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Sanitation and Hygiene Applied Research for Equity

REPORT

Urban Sanitation & Hygiene

A Story of Change

Building knowledge. Improving the WASH sector.

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Partners

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Acronyms

CIDRZ: Centre for Infectious Disease Research Zambia

DFID: Department for International Development (UK Government)

IIED: International Institute for Environment and Development

JMP: WHO/UNICEF Joint Monitoring Programme

LSHTM: London School of Hygiene and Tropical Medicine

MDG: Millennium Development Goals

SDG: Sustainable Development Goals

SDI: Slum and Shack Dwellers International

SHARE: Sanitation and Hygiene Applied Research for Equity

SoC: Story of Change

WASH: Water, Sanitation and Hygiene

1. Introduction

Stories of Change (SoC) synthesise qualitative monitoring data to investigate how inputs have contributed to achieving specific outcomes through pathways of expected or unexpected change. Through this approach, the Sanitation and Hygiene Applied Research for Equity (SHARE) consortium aims to evaluate its indirect reach and its broader impact in the water, sanitation and hygiene (WASH) sector (Balls, 2016).

SHARE funded several urban sanitation research projects focusing on three broad areas: health impact of sanitation in urban environments, sustainable sanitation systems and effective behaviour change. This Story of Change focuses on SHARE's contribution to research and policy and practice change related to urban sanitation and hygiene. It has been produced through synthesising monitoring data, undertaking a desk review of resources and conducting five interviews with researchers, practitioners and experts.

2. Background

Urban WASH is a major ongoing challenge in many low and middle-income countries. Globally, more people now live in urban areas than in rural areas, and six out of every ten people in the world are expected to live in cities by 2030 (UN-Habitat, 2017). Furthermore, predictions place the majority of future urban growth in Africa, Asia, Latin American and the Caribbean, regions that include many low and middle-income countries (UN-Habitat, 2016). A large proportion of this growth will be in low-income, informal settlements, often characterised by poverty, high-population density and inadequate infrastructure which present unique challenges to human development (UN-Habitat, 2016).

Globally the Millennium Development Goal (MDG) target for sanitation was missed by almost 700 million people and the majority of countries in Africa did not meet the target for urban sanitation (UN-Habitat, 2016). While Sub-Saharan Africa had some gains in rural sanitation during the MDG period, progress in urban areas has failed to keep pace with the explosive growth in urban, informal settlement populations. Sustainable Development Goal 6 (SDG) now seeks to "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 and those in vulnerable situations" by 2030 – in order to reach this ambitious goal urban contexts and their unique challenges must be addressed (UNDP, 2017).

A large proportion of the research on the health impacts of WASH has taken place in rural contexts, suggesting a knowledge gap about urban contexts. There are potentially serious health and hygiene consequences for poor sanitation in densely populated and crowded urban areas such as disease outbreaks and endemic diarrhoea. This impacts mortality and morbidity, with a particularly heavy burden placed on vulnerable groups such as children and those living in

informal settlements. Other impacts include environmental degradation and reduced economic productivity and school attendance due to the burden of disease (Rosenboom et al., 2016).

3. SHARE's role

In 2011, SHARE published a Pathfinder paper on the challenges of urban sanitation and potential research gaps that the SHARE programme could address (Mulenga, 2011). Research gaps were identified in the areas of health impact, sustainable sanitation systems and effective behaviour change. Phase I of SHARE funded several urban sanitation projects. In Phase II, urban sanitation was selected as a strategic theme and two projects were funded in Zambia and Tanzania.

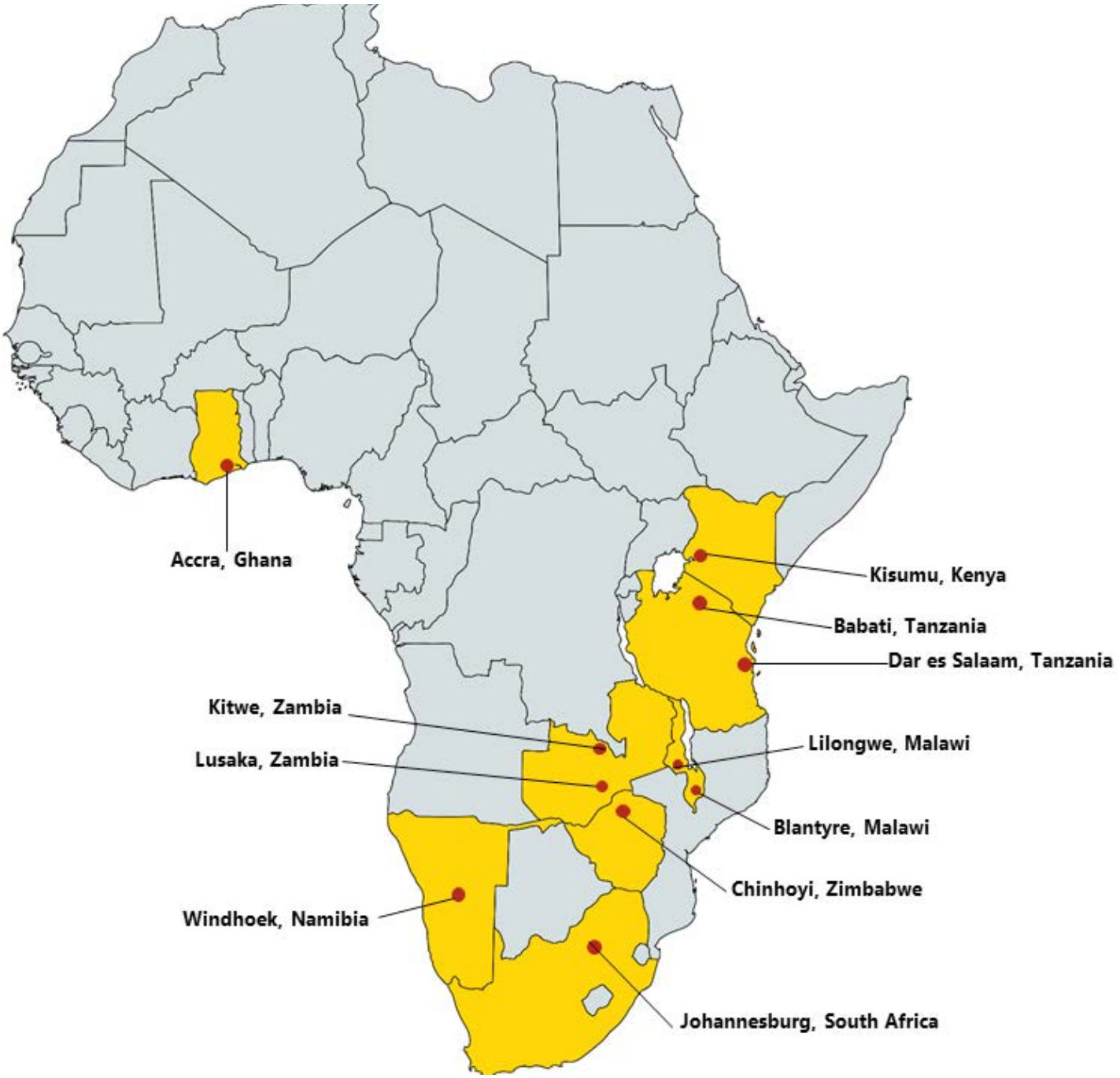


Figure 1: Map of SHARE's urban sanitation research in Africa

3.1 Evaluating the health impact of sanitation in urban environments

SHARE funded research to analyse data on **disease burden inequities across six countries** (Bangladesh, India, Kenya, Malawi, Nigeria, Tanzania (Rheingans et al., 2014). The research aimed to compare sanitation between urban and rural areas focused on the differences between home assets of the urban and rural poor. The results showed that the health burden of inadequate sanitation falls upon children living in the poorest households, due to both an increased exposure to infection and increased susceptibility to illness. Urban poor populations are at a greater risk of sanitation related illness than those living in rural settings. This is due to increased population density although in some urban areas an increase in wealth reduced this trend. Overall there are lower levels of access to sanitation in rural populations than within urban settings.

SHARE funded a **shared sanitation systematic review** to identify and summarize existing evidence that compares health outcomes associated with shared sanitation versus individual household latrines (Heijnen et al., 2014). This was linked to the previous Joint Monitoring Programme (JMP) classification of shared facilities as "unimproved'. The review included findings from 21 studies and found limited but suggestive evidence of increased risk of adverse health outcomes from shared sanitation as compared to individual household latrines. The analysis found that there was a 44% increased chance of diarrhoea disease from use of a shared facility as compared to an individual one. Though the conclusions from this review did not support excluding shared sanitation as "improved" on international monitoring targets, it called for "further research to determine in which situations shared facilities can offer safe, appropriate and acceptable alternatives to household latrines" (Heijnen et al., 2014).

SHARE also funded a **study on contamination of shared and individual sanitation facilities** in rural and urban Tanzania (Exley et al., 2015). The study evaluated contact with faecal pathogens and E coli from areas within the latrine and household. When the facilities were split into the categories defined by the JMP (improved, unimproved and shared) the results showed that unimproved facilities were the most contaminated areas. The study found no evidence that shared facilities were more contaminated with E. coli than privately accessed facilities. The authors concluded that these findings did not support the existing assumption "that shared facilities of an adequate technology are less safe than individual facilities and should be classified as 'unimproved' as part of global monitoring processes" (Exley et al., 2015).

3.2 Sustainable sanitation systems

The largest project funded in Phase I was the International

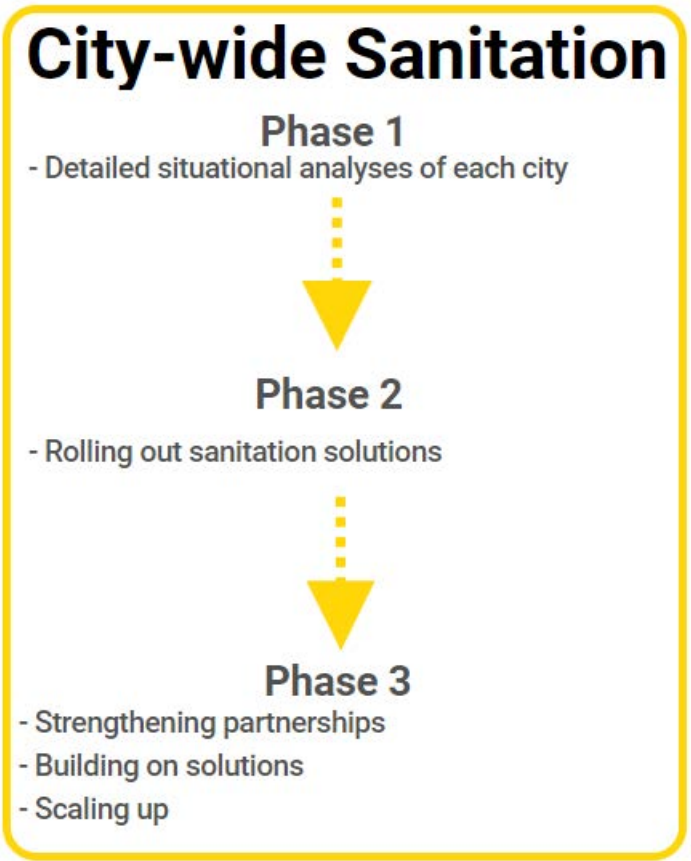
Institute of Environment and Development (IIED) and Slum/Shack Dwellers International (SDI)'s work on **city-wide sanitation in four African cities** (2012- 2016). This project applied action research and community-driven models to address the challenge of urban sanitation across four urban centres in Malawi, Tanzania, Zambia and Zimbabwe. It also included additional complementary themed studies in India, South Africa and Namibia. Figure 2 describes each phase of the project.

The research targeted informal settlements such as slums using qualitative and participatory methodologies through stakeholder engagement, community consultation and focus group discussions. To seek sustainability and scalability, IIED and SDI worked with local partners to complement existing sanitation efforts (detailed in Table 1).

Table 1: Cities and partners for city-wide sanitation project

City	Local partners
Blantyre, Malawi	The Centre for Community Organisation and Development (CCODE) and the Malawi Homeless People's Federation
Chinhoyi, Zimbabwe	The Zimbabwe Homeless People's Federation and the Dialogue on Shelter for the Homeless in Zimbabwe Trust
Dar es Salaam, Tanzania	The Tanzania Urban Poor Federation and the Centre for Community Initiatives
Kitwe, Zambia	People's Process on Housing and Poverty in Zambia and the Zambia Homeless and Poor People's Federation

Figure 2: City-wide sanitation project phases



The research found several potential solutions including building social capital within communities to strengthen collective action, influencing local authorities to leverage their resources, introducing cross-subsidies between landowners and tenants, valuing incremental improvements as a longer term solution, developing new financing mechanisms and building government partnerships (McGranahan, 2015).

The project also included sanitation technologies and aimed to develop precedents for new and effective sanitation solutions (Walnycki and Schermbrucker, 2016) These included shared sanitation toilet blocks, Gulper pumps, to decentralised wastewater treatment systems (DEWATS), EcoSan toilets, individual septic tanks and connecting toilets to sewer networks (SHARE, 2016). The findings suggest that the technological solutions needed to meet the needs of diverse urban communities differ across contexts. While a range of bottom-up trajectories towards improved urban sanitation can drive improvements at the local level, the project noted that state support (both political and financial) to these local initiatives is required to meet ambitious global goals (McGranahan, 2015).

In 2011 SHARE funded WaterAid to develop a low cost and participatory decision-support and monitoring tool (including spreadsheet and map-based outputs), called the **Sanitation Mapper** which was piloted in urban (Dhaka) and rural (Matlab) areas of Bangladesh in 2012. Designed to provide both area-based and point-based mapping, Sanitation Mapper instantly converts sanitation survey data into Google Earth compatible maps without the need for complex GIS software or an internet connection. It enables data collection and mapping of the level of sanitation coverage in chosen areas in order to better inform sanitation-related interventions.

SHARE funded the University of California Davis and LSHTM to examine **sanitation conditions, facilities and practices among the urban poor in Dar es Salaam** (Jenkins et al., 2014). The study was conducted through an equity lens, exploring the relationship between indicators of household situation and wealth, levels of investment in current sanitation facilities, and access to and cost of hygienic pit emptying. This paper documented the widespread practice of “flooding out” to empty pit latrines in Dar es Salaam and the associated risks of contamination. The research found that only 8% of households had a functional facility that could be considered safe and sustainable (Jenkins et al., 2014). Safe, sustainable, functioning sanitation access was 2.6 times greater among the richest quintile than the two poorest quintiles.

SHARE funded **Richard Chunga**, one of its PhD students, to research household sanitation technology choices in Blantyre and Lilongwe, Malawi. The study sought to understand urban household preferences with a particular focus on attitudes towards ecological sanitation and other alternative sanitation technologies. The research found that households preferred to

adapt existing technology such as pit latrines through building replacements or emptying existing pit latrines. The study found there were challenges for households adopting new sanitation technologies such as ecological sanitation, and recommended that alternative sanitation technologies should be informed by context (Chunga et al., 2016).

Phase II of SHARE funded WaterAid, who work in partnership with the Nelson Mandela African Institute of Science and Technology, to lead the **Cities of Tomorrow** project in Tanzania (2016). In collaboration with key stakeholders, the project aims to produce a town-wide sanitation and hygiene plan that can deliver inclusive and sustainable sanitation services for all. The project aims to contribute to understanding how to achieve universal sanitation access in urban areas as well as demonstrate the conditions under which municipalities and citizens can co-produce and implement an inclusive and sustainable town-wide sanitation plan. Phase II of SHARE is also funding a study to explore **women and girls' sanitation vulnerabilities in urban Tanzania**. This mixed methods study will examine the gender-specific WASH needs of women and girls though specific life stages and explore linkages with psychosocial stress and violence.

3.3 Effective behaviour change

SHARE funded WaterAid and the Bunda Agricultural College of Malawi to determine what motivates or deters households from adopting EcoSan toilets in both urban and rural areas of Malawi. The **Scaling up Eco-San** research found that the Eco-San sector in Malawi has various strengths and weaknesses and noted the need for further dialogue amongst all the actors involved.

SHARE also funded IIED and their partners to conduct work on **urban sanitation in Namibia** to inform the city-wide sanitation project. The study in Namibia sought to understand community decision-making within poor urban settlements, identifying that the absence of adequate sanitation affects everyone in the community. While government agencies are responsible for supplying sanitation nation-wide as part of their SDG and human rights commitment, the project findings suggested that a progressive partnership approach including households may be necessary to scale up sanitation.

Prince Antwi-Agyei focused his PhD research on using **waste water in urban agriculture** in Accra, Ghana (Antwi-Agyei and Ensink, 2016). The study aimed to identify and quantify key exposures and behaviours associated with the transmission of faecal pathogens by farmers using wastewater for irrigation, to evaluate risk factors for contamination. The work also assessed how knowledge of wastewater and health risks influences consumption. The study identified several risk factors for contamination: farm soil contamination, wastewater use for irrigation and poor hygiene. It found that awareness of health risks from farmers and consumers did not influence their behaviour. The study recommended promoting interventions that would benefit producers and vendors, together with hygiene

education, inspection and certification and enforcement of food safety byelaws to increase the uptake of the multi-barrier approach.

Sheillah Simiyu focused her SHARE-funded PhD research on socio-economic dynamics of **sanitation in the informal urban settlements** of Kisumu, Kenya (Simiyu, 2015). The study applied quantitative and qualitative approaches to decipher the social, economic and management aspects of sanitation. It included user preferences for sanitation technologies, evaluated the determinants of usage and quality of shared facilities, the estimated cost and how decisions were made around shared sanitation. The study noted the importance of cooperation among stakeholders such as landlords and tenants in order to make sanitation decisions, identify affordable and appropriate sanitation technologies and to keep shared facilities clean and functional.

Phase II of SHARE has continued this area of focus through funding an urban sanitation project in Zambia. The Centre for Infectious Disease Research Zambia (CIDRZ) with LSHTM are leading a study to determine how far a state-of-the-art approach to behaviour change can enhance demand for and acquisition of improved toilets in peri-urban informal settlements in Bauleni Compound in Lusaka. Building on previous work, it will demonstrate the potential role for demand creation in accelerating uptake of improved sanitation without improving supply.

4. Global and national change

Scaling up city-wide sanitation in East Africa

The city-wide sanitation project used an action research approach, seeking to engage communities in a participatory manner throughout the project. IIED/SDI partners in Malawi have continued to scale up the sanitation financing mechanism linked to EcoSan with government support and have published a paper about their experiences (Hunga, 2016).

IIED have also used additional Department for International Development (DFID) funding to enhance their work in Tanzania through the Connecting Cities to Basins project. This work builds upon the SHARE funded project to look at acceptability of sanitation technologies, using Dar es Salaam as a case study to consider the complexity of realising SDG 6 targets. The research noted the importance of linking global targets with local efforts, especially at the municipal level. The findings have contributed to a book on progress towards the SDGs which highlights the importance of incremental improvement and incorporating local perspectives (McGranahan et al., 2016).

Sanitation in Tanzania

In 2013, SHARE was commissioned by DFID and the World Bank Water and Sanitation Programme (WSP) to conduct a process evaluation of Phase I of the national Tanzania sanitation

programme (2011 – 2015) which focused largely on rural contexts (Chitty et al., 2016). The process evaluation noted that the behaviour change component of the programme had not been implemented, potentially hindering campaign delivery. It also identified the importance of targeting multiple routes of disease transmission in order to improve health outcomes and the need to provide gender-specific WASH facilities in schools.

DFID have now invested in a second phase of this campaign (2016 – 2020) which will focus on improving sanitation and hygiene conditions in urban households and public facilities, with an increased focus on behaviour change. LSHTM has won funding from DFID Tanzania to help design and deliver the second phase of the campaign This work is building upon the findings from the process evaluation and may result in high uptake and health impact in urban Tanzania.

Taking Sanitation Mapper online

The development of mobile based technologies has opened up potential to use online monitoring tools in low and middle income countries. While Sanitation Mapper is an offline system, WaterAid have since contributed to funding an online open source tool, known as mWater, which integrates Sanitation Mapper's indicators and survey questions. WaterAid have used mWater to map sanitation in urban contexts in Pakistan, Bangladesh, Malawi and Tanzania. In these contexts, mWater has been used for latrine monitoring and post implementation monitoring surveys. WaterAid have also trained and supported external partners to use Sanitation Mapper or mWater, particularly small local NGOs as well as service providers.

Mass media dissemination of research findings in Ghana

SHARE's research on use of wastewater in urban agriculture and Ghana has had high media uptake. Dr Prince Antwi-Agyei, former SHARE PhD student, was selected as a panel member for an online Q&A on the Guardian website for World Water Day (Purvis, 2017) . He spoke about wastewater and made many references to his PhD work. Two of his recommendations were also incorporated into a follow-up article on the Guardian titled '12 ways to turn water from waste to resources'.

The study also made major news on national TV and radio stations as well as the electronic and print media in Ghana in December 2016. It was featured on two TV stations - TV3 (the second most watched TV station in Ghana) and Joy News (the eighth most watched TV station in Ghana) (News Ghana, 2015).

5. SHARE's contribution to change

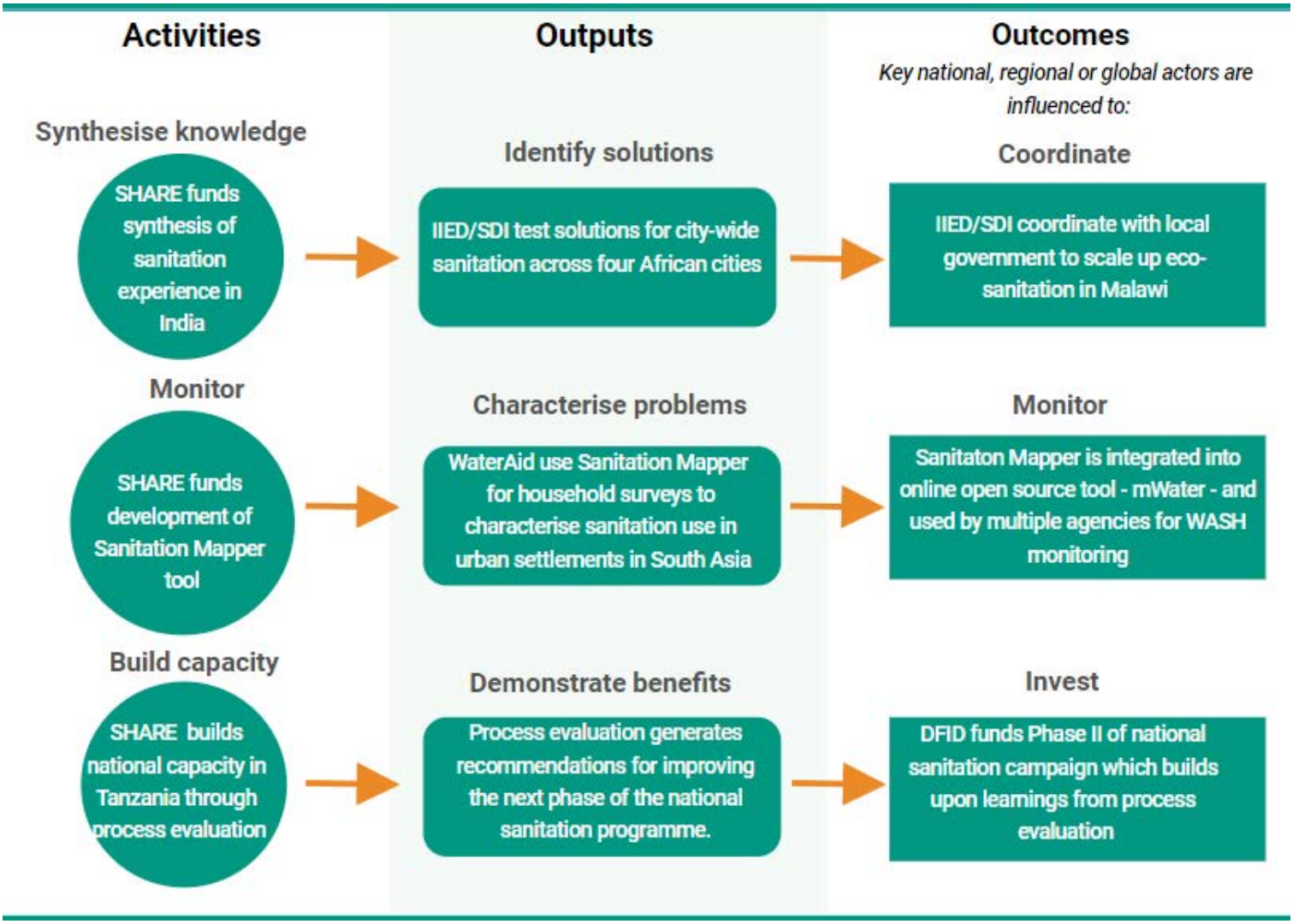
In line with our Theory of Change SHARE has supported research, knowledge synthesis, monitoring and capacity development in the area of urban sanitation and hygiene. Importantly SHARE's work has been in partnership with others, particularly IIED/SDI and

WaterAid.

SHARE conducted a wide range of research projects in different contexts that have added to the evidence base on urban sanitation. SHARE's work evaluating the national sanitation programme in Tanzania sought to build national capacity as well as to conduct rigorous research. SHARE worked in partnership with IIED to synthesise knowledge for the sector by documenting and sharing experiences of participatory sanitation processes in India and elsewhere. Through funding our partner WaterAid to develop the Sanitation Mapper tool, SHARE has helped contribute towards improved sector wide monitoring.

Figure 3: Pathways of Change

This figure applies SHARE's Theory of Change to demonstrate some of the pathways of change through which SHARE has contributed to impact in the area of urban sanitation.



Other advocacy contributors

This section highlights other organisations who have contributed to urban sanitation through advocacy work.

IIED/SDI led SHARE's largest investment in urban sanitation in partnership with local organisations. After completion of

their SHARE project, they have continued to work on achieving universal access to sanitation in complex informal urban settlements and continue to support federations of the urban poor with a focus on East Africa. They are also advising the World Resources Institute on water and sanitation and working through the Infrastructure and Cities for Economic Development (ICED) consortium on how improving water and sanitation can influence economic growth. IIED are currently working with UNICEF on an exciting new area of research; including access to WASH in protracted urban humanitarian crises for refugees and host communities, with initial research taking place in Lebanon.

WaterAid are a SHARE partner who have been involved in several urban sanitation projects funded by SHARE and others. Their work has included research on successful city sanitation, work on spatial planning, holistic urban WASH projects and smaller scale municipal level projects such as the one in Babati, Tanzania. WaterAid's aid work is guided by an Urban Framework which outlines five principles for working in urban contexts; delivering inclusive services, making strategic choices based on local need, facilitating collaboration between diverse actors, prioritising sanitation and hygiene and integration of implementation and policy/advocacy work (WaterAid 2011). Their recent Urban Learning Review seeks to inform their ongoing approach and builds upon the lessons learnt from previous projects (WaterAid, 2017). WaterAid is planning to refine and update its Urban Framework in 2018.

Many NGOs work in the field of urban sanitation including BORDA, IIED/SDI, International Rescue Committee (IRC), SNV, Plan International, WaterAid and Water and Sanitation for the Urban Poor (WSUP). A key advocacy moment has been academic and NGO sectors coming together to release a Call to Action on city-wide inclusive sanitation and a shared position on this topic (Rosenboom et al., 2016) This was co-authored by The Bill & Melinda Gates Foundation, Emory University, Plan International, The University of Leeds, WaterAid and the World Bank and sought to "mobilise all stakeholders to embrace a radical shift in urban sanitation practices." This came about through stakeholder meetings including a joint session at Stockholm World Water Week in 2016 which helped to build momentum, discuss challenges and come together as a sanitation sector (Hueso, 2016).

Other academic contributors

Key academic contributors to urban sanitation include Professor Barbara Evans and her colleagues at the University of Leeds. Professor Evans developed the Shit Flow Diagram (SFD) method in partnership with Peter Hawkins (World Bank) and this has achieved broad uptake within the sector, with WaterAid using it in their SHARE Phase II project.

The Water, Engineering and Development Croup (WEDC) at the University of Loughborough are also working on urban sanitation including faecal sludge management, urban land

tenure and sanitation and sanitation marketing. Other academic contributors include Professor Huw Taylor (University of Brighton) and Dr Christine Moe and colleagues at Emory University who are developing Sanipath, an exposure assessment tool for urban contexts. The Institute for Sustainable Futures at the University of Technology Sydney have contributed to the field by challenging current planning paradigms and developing alternative approaches to traditional urban planning. Additionally EAWAG's SanDec team have a particular focus on faecal sludge management as well as providing capacity building for the sector on sanitation planning.

Contributing donors and international agencies

In terms of urban sanitation funding, key donors currently include the Bill & Melinda Gates Foundation, the Wellcome Trust and the World Bank. World Bank Water have also played a key role in urban sanitation and has held close ties with academics working in this field since the 1990s. Former World Bank staff member Pete Kolsky advocated internally for a sanitation marketing approach and brought in external expertise including LSHTM.

Lessons learnt

1

Documenting experience
A key lesson was dedicating time and resource to document previous experience. This resulted in the documentation of decades of grassroots work in India for the first time by IIED/SDI. The resulting report laid bare assumptions, challenges and made the long history of this process publically available through an open access paper. Dedicating funding to document these processes was a valuable use of resources (Patel, 2015).

2

Context analysis
A detailed initial context analysis is essential for urban work due to the diversity of settings. This emerged as a key lesson from WaterAid's urban portfolio with the context analysis taking different forms depending on the type of project (from stakeholder mapping to formative research to scoping to needs assessment) (WaterAid, 2017).

3

New types of stakeholders
Building relationships with diverse sets of urban stakeholders was essential for the success of many of SHARE's projects. WaterAid's Urban Learning Review also noted the complexity of partnerships in urban settings and the need to work beyond traditional WASH partners (WaterAid, 2017). Utilities, regulators and local government bodies are key stakeholders who are essential for co-creating WASH interventions at the muncipal level. WaterAid's ongoing Cities of Tomorrow project seeks to actively engage different stakeholders using outcome mapping as a planning and monitoring tool.

4

Holistic city-wide strategic planning
WASH needs to be considered alongside other city-wide spatial priorities and not in isolation. This involves working with a wider group of stakeholders to ensure WASH needs are considered in the greater city-wide spatial plans (WaterAid, 2017).

6. Value for money and estimated reach

SHARE invested **£1,694,995** in urban sanitation, with the majority of funding going on research. This was **17%** of the total SHARE Phase I budget and does not include Phase II funding.

Table 2 suggests the reach of SHARE's work on urban sanitation and hygiene; this is indicative and represents complex social change which SHARE's work may have contributed towards[1]. It only includes global or national changes where enough data was available to make assumptions.

If SHARE's interventions prove to be successful and are replicable across other contexts, then there is the possibility for many more people to benefit in future. Given that SHARE's urban sanitation work is a major component of Phase II, it is likely that our work will contribute to informing improved programmes in the future and towards achievement of SDG 6.

Table 2: Estimated reach of urban sanitation and hygiene work

Uptake	Direct reach	Indirect reach	Practitioners /donors	Assumptions
City-wide sanitation project in East Africa	27, 267 people (11, 741 in Tanzania, 14, 094 in Malawi, 907 in Zambia, 525 in Zimbabwe)			This captures the number of people who gained access to sanitation as part of the project.
Pit emptying in Dar es Salaam	**662** people			This captures the number of people who participated in the research project.

1 Direct reach is defined as people who participated in SHARE funded research. Indirect reach refers to those people who may benefit from changes that SHARE's work has contributed towards; i.e. the uptake and application of findings from SHARE research at a national level or research building upon SHARE's work. Practitioners/donors is defined as those who have attended events convened by SHARE, accessed resources created by SHARE or gained new knowledge due to uptake of SHARE's work within an organisation.

Uptake	Direct reach	Indirect reach	Practitioners /donors	Assumptions
Urban hygiene in Ghana	850 people	1631 people		Direct reach captures the number of people who participated in the research project. Indirect reach counts the number of people who shared news articles or viewed the YouTube news clip (October 2017).
Cities of Tomorrow	93,109 people (by project end in 2018)			This captures the population of Babati who are the target population of the research project. Assumption the project will inform and improve Babati's sanitation for all residents.
Total estimated reach	121,225 people reached directly	1631 people reached indirectly	242 practitioners/ donors reached	

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Building knowledge. Improving the WASH sector.

The Sanitation and Hygiene Applied Research for Equity (SHARE) consortium seeks to contribute to achieving universal access to effective, sustainable and equitable sanitation and hygiene by generating, synthesising and translating evidence to improve policy and practice worldwide. Working with partners in sub-Saharan Africa and Asia, two regions with historically low levels of sanitation, SHARE conducts high-quality and rigorous research and places great emphasis on capacity development and research uptake.

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