responsible for the fall in the sales of the kiosks. I firmly believe that no one in their right mind who has a choice to consume water for a low price would be interested in paying a high price for the same quantity of water, especially when the kiosk water is popular among people and more reliable than the private water cans' (Interview, 13 November 2021).

In contrast to Ms Jyothi, Mr Diwakar is semiskilled and understands that repairing and maintaining the high-end technology in the purification of AWG requires different skills. According to him,

> "The technical team from Hyderabad guides me remotely for minor issues, and I promptly address them. But, for more technical problems, I am not equipped with the required skills, so I wait for three to four days to get the problem fixed by an expert from the central office. Unfortunately, this delay also impacts sales, but Maithri Aquatech never considered this a problem' (Interview, 10 November 2021).

However, Mr Diwakar shared concerns similar to Ms Jyothi's regarding the decrease in sales. Although both kiosks faced the same problem, they attributed it to different factors: Ms Jyothi suggested that the lack of training in working with the RO filters was the problem and sought financial assistance, whereas Mr Diwakar attributed the decline to shifts in people's preferences and perceptions post-COVID, the increased workload on the operator due to multiple tasks and the location, which he shared as follows:

> "After the second Covid lockdown, there has been a drop in sales and customers have become wary of consuming non-branded water, which will not be consumed by people coming out of their fancy cars who are mostly the class of people in the locality. Also, balancing sales with other responsibilities poses challenges. Managing such a kiosk effectively requires at least two individuals to address sales and awareness-building requirements' (Interview, 10 November 2021).

Further, the decline in sales is accrued to location, as Mr Diwakar highlighted,

> "[…] positioned at the end of the beach, 4 km away from the bus stop with less population flow to this side, is responsible for low sales. Few would venture this far without the strategic location to access water' (Interview, 10 November 2021).

The narratives shared by Ms Jyothi and others offer profound insights into the pivotal role of intermediaries and their agency in the provision of water. These accounts illuminate the everyday practices encompassing negotiation tactics, bargaining methods, manoeuvring within bureaucratic confines, accessing familial support, operating with irregular schedules and resorting to legal recourse such as obtaining stay orders. In navigating adverse circumstances at the kiosks, operators employ diverse survival strategies, akin to what Pardo (1996) terms a

network-based system of strategies rooted in familial and social connections. These approaches may appear unconventional to external observers but stem from the inherent precariousness of informal work environments. Moreover, amidst these challenges, operators showcase resourcefulness and entrepreneurial acumen, shaping a lived environment characterised by innovative strategies to optimise underutilised public resources, such as selling wastewater, to sustain sales despite lacking formal training in filter management. Through such endeavours, Ms Jyothi consistently perpetuates informality within the formal kiosk structure.

However, Mr Diwakar's case illustrates that not all intermediaries possess the agency, ownership, or inclination to shape the kiosk environment, underscoring the variability in intermediary roles and their impact on space. Social enterprises occupy an intermediary position between profit-driven private businesses and nonprofit organisations with social or environmental missions. Striking a delicate balance between these objectives is essential for their sustainability; otherwise, the enterprise's core purpose may be compromised.

Although he harboured innovative ideas to boost sales, Mr Diwakar faced constraints in implementing them due to the risk of jeopardising his employment. The ultimate decision-making authority of the enterprise limited the operator's autonomy, contrasting starkly with models like NTR Sujala, where, owing to the nonprofit nature of the enterprise, operators enjoy complete control over operations and maintenance. The dual responsibility of driving sales while promoting welfare through distributing monthly cards and conducting awareness sessions could prove overwhelming for operators. In spite of the potential inherent in the model and the initial enthusiasm of operators, the lack of agency becomes evident as the enterprise retains ultimate control. Consequently, when sales dwindle, operators are deprived of a livelihood.

Conclusion

Kiosks are vital in water provisioning in post-colonial cities with heterogeneous water infrastructure. In this article, we contested the inherent categorisation of non-networked infrastructure as informal by demonstrating how both the kiosks that we studied are established through formal procedures, providing a unique perspective within the water kiosk literature. The first kiosk, NTR Sujala was directly sanctioned by the state government; the second kiosk, *Meghdoot*, was established under the central government Make-in India program through a multi-stakeholder collaborative effort. Through the disaggregation of service modality, we argued how, within a single service delivery mechanism like a kiosk, the activities undertaken could be formal or informal with varying degrees. We also established that this disaggregation of service is dynamic and has limitations, as explained in the case of sourcing atmospheric moisture, which cannot be gauged through formality or informality. The everyday experiences of kiosk operators have illustrated how the agency and ownership reconfigure the urban waterscapes. We have emphasised that these operators have varying levels of influence, contingent upon the governance structure in place. We have highlighted the importance of acknowledging the heterogeneity in water infrastructure in post-colonial cities and recognizing intermediaries' pivotal role in reconfiguring urban waterscapes. We have advocated a deeper

exploration into the role of intermediaries and their lived space across different socio-cultural contexts, examining their contributions to urban waterscapes. We believe that this study could be extended by investigating the interactions between these intermediaries and citizens, which can offer insights into their impact on citizenship and governance structures.

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