



Infrastructure & Cities for Economic Development

Revealing and strengthening the links between WASH, productivity, and well-being for informal vendors in Durban, South Africa, and Nakuru, Kenya

Produced For: DFID

Version: 3.0

Date: July 2019





Contents

<i>Executive Summary</i>	3
<i>1. Introduction and objectives</i>	5
<i>2. Methodology</i>	9
<i>3. Findings: Multiple Burdens of Inadequate WASH for Vendors in Durban and Nakuru</i>	10
<i>4. Conclusions</i>	24
<i>5. Recommendations: Realising the Potential of WASH for Workers</i>	26
<i>Bibliography</i>	29

Note on currency conversion:

In July 2019, the conversion rate was Ksh. 129 per £1 (129 Kenyan shillings per GBP) and R17 per £1 (17 South African Rand per GBP).

Executive Summary

Background

Limited Recognition of Workplace Water, Sanitation, and Hygiene (WASH) for Informal Labourers

Past WASH research typically focuses on residents' access, including yard taps or public toilets, but these studies usually overlook the vital need for WASH in workplaces. Although it is often assumed that employers are responsible for providing WASH to employees, many workers in the 'informal economy' are self-employed and lack access to basic infrastructure, healthcare, or other social protection (ILO 2013, Lund, Alfors, and Santana 2016). 'Informal employment' encompasses all livelihoods lacking in legal or social protection, whether in informal enterprises, formal enterprises, or households (ILO 2013). Informal street vending is a common livelihood strategy in the Global South; in sub-Saharan African cities, it often represents 12% to 24% of total urban informal employment (Roever 2014, p. 5). As this report will argue, inadequate workplace WASH not only curtails informal vendors' livelihoods, but it can also negatively affect their health while reinforcing social and economic exclusion.

Study Findings from Durban (South Africa) and Nakuru (Kenya)

Multiple Burdens and Inequitable Impacts of Inadequate WASH

Using research from Durban and Nakuru, this paper will demonstrate that informal vendors' access to WASH is often highly inadequate and can impose a range of burdens. The study conducted focus group discussions with market traders and mobile vendors to analyse how they access WASH, the associated costs and waiting times, coping strategies, and priorities for future interventions. These traders must often travel lengthy distances and endure long queues to access WASH (thereby losing vital incomes) and pay unaffordable prices for low-quality toilets or water.

In Durban, the costs of water and toilet access represented **8% to 12%** of monthly earnings while in Nakuru, vendors usually spent about **20%** of their incomes on water and toilets. Vendors repeatedly noted that inaccessible or unreliable WASH can threaten their relations with their customers because they cannot sell whilst seeking to access WASH. Furthermore, the impacts of poor WASH may be gender-inequitable, as women are overrepresented in vending sectors that rely heavily upon adequate WASH, such as food sales or hairdressing. Many vendors criticised local authorities for failing to provide adequate WASH at their worksites and relied upon coping strategies that may only deepen their poverty, time burdens, or marginalisation.

Unlocking the benefits of adequate WASH for workers

These findings also suggest several potential benefits of adequate WASH, which can 1) improve workers' health, 2) reduce the time burdens of accessing water or sanitation, and thereby 3) bolster productivity. Further gains may include 4) enhanced food safety and 5) improved environmental and public health for traders and customers alike, rather than contaminated foods or unclean vending sites linked to inadequate WASH.

Adequate WASH can also promote 6) significant psychosocial gains for vendors, such as enhanced self-esteem or reduced levels of stress. Potential benefits for 7) gender equity can again be considerable, and adequate WASH for informal workers can 8) promote productivity of *formal* firms and formal workers, given the close linkages between formal/informal enterprises in the Global South (Meagher 2013).

Key Recommendations for Future Interventions

- Workers require affordable, clean WASH facilities located near their trading sites
- The timeliness of WASH provision and predictable maintenance schedules are crucial
- Labourers may need complementary interventions, such as rubbish collection and adequate lighting

Recommendations to Promote Gender Equity and Inclusion

- Municipal officials, public utilities, and donor agencies can collaborate with workers to develop inclusive, gender-sensitive WASH provision (e.g., menstrual hygiene facilities, support for workers who are breastfeeding, accessible facilities for labourers with disabilities)
- More broadly, policymakers can partner with worker groups to enhance their voice in city planning

Implications for Formal Workers and Firms

- Providing WASH to informal workers can enhance not only their productivity, but also strengthen the enterprises of formal workers and firms
 - Informal workers in the Global South often source their inputs from formal firms
 - Informal workers also regularly provide formal workers and enterprises with affordable, accessible items
- Adequate WASH can enhance food safety, thereby supporting the health of food vendors' customers in the formal or informal economy

Policy prioritisation and additional data needed on workplace WASH

- WASH is not recognised as a key input to support workers' livelihoods and productivity
- Very limited data is currently available on workplace WASH
- Additional data-collection is particularly needed on the following topics:
 - Affordability, quality, proximity, and waiting times for WASH at informal worksites
 - Impacts of deficient workplace WASH, such as a) lower productivity, b) gender-inequitable burdens, and c) effects upon workers with disabilities or other vulnerable labourers
 - Further attention to climate change, WASH, and well-being (particularly for outdoor informal workers at elevated risk of dehydration and ill-health)

1. Introduction and objectives

Revealing the Economic, Health, and Gendered Impacts of Minimal Workplace WASH for Informal Workers in African Cities

Workplace access to water, sanitation and hygiene (WASH) has been ignored in past research and global monitoring, despite its key role in fostering health and inclusive economic development. Adequate WASH "contributes to producing a healthy, educated and productive workforce," thereby providing "the foundation of economic growth and social development" and serving as "a necessary enabling condition [for] jobs and reducing inequality" (UN 2018, p. 165; UN-Water 2016, p.4). For instance, WASH can support economic growth by reducing rates of waterborne illness and thus improving health outcomes;¹ by lowering risks of work-related accidents or illness linked to dehydration; and by strengthening the livelihoods of workers with water-dependent jobs (*ibid.*, also WaterAid *et al.* 2016). WASH in other non-household settings (e.g., schools, health clinics) has recently garnered additional policy attention (Cronk *et al.* 2015, Kendall and Snel 2016), but presently there are no available guidelines nor regular monitoring of workplace facilities. In turn, data shortfalls on workplace WASH have obscured its potentially far-reaching benefits for productivity and public health in cities of the Global South. Workplace WASH may be especially critical for outdoor labourers in the context of rising heat stress due to climate change (Nerbass *et al.* 2017) as well as for food vendors and others with water-dependent livelihoods.

To help fill existing gaps in the empirical literature, the following paper will analyse the multiple negative impacts of meagre WASH for informal vendors in Nakuru (Kenya) and Durban (South Africa). It will also underscore the potential contributions of adequate workplace WASH to workers' health, gender equality, and inclusive development in other cities of the Global South.

Within the already-limited literature on workplace WASH, informal workers are particularly overlooked even as the majority of African and Asian cities' workforce is in the informal economy (ILO 2018, also below). The Water and Jobs Report (UN-Water 2016) acknowledged the challenges of gathering data on informal work and of identifying the level of 'water-dependence' for particular jobs (p.123), but it did not discuss urban informal workers in detail. Guiding principles on workplace WASH again failed to mention informal workers, but they do recommend 1) developing a code of conduct for improving WASH in the supply chain and 2) providing WASH at temporary and mobile worksites (WBCSD 2013, pp. 12, 23-24). Similarly, in a handbook on workplace WASH, ILO (2016) included only two brief mentions of informal workers and does not discuss informal own-account labourers. The latter workers can be especially difficult to monitor and to reach with improved WASH provision, given their lack of clear employer and dispersed or temporary worksites. More generally, monitoring non-household WASH is a challenge "due to a lack of leadership and accountability regarding which ministry or organisation is responsible" for provision (Cronk *et al.* 2015, p. 701). Thus, the multiplicity and dispersion of worksites; lack of leadership from donor agencies or government ministries; and unclear lines of accountability for own-account and other informal labourers may all help to explain the neglect of workplace WASH.

Meanwhile, there is rising recognition of WASH's socioeconomic benefits, including its potential to advance gender equality, but again the focus is usually upon household provision. In the Global South, the onerous task of water-collection (with its associated physical burdens and time poverty due to lengthy queues) is typically shouldered by women (Ray 2007, Sorenson 2011). Analysis of UNICEF's Multiple Indicator Cluster surveys (MICs) has confirmed that women in African cities typically

¹ Inadequate WASH is associated with a range of diarrhoeal diseases and cholera (that can be foodborne as well as water-borne) as well as typhoid and paratyphoid, intestinal worms, and eye and skin diseases associated with a lack of water for washing (see Bartram and Cairncross 2010).

collect water, although such findings centre upon the household rather than workplace water-fetching (Geere and Cortobius 2017, p. 522). More positively, adequate WASH can generate “substantial benefits for public health, the economy and the environment,” including benefit-to-cost ratios of “as high as 7 to 1 for basic water and sanitation” (OECD 2011). This report also highlighted the gender-equitable benefits of WASH: “for women and girls, a private sanitary latrine [is] particularly important and has considerable impact on the quality of life” by avoiding girls’ lost school days and facilitating menstrual hygiene management (MHM) (*ibid.*, p. 56).² In related policy priorities, SDG 6 has a target on improving women and girls’ access to WASH³ and UN General Assembly resolutions have called on member states to reduce the time spent by women/girls in collecting water and to prevent gender-based violence when accessing WASH (UN-Women and WSSCC 2016).

But such laudable aims remain difficult to achieve in practice, particularly for women in the informal economy. For instance, informal employers are not obligated to provide workplace WASH or to support women’s menstrual hygiene management; own-account informal workers may also lack accessible public toilets for MHM at work (Sommer *et al.* 2016, p.2). Our findings will suggest that meagre WASH for informal workers may create particular challenges for women while, conversely, improving WASH has strong potential to advance gender equity (see below).

Adequate WASH may advance several SDGs alongside health and gender equity (SDGs 3, 5) by helping to eliminate poverty (SDG 1), improve nutrition (SDG 2), and foster economic growth (SDG 8). It can offer significant benefits for maternal and child health, as children are particularly vulnerable to WASH-related illnesses; the combination of malnutrition and recurrent diarrhoea can stunt children’s physical growth and cognitive development in the long-term (Ezeh *et al.* 2017). The harmful impacts of poor WASH upon child health may also contribute to women’s time poverty and gender-inequitable burdens in the unpaid ‘care economy,’ as it is usually women who care for ill relatives (Chant 2013). Additionally, undernourished mothers typically have lower incomes, assets, and earning capacities, so WASH-related diseases “create a vicious spiral of poverty that often persists across generations” (Chase and Damania 2017, p. 16). But improving WASH can reduce the incidence of diarrhoea and therefore of malnutrition in both mothers and children, in turn lessening the extent of stunting, under-development, and poverty (*ibid.*). Adequate WASH can thus provide a pathway towards improved health and economic growth across the life-course, contributing to intergenerational improvements in economic productivity. There are still major evidence gaps regarding WASH’s impacts upon absenteeism, labour market outcomes, or productivity levels (WaterAid *et al.* 2016, p. 7).⁴ Nevertheless, the above discussion does suggest plausible links between improving WASH and promoting health, decent work, economic growth, and several other SDGs.

In a notable contribution to climate resilience (SDG 13), workplace water provision can foster well-being for outdoor labourers, who will face more intense heatwaves and are already at elevated risk of dehydration. There is strong evidence that increased core body temperature and excessive sweating can result in dehydration, which has been associated with chronic kidney disease, heat stroke, and reduced work capacity (Kjellstrom *et al.* 2016, pp. 100-101). According to a *Lancet* review of workers’ health and productivity under occupational heat strain, 30% of workers facing heat stress conditions have recorded productivity losses, although past studies did not distinguish between formal and informal workers (Flouris *et al.* 2018, p. e527). Multiple responses can promote workers’ adaptation to climate change and occupational health (e.g., appropriate clothes, adjusting work/rest

² Sommer *et al.* (2015) and Burt *et al.* (2016) discuss how gender-based violence has been linked to inadequate WASH, such as when women or girls risk rape when walking to public toilets in insecure informal settlements.

³ “By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls...” (emphasis added). See <https://www.un.org/development/desa/disabilities/envision2030-goal6.html>

⁴ See also 3ie’s chart available at <http://gapmaps.3ieimpact.org/evidence-maps/water-sanitation-and-hygiene-wash-evidence-gap-map-2018-update>, which does not include any studies regarding labour market and employment impacts of WASH interventions (updated May 2018).

cycles), complemented by green infrastructure and built environment strategies to foster cooling (Day *et al.* 2018). But a review on kidney and occupational health argued that “maintaining *adequate hydration* may be the single most important intervention in the management of workers exposed to heat stress” (Nerbass *et al.* 2017, p. 1004, emphasis added). Although formal workers again face occupational risks due to rising temperatures, it is *informal* workers who are more likely to lack the job security, clear employment relations, and assets to enable the regular hydration and rest breaks necessary to manage rising temperatures (*ibid.*, p. 999). Climate change further underscores the need for workplace WASH, given the rising temperatures and projected water scarcities in cities where informal outdoor workers may already struggle to remain hydrated and access adequate provision.

Limited Empirical Data on Workplace WASH’s Benefits in the Global South

Although there is evidence of the health and economic burdens of inadequate sanitation, few studies have examined the impacts of meagre toilets at the workplace. For example, the World Bank’s Economics of Sanitation Initiative (ESI) found that the costs of inadequate sanitation in Africa exceed 2% of total GDP and even 4% of GDP in South Asia (Hutton and Chase 2016, p. 11). Poor sanitation in Nairobi County results in a loss of Ksh. 1.7 billion annually due to health-care costs, lost time (predominantly among women), lower productivity, and premature death—a staggering figure that still does not include costs such as water pollution and losses of tourism or livelihoods (WSP 2015). Economic research on sanitation has often examined reductions in diarrhoea morbidity or mortality, yet few studies explore the labour market, income/poverty, or time use impacts of meagre WASH.⁵ Grey literature has noted that adequate WASH can reduce attrition and workplace accidents while also supporting productivity and health, but offered little detailed discussion (WBCSD 2013, World Toilet Day 2016).

In a notable exception, a case study surveyed 300 women workers in Tamil Nadu (including in brick and steel manufacturing) and examined the occupational implications of heat and inadequate WASH (Venugopal *et al.* 2016). Of the 200 female workers lacking access to sanitation, 174 women (87%) had genitourinary problems ($p < 0.001$) (*ibid.*, pp. 4-5). Furthermore, the survey found a significant association between ‘not drinking water’ and prevalence of genitourinary issues; 10% of women stayed home from work during menstruation, confirming the income losses linked to poor MHM (*ibid.*). The authors recommend urgently providing workplace WASH to reduce women’s anxiety and absenteeism; to promote workers’ concentration and well-being; and to advance economic development and public health due to reduced open defecation (*ibid.*, p. 8).

There is only suggestive case study evidence exploring how WASH can enhance the productivity of urban informal labourers and its benefits for gender equality. For instance, findings in Zambia confirm that adequate WASH and other infrastructure can support home-based enterprises (HBEs), with major potential for women who are more likely to work in their settlements. After water, sanitation, and other infrastructure was provided in Lusaka’s informal settlement of Chaisa, HBEs selling drinks or other water-dependent livelihoods often benefited and on average, households with HBEs had higher incomes than their neighbours without enterprises (Mpembamoto *et al.* 2017, p.12). In an evaluation of Manila’s upgraded water supply system, over 72% of beneficiary households earned more income, largely thanks to time savings, while women in the control areas still averaged 3-4 hours per day collecting water (Aiga and Umenai 2002). Finally, a survey of 443 Accra households found a high prevalence of small-scale, water-dependent occupations especially for women in low-income areas (Abraham *et al.* 2015). Such livelihoods included food preparation, hair salons, and beautician services, and for households in low-income areas, water-dependent livelihoods comprised at least 40% of monthly household incomes amongst nearly 60% of respondents (*ibid.*, p. 151). Improved WASH provision in Accra could potentially bolster the earnings of water-dependent workers, who are more likely to be women (*ibid.*). Nevertheless, there are several research gaps on WASH’s impacts at the

⁵ See footnote 4 above for 3ie’s 2018 chart on WASH evidence.

workplace, such as its potential contributions to workers' absenteeism and to female empowerment, as well as its role within supply chains (WaterAid *et al.* 2016, p. 7).

Study Objectives

To help address the above gaps, this paper has the following objectives:

- To generate new evidence on the links between labour productivity and access to WASH;
- To map transmission mechanisms to more inclusive, resilient or faster economic growth, filling a critical evidence gap relating to constraints on workers' productivity in Africa;
- To link DFID into an emerging agenda focusing on slum health (cf. Lilford *et al.* 2017); and
- To support DFID's broader strategic goals by demonstrating linkages between WASH investment, labour productivity and structural barriers to inclusion; and to identify gaps that could unlock the transformative gender and inclusion potential of WASH programming.

With its focus on the inclusion of female informal workers, this research recognises that improving access to economic opportunities must be accompanied by shifting the structural drivers of inequality. It will examine the roles of WASH for African workers in 'informal employment,' defined as "all employment that lacks legal or social protection, whether in informal enterprises, formal enterprises or households" and representing a major source of livelihoods in the Global South (ILO 2013, p.1). Informal employment is especially pervasive for city-dwellers in sub-Saharan Africa, where 76% of total employment is informal (ILO 2018, p. 28), far exceeding the rates of 51.5% and 47.7% in informal employment for Asian and Latin American cities, respectively (*ibid.*)⁶ ILO data also indicate that 71.6% of men and 82.8% of women in Africa are employed in the informal sector (excluding agriculture), underscoring its particular significance for women. Furthermore, street vendors are often a sizable proportion of informal labourers: in India and South Africa, street vendors represent 11% and 15% of the urban workforce, respectively (Roever 2014). Given the centrality of informal employment in Africa, particularly for women, this study will examine how WASH provision may bolster informal workers' productivity while fostering gender equality and well-being.

Prior research by Women in Informal Employment: Globalizing and Organizing (WIEGO) already highlighted informal workers' need for adequate WASH, as well as suggesting the close links between workers' health and income-generation possibilities.⁷ In Accra, informal catering businesses reported an average annual cost of US\$ 286 for maintaining access to water and \$141 for toilet facilities, which could otherwise be reinvested into their enterprises (Lund *et al.* 2016). In the Informal Economy Monitoring Study (IEMS), WIEGO and local partners gathered qualitative and quantitative data from a total of 743 vendors in Durban, Nakuru, Accra, Ahmedabad, and Lima (Roever 2014; Lubaale and Nyang'oro 2013, Mkhize *et al.* 2013). The study revealed substantial differences in WASH provision between the cities: access to water ranged from a low of 21.5% of vendors in Durban and 47.3% of vendors in Nakuru to 86% in Accra (Roever 2014, p. 33). Toilet access varied from 45.5% of vendors in Durban to 86.7% in Nakuru and 96% in Lima (*ibid.*). The IEMS also highlighted the close links between vendors' health and income-generating possibilities or, conversely, the dire impacts of illness upon workers' earnings. Almost 25% of female street vendors and 20% of male street vendors cited poor health/illness as a reason for not working for part of the previous year, usually resulting in a complete loss of income (Roever 2014, Alfors *et al.* 2016). Key IEMS recommendations included the need for improved WASH, electricity, and storage facilities, alongside supportive municipal policies and access to well-located vending spaces (Roever 2014). The current study's findings will complement and deepen WIEGO's past research by analysing the multiple roles of WASH provision in enhancing vendors' health and livelihoods.

⁶ Own-account workers comprise over 52% of informal employment in Africa, alongside 28.3% informal employees, 17.8% contributing family members, and just 3% informal employers (ILO 2018, p.27). The prevalence of own-account informal workers in Africa (who by definition lack employers) suggests the importance of public utilities or municipalities' action in supporting workplace WASH (see Conclusion below).

⁷ See below on methodology and also <http://www.wiego.org/wiego/what-we-do>

2. Methodology

This report will present findings and analysis based on primary data-collection with informal vendors in Nakuru (Kenya) and Durban (South Africa). Utilising focus group discussions (FGDs) and short surveys with informal traders in these 2 cities, it will offer comparative insights into the multiple impacts, creative responses, and possible solutions that vendors identified to their inadequate WASH provision. Data-collection was spearheaded by 2 grassroots organisations in Durban and Nakuru with support from WIEGO, a network promoting secure livelihoods for informal workers with a particular focus upon female labourers. WIEGO combines membership-based organisations of informal workers with researchers and practitioners throughout the Global South. Their research and advocacy have centred upon sectors of informal employment where women predominate, namely, 1) street vendors, 2) waste-pickers, 3) home-based workers, and 4) domestic workers. WIEGO's Kenyan affiliate and partner in this research project is the Kenyan National Alliance of Street Vendors and Informal Traders (KENASVIT), which was formed in 2005 and currently has over 8,600 members in several informal trades.⁸ For the Durban data-collection, WIEGO partnered with Asiye eTafuleni (AeT), an organisation established in 2008 to develop inclusive research, design, and advocacy around informal work. Via an integrated programme for incorporating informal workers in urban areas, AeT seeks simultaneously to support informal workers' livelihoods and create vibrant spaces for the entire city.⁹

Data-collection with vendors examined the multiple pathways between inadequate WASH, reduced productivity, and harmful effects upon their well-being. WIEGO and local partners conducted FGDs with male and female vendors from several sub-sectors (e.g., services, retail, prepared and fresh foods), including both market traders and mobile vendors. In Durban, WIEGO and AeT conducted 4 FGDs with 25 vendors from various sectors, including cooked food, fruit, and vegetables as well as non-perishable goods (e.g., clothing, traditional incense, and cosmetics). In Nakuru, a total of 40 vendors participated in 5 FGDs, with support from KENASVIT.¹⁰ Vendors also completed short surveys with questions on their daily incomes, access to WASH, and associated expenditures. Given the time and resource constraints of this exploratory research, it was not possible to conduct a large-scale quantitative survey. Nor did the study seek to verify workers' working conditions, and participants may have exaggerated the negative aspects of their workplace WASH (similar to other research relying heavily upon self-reported data). Such caveats serve to highlight the need for further studies, which may verify and expand upon this study's findings.

The following discussion can still provide useful insights from 2 cities into an overlooked topic, with broader relevance to informal workers across the Global South. This report will build upon WIEGO's longstanding relationships with local partners and its earlier research into service provision for informal workers (Skinner *et al.* 2018, Roever 2014). In July 2019, the project also supported a multi-stakeholder workshop in Nakuru that confirmed its findings and resulted in pledges by Kenyan officials to address vendors' key concerns (see below). It is hoped that the study can motivate future research and interventions in other cities of the Global South with extensive informal economies, but only limited prior attention to workplace WASH.

⁸ See also <http://www.wiego.org/wiego/kenya-national-alliance-street-vendors-and-informal-traders-kenasvit>

⁹ For more information on AeT, see <https://aet.org.za/about-asiye-etafuleni/our-story/>. This report is based upon contributions by WIEGO, IIED, AeT, and KENASVIT (see Acknowledgments below).

¹⁰ FGDs in Nakuru included 3 female hairdressers, 2 female cooked-food sellers, 2 female vegetable vendors, and 2 women in agribusiness and chicken-rearing.

3. Findings: Multiple Burdens of Inadequate WASH for Vendors in Durban and Nakuru

In both cities, paltry workplace WASH provision has imposed economic, time, health, psychosocial, and environmental burdens, which can combine to entrench vendors' poverty and exclusion. Inadequate WASH in Durban may result in taking time off work (with concomitant reductions in income); lost clientele and customers' confidence (again lowering their earnings); health problems; and insanitary workplaces (Table 1). Similarly, vendors in Nakuru identified an array of economic, environmental, health, and time burdens linked to inadequate WASH (Table 2). As many as 70% of Nakuru vendors reported that their health suffered due to dehydration, fatigue, and water contamination. Over 72% of vendors in Nakuru noted that toilet deficits had harmful business impacts and negative environmental health effects.

Table 1: Impact of WASH deficits on Labour Productivity in Durban

Type of Impact	Water Deficit Frequency of Response (N=25)	Toilet Deficit Frequency of Response (N=25)
Reduction in customers	80% (20)	88% (22)
Limits production of goods	56% (14)	40% (10)
Time away from workplace	76% (19)	64% (16)
Negative health impacts	84% (21)	88% (22)

Table 2: Impacts of WASH Deficits upon Vendors' Productivity in Nakuru

Impact	Water deficit Frequency of responses (N=40)	Toilet deficit Frequency of responses (N=40)
Loss of business and customers (e.g. no water to clean fruits, cook, wash customers' hair)	40% (16)	75% (30)
Environmental health effects of dirty working places and poor hygienic conditions, leading to lost customers and threat of business closure by authorities	52.5% (21)	72.5% (29)
Poor personal health (due to dehydration, fatigue, contaminated water, etc.)	70% (28)	30% (12)
Links to disease outbreaks	32.5% (13)	30% (12)
Poor hygiene and lack of personal cleanliness	37.5% (15)	
Time lost to look for water	35% (14)	
Psychological and indirect effects		15% (6)

However, our discussion will also suggest that adequate workplace WASH can bolster vendors' health, productivity, and psychosocial well-being. Given informal traders' fierce competition and the imperative to maintain good relations with customers (Roever 2014), inadequate WASH may impose reputational risks and threaten these vital links with clients. But more positively, their testimonies indicate that improved WASH may have far-reaching potential to promote workers' livelihoods and well-being.

Through a comparative analysis of data from Durban and Nakuru, the next sections will discuss the following consequences of inadequate WASH:

- a) Economic costs, time burdens, and reputational risks
- b) Sectoral impacts and gendered burdens
- c) Health, psychosocial, and other well-being impacts

a) Economic costs, time burdens, and reputational risks of inadequate WASH

Vendors not only shoulder the heavy costs of WASH access, but they can also forego earnings whilst travelling or queuing for provision. In Durban, the costs of water and toilet access represented **8-12%** of monthly earnings¹¹ while in Nakuru, vendors spent a daily average of **20%** of their incomes on water and toilets.¹² Many vendors pay to access water and public toilets several times per day; payments for water delivery may impose additional burdens. In Durban, water delivery costs ranged from R3 to R10 per drum, on top of the usual payment of R5 for a 20-litre or 25-litre drum. To access toilets, many vendors rely upon private providers who may charge both for toilet paper and toilet use (Tables 4 and 5). Such payments represent a major recurrent expenditure, and the heavy direct costs are often compounded by lengthy waiting times and associated lost earnings (see below). Meanwhile, other vendors can take their customers when the traders are away fetching water or accessing toilets: “Sometimes when someone is at your table without you being there, another trader will say, ‘come this side’ ” [Durban FGD1]. Only a few vendors can afford to employ assistants to look after their sites while they are away, leading to foregone incomes when they leave to access WASH. Furthermore, due to the lack of nearby water or toilets, municipal officials may confiscate goods and penalise vendors for being absent from their sites (a violation of Durban’s bylaws)¹³. Taken together, these direct and indirect costs of WASH can be extremely onerous for low-income vendors already facing stiff competition and with only minimal profits.

Water expenditures depend upon several factors including vendors’ sub-sector, municipal provision, and social networks, as some vendors borrow water from nearby sellers. Water

¹¹ Rogan and Skinner (2017) show that the median monthly earnings of South Africa’s self-employed informal workers are R2000 a month (with average earnings of R4684 likely to be skewed by the relatively fewer higher earners in this category). In the Durban IEMS study, 88 percent of male and 65 percent of women street vendors reported working 6-7 days in the week prior to the survey, meaning that median daily earnings are likely to be in the range of R83 per day (assuming six days of work per week), with average daily earnings at R195 per day. There is obviously variation in this sample –such as the bovine head cook, who spends R96 per day on water also earning more than the national median and probably above the national average. A non-food trader located in an area with poor WASH access could well be spending between R2.5-R5 (for 10-20 litres) per day on water and R4 per day on toilet access (R2 x 2 visits). This amounts to between R6.5-R9/day, or 8-11% of the South African median daily income in the informal sector. For a producer of cooked food in the same situation, earning closer to the South African average of R4684/month, a conservative estimate is R20 per day on water (the minimum amount spent by cooks in this study) and R4 (R2 x 2 visits) per day on toilet access, amounting to R24 per day or **12%** of the South African average daily income in the informal sector.

¹² FGDs in Nakuru included 3 female hairdressers, 2 female cooked-food sellers, 2 female vegetable vendors, and 2 women in agribusiness and chicken-rearing. In Durban, 18 women and 7 men participated.

¹² Based on this study’s short questionnaires, Nakuru traders’ average daily income is Ksh. 462 (about £3.25), and the average daily cost of water for those who buy water on a daily basis is Ksh. 74 and toilet is Ksh. 20 (two visits to the toilet at Ksh. 10 per trip) (totalling Ksh. 94 per day). On a daily basis, the average expenditure on water and sanitation represents approximately **20%** of daily income.

¹³ In the IEMS, 99% of participating vendors said that if they were not at their stalls, they had no one to help and therefore could not earn (Roever 2014). A municipal bylaw in Durban states that only a permit-holder can attend to a stall, and as a result police officers may confiscate vendors’ goods if passing by whilst the vendor is away: “When I run around looking for water, sometimes I come back to my goods being stolen...the policeman comes and takes my things if I’m late. They ask for permits and they do their own theft” [Durban, male vendor, FGD3].

expenditures in Nakuru varied widely, but only a few traders do not pay for water. For those buying water, daily costs ranged from Ksh. 15 to 250, averaging Ksh. 74 daily (or Ksh. 445 per week, assuming a 6-day work week). For instance, a disabled clothes-vendor in Nakuru pays Ksh. 20 daily for water delivered at the site while a vegetable-trader spent Ksh. 90 per day, including delivery costs. By contrast, some mobile hawkers either carried their water from home or borrowed from nearby traders and restaurants (see below). Finally, a total of 7 Nakuru traders paid for water as part of their kiosks' rent, averaging Ksh. 311 on water per month. This is much cheaper than the daily payment made by the vendors selling from less-formal premises.

Meanwhile, to access water in Durban, 40% of vendors paid R20 to R96 per day and another 20% paid R8-15 per day (Table 3). Cooked-food sellers consistently reported the largest water expenditures, with all vendors spending at least R20 per day in this occupational category. Durban vendors can access free water at municipal toilets but as explained below, they may still struggle with intermittent supplies or poor maintenance.

Table 3: Water Access and Costs in Durban¹⁴

Access Arrangement for Water	Frequency (N=25)
Self (no cost)	32% (8)
Self (at cost)	44% (11)
Delivered	24% (6)
Daily Expenditure on Water in Rand)	Frequency (N=25)
Free	32% (8)
R5 or less	8% (2)
R8-15	20% (5)
R20	24% (6)
R30	4% (1)
R60	4% (1)
R80	4% (1)
R96	4% (1)

Pay-per-use toilets are the norm in both cities, and many vendors struggled to access clean, affordable, or convenient sanitation, even when free options were available. In Nakuru, 6 out of 40 traders (15%) had access to free sanitation, but over 67% of vendors used toilets costing Ksh. 10 per use (see below Table 4). Although these vendors averaged 3 uses per day (totalling Ksh. 30), market traders in Nakuru pay a lower rate of Ksh. 5 per use and disabled vendors are usually exempt from payment (see below). Meanwhile, mobile vendors in Nakuru were especially troubled by the lack of well-located sanitation: as they explained, “If there is no toilet near[by], one has to walk back to look for one. This results in loss of time [and] also loss of customers because they might come and not find you” [FGD 2]. In contrast with Nakuru’s privatised toilet blocks, free public toilets are available to vendors in Durban. A total of 11 out of 25 traders in Durban (44%) had access to free toilets, while others typically paid R2-5 (Table 5). However, ‘free’ toilets usually have hidden fees (e.g., street boys who maintain them and demand R1 per use), and these toilets may fall into disuse or have excessively long queues. Other vendors complained of toilets’ erratic opening and closing times: “The toilet is free, but it’s as good as useless because they only open it when they want to” [FGD 3, also below].

¹⁴ Comparable findings were not available for Nakuru vendors.

Table 4: Toilet Costs in Nakuru¹⁵

Approximate Daily Expenditure in Ksh.	Frequency (N=40)
Free or exempt from payment	15% (6)
Included in rent	7.5% (3)
Ksh. 5	2.5% (1)
Ksh. 10	67.5% (27)
Ksh. 15	2.5% (1)
Ksh. 20	2.5% (1)
Ksh. 25	2.5% (1)

Table 5: Toilet Costs in Durban

Approximate Daily Expenditure in Rand	Frequency (N=25)
Free	44% (11)
R2/day	20% (5)
R3/day	8% (2)
R5/day	12% (3)
R6/day	8% (2)
R13/day	4% (1)
R40/day ¹⁶	4% (1)

Temporal aspects are a critical dimension of economic burdens: the timing of water delivery, toilet opening hours, and waiting times can all affect vendors' incomes. If water arrives late or toilets are closed early, traders' productivity and earnings will inevitably suffer. Vendors in Durban often complained about municipal toilets' unpredictable operating hours: "Some attendants close at about 5pm, another will close at 2pm so they can clean the toilet, and another cleans and closes at 1pm..." [FGD 3]. Irregular cleaning schedules thus disrupt vendors' businesses significantly, to say nothing of the negative impacts upon their health and comfort. Vendors in both cities also face major opportunity costs and time burdens when travelling to access taps, queuing for toilets or water, or waiting for water deliveries. Although 40% of Durban vendors spent just 5-10 minutes to access water, the remaining 60% spent between 15 minutes and over 1 hour to access water (Table 6). Similarly, 44% of Durban vendors spent 5-10 minutes to access toilets, but over half spent between 15 minutes and over 1 hour (Table 7). For traders requiring water multiple times per day, the cumulative waiting times could be particularly burdensome. In Nakuru, the time needed to access water ranged from 3 to 90 minutes, with an average of 20 minutes per trip (Table 8). Only 20% of the participating traders required under 10 minutes to access water; another 43% of vendors needed at least 30 minutes to access water. Additionally, to access toilets, Nakuru vendors spent an average of 9 minutes per trip, though their access times ranged widely from 2 minutes to 30 minutes (Table 9). With Nakuru vendors using toilets on average 3 times per day, these cumulative access times could significantly reduce their working hours and thereby curtail their earnings.

¹⁵ Table 4 represents Nakuru vendors' daily expenditures on toilets. Some traders spent Ksh. 5 per day for a single toilet visit, which could reflect financial constraints and their avoidance of drinking or eating to reduce toilet expenditures. It is also possible that vendors may resort to open defecation or urination, although the study did not explore this in detail.

¹⁶ The amount of R40 is for a trader who bought toilet paper for his customers every day (an outlier compared to the other vendors) and the other values are expenditures per visit.

The time burdens of accessing WASH may vary widely between vendors, depending on factors such as their location, disability, access to assistants, and length of queues. In Durban, a cooked-food seller regularly pays for water deliveries, but may lose income if it is not delivered quickly: “I have to hire someone to go to Inanda Rank [for water] ...It’s far [and] by the time they have got back it’s late[,] people have moved through the market, and I have already lost income” [FGD 4]¹⁷. Another vendor in Durban lamented the onerous time burden of searching for sanitation when toilets were broken and/or had lengthy queues: “You go to the toilet and if it’s open, you stand [in] the queue for about 20 minutes because there are only 2 of them, [but then discover] the toilet is actually dysfunctional then you have to travel again...” [FGD 3]. Her experience underscores the need for well-maintained toilets with short waiting times; even if located near a toilet, vendors may still endure lengthy queues and search times. Such challenges of access can be especially acute for vendors with disabilities: in Nakuru, traders with disabilities can access toilets for free but often have protracted, hazardous journeys. According to a disabled vendor, “It takes me about 1 hour to access the toilet because I have to cross the busy streets. It is dangerous to cross the road on a wheelchair” [FGD 5].

Table 6: Time Spent Accessing Water Each Day in Durban

Time	Frequency of Response (N=25)
5-10 minutes	40% (10)
15-30 minutes	24% (6)
40-60 minutes	28% (7)
1-1.5 hours	8% (2)

Table 7: Time Spent Accessing Toilets Each Day in Durban

Time	Frequency of Response (N=25)
5-10 minutes	44% (11)
15-30 minutes	32% (8)
40-60 minutes	20% (5)
1-1.5 hours	4% (1)

Table 8: Time Needed to Access Water in Nakuru

Typical Time to Access Water	Frequency (N=40)
Less than 10 minutes	20% (8)
Between 10-20 minutes	37.5% (15)
30 minutes	27.5% (11)
Over 40 minutes	15% (6)
Minimum	3 minutes
Maximum	90 minutes
Average	20 minutes (per trip)

¹⁷ Similarly, in the IEMS study, hairdressers in Durban reported having to pay porters to buy and transport water to their vending sites (Roever 2014, p. 33).

Table 9: Type of business and frequency of water access in Nakuru

How many times per day do you access water?	Business category				Total (N=40)
	Trade	Service	Production	Agri-Business	
1 time	10	3	1	0	35% (14)
2 times	5	2	0	1	20% (8)
3 times	3	0	0	0	7.5% (3)
4 times	3	1	0	0	10% (4)
5 times	2	0	0	0	5% (2)
Throughout	3	4	1	1	22.5% (9)
Total	26	10	2	2	100% (40)

These time burdens may have lasting effects on vendors' reputations, as traders may lose customers if they cannot easily access WASH or fail to maintain a regular selling schedule. Many traders feared losing business if they must travel to taps or toilets and if their selling sites are unclean (e.g., from open defecation or urination). According to a male produce-seller in Durban, being away from the trading site can erode their customers' trust and such losses can prove irreversible: "You may come back having lost all your customers based on the fact that the toilets are so far away... [Customers] don't trust that you'll be around tomorrow [and] *it's not easy to get them back*" [FGD 1, emphasis added]. Traders in Nakuru similarly underscored that the "lack of water and toilets leads to loss of time and loss of customers" and when "customers come and do not find us, we lose business and income" [FGDs 2 and 4]. More generally, ongoing face-to-face interactions and strong social networks are crucial to ensure vibrant informal economic activities.¹⁸ During the IEMS, vendors also highlighted the need to attract and maintain their customers "through visibility (selling in the same location every day), through offering a reliable selection of quality stock, and through keeping prices low" (Roever 2014, p. 40). But if their links with clientele are disrupted due to poor WASH and the associated time burdens, it will be very difficult for vendors to rebuild these essential relationships and maintain their livelihoods.

Environmental hazards linked to poor WASH can impose additional time burdens and may further weaken vendors' reputations with customers. According to traders in Nakuru, the lack of toilets can affect their businesses since customers will shun dirty trading sites: "people who cannot afford to pay for toilets use the bushes or the incomplete buildings. This makes the environment dirty and there is also bad smell...customers avoid such places" [FGD 5]. In Durban, vendors noted that customers may defecate and urinate around trading sites, potentially deterring their other clientele. A female trader explained that if customers find an unclean, malodorous vending site, they'll decide "I'm not going to buy here because it smells and the dishes here are dirty'...the customers lose confidence in you" [FGD3]. Traders in Durban also lamented having to clean up excreta, with the associated time burdens for cleaning and buying additional water supplies.¹⁹ Not only do contaminated vending sites pose health risks (to traders and customers

¹⁸ For the key role of social networks for informal workers in Nairobi and Harare, see Macharia (1997).

¹⁹ As vendors in the early-morning market explained, "when we arrive, we get there and sometimes they've defecated, and on other days they've urinated...Because we are the ones who work there; we clean for ourselves. We clean using the water which we have purchased ourselves" [FGD 3].

alike), but they may also threaten vendors’ abilities to attract and maintain their clientele. Below we delve further into the health, gendered burdens, and other negative impacts of poor WASH.

b) Sectoral impacts and gendered burdens of inadequate WASH

Certain vending sub-sectors are especially reliant upon water as a key input, and as a result paltry, unreliable, or unaffordable water provision may impose heavier burdens. As indicated below (Table 10), Durban’s vendors selling food, cosmetics, and live chickens rated water as essential, in contrast with vendors who sell ready-made goods like socks, clothes, or hats. Even for traders who distribute packaged items or non-food products, water may have a hidden but still central role. As a shoe-seller noted, “You can’t put sandals out without wiping them first” [FGD3], and a snack-seller explained that she first needed water “to wash the plates before putting out the snacks and wiping down with the cloth” [FGD3]. Water was also essential for fruit-sellers, including a vendor who needed water because the “person you are selling to will always ask you to wash the fruit for them” [FGD3]. Whether for hygienic, aesthetic, or food-preparation purposes, water often played a central role in vendors’ livelihoods, but its centrality could vary by the sub-sector in question.

Table 10: Ratings of Perceived Need for Water in Durban (1-5, with 5 considered ‘essential’)²⁰

1	2	3	4	5
Socks Batteries Drinks	Toys Clothes Sandals, bags & hats	Cigarettes Sandals Clothes Hats & Bags Towels Cosmetics	Fruit/Vegetables Lime and <i>Imphepho</i> (traditional incense)	Snacks Fruit Biscuits/Cakes Cosmetics Cooked Food Bread & Tripe Live Chickens

Moreover, due to gender differences in what goods or services were sold, many female vendors were disproportionately affected by inadequate WASH provision. These variations are rooted in 1) disparities in education and wealth (e.g., men are more likely to have higher levels of education and to sell lucrative items requiring greater access to capital), as well as 2) gender norms surrounding food preparation or traditional medicine. According to Durban’s IEMS, male vendors usually sold clothing and ready-made products like umbrellas or DVDs; women dominated the sale of food, traditional crafts and medicines, and other lower-value goods (Mkhize *et al.* 2013, p. 16). Similarly, Nakuru’s IEMS found that male vendors typically sell higher-value items like new clothes, jewellery, and electronics, while women usually sold sweets, vegetables, and fish (Lubaale and Nyang’oro 2013, p. 13).²¹ For the many female vendors selling food, running hair salons, or dominating other sub-sectors where water is a key input, access to water often has particular importance. Furthermore, in the IEMS study, just 58% of fruit and vegetable vendors (who were largely female) had access to toilets, as compared to 84% of durable goods vendors (usually men) who had access to toilets (Roever 2014, p. 34). Given these gendered sub-markets and existing disparities in WASH access, as well as the vital role of water in sectors where women predominate, *adequate WASH may have significant potential to support gender equality and bolster women’s productivity.* By the same token, our findings below will suggest that

²⁰ Items are sometimes listed twice because the FGDs in Durban assigned a different score to the same products (e.g., some FGD participants said clothes were rated a “2” and others said clothes were a “3”).

²¹ Some goods in Nakuru are offered by both male and female vendors, such as books, soda, juice, and biscuits (Lubaale and Nyang’oro 2013).

inadequate WASH can especially curtail female vendors' earnings and impose gender-inequitable time burdens.

Female vendors in Durban reported that the lack of water could serve as a binding constraint, and water was often a major recurrent expenditure. Durban's IEMS already identified water as especially important for women, as they are more likely to sell cooked or uncooked food, traditional medicine, and fresh produce where water is an especially vital input and key to hygienic preparation (Mkhize *et al.* 2013). In this study, Durban's cooked-food traders had the highest water expenditures; surveys indicated that all vendors with daily water expenditures of at least R20 were cooked-food sellers. For a cooked-food vendor earning R4684/month, spending R20 per day on water and R4 per day on toilets (R2 x 2 visits) would comprise **12%** of the average daily income in the informal sector.²² In addition, deficient water provision can severely hamper their livelihoods and entail lost customers, since it is impossible to prepare cooked food without water. When water access is poor, "the people that suffer the most are those that cook [because] we cannot even start cooking without water... we have to waste time looking for water... while we are looking for water, customers leave" [FGD 4]. These findings highlight the need for timely, reliable water provision in preparing foods that can particularly benefit *female* cooked-food vendors, while also generating wider potential gains for food safety and public health. But in the absence of adequate WASH, cooked-food vendors may lose customers with an ensuing increase in their stress, reduction in incomes, and time burdens linked to paltry provision.

In Nakuru, water was again recognised as key to hairdressing and cooked-food sales (2 sub-sectors where women predominate), and mobile vendors saw WASH as vital but difficult to access.²³ Cooked-food vendors and hairdressers emphasized that water is very important for their livelihoods, arguing that "without water there can be no business" [FGD 1, 3 and 5]. When they lack water, hairdressers cannot wash their customers' hair, and they still needed to access water throughout the day. During the IEMS study, vendors similarly identified the pivotal role of running water to ensure safe handwashing and prepare cooked foods: according to a Nakuru cooked-food vendor, "Without water there is no work that you will do. When there is no water, you can't eat because all food must go through water" (quoted in Roever 2014, p.33).

Gendered differentials in access to WASH may also reduce women's potential earnings and increase their time poverty due to their unequal responsibility for the care of children. Based on WIEGO's earlier studies of child-care practices in 6 countries, significant numbers of female informal traders have little option but to bring their young children to work with them. In this context, not having appropriate facilities for changing nappies and breastfeeding can be a major problem, particularly for food vendors: "When you sell food with a child who is just some months old and you breastfeed and change diapers alongside, people don't buy from you because of the unpleasant scene these things create; they see it as disgusting and so is the food," said one Ghanaian trader (Alfers 2016; Moussié & Alfers, 2018). In turn, inadequate WASH may have a detrimental impact not only on the productivity and health of the worker (as described further in the following section), but also upon their children's health.

Furthermore, some mobile vendors were disadvantaged in WASH provision (as compared to market vendors), and such outdoor workers may be especially at risk of dehydration as a result of

²² Drawing on national survey data, Rogan & Skinner (2017) show that the median monthly earnings of self-employed informal workers in South Africa is R2000 a month (with average earnings of R4684 likely to be skewed by the few higher earners in this category).

²³ In Nairobi's informal settlements, women again predominated in cooked-food and also fresh produce, while men were predominant in meat and sometimes ran small restaurants, sold produce, etc. (Githiri *et al.* 2016).

rising temperatures and water scarcity linked to climate change. In Nakuru, mobile vendors identified water as particularly crucial as they are always walking and therefore need ample drinking-water to prevent dehydration [FGD 1]. Additionally, based on IEMS findings in 5 cities, as many as 85% of market vendors had access to toilets, while only 69% of street vendors had toilet access (Roever 2014, p. 33). The lack of adequate WASH may pose particular burdens for outdoor workers like mobile vendors, in light of more intense or frequent heatwaves and rising water scarcity due to climate change. The *Lancet's* Countdown on climate and health has begun collecting data on reduced labour productivity due to rising temperatures, with outdoor workers identified as a particularly vulnerable group (Watts *et al.* 2017, p. 1154).²⁴ But more positively, providing adequate WASH can help to combat dehydration and promote occupational health for mobile vendors and other outdoor workers. The next section continues discussing vendors' health and well-being concerns linked to inadequate WASH.

c) Health, psychosocial, and other well-being impacts of inadequate WASH

Traders recognised that WASH not only strongly influences their physical and psychosocial well-being, but it may also affect their relations with customers and with fellow traders. Vendors in Nakuru said "it is important to provide water to customers to make them comfortable" [FGD 1], suggesting the simultaneously social and commercial functions of WASH access. Vendors in both cities identified several pathways between inadequate WASH and health burdens, such as medical expenditures and the opportunity costs of seeking treatment. As explained below, traders noted that water is essential for vendors and clients taking medicines to manage chronic conditions (e.g., diabetes and HIV). Shortfalls in WASH can even reduce vendors' self-esteem and heighten their stress, with further negative impacts upon their ability to attract customers. Such intangible impacts may threaten vendors' crucial ties with their clientele, which suggests the complex interrelations between WASH, productivity, and well-being.

Several vendors noted that poor WASH can lead to 1) elevated healthcare expenditures, 2) reduced productivity due to dehydration or illness, and 3) heavy opportunity costs of seeking treatment. Most vendors in Durban linked their WASH deficits with negative health and economic impacts (Table 1 above), such as the associated treatment costs and time away from work due to diarrhoea. As one trader noted, "You go to the chemist to buy pills to stop your runny tummy, and therefore you are pulled away from your work...[As a result,] you lose money...there is also the money you spend to buy medicine [and] for the doctor too" [FGD 1]. Furthermore, there are risks from dehydration (particularly for mobile vendors), and the ensuing exhaustion can result in missed work or lower levels of productivity. As vendors in Nakuru explained, the "lack of drinking water leads to dehydration. One gets a headache and feels tired. Because of this, one may be forced to close early due to feeling tired or may not work at their best" [FGD 1].

In African cities where HIV, diabetes, and other chronic diseases are ever more prevalent (Oni *et al.* 2016), access to water can strongly foster treatment adherence as well as help to attract customers. Both for vendors and customers in Durban, access to water can be essential for taking medication: as a female second-hand clothes seller explained, "Water is much-needed as people are sick in various ways and need to take pills" [FGD 4]. A male trader agreed, noting that if a client comes with pills from the hospital, having water will encourage the customer to buy from him; meanwhile, a lack of water may lead the client to buy from a formal competitor [FGD 3]. These findings demonstrate new links between water, health, and vendors' livelihoods, while also confirming the importance of maintaining strong relations with vendors' clientele (Roever 2014).

²⁴ Globally, from 2000-2016, increasing ambient temperatures resulted in an estimated reduction of 5.3% in outdoor manual labour productivity (Watts *et al.* 2018, p. 581).

In particular, our findings indicate that vendors' relations with clients can be mediated by access to water. Along with fostering vendors' own treatment adherence, access to water can promote their clients' treatment regimen and strengthen their ties to traders enjoying access to water.

Meanwhile, vendors in both cities explored how inadequate WASH may have far-reaching consequences, including elevated stress, debts, and conflicts that can all undercut their livelihoods. Traders in Durban carefully analysed the knock-on impacts of inadequate WASH, which could result in lost customers and rising debts, leading to illness, interrupted schooling, and several other health or livelihood risks (Figure 1 below). As they explained, "One isn't able to pay those loans [because of livelihoods disrupted by poor WASH]. I have insurance that I haven't been able to pay, and I've had to cancel it now...After that, you get a bad name, [and] with that comes stress and ill-health" [FGD 1]. These traders lamented rising levels of precariousness due to cancelled insurance, rising levels of debt, and reputational losses, all of which may be rooted in inadequate WASH. In Nakuru, vendors similarly linked inadequate toilets to business closures, negative health impacts, environmental pollution and family or employment-related conflicts (Figure 2 below). As vendors explained, "lack of toilets can lead to conflict between employers and employees if the employee takes long to access toilets, and this becomes a source of stress for the employee" [FGD 3]. Inadequate WASH can thus result in short- and long-term increases in stress, indebtedness, and ill-health linked to the financial constraints or interpersonal conflicts associated with deficient water or sanitation.

Figure 1 (from Durban FGD 1)
Causal Flow Diagram of Losing Customers due to Inadequate WASH



Vendors in both cities reported feelings of indignity, low self-esteem, and other psychosocial impacts of inadequate WASH; the ensuing shame may prevent them from attracting customers. According to a Durban vendor, inadequate hygiene stemming from poor water provision can cripple his confidence:

When you don't have access to water to clean yourself, you lose self-confidence, you are uneasy and people don't want to see your face as being sad. They are hesitant to even ask you how much things cost. A customer must always see you smiling [FGD3].

He poignantly explained how the lack of water and resultant challenges in personal hygiene can trigger feelings of shame, lack of self-esteem, and difficulty in engaging with his customers. In turn, vendors may feel rising levels of stress and stigma as well as declining morale linked to inadequate WASH provision. In Nakuru, vendors highlighted similar threats to their confidence as a result of inadequate sanitation: “if one has no access to toilets when needed, he/she feels very uncomfortable and lacks confidence when working or serving customers” [FGD 3]. These findings reveal the extremely harmful impacts of inadequate WASH on vendors’ dignity and self-esteem, as they sometimes felt unable to attract customers and thrive in their businesses. Below we examine how vendors have responded (individually and collectively) to their inadequate WASH provision as well as their priorities for future initiatives.

4. Vendors’ responses and prioritised interventions

In Durban, traders’ main responses included 1) advocating with city officials to improve WASH; 2) cleaning up their working environments; and 3) compromising in their levels of hygiene. Given the city’s inaction regarding rubbish collection or providing adequate WASH, vendors felt compelled to clean their trading sites themselves or to hire private cleaners.²⁵ As participants explained, “We try to sweep and clean ourselves, we hire people to clean, we use Jeyes Fluid

²⁵ Self-organised practices to maintain their vending sites are common elsewhere in the Global South: “where public sanitation services are not available, vendors often clean their areas of operation. In many cities, street vendors self-monitor and self-manage their vending sites to reduce congestion, crime, grime, and public health risks” (Skinner *et al.* 2018, p. 6).

(bleach) to clean up the smell... We clean using the water we have purchased ourselves” [FGD 4]. Vendors’ efforts to maintain their sites not only created additional time burdens and costs of purchasing water or bleach, but also led to feelings of indignation that local authorities persisted in scapegoating the traders for their unhygienic environment [FGD 3]. However, traders in Durban acknowledged that they sometimes engage in open urination or defecation, which could lead to conflicts between vendors as well as unpleasant smells and a corresponding reduction in customers. According to a female trader, “You end up hiding behind your table when you want to urinate” and “women hold it in and eventually resort to using buckets. When they are done, they pour it down the drain, and then there is a bad smell and customers are chased away” [FGD 1].

Traders’ associations in Durban were considered better-able to manage WASH than local officials, and vendors also argued for a reporting system to ensure the city’s timely maintenance of these facilities. All FGD participants recommended that traders’ associations be permitted to manage WASH at their work sites, while the municipality should provide an effective reporting system to support a speedy response in cases of malfunction. Meanwhile, vendors typically voiced their frustration with local officials or agencies and were especially dissatisfied with the Business Support Unit (which has overall responsibility for managing informal trade), and with Parks and Recreation (responsible for managing toilet blocks). The Business Support Unit was criticised as unhelpful and extractive (“all they care about is chasing rents,” according to FGD 2); vendors also lamented that Parks and Recreation officials do not listen to them or follow-up on complaints. Similarly, participants considered the Ward Councillor to be ineffective and saw the solid waste management department as unhelpful (although vendors in FGD 3 noted that rubbish collection workers may help them to clean the work sites). Having been largely abandoned by local officials and municipal departments, traders often felt they could only rely upon their own associations to manage WASH facilities or maintain their sites.

For vendors in Nakuru, responses to inadequate WASH varied from storing water and utilising social networks, to engaging in advocacy and various improvised solutions. Coping strategies for inadequate water included a combination of purchasing, storing, borrowing, or carrying it from home. Some traders with better access to water could buy and store it in containers; others reported harvesting and storing rainwater. Furthermore, strong social networks may enable low-income mobile vendors to access water freely from small restaurants (known as ‘hotels’): “Most of the time we do not have money to buy water. It is also expensive to buy water. So we usually go to a hotel and borrow water... The hotel people now know us so they do not refuse us to drink the water” [FGD 2]. A total of 6 traders in the FGDs (mainly mobile vendors) said that they do not buy water and instead carry it from home or borrow from friends, neighbours, or from nearby hotels.²⁶ For toilets, participants typically utilise pay-per-use services and may cultivate good relations with neighbours who permit ‘borrowing’ toilets (Figure 2 below). Additional responses to deficient sanitation facilities include 1) advocacy for improved provision with county authorities, 2) open defecation or urination, or 3) deliberately curtailing food or drink consumption to reduce need for toilets (Figure 2).

²⁶ By contrast, Durban FGDs indicated that vendors had to pay to “borrow” water from a nearby shop.

Figure 2: Casual Flow Diagrams of the Impacts and Vendors' Responses to Deficient Toilets in Nakuru

	Impact		Responses
GROUP 1	(i) Loss of business and customers (ii) Poor hygienic conditions (iii) Disease outbreaks (iv) Poor drainage leading to mosquitoes and malaria outbreaks	Dirty working environment	<ul style="list-style-type: none"> • Use municipal toilets (free but also dirty) • Use incomplete buildings to relieve oneself • Borrowing from neighbours • Fixing of broken toilets • Direct customers to use the 'pay-as-you-use' toilets
GROUP 2	(i) Loss of customers (ii) Relocation from trading area (iii) Closure of business (iv) Take a long time to access toilet elsewhere (v) Breakout of diseases	Environment will not be clean	<ul style="list-style-type: none"> • Go to where there are clean toilets • Approach county authorities to build more toilets • Continue to pay for toilet services
GROUP 3	(i) Inability to work leading to loss of income. This could lead to family conflicts (ii) Closure of business by County authorities, leading to lost customers (iii) Costs for meeting medical expenses (iv) Conflicts between landlords/tenants	Health problems (stomach, bowel movement, kidney)	<ul style="list-style-type: none"> • Pay to use toilets (Ksh. 10 per use) • Being friendly to neighbours so that they permit use of their toilets • Use of NAWASSCO mobile toilets
GROUP 4	(i) General level of health goes down (ii) Reduced profits (iii) Loss of customers (iv) Outbreak of diseases (v) Low staff morale (vi) Can lead to closure of business	Dirty environment leading to loss of customers	<ul style="list-style-type: none"> • Reduce food and drink intake while trading • Ensure toilets are clean and with water at premises
GROUP 5	(i) Sickness leading to death and closure of business (ii) One become ineffective and unproductive in their business (iii) Customers will go away leading to loses and low income (iv) Environmental pollution	Possible disease outbreak at workplaces and poor drainage	<ul style="list-style-type: none"> • Pay for clean toilets • Direct customers to where there are clean toilets (pay-as-you-use toilets) • Washing hands after toilet use • Proper disposal of sanitary pads.

Traders in Nakuru felt aggrieved by the unsupportive stance of County and other officials, and they identified several interventions to improve their access to affordable, reliable WASH. Participants in the FGDs often complained that Nakuru County Government did not support their businesses since ownership of public toilets had been privatised. Additionally, just as in other Kenyan counties, Nakuru has engaged in water rationing to deal with water shortages and Nakuru Water and Sanitation Services Company Ltd (NAWASSCO) uses a scheduled plan in which water is only received on specific days.²⁷ In turn, users are compelled to store water, with negative impacts upon vendors' livelihoods and creating time burdens. As longer-term responses, vendors advocated instituting public water points or water kiosks; reducing water prices; digging boreholes; and only limited use of water rationing. They also suggested that NAWASSCO should connect their businesses to water and provide pre-paid meters or tokens.

²⁷ See <http://nakuruwater.co.ke/nawassco-rationing-program/>

At a validation workshop held in Nakuru, vendors discussed several challenges with accessing WASH, which Kenyan officials pledged to address in the future. On 12th July 2019, a total of 60 participants from Nakuru's County Government, NAWASSCO, and vendors attended a half-day session convened by KENASVIT. The participating traders noted that their toilets and washrooms often lack water, and as a result they cannot wash hands (even before preparing food). Another concern is that Nakuru's water rationing occurs without prior alerts to users, including traders urgently needing water in their businesses. People with diabetes and pregnant mothers may have higher toilet use, but typically struggle to afford sanitation. The trading sites' low-quality open drainage regularly carries waste into Lake Nakuru, contributing to contamination and environmental hazards. Finally, public toilets are open from 6AM until 8PM, but closed on Sundays and at night when vendors may still be working. Workshop participants urged Nakuru's authorities to 1) construct additional accessible toilets for people with disabilities, 2) provide additional water connections in public places, and 3) notify users in advance of rationing. In response, a local government official promised site visits by relevant County Assembly committees. A NAWASSCO representative also pledged to work collaboratively with traders and to provide schedules for rationing in all areas before supplies are suspended.



Figure 3 Nakuru vendors discussing findings at a validation workshop held in July 2019 (Source: Francis Kapere, KENASVIT)

The final sections will synthesise the study's key findings and discuss other recommendations.

4. Conclusions

I am unable to give you time to listen to you [because] I am desperate to go to the loo...Maybe I have a stomach-ache; I'm considering which way I should go [to find a toilet]. How do I continue with the customer? (Female street trader, Durban, FGD 3).

Workers' Multiple Burdens Linked to Inadequate WASH

In both cities, the lack of affordable, reliable, and well-located WASH has imposed multiple burdens upon informal vendors. Economic costs are often extremely high: expenditures on WASH comprised from 8% to 12% of vendors' incomes (Durban) or even 20% of the average vendor's income (Nakuru). As explained above, vendors with the highest water expenditures were cooked-food sellers, who are mainly female. Along with these **sizable direct costs**, vendors often experienced **time burdens, lost income, ill-health, and several intangible impacts** linked to poor provision. In the above quote, a vendor explained that she cannot properly serve her customer when she is "desperate to go to the loo," simultaneously impinging upon her health and her earnings. Vendors' lost incomes are often linked to the time burdens stemming from poor WASH, as traders often queue for toilets or find them closed, wait at taps or for water deliveries, and lose time travelling to these facilities. Many participants underscored their vital relations with customers, which depend upon ongoing face-to-face interactions, clean environments, and aesthetic benefits potentially enabled by WASH provision. But as a result of their deficient water and sanitation, they feared **losing customers** and often suffered from **lower self-esteem**, including from poor personal hygiene. They often responded by cleaning their insanitary environments to retain customers, in turn purchasing water and losing more time.

In the absence of adequate WASH, vendors experience not only ill-health but also elevated levels of **stress, dehydration, stigma, and rising poverty or debts**. Many informal workers are excluded from vital social protection schemes like health insurance, increasing their economic precariousness and vulnerabilities to ill-health (Kamau *et al.*, 2018). Related research by WIEGO has found that female workers who lack access to spaces for breastfeeding and changing diapers may lose their customers, as well as endangering their children's health and risking food contamination (Alfers 2016, Moussié and Alfers 2018). The combined economic, health, and other well-being impacts of inadequate WASH may heighten workers' feelings of **social and economic exclusion**. Such detrimental, far-reaching consequences may even have intergenerational impacts since vendors are often primary breadwinners for their households (Roever 2014).

Inadequate WASH can be particularly burdensome for **mobile vendors, disabled traders**, and vendors in **female-dominated sectors** like cooked food where water is essential. The gendered productivity impacts will require additional investigation, but our findings already suggest that women in key sectors may benefit disproportionately from improved WASH. Past literature has explored the psychosocial burdens of inadequate WASH and the risks of gender-based violence linked to inadequate sanitation (Burt *et al.* 2016, Sommer *et al.* 2015). But there are few discussions of how labourers are affected by the psychosocial and work-related impacts of poor WASH,²⁸ including any gender-inequitable burdens. Given the gendered segmentation in informal vending,²⁹ female traders in key sectors like cooked food, fresh produce, or traditional medicine may benefit disproportionately from improved WASH. Additionally, vendors with disabilities often faced major challenges and time burdens in accessing WASH, such as lengthy journeys or struggles to use poorly-designed facilities.

²⁸ However, see Subbaraman *et al.* (2015) on the impacts of inadequate WASH on Indian workers: "I work at a call centre. Our call centre rule is that you always have to look fresh. Sometimes I skip work because there is no water to take a bath", according to a 25-year-old man (quoted in *ibid.*, p. 8).

²⁹ See Roever (2014) and Githiri *et al.* (2016).

Additional data are needed to analyse disabled vendors' particular WASH needs,³⁰ which can inform future strategies for enhancing their productivity and inclusion.

Findings from both cities indicate that **free provision is insufficient** to promote workers' well-being, as vendors also need **well-located and regularly maintained** WASH facilities. Although vendors in Durban rarely paid for sanitation access, they still required **accessible, clean facilities with short waiting times and predictable cleaning schedules**. Similarly, a guide to female-friendly public and community toilets has underscored the need for implementing extended opening hours and limited waiting times (WaterAid, WSUP, and UNICEF 2018).³¹ In Nakuru, mobile vendors often struggled to afford water, although sometimes they could utilise their social networks to secure access without payment. As well as ensuring **affordability**, future interventions need to provide **convenient, high-quality facilities offering timely access** so that vendors' relations with customers are not disrupted.

Strategies to enhance WASH at informal worksites may face several barriers, requiring new collaborations and interventions with these labourers. Workers' incentives may not readily align with improving access to WASH: for instance, labourers earning on a piece-work basis may delay taking breaks for water or toilets (WaterAid *et al.* 2016, p. 9). More generally, informal workers' erratic earnings may lead them to prioritise income-generation over taking water or rest breaks.³² Further barriers are linked to unclear lines of responsibility for informal employers, whose provision of WASH would depend on voluntary compliance, which is often fraught with difficulties even in the case of formal employment (see WaterAid *et al.* 2016, p. 13). Meanwhile, own-account informal workers will need support from local governments or utilities agencies as well as health officials, who can provide trainings in hygiene (cf. WBCSD 2013, p. 18 on the need for hygiene promotion interventions, especially near washrooms and food preparation areas). By understanding workers' precise barriers to workplace WASH, policymakers can develop appropriate responses that may significantly advance health, reduce poverty, and foster gender equity (see recommendations below).

Implications for Formal Workers and Firms

Although the above findings centre upon informal workers, *formal* workers' livelihoods, health, and productivity may similarly depend on adequate WASH. For instance, informal food traders often provide affordable, accessible food sources for formal workers near to their workplaces or on their routes home (Skinner 2016, Githiri *et al.* 2016). In Durban, Warwick Junction is a transport hub where over 460,000 people pass on their way to and from work; many of these commuters are formal workers who buy lunch from informal vendors (*ibid.*, Dobson *et al.* 2009). If vendors' foods are prepared with contaminated water, the ensuing health risks for their formal clientele may also have deleterious impacts upon formal firms such as increased absenteeism, reduced productivity, and lower earnings. Additionally, if food prices must rise to accommodate informal vendors' WASH expenses, that may have negative implications for the wages and poverty levels of *formal* labourers as well as their informal food providers. More broadly, there is ample evidence of interrelated formal/informal economies in the Global South, with formal and informal firms often generating both backward and forward linkages (Meagher 2013). For instance, many cooks in Warwick Junction regularly buy meat and vegetables from nearby formal shops; if informal traders cannot afford WASH or can only access inadequate facilities, this may lead to reduced earnings and severed ties to formal suppliers. Whilst further research is needed, inadequate WASH may have significant impacts upon the formal economy stemming from the extensive formal/informal linkages in African cities.

³⁰ See <http://www.inclusivewash.org.au/resource-library-people-with-disabilities>

³¹ "The presence of public and community toilets is not enough – they need to be open at the right times, not have long queues and be affordable...Community toilets and public toilets near a busy station might have to operate 24 hours" (WaterAid, WSUP, and UNICEF 2018, p. 20).

³² Similarly, "payment per output of fear of losing employment can drive individuals to work beyond safe thermal limits," which can contribute to dehydration and other risky behaviours (Nerbass *et al.* 2017, p. 1003).

5. Recommendations: Realising the Potential of WASH for Workers

Unlocking the Benefits of WASH in Future Interventions

Workplace WASH initiatives can help fulfil its vast yet under-recognised possibilities for inclusive, gender-equitable economic development. This paper uncovered several possible benefits of providing workplace WASH, which can 1) **improve informal labourers' health**, 2) **reduce their time burdens**, and thereby 3) **bolster productivity**. Adequate WASH can also 4) **support food safety** and 5) **promote environmental and public health** for vendors and customers alike, rather than contaminated foods or unclean vending sites linked to inadequate WASH.

More generally, adequate WASH can promote 6) **significant psychosocial gains**, such as **enhancing workers' self-esteem or reducing levels of stress**. Potential benefits for 7) **gender equity** may again be considerable, due to women's concentration in food vending, hairdressing, and other water-reliant informal livelihoods. Improving WASH for informal labourers may even generate benefits for 8) **formal workers and firms' productivity**, given the formal/informal economic linkages in many cities of the Global South. Finally, improved water access can 9) **foster climate change adaptation** for mobile vendors and other outdoor workers, who are at elevated risk of rising heat stress and may already struggle to remain hydrated (Louris *et al.* 2018, Nerbass *et al.* 2017).

There is a need for multi-sectoral strategies to improve WASH as well as other infrastructure and services at the workplace; policymakers can also support informal labourers' **inclusion in local decision-making**. In particular, decisionmakers will need to partner closely with informal workers' organisations to analyse key concerns and to develop appropriate strategies (such as the opening hours, maintenance, and location of WASH facilities). These initiatives will also need to co-design inclusive WASH solutions with workers who have disabilities.³³ Informal vendors have previously identified the need for regular rubbish collection and clean, safe worksites with adequate WASH, storage, and electricity (Roever 2014). Such holistic responses can help to fulfil WASH's significant potential for advancing productivity and well-being in urban areas, while also amplifying workers' voice and recognition. Improved WASH should form part of a broader suite of policies and supportive initiatives for workers in the informal economy (Chen *et al.* 2016; Skinner *et al.* 2018).

Additional policy guidance and ongoing data-collection will be needed on workplace WASH, including data on informal labourers' provision at a range of worksites. Policies or guidelines on workplace WASH do not currently exist, making any action entirely voluntary, and given the diversity of workplaces, "creating WASH standards or guidelines [will be] a complex task" (Kendell and Snel 2016, p. 29). The challenge of developing WASH standards or gathering data remains particularly acute in the case of informal worksites. These workplaces are highly heterogeneous (e.g. streets, markets, homes), though by definition informal areas lack governmental regulations and are likely underprovided with WASH or other infrastructure. Many municipalities justify their eviction of informal food traders based on public health violations, but rarely furnish them with WASH or vital services needed to make street foods hygienic (Skinner *et al.* 2018, pp. 8-9). As a way forward, possible data sources on workplace WASH may include the World Bank's enterprise surveys and research by the ILO, local government, and stakeholders in water provision (Cronk *et al.* 2015, p.701). Detailed surveys with informal workers can also analyse infrastructure access (such as WASH, storage provision), employment dynamics, and local regulations, helping to inform future interventions (Skinner *et al.* 2018, p. 13).

³³ For slum-dweller federations' WASH facilities for disabled traders in Africa, see Banana *et al.* (2015), p. 32.

Local governments, health officials, aid agencies, and WASH professionals can partner with workers to improve workplace provision while also supporting the 2030 Agenda. Past initiatives and data on WASH have emphasised residential settings, healthcare facilities, or school provision, overlooking the centrality of WASH at the workplace. The above findings from Durban and Nakuru not only underscore the heavy (direct and indirect) costs of inadequate WASH; they also suggest the transformative potential of WASH to support workers' livelihoods and well-being. By recognising WASH's vital possibilities to strengthen livelihoods and advance multiple SDGs (such as SDG 3 health, SDG 5 gender equality, SDG 13 climate action, and SDG 1 poverty), future workplace initiatives can unlock its immense potential for inclusive economic development.

Policy Prioritisation and Additional Data Needed on Workplace WASH

- WASH is not recognised as a key input to support workers' livelihoods and productivity
- Very limited data is currently available on workplace WASH
- Additional data-collection is particularly needed on the following topics:
 - ❖ Affordability, quality, proximity, and waiting times for WASH at informal worksites
 - ❖ Impacts of deficient workplace WASH, such as a) lower productivity, b) gender-inequitable burdens, and c) effects upon workers with disabilities or other vulnerable labourers
 - ❖ Further attention to climate change, WASH, and well-being at a range of worksites (particularly for outdoor informal workers at elevated risk of dehydration and ill-health)

Implications for Formal Workers and Firms

- Providing WASH to informal workers can enhance not only their productivity, but also strengthen the enterprises of formal workers and firms
 - Informal workers in the Global South often source their inputs from formal firms
 - Informal workers also regularly provide formal workers and enterprises with affordable, accessible items
- Adequate WASH can enhance food safety, thereby supporting the health of food vendors' customers in the formal or informal economy

Key Recommendations for Future Interventions

- Workers require affordable, clean WASH facilities located near their trading sites
- Timeliness of WASH provision and predictable maintenance schedules are crucial
 - Long queues at taps or toilets, inconvenient opening hours, or unpredictable cleaning times may all reduce vendors' earnings
 - Water rationing can impose major burdens upon workers (as in Nakuru)
- Labourers may also need complementary interventions to promote environmental health and productivity, such as rubbish collection and adequate lighting at WASH facilities

Recommendations to Promote Gender Equity and Inclusion

- Municipal officials, public utilities, and donor agencies can partner with workers' organisations to develop inclusive, gender-sensitive WASH facilities
- Future strategies can develop appropriate WASH designs for workers with disabilities; provide menstrual hygiene facilities; and offer support for workers who are breastfeeding
- Policymakers and donor agencies can also partner with worker organisations to enhance their voice in creating urban development strategies

Acknowledgments

This report draws upon primary data-collection and summary reports written by Laura Alfers (WIEGO, Durban), Tasmi Quazi (AeT, Durban), and Anne Kamau (Nakuru). It also draws upon Asiye eTafuleni's prior work in Durban and WIEGO's Informal Economy Monitoring Studies (IEMS) in Nakuru and Durban. It was written by Alice Sverdlik (IIED) with key inputs from Laura Alfers (WIEGO), Anne Kamau (University of Nairobi), and Tasmi Quazi (AeT).

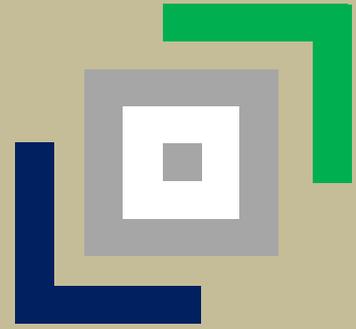
We express our profound gratitude to the participating vendors for sharing their insights, and to Francis Kapere (KENASVIT), Richard Dobson (AeT), Steph Ray (IIED), and Mike Bird (WIEGO) for their tireless support and significant contributions throughout the project.

The paper also benefited significantly from the feedback offered by Sarah Colenbrander (Coalition for Urban Transitions, formerly IIED), Will Monteith (Queen Mary University of London, formerly IIED), and David Satterthwaite (IIED). Finally, we gratefully acknowledge DFID's ICED facility for supporting this research and appreciate the thoughtful feedback of Guy Howard (DFID), Stephen Lindley-Jones (DFID), and Soha Sudtharalingam (PWC).

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Infrastructure and Cities for Economic Development (“ICED”) is a project funded by the UK’s Department for International Development (“DFID”) and is led and administered by PricewaterhouseCoopers LLP, working with organisations including Adam Smith International, Arup, Engineers Against Poverty, International Institute for Environment and Development, MDY Legal and Social Development Direct.

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