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The rural–urban equity nexus of Metro Manila's water system

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ABSTRACT

This article examines equity concerns and inherent conflicts related to rural–urban water supply allocation and use, with focus on Metro Manila. Going beyond the much-discussed difficulty farmers experience from an allocation policy prioritizing urban water requirements, it shows that inequity in raw water allocation is linked to, and further exacerbated by, inequities in urban domestic water provision. Moreover, it highlights the need for broader equity reviews, using the concept of the rural–urban water equity nexus to draw attention to key equity considerations across space and scale that otherwise might remain invisible.

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Introduction

While the concept of efficiency has dominated the discourse on water resources management in recent decades, particularly given broader shifts towards neoliberal and utilitarian views of water, there has been growing emphasis on issues of water justice and equity – concepts that are emphasized by NGOs, scholars and water justice advocates (Boelens, Perreault, & Vos, 2018; Lacey, 2008, Perreault, 2014). For water allocation, a focus on productive uses, market mechanisms and economic incentives has often prioritized higher-value uses in water supply, typically shifting the allocation schema from agricultural to urban and industrial uses in varied geographical contexts (Shah & Zerriffi, 2017; Whiteley, Helen, & Perry, 2008). Though efficiency is an important policy focus, there are clear costs and risks associated with singular attention on this concept as a predominant metric. This is particularly so considering that at times it is applied in ways that fail to attend to, and may even aggravate, water-related conflicts and supply challenges (Whiteley et al., 2008). As Lacey (2008) and Perreault (2014) have argued, there is a clear need to recognize values of equity and justice to counterbalance the common focus on efficiency and markets. Greater consideration of these values offers the ability to understand and address concerns of importance for populations that are socially disadvantaged and economically marginalized (Kirjan, 2012). Echoing and amplifying this suggestion, a range of water justice advocates and environmental justice scholars have highlighted equity concerns as paramount in water governance discussions (e.g., Boelens, 2009; Harris, 2013; Harris, McKenzie, Rodina, Shah, & Wilson, 2017; Zwarteveen et al., 2017).

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Contributing to this focus, this article investigates the *rural–urban water equity nexus* of the Metro Manila water system, with specific attention to periods of El Niño occurrence and long dry spells. To develop and interrogate the notion of the rural–urban water equity nexus, the analysis considers equity issues related to water allocation from the Angat Dam, a multipurpose reservoir supplying domestic water to Metro Manila residents and irrigation water to rural farmers. Other authors (e.g., Shah & Zerrifi, 2017; Tabios & David, 2004) have also discussed the difficulty rural farmers experience during extremely dry conditions, particularly given an allocation policy that favours urban consumers of Metro Manila in times characterized by these conditions. However, this article goes further by showing that inequity in raw water allocation is linked to, and further exacerbated by, inequities in drinking water provision for nearby urban Manila. The concept of the equity nexus emphasizes linkages and interdependencies across the rural–urban gradient, and ways that these issues are often recalibrated across spaces and scales, as clearly elaborated by the introductory article of Hommes, Boelens, Harris, and Veldwisch (2019).

To begin with, our article discusses varied concepts of equity in water governance to lay the foundation for the analysis. The next section reviews the existing allocation protocols for Angat Dam, highlighting the inherent bias that favours urban water supply over agricultural uses, resulting in significant precarities and revenue losses for the farmers during periods of water scarcity. Metro Manila's water provision is then examined in the contexts of pre- and post-privatization scenarios, to understand conditions of urban water inequities that have evolved during these different periods, with attention to temporal shifts that may have occurred. The concluding section calls for broader equity reviews on water allocation and use in Metro Manila, using the rural–urban water equity nexus as a conceptual framework to document and highlight interlinked equity considerations that might otherwise remain invisible.

Equity: a variegated concept

The concept of equity is intrinsic in water resource management (Wegerich, 2007; Whiteley et al., 2008), and many policies stress the need for equitable allocation of water, but the concept of equity often remains undefined and ambiguous (Syme, Nancarrow, & McCreddin, 1999; Wegerich, 2007). Kirjan (2012) and Lacey (2008) point out that the lack of sufficient attention to equity in water resource management has led to significant conflicts, disempowering many consumers – at times, even denying basic rights to water for some. Arguably, the relative under-focus on equity is shifting, with growing discourses on the human right to water and politics associated with water justice over the past few decades (e.g., Boelens, 2009; Harris et al., 2017; Perreault, 2014; Roth, Boelens, & Zwarteveen, 2005; Zwarteveen & Boelens, 2014). Nonetheless, there is a clear need for conceptual elaboration, including clarification of key approaches and definitions, as well as enriched policy analysis with an equity lens for various aspects of water governance – from shifting water supply or pricing regimes, to implementation of new technologies or governance approaches. While these themes have been explored in the literature (e.g., Harris et al., 2017; Phansalkar, 2007; Zwarteveen et al., 2017), our contribution elaborates on the concept of *rural–urban water equity nexus*, offering analytical focus to highlight the multifaceted and

multiscalar ways that urban and rural water equity issues are often interlinked, interdependent and mutually imbricated. Often there are complex equity trade-offs and consequences arising from spatial and temporal shifts across the waterscape, frequently entailing shifting water access, uses and conditions between rural and urban users and spaces. Many of the other contributions to this volume (2019) similarly elaborate dynamics and trade-offs between rural and urban users and uses. For instance, the Duarte-Abadia and Boelens (2019), Bleeker and Vos (2019), and Goldman and Narayan (2019) provide similar examples of rural-to-urban water transfers, and associated inequities – often in the name of modernity, global urbanism (in the case of Bangalore), or water utopias (in the case of Spain). Also with complex trade-offs, but with different dynamics that favour white commercial farmers in the case of South Africa (Wessels, Veldwisch, Kujawa, & Delcare, 2019), or export-oriented agriculture in Peru (Damonte & Boelens, 2019), here there is a complex dynamic where large industrial farming enjoys privileged access to water, at the expense of impoverished urban households, peasants and other marginalized communities. As such, all the contributions in this issue speak in different ways to dynamics of the rural–urban equity nexus. Here, with this contribution focused on Metropolitan Manila, we document and analyze the complex ways equity is renegotiated in relation to rural–urban water dynamics, as well as how shifting uses and conditions of water across urban and rural spaces have complex implications for differentiated, yet interlinked, inequities. We explore these linkages specific to our case study, and also offer some more general conceptual and analytical insights along these lines.

To further develop some of the required conceptual building blocks, equity is generally described as the quality of being fair, reasonable, impartial, or just (Kirjan, 2012; Perreault, 2014; Sajor & Ongsakul, 2007; Syme et al., 1999; Wong & Srikantha, 2014, Zwarteveen & Boelens, 2014). In the context of social policy, equity often has two principal components, proportionality and egalitarianism. Proportionality (or vertical equity) implies that individuals derive benefits according to the degree of effort they put in, while egalitarianism (or horizontal equity) implies equal treatment for everyone (Syme et al., 1999; Wegerich, 2007). The concept of equity is also closely related to distributive justice and procedural justice, where the former might relate to fairness in allocating water or providing water services, while the latter relates to the regulatory and participatory processes that ensure everyone has a voice, is heard, and is treated fairly in terms of the processes by which decisions are made (Kirjan, 2012; Lacey, 2008; Perreault, 2014; Sajor & Ongsakul, 2007; Syme et al., 1999; Whiteley et al., 2008; Wong & Srikantha, 2014). Harris et al. (2017) emphasize the importance of using a justice lens to respond to various water concerns related to access, affordability, quality, water-related hazards, or productive uses.

As noted by Phansalkar (2007) and Wegerich (2007), equity has no universally accepted definition, and varies considerably across regions, cultures and communities. This is particularly so when we differentiate equality (everyone has the same attributes or access to goods, exposure to bads, etc.), from equity, which relies more on a notion of fairness or sense of ethics – to ensure that everyone has fair and just distribution, or process, with explicit consideration of past injustice, uneven access, and other social justice concerns (see Goff & Crow, 2014; Wutich, Brewis, York, & Stotts, 2013; Greenberg, 1981 for elaboration of the difference between equity and equality). Given

that equity relies on a sense of what is ethical and right, it is necessarily influenced by historical and cultural contexts, perceptions and circumstances (Boelens, 2009; Wong & Srikantha, 2014, Zwarteveen & Boelens, 2014). To this, Fraser (2000) adds the concept of cultural justice, which relates to the recognition that all individuals are full partners in social interaction, with the capacity and right to participate on par with other individuals in a manner that is not regulated by the institutionalized patterns of cultural value. Cultural justice deals with the acknowledgement of non-official water norms, customary patterns of organization and structures, deviant water rights, and other related values. Such considerations are related to, but not the same as, issues of participatory justice and engagement in water governance. In this regard, a holistic equity approach requires representation that includes recognition of cultural norms, coupled with the concept of fairness related to water resource distribution, and also procedural issues related to participation.

In addition to contextual understandings, equity considerations are affected by a diversity of values attributed to water (Kirjan, 2012; Lacey, 2008). Aside from utilitarianism, other values such as water's symbolic, religious and lifestyle meanings are critical to discussions of equity (Whiteley et al., 2008). The equity concept also reflects temporal dimensions, as it might refer to past circumstances and values the rights of present and future generations (Kirjan, 2012; Whiteley et al., 2008). Moreover, Greenberg (1981) points out that conditions of scarcity and abundance tend to influence and generate different perceptions of fairness, even within the same community. Based on a study involving 155 undergraduates of a Midwestern-US university, Greenberg (1981) notes that allocations based on needs, as opposed to those based on equality, were perceived as fair under conditions of scarcity while the use of either criterion was perceived as fair when making allocations of abundant resources. Echoing these findings, recent work by Wutich et al. (2013) shows that the perception of distributive justice in water-rich areas relates more with equality, while that for water-scarce areas relates more with the concept of equity. Here, there is a sense that perhaps when water is less available, considerations related to equity might emerge as paramount.

Inequities related to water are directly linked to asymmetries and imbalances in socio-economic status and political power (Phansalkar, 2007; Whiteley et al., 2008). While water scarcity may be attributed to such factors as population growth, inadequate water infrastructure, poor management, and ineffective institutional arrangements, water scarcity may also be generated by socio-political processes, through exclusion, bias and discrimination (Mehta, 2006). Adding to the biophysical concepts of meteorological or hydrologic drought, 'socially produced drought' refers more centrally to the ways that drought-like conditions, or scarcity, at times occur based on a host of socio-political or institutional factors (see Mehta, 2006; Mahayni, 2013 for linked discussions of socially produced scarcity) – thus directly linking conditions of water scarcity and key socio-political inequalities in particular spaces and times. Mena-Vasconez, Boelens, and Vos (2016) also note that psychological inclination or 'mimetic desire' to become like leading models (e.g., big farmers) produces subjects who try to follow the practices (i.e., water-intensive crops, claims to larger water supplies) of these 'mirrored successful actors', resulting in another form of socially manufactured water scarcity.

Rural–urban equity nexus

Adding a novel dimension to the discussions outlined above, we highlight interlinked rural–urban inequities to reconsider water allocation and use at the regional scale, attending to trade-offs and linkages between urban inequities and broader regional dynamics. Specifically, we link allocation protocols for raw water supply from the Angat Dam to considerations of key inequities observed in the context of urban domestic water provision, under two different scenarios: before and after the privatization of the Metropolitan Manila supply system. Subscribing to Sen's (2006, 2009, 2012) view about the difficulty of defining an ideal state of justice, we do not attempt to define the ideal state of equity in this context, but rather, analyze these scenarios in order to cast a spotlight on key inequities that are renegotiated as rural–urban water transfers and rights shift and evolve (Hommes et al., 2019), with simultaneous shifts in institutions responsible for water provision, in the context of Metro Manila's privatization. Acknowledging Boelens's (2009, p. 310) notion of equity as 'location-, time-, and group-specific political constructs of fairness', we also recognize that further engagement with location-specific notions of equity would be of interest for the analysis, although we are not able to attend to it in the context of this study. Likewise, while our case study is directly connected to the other spheres of equity and social justice, we will primarily focus on the issue of distributive justice, that is, the question of socio-economic distribution and redistribution. We now turn to our examination of multi-scalar and intra-regional trade-offs, notably between rural and urban areas, as well as intra-urban inequities.

Angat Dam and its water allocation protocol

Completed in 1967, the Angat Dam is a 131-metre rock fill multipurpose reservoir in a nearby province, 58 km north-east of Metro Manila (Metropolitan Waterworks and Sewerage System [MWSS], 2012a). With a storage capacity of 850 million cubic metres (MCM) of water, the dam supplies 97% of Metro Manila's domestic water requirements, irrigates 28,000 hectares of farmland in the nearby provinces of Bulacan and Pampanga, and generates 246 megawatts of electricity (MWSS, 2012a). It also functions as a flood-control facility: water release is regulated during extreme rainfall conditions to prevent heavy flooding of low-lying communities along the Angat River.

Water for irrigation is released through four main hydroelectric turbines with a combined power output of 200 megawatts, and flows downstream to Bustos Dam and the Angat-Maasim River Irrigation System before eventually reaching the farmlands (Figure 1). Domestic water supply for Metro Manila is released through five auxiliary turbines, generating 46 megawatts of electricity in the process, and flows to Ipo Dam for distribution to the treatment plants of the two private concessionaires (MWSS, 2012a). About 97% of Metro Manila's water supply comes from Angat Dam through a north-to-south water infrastructure system, serving the needs of 14.3 million consumers in 37 cities and municipalities (MWSS, 2012b).

Water supply allocation for the dam is governed by the Memorandum of Agreement on the Angat Water Protocol, signed by the reservoir's major users and policy makers, one of which is the Metropolitan Waterworks and Sewerage System,

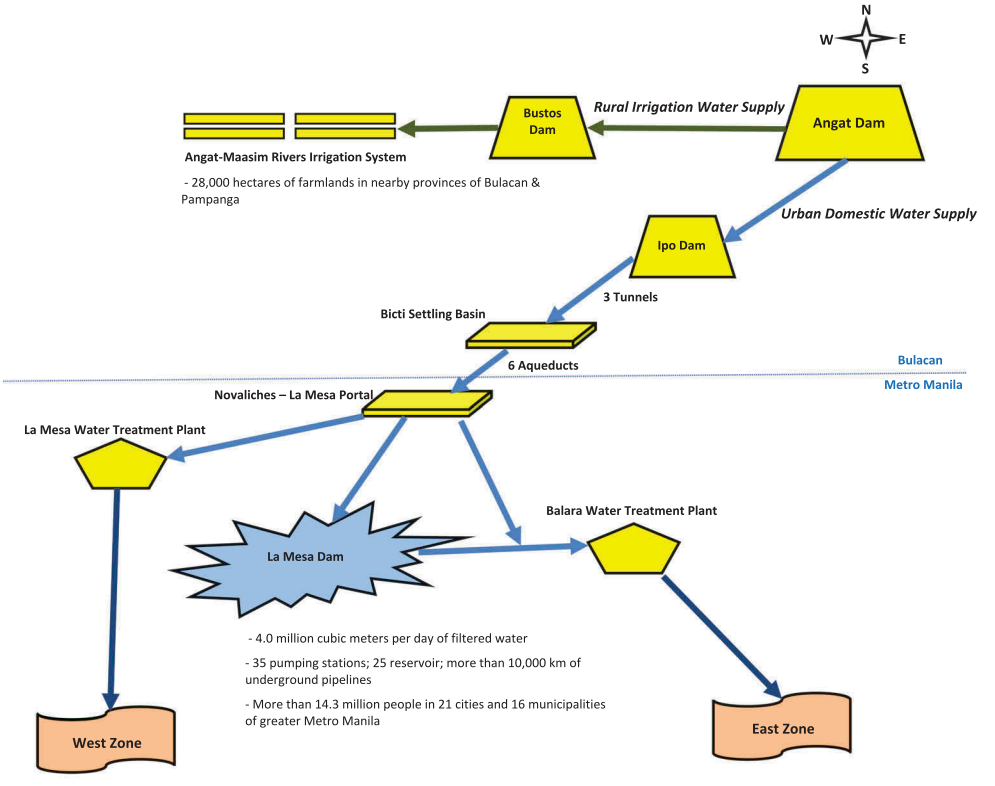

Figure 1. Rural–urban water supply system. Adapted from Torio (2016). Aside from power generation, water supply from the Angat Dam is also used for irrigation and urban domestic consumption.

the government agency responsible for water and sanitation services in Metro Manila (MWSS et al., 2013). Based on this allocation protocol, the use of water from Angat Dam is governed by the principle of 'priority in time of appropriation' for water coming from the same source – *provided that in times of emergency, municipal and domestic use shall have priority over all other uses*. Currently, this guiding principle is implemented through the Reservoir Operation Rules (Figure 2), which impose upper and lower rule curves prescribing the allocation of water among the reservoir's various users (see Shah and Zerrifi, 2017, for a more detailed discussion of Angat Dam's water supply allocation). Please note that this allocation protocol includes a miniscule allocation of 1.9 m^3/s (or only 1.4% of the total water allocation from the reservoir) for the drinking requirements of Bulacan, the province where the reservoir is located (MWSS et al., 2013). The situation that has emerged over time is one where the drinking water needs of Metro Manila are prioritized over both the productive and the drinking water needs of rural residents in Bulacan Province. What must be highlighted and examined more critically in relation to the prevailing allocation protocol are scenarios when reservoir water levels are below the lower rule curve. In line with the government's allocation policy, such scenarios, which normally occur during periods of drought, require that available water supply be

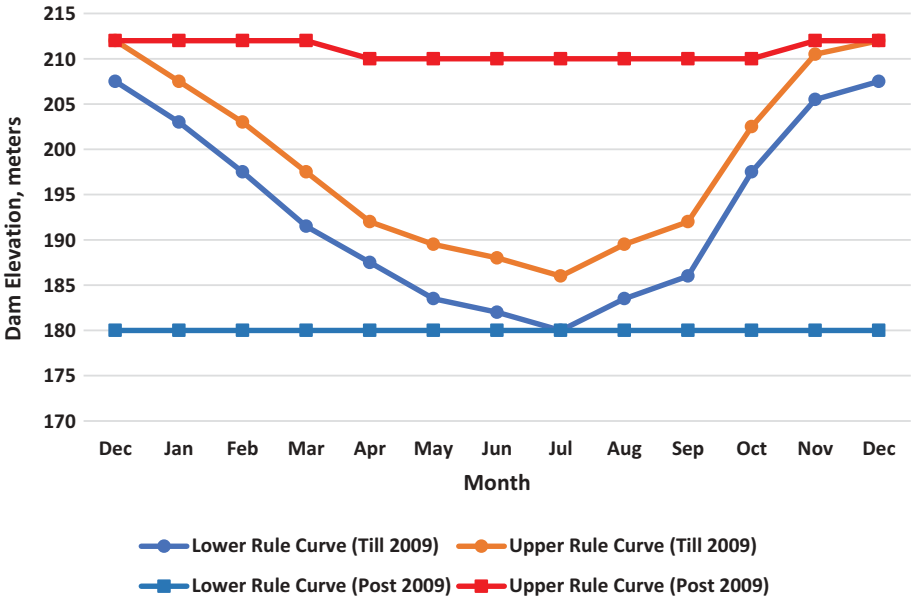

Figure 2. Operating rule curves. Adapted from MWSS (2014a, 2014b). Above the lower rule curve, all water allocations are met. Below the lower rule curve, urban water supply is prioritized over irrigation requirements.

reallocated (partly or in full) in favour of Metro Manila's urban domestic use, over the irrigation requirements of rural farmers.

Rural irrigation water supply shortfall: a frequent occurrence

From 1968 to 2010, annual water inflows into the Angat Dam were affected by the El Niño and La Niña phenomena, which are characterized by alternating periods of low and high inflows, respectively (Ortega, 2011). Of particular interest are the years of very low water inflows to the dam, resulting in water levels below the lower rule curve, which meant supply cutbacks for irrigation water. Irrigation water supply was permitted only when the water levels rose above the lower rule curve as a result of new inflows from precipitation during the wet season. A study by the Japan International Cooperation Agency, Nippon Koei Co. Ltd., and the University of Tokyo (2013) on the volume of water allocated to irrigation from 1968 to 2010 reveals several years of water supply shortfalls for irrigation with respect to the estimated mean irrigation water requirement of 600 MCM per year. Figure 3 shows these deficit periods, which generally coincided with a year of El Niño or the year immediately thereafter.

During these deficit periods, water supply for irrigation was reduced by an average of 35% from the required allocation volumes, based on approved water rights. The greatest shortfall was in 1998, when the outflow for irrigation was stopped for eight months due to a severe El Niño weather event. Cropping operations were suspended from November 1997 to June 1998, resulting in losses of 968 million Philippine Pesos (PhP) (US$24 million) (Pascua, 2007). The national irrigation agency filed a claim for compensation for these losses, but the

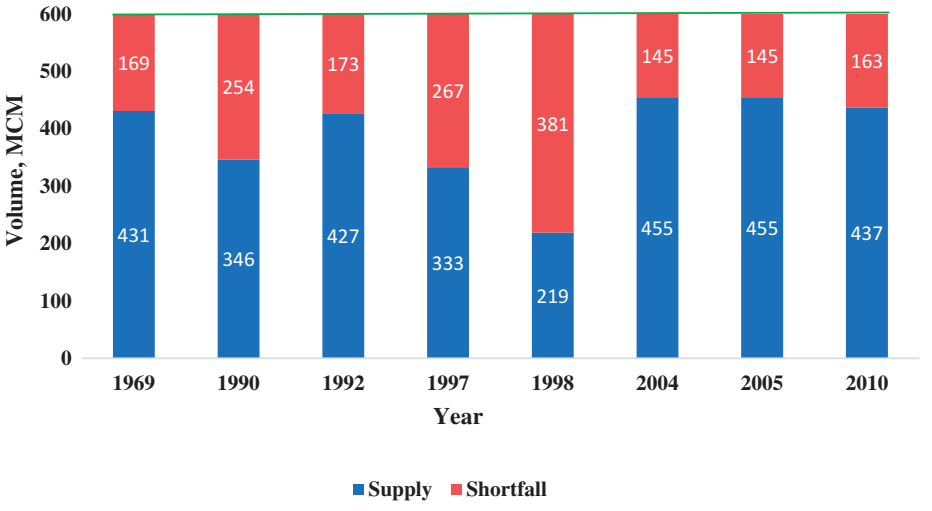

Figure 3. Irrigation water supply and shortfall. Source: Torio (2016). Irrigation water supply shortfalls normally occur during the El Niño phenomenon or prolonged dry conditions. Note: MCM = million cubic metres.

Metropolitan Waterworks and Sewerage System insisted that the reallocation was due to an unforeseen and uncontrollable event and thus was not subject to compensation under the Philippine Water Code (Pascua, 2007).

As also observed by Shah and Zerriffi (2017), the allocation protocol for Angat Dam has an inherent bias against rural irrigation water supply during times of drought, arguably at a time when the farmers would be most in need of additional water. Viewed solely through an economic lens, such a practice may be deemed justifiable, given that the opportunity cost for urban water during these conditions is estimated at PhP 5.7/m^3, while the cost of compensating the farmers for forgone revenue is only PhP 1.6–2.9/m^3 (Tabios & David, 2004). However, we agree with Tabios and David (2004), Pascua (2007), and Shah and Zerriffi (2017) that such allocation protocols result in gross inequities for the farmers, especially when they are not compensated for water supply reallocations and resultant lost revenue (which would also be invited by an equity perspective in the context of compensatory justice). Moreover, we argue that the level of inequity suffered by the farmers from an allocation scheme biased towards urban water supply is greater than has been acknowledged. We show this in the next sections by establishing the linkages to urban water inequities during pre- and post-privatization scenarios for water provision in Metropolitan Manila.

Public urban water provision until 1997

Until 1997, the Metropolitan Waterworks and Sewerage System was the provider of water and sanitation services for Metro Manila, supplying water to around 67% of the 10.9 million people in its service area, with an average supply duration of 16 hours per day (Table 1). During that time, the system's non-revenue water (NRW) level (the volume of water lost by way of leaks and pilferage) was 58%. This meant that out of a total daily water supply of 2.8 MCM, around 1.6 MCM of water was lost from the system. This proportion was worse than the average for 50 Asian water utilities, which ranged from

Table 1. Privatization scorecard.

	1997	2013	
Service indicators	Before privatization	After privatization*	Increase (decrease)
Population served (millions)	7.3	14.9	104%
Water supply (million L/d)	2,800	4,147	48%
Non-revenue water	58%	26%	(32%)
Water coverage**	67%	91%	24%
24-hour availability	67%	99%	32%
Water pressure (7 psi)		100%	
Water quality		100%	

*As a percentage of population served

**Post-privatization data are based on the weighted average results of the operational performance of the two private concessionaires.

Adapted from Torio (2018). Typical performance scorecard for Metro Manila's water privatization shows generally improved service levels in terms of non-revenue-water reduction, water supply availability, water pressure and water quality.

35% to 40% (McIntosh & Yñiquez, 1997). Note that water systems with high NRW require larger volumes of water supply than would be required if they were operating at higher efficiency. Moreover, the issue of NRW in the urban area links directly to the issue of water levels in the Angat Dam. Reducing NRW would have meant lower urban water supply requirements, which would have translated to higher volumes of water behind the dam. In turn, this would have meant more water for irrigation or even for setting up a buffer stock that all sectors could use during periods of drought.

Particularly in 1990, 1997 and 1998 (Figure 3), when rural agricultural water supply was cut by an average of 50%, lower NRW in the urban water system could have meant significantly smaller water supply shortfalls, significantly reducing the losses incurred by farmers during those periods. Linking these dimensions through the perspective of the rural–urban equity nexus, we see that inefficiencies in urban water provision, particularly infrastructural problems such as leaks, are directly linked to aggravated inequities experienced by the farmers. Even arguing from a narrow economic lens by considering the value of urban water supply, which Tabios and David (2004) estimate to be at PhP 5.7/m^3 (as opposed to PhP 1.6—2.9/m^3 for irrigation water), this scenario had significant cost consequences, given the large volume of water loss experienced in Metro Manila during those times. In this scenario, we point out, allocation rules, system inefficiencies and quality of urban infrastructure all recalibrate the rural–urban water equity nexus in complex and important ways. Thus, the issue of inequity is not simply about privileging urban users over rural uses: inequities are linked and dynamically reconfigured in myriad ways along the rural–urban divide.

Private-sector provision after 1997

Moving forward two decades from Metro Manila's water privatization in 1997, we ask whether this programme has caused corresponding shifts in rural–urban water equity connections. Many have already highlighted key inequities often associated with tariff increases and other changes that commonly accompany privatization, in addition to broad concerns related to the ethics of profiteering from the delivery of needed basic services, such as water (Bakker, 2007, 2010; Budds & McGranahan, 2003; Castro, 2007; Hall & Lobina, 2007; Harris & Roa-Garcia, 2013; Swyngedouw, 2005). However, our

evaluation of equity issues related to Metro Manila's water privatization reveals additional complicated and ambiguous outcomes. Among other documented shifts, the private concessionaires have managed to increase service coverage to 91% in the metropolitan area, and have reduced NRW to 26% (Table 1). Likewise, in areas where infrastructural networks are in place, the private concessionaires have been able to supply high pressure and good-quality water on nearly a 24-hour basis. These major shifts hold significant potential to reduce inequities in the linked system (as indicated above), while contributing to persistent or even aggravated inequities in this context.

Conditions of inequity related to Metro Manila's urban domestic water provision generally manifest under scenarios where water remains unaffordable for those who are connected and access remains difficult for those who are not. In both scenarios, the urban poor suffer the most. Torio's (2016, 2018) research on the Metro Manila water privatization provides insights on these lingering equity concerns for poor households under varying conditions of access and affordability. In brief, low-income households in areas not covered by the private concessionaires' networks (mostly in the city's southern peripheries) consume less than the minimum World Health Organization standard of 50 litres/capita/day for basic health needs (Howard & Bartram, 2003) but pay the highest price for water among all unconnected households (Torio, 2016). Until property rights issues are settled, households in informal settlements within the networked areas must rely on services provided by community-based operators (sub-contractors for the concessionaires), at times paying 10 times as much for the last phase of water delivery. For low-income households able to acquire direct service connections from the private concessionaires, the experience of nearly 24-hour supply of high-pressure, high-quality water has doubled consumption, increasing water expenditure from 6% to 11% of average household income. This expenditure level is well above the maximum affordability limit of 5% that the Asian Development Bank and the World Bank generally recommend (Fankhauser & Tepic, 2007; World Bank, 2008).

These examples make it clear that even with improved operating efficiencies, safeguards remain necessary to ensure equitable water provision for all urban consumers. Without equitable urban water provision, water flows are often in the direction of rich households able to pay the increasing cost of water, especially when concerns related to access, affordability, quality and other dimensions continue to plague poor households. Based on existing rural–urban equity linkages, under a scenario of inequitable urban water provision, the water supply will be diverted from farmers to the taps of high-income urban households. Again, even through a narrow economic lens, the urban domestic water supply with an economic value of PhP 5.7/m^3 would benefit mostly the rich urban consumers, while the farmers suffer economic losses. Thus, there is a need to insure that urban water provision is equitable, especially under conditions where the farmers are not properly and justly compensated for lost revenues.

Note that under public-sector provision, the water allocation inequity suffered by the farmers is exacerbated by high levels of waste of urban water, with high economic value. On the other hand, under private operators, the farmers' inequity is magnified if urban water provision is inequitable, as only rich urban households benefit from the use of the highly valued water. From both efficiency and equity viewpoints, both scenarios are unacceptable. Yet they often remain invisible to policy makers, and thus generally remain unaddressed or unattended to.

Conclusion: the case for broader equity reviews

In this article, we have made a case for broader equity reviews that are multi-scale and multi-actor, given that conditions of inequity manifest in different forms, with shifting linkages, over different geographical areas, scales and time frames. We suggest that Philippine policy makers re-examine the allocation protocols for Angat Dam based on a more holistic and comprehensive view of the equity issues, with particular attention to rural users, but also in ways that engage the interlinked dimensions that emerge and shift across the rural–urban waterscape (Hommes et al., 2019). Such an approach would help policy makers realize that inequities in water governance are not confined to the geographical area of Metro Manila, nor that of Bulacan, but that key resonances, linkages and shifts exist across these spaces. What occurs in Metro Manila reverberates with equity consequences in the nearby provinces, whether due to the considerable losses from the system, or unfavourable conditions of access and affordability for poor urban households. Without a comprehensive equity review to drive water supply allocation policy, it is likely that rural farmers and impoverished and underserved urban residents will continue to suffer. Many of these inequities are worsened by ongoing inefficiencies in the urban system. Thus, our analysis offers a corrective to analyses that often position equity as a counter to efficiency focus – instead, we have shown that the ongoing system inefficiencies often propagate and worsen inequity, suggesting that these priorities and goals are linked in complex and ambiguous ways. While clearly a sole focus on efficiency often precludes an equity analysis, equity dimensions may also be served by improving system efficiency.

In the long term, the stability and reliability of water supply for the rural farmers is a major policy issue for the government. To this end, Philippine policy makers must consider building a new reservoir or any related infrastructure that ensures irrigation water supply according to the farmers' water rights, as stated in their water permits. Doing so is critical to their livelihood, and all the more so given that dryer-than-average years are expected to be increasingly common in the coming decades. It is also likely that a broader equity perspective would also invite consideration of alternative livelihood activities for the farmers, rather than a sole focus on water supply (see Shah, 2015, for a more extensive discussion of this mitigation strategy for Bulacan).

Another consideration that comes to light with an equity focus is the very real concerns related to procedural justice – concerns that are critical to rural farmers, and the urban and rural poor alike. It is clear from the allocation rules, and also from analysis of the governance of Metro Manila's water system, that there are few if any opportunities for users to participate in decisions related to pricing, irrigation supply, or domestic water needs. At the same time, we acknowledge that there are other critical aspects of equity that we have barely touched on in relation to water allocation and use in Metro Manila, such as cultural justice, gender equity, intra-rural water allocation, and other equally important issues. While these issues further highlight the need for a broader equity perspective, as we have suggested, some of the precise concerns therein are beyond the scope of the current analysis. We hope that other academics and social justice advocates will continue research on these topics to help drive policy towards more equitable conditions. With the benefit of our analysis, and the concept of the rural–urban equity nexus, we should all aim to do so in ways that attend to and foreground key connections and interlinkages, rather than focusing on single issues or concerns in isolation.

Disclosure statement

No potential conflict of interest was reported by the authors.

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