



ACCELERATING ACCESS TO WASH AND HEALTHY SPACES TO SLUM COMMUNITIES IN URBAN INDIA: RENEWED URGENCY POST-COVID-19

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India is committed to improving its urban areas, as reiterated in a 2019 address at the UN-Habitat Assemblyⁱ. But residents of urban slum settlements remain deprived of quality services and amenities. Making up 35% of India's urban populationⁱⁱ, slum dwellers have little or no access to universal, equitable and safe facilities for water, sanitation, hygiene services (WASH) and healthy spaces. This lack made the COVID-19 crisis more acute for slum dwellers as they were forced to crowd around whatever common facilities were available. Intensive efforts are required to create more equitable access to basic infrastructure to improve the habitats and living conditions of residents in urban slums.

Around 24% of urban poor households depend on communal or shared sanitation facilitiesⁱⁱⁱ. Slum households were forced to ignore social distancing protocols at public standposts and water tankers to collect the limited water available. Shared toilet and bathing facilities increased the risk of transmission of the corona virus in these communities. Almost 32% of slum residents^{iv} v across India were exposed to the virus in 2020.

Deficient WASH infrastructure in slums also impacted the larger urban economy during the pandemicⁱ. For many, the chronic daily struggles of WASH access were aggravated by loss of pay, eviction and inadequate social welfare protections. Migrant populations in slums deserted their shanties en-masse to escape the trauma of the pandemic^{vi}. As millions returned to their rural homes in a chaotic reverse migration, infection rates in rural areas spiked^{vii} linking regional disease spread to poor habitats and service access in urban areas.

All slum dwellers face stresses due to lack of WASH services and access to healthy spaces but we see a definite gender skew. Women and girls often bear the brunt in complex ways, distinct from the challenges faced by men in the slum settlements. Womenfolk are typically responsible for collecting water for drinking and other domestic uses which decreases time for income generating work or education. The use of shared public facilities also poses safety concerns for women and children as there is risk of violence or assault in

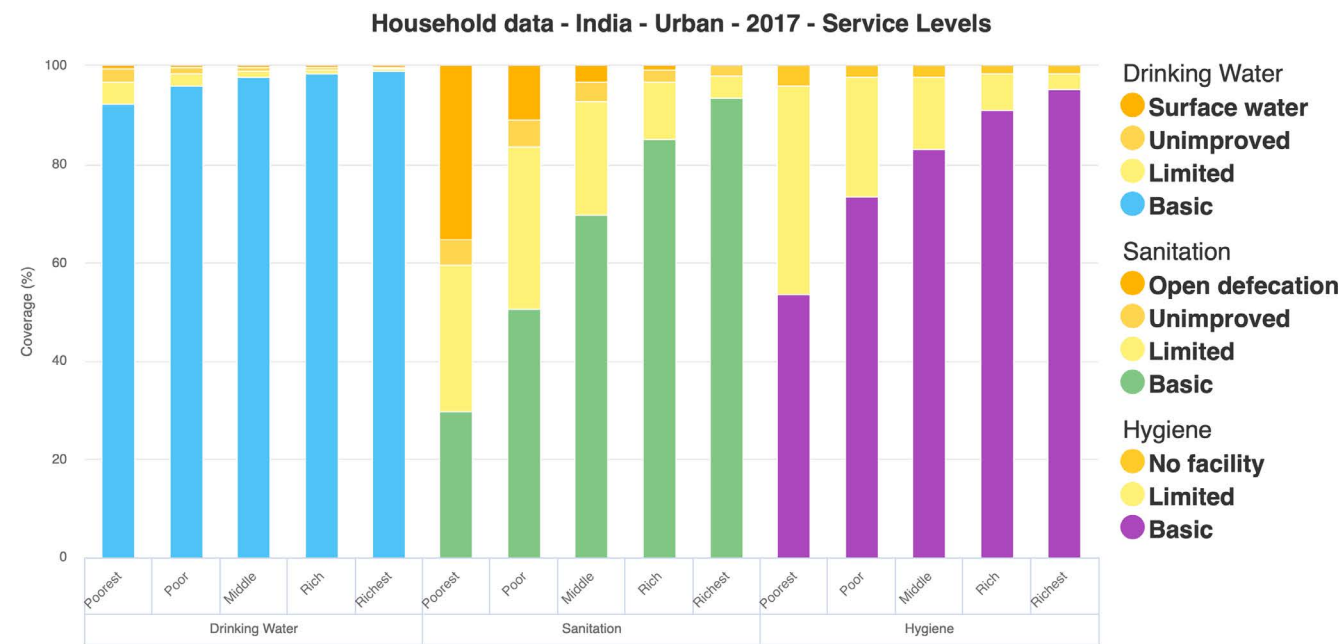
these locations.

Ignoring these settlements, as we have largely done, can further burden healthcare systems and economies during pandemics and other disasters, while placing urban and rural dwellers at risk. We bring together community voices and global research in this commentary to advocate for prioritizing and accelerating adequate and affordable water, sanitation and hygiene (WASH) and healthy spaces for urban slums. This can no longer be ignored or overlooked as and is a critical and urgent requirement for urban India to thrive and prosper.

EXISTING EFFORTS AND GAPS IN CITYWIDE WASH SERVICES: GOVERNMENT AND COMMUNITY-LED APPROACHES

The pandemic has reinforced that communal solutions (public toilets and water taps) alone are insufficient to safely meet WASH needs in urban slum communities. These communities need household-level access to

Household data for urban India (2017) indicating service levels for drinking water, sanitation and hygiene. Data source: <https://washdata.org/data/household#!/dashboard/new>



reliable, regular, safe and affordable WASH services^{viii} and healthy spaces. A study from 2016 indicates that the top stated needs of slum households are: toilets (44%), water (36%) and drainage (28%)^{ix}.

Many well-intentioned national initiatives have been launched in India but are unable to meet constantly growing urban needs. The Basic Services for Urban Poor (2005) and the Housing for All (2015) initiatives^x propose new serviced housing for the urban poor and are on-track to meet established targets. But the number of slum households is constantly increasing and meeting project targets is insufficient to meet actual demand. Missions such as the Jawaharlal Nehru National Urban Renewal Mission (JnNURM), Smart Cities^{xi} focus on citywide service upgrades, especially to improve water supply and sanitation. Though the mission objectives are to improve citywide coverage of centralized services there is scant focus on the specific needs of slum households.

Urban India demonstrates a major gap between the services provided to top and bottom income quintiles^{xii},

particularly in relation to sanitation and hygiene. In slums, about 1.2 million people still drink untreated water, and 63% of the households lack access to enclosed drainage systems^{xiii}. To achieve universal WASH coverage by 2030, as outlined in the United Nations' SDGs, India must meet an estimated financing gap of USD123 billion^{xiv}.

Many slum communities also face legal and institutional challenges^{xv} to accessing WASH, storm water and solid-waste services due to insecure tenure, as they do not own the land they reside on. Authorities wary of improving services in such "illegal" settlements^{xvi} neglect these areas. The WASH access gap in urban slums is likely to persist in India, as urban populations grow at 2–3% per year across the country while slum populations are increasing at 6–8% per year^{xvii}. Women and girls are especially vulnerable and their social and economic upliftment impeded, as lack of WASH affects their livelihoods, education and health.



EXPERIENCES FROM IMPOVERISHED URBAN COMMUNITIES: WOMEN'S VOICES

Slum communities are often located near garbage dumps, waste treatment facilities or on flood plains and hillsides. These precarious locations increase risks of service disruptions, disease spread and loss of life and property due to disasters. Along the Mithi river, Mumbai 70% of the low-lying areas are crammed with urban slums^{xviii} and people remain deprived of services, shelter and food for days after floods.

To better understand the issues faced by urban slum communities and their specific needs, we collaborated with Mahila Housing Trust (MHT) to converse with residents in 16 urban poor settlements in 8 Indian cities². Ms. Veena Bhardwaj, Programme Coordinator at MHT also described the experiences of three resettlement communities (Nal Nagri, Bakkarwala and Safda Ghevra³) in Delhi. Her account provided us a valuable perspective on the conditions at the beginning of MHT's engagement process in 2007-08 and the incremental improvements that are occurring even now.

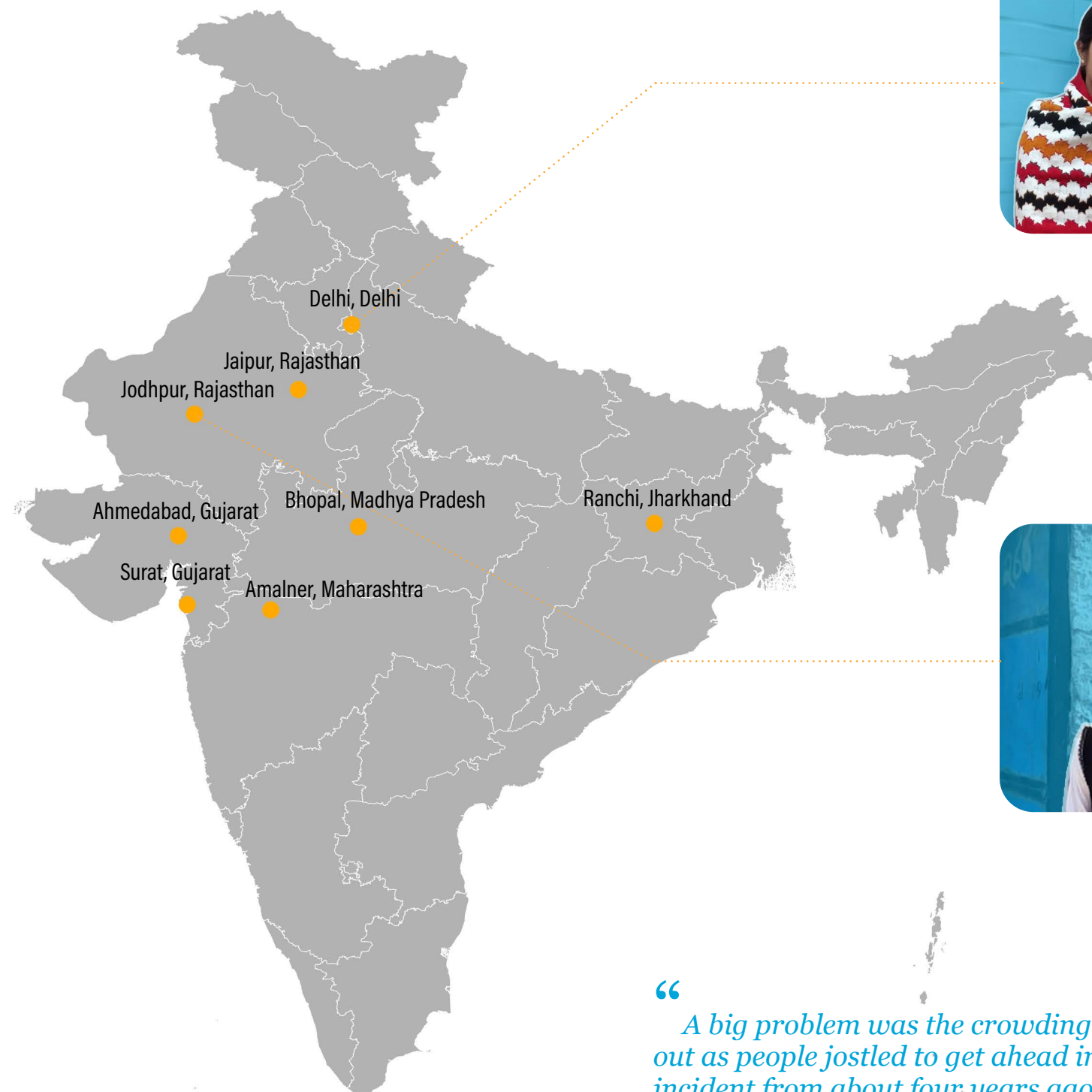
Limited Drinking Water

We spoke in detail to two women from Jodhpur and Delhi who gave us further insights into their everyday experience of accessing water, sanitation services and healthy spaces in their respective communities.

In Ashok Nagar, Jodhpur, a student named Pooja described the difficulty her family faces procuring drinking water in 2020.

Laxmi, a 28 year-old homemaker in Bakkarwal, Delhi, lives in a household of 13 people and frequently faces water shortages. This was a more acute problem in 2020 as the COVID-19 lockdown meant the entire household was at home all day.

Cities in sub-Saharan Africa and South Asia (including Bangalore and Mumbai) have the lowest proportion of piped water to a dwelling or yard in urban poor communities^{xix}. Households in such communities



DISCLAIMER: This map is for illustrative purpose and does not imply the expression of any opinion on the part of WRI, concerning the legal status of any country or territory or concerning the delimitation of frontiers or boundaries.



“ Yesterday, there was water supply for 20 minutes and today there is not even a drop. What else can we do? We are forced to crowd around government tankers to fetch whatever water we can get ”

- Laxmi, Delhi



“ Water for bathing and washing is got by private tanker but in summer even they have less supply. We get drinking water from a public tap about one kilometre away but even there we don't know if water will be available when we go to collect ”

- Pooja, Jodhpur

“

A big problem was the crowding around the tanker where fights would break out as people jostled to get ahead in the line to collect water. In one horrific incident from about four years ago, a pregnant woman was carrying three or four containers (one or two litre bottles) to fill at the tanker. A scuffle broke out in the pushing and shoving to get to the water tanker and she lost her life right there that day...all in the desperate scramble for water ”

- Veena Bharadwaj, MHT

rely on alternate (largely unregulated) sources such as tankers, which can cost 52 times more than piped water^{xx}. Many poor households are forced to ration water and resort to poor hygiene practices.

Veena Bhardwaj narrates the complex interplay between lack of WASH access and other socio-economic and health aspects that MHT observed in the resettlement colonies.

Linking WASH access and livelihoods

Working women face many hardships - mothers will accompany their daughters as they line up to use the common toilet facilities, or line up to collect water from the tanker. It might be 8 or 9 a.m. by the time they are ready to go to work. Many of the working women are domestic workers in areas like, Laxmi Nagar in Delhi. They have to travel a long distance to get to their workplace from the Safda Ghevra resettlement colony which is far from the city.

Lack of WASH and healthy spaces, social discrimination and health risks

When we (MHT) first went to Safda Ghevra, water would come by tanker (once in two or three days. People would not bathe for three to four days. Community toilets were two for all 13 blocks. How can two toilets cater to about 4000 households?

Other people would ostracize these communities due to their lack of hygiene – but what else could they do without any of the basic services being available to them in these slum colonies?

The issue of toilets is an equally pressing issue in slum communities. Swacch Bharat Mission prescribes one seat per 35 men and one seat per 25 women^{xxi}. In reality, informal communities in Mumbai are severely underserved with one seat per 190 users^{xxii}; Delhi had a shortfall of about 50% in 2016 of the required 36,000 seats in community toilets^{xxiii}.



“Most residents use community toilets which are always dirty,” said Laxmi of Delhi. “Here, the community toilet remains open only for a few hours so everyone rushes to use it. We have to pay INR 2 each, every time we want to go. How can poor families like us afford to spend so much to use the toilet, and what if we need to go more than one time during the day?”

During COVID-19 lockdown affected families worried that the community would not allow them to use the shared facilities and would not report if anyone fell ill. This increased the risk that the virus might spread as shared toilets were used amongst multiple households. The local Community Action Group (CAG) counseled affected households and ensured that patients entered the community quarantine and treatment centers.

In Jatkhedhi, Bhopal, individual household toilets lead to small soak pits, rather than septic tanks or drain lines, according to Ektaben, a community support staffer with MHT. Since many of these systems are built poorly, faecal matter ends up leaching into the ground. Also, without regular cleaning services during the pandemic many households started open defecation again. The World Resources Report on sanitation finds that 62% of sewage and faecal sludge is unsafely managed in urban poor communities^{xxiv}. Research suggests that instituting centralized management for decentralized wastewater treatment is key for long-term effectiveness of such systems^{xxv}.

The conversations with the women in the communities MHT works in, along with Veena Bharadwaj’s insights, indicate that civil society engagement has helped enable access to WASH services to some degree. But this has been a long and slow process from when the community was setup to when some basic services finally became available.

MAHILA HOUSING TRUST'S ROLE IN SUPPORTING THE COMMUNITY

MHT's interventions start with a needs assessment (water, sanitation, houses, electricity, other issues) followed by a community meeting, exclusively with women residents. A policy assessment is next to understand how regulations, policies and incentives are applied in these communities⁴.

MHT, as a civil society organization (CSO) engages with the community through multiple community (mohalla) meetings to build trust with the residents. They hand-hold the community to achieve the stated needs (where possible) and engage with the government in parallel to do advocacy. MHT empowers the women in the Community Action Groups (CAG) – to make them aware of what the technical system is, who the governance agencies are (municipal corporation, water utility, local elected representative) and how to represent their needs to access services.

During the COVID-19 lockdowns, MHT and the supported CAGs were better able to access government benefits (food grains, household and hygiene products) due to their better access to and understanding of government and institutional mechanisms.

CAN HYBRID SOLUTIONS INCREASE RESILIENCE IN URBAN SLUM COMMUNITIES?

Floods and water scarcity in the future can deprive slum communities of safe and secure living conditions and burden them with additional costs^{5 xxvi}. Climate resilience must be integral to the accelerated access approach, whether through centralized or decentralized solutions. But densely packed, organically organized slum communities lack space for conventional solutions and alternate interventions must be considered.

Alternate approaches explored in India include decentralized solutions to water supply and sanitation. In the Beedi Workers Colony in Bengaluru, a decentralized wastewater treatment plant uses nature-based infrastructure to treat wastewater from 120



houses which is used to irrigate the landscape^{xxvii}.

In Ranchi, India, MHT worked with 55 settlements to implement resilience and water security measures through women-led CAGs, local elected officials and technical experts. In a pilot project in Bada Ghagra, Ranchi, community-level rainwater harvesting and revival of open wells^{xxviii} provides a secure local water source for residents to use.

Another approach specifically for the sanitation sector, has been coalition building to engage in the development of a sanitation ecosystem, peer-to-peer learning and identifying funding streams to implement innovative new technology. The National Faecal Sludge and Septage Management Alliance^{xxix}, Toilet Board Coalition^{xxx} and others have boosted the discourse around urban sanitation in India.

In sum, the most useful path to improve water or

sanitation services has been the hybrid approach where micro-solutions are integrated into larger service networks through design innovations. The community in Safeda Basti, Delhi, invested in the construction of a mini-sewer system^{xxxi} to fit into the narrow lanes of their locality which then connected to a nearby main sewer line laid by the urban authorities.

PATHWAYS TO A RESILIENT URBAN FUTURE: PLACE-BASED, CLIMATE ADAPTIVE AND COLLABORATIVE APPROACHES

The community stories narrated in their own voices earlier, typify the precarious conditions in slums in urban India. Improving living conditions and providing basic services in urban slum communities is a human rights issue. As a signatory to the Millennium Development Goals (Goal 7)^{xxxii} and Sustainable Development Goals (Goal 11)^{xxxiii}, India has committed to building healthy and inclusive cities. This must include providing improved services and environment in urban slums. Delays in uplifting conditions in slum settlements has huge public health and economic implications, as the COVID-19 pandemic has re-emphasized, for all of us who live in cities where these slums are ignored and neglected.

Establishing, extending or improving WASH and healthy spaces in these communities will not be easy, given **increased demand due to population growth, reduced water availability exacerbated by climate change** and a **lack of sustained pro-poor focus**.

THREE PATHWAYS TO IMPROVE WASH AND HEALTHY SPACE ACCESS FOR RESILIENT URBAN COMMUNITIES

We propose three pathways to enable transformative change in WASH and healthy space provision for vulnerable urban slum communities, while building healthier and more resilient cities.

1. Take a practical, multi-solution approach to place-based WASH improvements for the urban poor

Collaboration between local governments, non-government organizations, community federations and private vendors is necessary to improve on-site solutions when funds for network expansion are absent. This includes supporting policies (approvals, tax incentives, subsidies), regulations (standards and guidelines to ensure quantity, quality and safety) and funding (federal and state grants, co-financing & blended finance models) to improve and scale cost effective on-site solutions for water and sanitation.

Dhaka, Bangladesh is providing universal access to safe drinking water through a network of 300 water kiosks^{xxxiv} in collaboration with Drinkwell. In Bihar, India the same organization installs integrated water and sanitation infrastructure which uses human waste from the toilet blocks to power the water kiosks^{xxxv}. These examples show the benefits of partnerships between public sector, private sector and community organizations for implementation of innovative solutions.

Where capital investments allow extension of piped infrastructure, local government must ensure operation and maintenance standards are followed and redressal mechanisms are in place to respond to failures and disruptions in a timely manner. City governments can partner with communities to implement hybrid mini-grid solutions as in Safeda Basti, Delhi.

Where settlement upgradation opportunities exist, upgrades should take a city wide programmatic approach. Interventions must be implemented with long term commitment to integrate urban poor communities into city wide improvement plans and processes, as outlined in UN-Habitat's "A practical guide to designing, planning and executing citywide slum upgrading programmes"^{xxxvi}.

2. Integrate climate resilience into WASH and healthy space solutions

Urban poor communities bear the brunt of climate extremes like floods, water scarcity and heat stress. The

lack of money or political connections pushes families into intergenerational poverty from repeated climate shocks. Investments can be directed towards cost-effective, localized, modular and adaptive solutions that can work in space-constrained and dense environments. Community-level adaptation measures, such as rainwater harvesting and flood prevention measures can improve community resilience^{xxxvii}. Many nature-based solutions in water and wastewater management also mitigate heat and flood risks. City governments should advance such multi-benefit approaches to improve efficiency through localized collection, use, treatment and recycling of water and wastewater.

3. Advance a collective action model for transformative change

To provide a holistic approach to improve access to WASH services and healthy space access for the urban poor in India, WRI India launched the Accelerating Access Coalition (AACO) in November 2020, in partnership with Biome Environmental Trust, Dasra, Finish Society, Indian Institute of Human Settlements, IRC, Mahila Housing Trust, Take-a-Stake Fund, WaterAid, Water.org, WASTE. The coalition brings together key actors in the urban WASH space, along with funders and community groups to develop joint offers. Leveraging their complementary skills and relationships, partners will convene and influence global, national and local stakeholders through ongoing research and action.

The partnership will support improvements in service delivery and access, development of hybrid solutions, integrated settlement upgradation plans, as well as deploying nature-based solutions by working closely with communities. These solutions will be implemented through innovative financing and partnerships between government, civil society and private sector organizations. Through this collaboration, WASH and healthy spaces access for urban poor communities will be emphasized and new tools and mechanisms for institutional capacity building, robust policy and sustained financing will be explored.

CONCLUSION

The community voices we presented in this commentary offer a stark view of the absent, fragmented and intermittent WASH service delivery in urban poor communities. The COVID-19 crisis has highlighted and emphasized the citywide risks when governments and donors overlook the need to provide adequate and inclusive WASH services and healthy spaces for the urban poor.

COVID-19 stimulus packages present a unique opportunity to increase access to WASH and healthy

spaces for the urban poor. International donors and national governments need to invest more^{xxxviii} and platforms like AACO offer a delivery architecture to aggregate solutions and capacity, and implement actions at scale through enhanced coordination and synergies across a large segment of WASH programs and organizations working with the urban poor. It can no longer be ignored that this basic health infrastructure (equitable WASH and healthy open spaces) is crucial to sustain healthy, inclusive and resilient cities.



ENDNOTES

1. Urban workers, such as healthcare, sanitation workers and service sector and industrial employees reside in these dense settlements and many were exposed to the COVID-19 virus while using shared and crowded facilities.

2. Representatives of Mahila Housing Trust (MHT) spoke to women (in the local language) in 16 communities in 8 cities in October 2020 (Ahmedabad, Amalner, Bhopal, Delhi, Jaipur, Jodhpur, Ranchi, Surat). MHT is a leading advocacy organization working with women from urban poor communities to organize and empower them to improve their habitats and increase climate resilience. Locations were selected based on MHT staff knowledge of where COVID-19 safety measures could be safely followed. An hour-long discussion with Ms. Veena Bhardwaj was conducted in June 2021 to add insights about the initial conditions in some of the communities when MHT had begun their engagement.

3. Nal Nagri, established in the 1970s is within the city of Delhi and houses about 100,000 people Bakkarwala and Safda Ghevra established between 2000 and 2005 have around 30,000 to 50,000 residents each and are about 30-40 km from the city on deserted rural land. Each of these resettlement colonies when initially established only offered land to the relocated households. There were no basic amenities such as water supply, sanitation etc. MHT began working in Safda Ghevra in 2008, Nal Nagri in 2010 and in Bakkarwala in 2017. Many of the WASH related issues were the same across all these communities when MHT began their interventions - there was no public piped water supply or sanitation services. Some of MHTs initial interventions were to provide off-grid solutions and only recently have public piped connections become available.

4. For example – Swacch Bharat Mission is a central govt program and is implemented at the state level. But its requirements meant the resettlement communities could not access these incentives easily.

5. The poor are disproportionately impacted, by climate change driven stresses, for example, during Chennai’s water crisis in 2019, urban poor households were forced to spend nearly half their monthly income to procure water from dwindling sources.

REFERENCES

i Chhabra, R. 2019. National Statement of India by H.E. Mr. Rahul Chhabra, High Commissioner & Permanent Representative of India to UN-Habitat At First Session of UN-Habitat Assembly (28 May 2019 – Nairobi). https://www.mea.gov.in/Portal/CountryNews/11213_UNHA_India_s_Statement_28.05.2019.pdf

ii The World Bank. 2021. Population living in slums, India. <https://data.worldbank.org/indicator/EN.POP.SLUM.UR.ZS?locations=IN>

iii NSSO. 2010. NSS 65th Round, Housing Conditions and Amenities in India, July 2008 - June 2009, National Sample Survey Office. <http://microdata.gov.in/nada43/index.php/catalog/120>

iv ABP. 2021. Urban Slums Had Higher Prevalence Of Covid-19, Here’s What ICMR Survey Reveals. ABPLive. <https://news.abplive.com/health/urban-slums-had-higher-prevalence-of-covid-19-here-s-what-icmr-survey-revealed-about-infection-spread-in-india-1442586>

v Murhekar et al 2021. Lancet Glob Health. [https://www.thelancet.com/journals/langlo/article/PIIS2214-109X\(20\)30544-1/fulltext](https://www.thelancet.com/journals/langlo/article/PIIS2214-109X(20)30544-1/fulltext)

vi Kumar, S. 2020. India debates how to end a lockdown without sparking another emergency. The New Humanitarian. <https://www.thenewhumanitarian.org/news/2020/04/28/India-coronavirus-lockdown-migrant-exodus-crisis>

vii Mishra, S.V., Mafizul Haque, Sk., Gayen,A. 2020. COVID-19 in India transmits from the urban to the rural. The International Journal of Health Planning and Management. <https://onlinelibrary.wiley.com/doi/10.1002/hpm.3047>

viii Mitlin, D., V.A. Beard, D. Satterthwaite, and J. Du. 2019. “Unaffordable and Undrinkable: Rethinking Urban Water Access in the Global South.” Working Paper. Washington, DC: World Resources Institute. <https://www.wri.org/wri-citiesforall/publication/unaffordable-and-undrinkable-rethinking-urban-water-access-global-south>

ix Jain, V., Chennuri, S., Karamchandani, A. 2016. Informal housing, inadequate property rights: understanding the needs of India’s informal housing dwellers. FSG. <https://www.fsg.org/sites/default/files/publications/Informal%20Housing%20Inadequate%20Property%20Rights.pdf>

x Hindman et al. 2015. Addressing Slum Redevelopment Issues in India. Dow Sustainability Fellowship. <https://smartnet.niua.org/sites/default/files/resources/Dow-Slum-Redevelopment-India.pdf>

xi World Bank. 2016. Community Slum Sanitation in India A Practitioner’s Guide. <https://www.wsp.org/sites/wsp/files/publications/Community%20Slum%20Sanitation%20in%20>

India.pdf

xii WHO/UNICEF. 2017. Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (JMP). <https://washdata.org/data/household#!/dashboard/new>

xiii Down To Earth. N.D. Slumming it out. <https://www.downtoearth.org.in/dte-infographics/slums/index.html>

xiv Intellecap. 2018. Prabhav 2018: SDG6-Clean water and sanitation. <http://intellecap.com/wp-content/uploads/2018/11/SDG-6-WASH.pdf>

xv Subbaraman, R., Murthy, S.L. 2015. The right to water in the slums of Mumbai, India. Bulletin of the World Health Organization. <https://www.who.int/bulletin/volumes/93/11/15-155473/en/>

xvi Nolan et al. 2017. Legal Status and Deprivation in India’s Urban Slums: An Analysis of Two Decades of National Sample Survey Data. IZA Institute of Labour Economics. Discussion Paper. <http://ftp.iza.org/dp10639.pdf>

xvii Swami, S.K. 2017. An Empirical Study of Growth of Slum Population in India. International Journal of Political Science. Volume 3, Issue 1, 2017, PP 10-13. <https://www.arcjournals.org/pdfs/ijps/v3-i1/2.pdf>

xviii Singh, S., Upmanyu, V. 2019. Urban flooding: The case of drowning cities and rising vulnerability. Down To Earth. <https://www.downtoearth.org.in/blog/natural-disasters/urban-flooding-the-case-of-drowning-cities-and-rising-vulnerability-67203>

xix Same as note viii.

xx Satterthwaite, D., V.A. Beard, D. Mitlin, and J. Du. 2019. “Untreated and Unsafe: Solving the Urban Sanitation Crisis in the Global South.” Working Paper. Washington, DC: World Resources Institute. Available online at www.citiesforall.org.

xxi Ministry of Housing and Urban Affairs. 2018. Advisory on Public and Community Toilets. <http://164.100.228.143:8080/sbm/content/writereaddata/Advisory%20on%20Public%20and%20Community%20Toilet.pdf>

xxii Desai, D. 2020. Poor sanitation in Mumbai’s slums is compounding the Covid19 threat. Urban Futures. Observer Research Foundation. <https://www.orfonline.org/expert-speak/poor-sanitation-in-mumbais-slums-is-compounding-the-covid-19-threat-66216/>

xxiii Delhi Urban Shelter Improvement Board. 2017. Vision Document (upto 2030). <https://webcache.googleusercontent.com/search?q=cache:Nh27GsBzwrcJ:https://delhishelterboard.in/main/wp-content/uploads/2020/06/Vision-document-15-yr-period-upto-2030-1.doc+&cd=2&hl=en&ct=clnk&gl=in&client=safari>

xxiv Satterthwaite, D., V.A. Beard, D. Mitlin, and J. Du. 2019. “Untreated and Unsafe: Solving the Urban Sanitation Crisis in the Global South.” Working Paper. Washington, DC: World

Resources Institute. Available online at www.citiesforall.org.

xxv Nelson, V. I., Shepard, F.C. 1998. Accountability: Issues of Compliance with Decentralized Wastewater Management Goals. Waquoit Bay National Estuarine Research Reserve and ad hoc Task Force for Decentralized Wastewater Management. Waquoit, Massachusetts. <https://www.mass.gov/files/documents/2016/08/qy/account.pdf>

xxvi Guntoju, S.S., Alam, M. F., Sikka, A. 2019. Chennai water crisis: A wake-up call for Indian cities. Down To Earth. <https://www.downtoearth.org.in/blog/water/chennai-water-crisis-a-wake-up-call-for-indian-cities-66024>

xxvii CDD Society. 2019. DEWATS for Beedi Waorkers Colony, Kengeri, Bangalore. Factsheet. <https://cddindia.org/wp-content/uploads/2017/10/Factsheet-2020-DEWATS-BWC.pdf>

xxviii Integrated Design. n.d. Designing water systems for Ranchi. A Social Design Library. <https://socialdesignlibrary.in/designing-water-systems-for-ranchi/>

xxix NFSSM Alliance. Home. <https://nfssmalliance.org>

xxx Toilet Board Colaition. Home. <https://www.toiletboard.org>

xxxi CURE. 2019. Slum Networking for Home Toilets. <https://cureindia.org/page39.html>

xxxii United Nations. Millennium Development Goals. <https://www.un.org/millenniumgoals/envIRON.shtml>

xxxiii United Nations. Sustainable Development Goals. <https://sdgs.un.org/goals/goal11>

xxxiv Chowdhury, M. 2019. Building smarter water partnerships. The World Bank Blogs. <https://blogs.worldbank.org/water/building-smarter-water-partnerships>

xxxv Drinkwell. n.d. Offering Overview. <https://static1.squarespace.com/static/5171eee1e4b08db7106e5bbb/t/5bc240d71905f4c1ac9b37ce/1539457260991/Drinkwell+Offering+Overview.pdf>

xxxvi UN-HABITAT. 2014. A practical guide to designing, planning, and executing citywide slum upgrading programmes. https://www.ohchr.org/Documents/Issues/Housing/InformalSettlements/UNHABITAT_A_PracticalGuidetoDesigningPlaningandExecutingCitywideSlum.pdf

xxxvii Chandran, R. 2017. Slum upgrades key to disaster mitigation in Indian cities, analyst says. Reuters. <https://www.reuters.com/article/india-landrights-disaster/slum-upgrades-key-to-disaster-mitigation-in-indian-cities-analyst-says-idINKCN1B2oUV?edition-redirect=in>

xxxviii Mitchell, A. 2020. Covid-19 shows us why UK Aid should be invested in creating a healthier, safer world. The Telegraph. <https://www.telegraph.co.uk/global-health/climate-and-people/covid-19-shows-us-uk-aid-should-invested-creating-healthier/>

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