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Going beyond basic access to improved water sources: Towards deriving a water accessibility index

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ABSTRACT

In this paper, we use a Water Accessibility Index (WAI) to determine differences in urban household water access in an inner-city community characterized by relatively high piped water coverage. The case study is based on field data collected in a low-income community called August Town, located in Jamaica's capital city of Kingston. A semi-formal survey was used to document how different socio-economic factors influenced household-level water accessibility within the study area. Data from the survey was later used to develop the WAI. The index revealed the importance of incorporating socio-economic and human-centered factors in the measurement of water accessibility, especially when access to improved drinking water sources is already gained. When used on its own, piped water coverage was found to be an inadequate indicator of water accessibility within the study area. In general, we regard the WAI as a useful management tool for tracking household-level and inter-community disparities, which could contribute greatly in facilitating improvements in water access where it is needed the most.

1. Introduction

As we continue to transition towards a post-2015 development agenda, the proper management and allocation of freshwater resources by all countries is critical in achieving universal and sustainable access to safe drinking water. Accurate collection and monitoring of data pertaining to the quality and type of drinking water sources used by populations around the globe will certainly form an essential part of this transition. In fact, monitoring programs dating back as early as the 1930s, have played a pivotal role over the years in (re)shaping international development policies and discourse around water and sanitation (Bartram et al., 2014). These monitoring programs are primarily intended to track progress towards achieving established global, regional and national development targets, as well as highlight gaps and opportunities for enhancing or accelerating efforts towards achieving these said targets and other related goals.

Since the 1960s, the international monitoring of drinking water has fallen under the UN system which has been based on a set number of global targets. The drinking water target under the recently concluded Millennium Development Goals (MDGs), called for halving the proportion of the global population without sustainable access to safe drinking water between 1990 and 2015. From all official accounts, this target was met from as early as 2010; which on the surface, signals a huge success for the international development community. Presently, according to official figures, the proportion of the world's population with access to improved drinking water sources stands at approximately 91 percent, compared to 76 percent in 1990 (WHO, 2017). This has resulted in an additional 2.6 billion people gaining access to an improved source of drinking water since 1990 (UNICEF/WHO, 2015). However, there are still wide disparities between countries and across regions. The drinking water coverage for both sub-Saharan Africa and Oceania is still below 70 percent for instance. There are also disparities between urban and rural water coverage, where approximately 96 percent of the global urban population had access to an improved drinking water source in 2015, as opposed to 84 percent of the rural population worldwide (WHO, 2017). As it pertains to piped water on premises, currently around 79 percent of urban dwellers globally have direct access to piped water on their premises, compared to only 33 percent in rural areas (UNICEF/WHO 2015).

There is a genuine concern however, that the situation may actually be worse than what is being reported. This is linked to a growing recognition of the inherent shortcomings in the data and other metrics conventionally used to measure countries' performance in achieving sustainable access to safe drinking water (see, for example, Bain et al., 2012; Bartlett, 2003; Clasen, 2012; Martinez-Santos, 2017; Smiley, 2017). As Satterthwaite (2016: 1) has pointed out in his recent review

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of progress made under the MDGs for urban water and sanitation provisions, UN statistics tend to overestimate who has sustainable access to safe drinking water due partly to deficiencies in available data globally, as well as how 'sustainable access' is both defined and measured. For example, the UN does not measure water quality directly, neither is there a clear set of methods to accurately capture quantity or sustainable access (also see, Clasen, 2012). Proxy indicators are used instead, based on the type of facility a household reports as its primary source of drinking water (WHO/UNICEF, 2012). Success is therefore evaluated based on the number of households recorded as having access to either an improved drinking water source (defined as water piped on premises) or other improved drinking water sources (which includes public taps, boreholes, rainwater harvesting or protected wells and springs). These contrasts sharply with unimproved drinking water sources that normally include informal vendor-provided water, unprotected wells and springs or surface water such as rivers, ponds and streams. However, these conventional measurements of improved water access say little as to whether the water is safe to drink (Dar & Khan, 2011; Smith, Lingas, & Rahman, 2000; Sultana, 2013); neither does it take other important parameters into account, such as the number of service hours available, distance to water source or if there is, in fact, an adequate, regular, affordable and reliable supply of potable water available (Martinez-Santos, 2017; Satterthwaite, 2016). No doubt these shortcomings in the data being used to measure people's sustainable access to water has serious policy implications, including masking underlying issues of social and material inequality, poverty and poor quality service provision. Furthermore, any limitation in the methods used to track and monitor progress in drinking water coverage could mislead future intervention and research programs aimed at extending and enhancing global water service provisions, or worse, result in the shifting of needed resources to other priority sectors.

Strongly tied to the aforementioned challenges, is a growing call for these metrics to be revised and reformulated to more accurately measure sustainable access to safe drinking water. These calls signal the need to go beyond measuring just access to 'improved drinking water sources', and to move instead towards an assessment of the quality and sustainability of public water provisions (Bain et al., 2012; Bartlett, 2003; Clasen, 2012; Martinez-Santos, 2017; Smiley, 2017). What has been noticeably missing from the debate so far however, is precisely how these methods and metrics can be improved given how difficult and costly it is to collect the required data at the global or national level; part of the reason the current international benchmarks were chosen in the first place – to provide the simplest and lowest common denominator all parties would be willing to accept and sign on to. For the most part, the focus has been on exploring more accurate ways of accounting for water quality due primarily to continued public health and human rights concerns in developing countries around water related illnesses (see, for example, Clasen, 2012; Dar & Khan, 2011; Sultana, 2013; Wang & Hunter, 2010). Findings from several recent studies have shown a clear disconnect between water infrastructure coverage and water quality (Clasen, 2012; Martinez-Santos, 2017; Sultana, 2013). Even a fairly recent study commissioned by the WHO/UNICEF Joint Monitoring Programme (JMP) on Water and Sanitation, which included field data from six countries, found that except for some centrally managed piped water systems, 'improved sources' were often microbiologically and chemically contaminated, with the level of faecal contamination being at its highest at the household level (WHO/UNICEF, 2010). Yet still, acceptable measurements of water quality remain elusive. A similar problem exists with regards to how best to treat the issue of sustainable access. This is largely due to the inherent difficulties in defining and measuring such a complex and cross-cutting concept as sustainability. From a practical standpoint, sustainability 'comes down to ensuring permanent water supplies without compromising affordability or water quality' (Martinez-Santos, 2017: 8). Therefore, the term does not apply to improved water sources unless the water provided is affordable and safe for domestic and personal consumption, and if the service is not subjected to regular interruptions or seasonal variability (Martinez-Santos, 2017). Again, these parameters are largely overlooked by current international benchmarks. There is therefore a genuine need for the international community to devise new methods that can better capture these and other important elements to provide a more accurate picture of the global situation.

In this paper, we seek to demonstrate an alternative approach to capturing inequalities in household water accessibility, while accounting for differences in reliability, affordability and adequacy of water supply. We utilize a Water Accessibility Index (WAI) to determine differences in urban household water access within an inner-city community characterized by relatively high piped water coverage. The case study is based on field data collected in a low-income community called August Town, located in Jamaica's capital city of Kingston. A semi-structured survey was used to document how different spatial and socio-economic factors influenced households' water access within the study area. Data from the survey was later used to develop the WAI. The index revealed the importance of incorporating socio-economic and human-centered issues in the measurement of water accessibility, especially when water is already piped on premises. When used on its own, piped water coverage was found to be an inadequate indicator of water accessibility within the study area. This contrasted with the WAI that was better able to capture critical household-level differences in water accessibility. In general, we regard the WAI as a useful management tool for tracking both intra- and inter-community disparities, which could contribute greatly in facilitating improvements in water access where it is needed the most. More importantly, the paper highlights the fact that continuous assessments and revision of indicators are needed to ensure that improvements in water supply and service provision benefits the most vulnerable and marginalized groups in society.

The remainder of the paper is organized into four broad sections. First, we discuss the context in which we situate the study, which includes a brief overview of Kingston's existing freshwater resources challenges. Second, we outline the steps taken in developing the WAI, and discuss its various components. This is then followed by a presentation of the main results of the study, paying particular attention to the socio-economic and spatial factors shaping household water accessibility in the August Town community. Finally, we conclude by discussing the strengths and policy implications of the proposed Water Accessibility Index relative to more conventional measurements of sustainable water access such as piped water coverage.

2. Context

Water resources in the Caribbean are greatly influenced by a range of socio-ecological factors including prevailing weather and climate conditions, existing water management practices and population dynamics – especially the continued concentration of the region's population within urban centers (Bates, Kundzewicz, & Palutikof, 2008, pp. 1–210; Cashman, Nurse, & John, 2010; Gohar & Cashman, 2016; Nurse et al., 2014). Water availability within the region, while heavily dependent on seasonal rainfall patterns, is often affected by escalating water demand and poor water management practices which expose many Caribbean islands to periodic water stress. As urban centers throughout the Caribbean continue to expand, there will be an increased demand on existing freshwater resources which could in turn affect surface water levels and groundwater recharge due to over-abstraction (Lester, 2015). So, while the reliability of total natural renewable water supply plays an essential role in the ability of regional public water providers to meet annual water demand, proper water management strategies are equally important in safeguarding water security within the Caribbean (UNEP, 2012; Cashman et al., 2010). Integrated water resources management and a lack of adequate financial and technical resources are some of the major hindrances to many Caribbean Small Island Developing States (SIDS) delivering sustainable water services (Lester, 2015). Unequal distribution of water