Politics and Practices of Wastewater Surveillance and Governance: Global Lessons from South Asia

This is a text transcript for the keynote lecture, “Politics and Practices of Wastewater Surveillance and Governance: Global Lessons from South Asia,” which took place on Day 2 of the 2024 Graduate South Asia Conference, presented by the Canada India Research Centre for Learning and Engagement (CIRCLE) at the University of Guelph. The keynote speaker was Josie Wittmer. The event was recorded on November 14, 2024.

Transcript:

Sharada Srinivasan

To a very exciting session at the CIRCLE South Asia Graduate Conference. This is Day 2 of the conference. I'm Sharadha Srinivasan, I am a faculty member with the Department of Sociology and Anthropology and the Guelph Institute of Development Studies. I'm also the interim director of CIRCLE, and by now you all know what CIRCLE is, so I won't go on about it.

It's great to welcome Dr. Josie Wittmer back to a CIRCLE for a brief period. For about 6 months, I think, Josie was the coordinator of CIRCLE, so she's not a stranger to CIRCLE, and she was actually involved in organizing the 1st South Asia Graduate Conference for CIRCLE. So, it's really coming back full circle. It's like a bad joke. But yeah, I can get away with it. I think. Okay.

So, Josie is currently the assistant professor in geography, environment, and sustainability in the School of Science and Environment at Memorial University in Newfoundland. This is a position that she started just a few months back. Josie did her PhD at the University of Guelph, and I had the privilege of being involved in her PhD committee as a member. So, I got to see how Josie did research, her approach to research, her passion to research, firsthand.

Josie has been conducting exceptional qualitative research in India for nearly a decade. I hope that's correct, Josie. If it's more, please correct me; if it's less, never mind. So today she's going to talk about, the title of her talk is the Politics and Practices of Wastewater Surveillance and Governance: Global Lessons from South Asia. So, this is from her recent and ongoing research. And please note that the keynote address itself, Josie's talk, is being recorded so that we can promote it through our CIRCLE website, but the discussions and Q&A will not be recorded. Over to you, Josie.

Josie Wittmer

All right, thank you. And I'm happy to be back with CIRCLE here. Thanks for inviting me to speak at this graduate South Asia conference, and for that lovely, generous introduction. So, thanks to CY and Dr. Srinivasan for inviting me to be here, and I'm going to discuss some new and ongoing work with you, because most of my work over the last decade, most of which was during my PhD at Guelph. And it was... It's actually one decade, like this year is one decade, Sharada, so I've been working in India for this decade, working on issues around urban, solid waste management and informal labor.

But today I'm going to talk about some more emerging work around wastewater and some new directions I'm traveling in and generating some conversations between work that's being done in South Asia and in Canadian municipalities, particularly on the island of Newfoundland, where I currently reside, and where a majority of municipal sewage actually goes directly into the ocean untreated here.

So today, I'm going to talk through some research on data politics around wastewater and public health surveillance in South Asia, sort of during and beyond the COVID-19 pandemic. And then I'm going to discuss some future directions and global lessons. So basically, what I'm thinking about in terms of 2 newer projects I'm working on around peri-urban wastewater reuse in Karnataka, in India and around wastewater management in Newfoundland, and how I'm bringing these 2 projects together.

So, here's another title page! I just had, I just finished up a pandemics and cities grant with the Urban Studies Foundation, with my co-investigators, Carolyn Prouse at Queens and Rafi Arefin at UBC. And here we were studying wastewater surveillance practices that rapidly unfolded and gained a lot of prominence during the COVID-19 pandemic. And so, through this project, it was a global scale study, but I was leading the South Asia team. And this paper I'm going to talk about is a paper that focuses on the South Asian context.

So, I'm going to talk through this paper a little bit. And yeah, so I'm sure many of you here have heard in the news in the last few years about wastewater signals telling us something about increasing or decreasing COVID-19 infection rates in your city or elsewhere around the world. And that's sort of the process that we're talking about when we speak about digitalizing sewage. This practice of making and sharing digital data out of sewer... like out of wastewater, in the sewers. So, this is a practice known as wastewater-based surveillance, or WBS.

So, while we were writing this paper, WBS has been deployed in, or was being deployed in, 72 countries and this basically involves sampling urban sewage to detect biomarkers for disease

and claims to offer sort of this non-invasive, real time, automatable, and transparent modes of collecting, analyzing, and sharing public health data. And so, through the COVID-19 pandemic, we saw a rapid increase in WBS practices, and its popularity and spread around the world. And it's been heralded since then as the future of governing urban public health and predicting future disease outbreaks.

And so now, scientists around the world are working with biotech firms and municipal officials to study and surveil the microbial life of urban sewers to predict and manage emerging infectious disease, environmental pollutants, and antimicrobial resistance, AMR. And I know there's a big focus on AMR research in India right now, too. So, municipalities are increasingly relying on producing this data, these big data sets to surveil populations and make decisions.

And so, with a focus that emanates from three South Asian cities, our paper is investigating the pathways through which WBS data is produced, made known, and operationalized in evidence-based decision making, and I should have mentioned, this paper is in... We had a final round of minor revisions recently with environment and planning, so hopefully it will be out soon.

So, our focus here is on the data infrastructures that underlie WBS practices. So, we are drawing inspiration from Eric Nost, who's actually at the University of Guelph, and Jenny Goldstein, and their articulation of a political ecology of data. And here we're thinking through data infrastructures together with urban environmental politics.

So here, when we're talking about data infrastructures of WBS, we're not just referring to sort of like the physical materials, resources, sensors and labour that support the development and use of technology. But we're also talking about the socio-material, and this is a quote, the socio-material "place and time-specific networks of funding standards, rules, technologies and environments" that also enable the capture, analysis, circulation, and use of data in urban environmental governance (Nost & Goldstein, 2022). So, it's more than just the physical things that we think of in terms of structures or infrastructures.

So we put these insights from political ecology together in conversation with emerging work from critical data studies and a lot of work that's come out recently from science and technology studies, STS, focused on public health and crisis as we work to sort of untangle the transnational data infrastructures of WBS in this context, because it was sort of emerging through this public health emergency.

So, these literatures helped us to do a few things. The first was work from scholars like Mike Annany and Kate Crawford [and] helped to provoke our thinking about the presumed neutrality

of open data and the various logics and resulting reliance on notions of things like accountability and transparency, that we often see being linked to data sharing practices, and this idea of good governance.

This work also enabled us to trace the expanded use of dashboards during the pandemic, as what we think are sort of this materialization of transparency discourses. So here we also engaged with work by Shannon Mattern on dashboards as these sort of like sanitized assemblages of data practices that actively produce social and political relations.

And finally, here, this work was helping us to shift the conversation about WBS beyond just preventing death during an emergency. And so that was sort of the initial focus of creating these data infrastructures, was like stopping, stopping the pandemic, preventing death. But what we're trying to do is shift the conversation and the focus towards the longer-term political ramifications of digital solutions for enabling things, like, you know, the rollout of surveillance capitalism or control creep, exacerbating racial and ethnic disparities, and ongoing asymmetrical relations around things like information, access, and power at multiple scales. So, all of these things sort of unfold and take place within this sort of rapid rollout of a technology with few guardrails on, initially.

And so, in this paper, we're arguing that in South Asia wastewater surveillance data is actively produced through fragile but power laden infrastructural networks of both transnational and local knowledge, funding, and practices. And then we found that these networks produced artifacts like dashboards to communicate data to the public in ways that enabled claims to things like objectivity, ethics, and transparency. But then they also simultaneously opened up messy spaces of translation that trouble this sort of linear notion of objective data informs transparent sort of decision making. So that's what the paper is mainly contending here.

And to do this work we used mixed qualitative methods, including discourse, analysis of policy documents and biomedical science publications. And we did a lot of interviews and oral histories with scientists from research institutions and private labs as well as wastewater engineers, biotech firms, municipal officials, utilities workers, and funders, philanthropic donors, basically.

And so our three case studies for this paper are set in Bangalore, India, with the Precision Health Platform, which was a collaboration of a bunch of different organizations, we also spoke to folks from a multi-city project led by researchers at the Gujarat Biotechnology Research Institute in Gujarat State, and we were in touch with a project at the International Center for Diarrhoeal Disease Research in Dhaka, Bangladesh.

So, I'm probably going to gloss over some of these results. I'm going to focus on, well, first, I'll go through a little bit of the production of these fragile networks, specifically referring to knowledge and funding and financing. I'll probably spend a bit more time talking about making data known and visible to the public, which is why it's emphasized here, and if we have time, I'll go into operationalizing the data for governance. But I might skip over that, we'll see.

So briefly, what we refer here to as fragile networks in the case of WBS in South Asia are the ways in which this knowledge came together, and the technologies and practices were developed. So the teams we spoke to referred to learning initially from some studies by Dutch scientists that came out from Europe, but then, having to work out WBS in their own context. So, this working out was both in terms of like the science and the method of analyzing samples, but also, like, yeah, collecting the samples in un-sewered situations and open drains. But also, the improvisations and all of the informal channels of personal and professional networks that people had to navigate, to obtain different equipment, to verify results and to obtain sampling permissions and that kind of thing. So, there's a lot of informal stuff happening to get this science to be worked out in the context of South Asian cities.

Many challenges were identified, but the main one that was identified for ongoing, this ongoing work, was the precarity of funding for ongoing surveillance, and this sort of tension between the catalytic role of philanthropic donors to develop the science, but then it wasn't being carried through by a lot of governments. And so, there was this sort of challenge, of doing science in a donor dependent context, that was articulated, and that was a key issue or key difference between colleagues in European and North American context, and the South Asian context, was how these programs were being funded long term.

And also, we found that because a lot of scientists in this context were some of the early movers in WBS, figuring this out and doing a lot of this research, they contributed a great amount of expertise to the establishment of global WBS guidelines that were put out through the World Health Organization, for example. So, there's a lot of different knowledge networks that were happening at multiple scales there. In terms of making the data known and visible to the public, open data is particularly emphasized in public health surveillance, because this data is derived from people's bodies. And so, there was this big emphasis by all of the teams that this data belongs to everyone who poops, like it's a public... this is [a] public good, I guess, and it was being framed explicitly as an ethical priority by all of the teams.

When we interviewed people about how they communicate WBS data to the public, they all talked about their dashboards, the dashboards present data in myriad ways. I have two examples here from Bangalore and from Gujarat. They mostly use graphs and maps to show how much SARS-CoV-2 RNA copies are present in a sample. They're often open access, and there were, you know, one of the interesting things was that all of the funders that were

funding these programs, the philanthropic donors, they were requiring that all of these projects show their data in a dashboard, and so that was enabled to enable transparency and accountability.

However, as we kind of heard in some of the theory slides earlier in critical STS studies, you know, communication by just posting raw data to a dashboard doesn't really take into account how users are going to interpret, use, and understand the data. And this critique is pretty important, I think, in India, and like a lot of places in the world, we just saw the election that happened in the US. But, you know, there might be a lot of access to technology, but digital literacy and the ability to question information that's being presented in social media or WhatsApp chains isn't perhaps as robust. And so, in this way, the dashboard, by just posting data, can also enact spaces of misinformation.

And that's important, because scientists that we interviewed emphasize, they don't interpret or tell people what to do with data. So, here's a quote, "one of the things we don't do as a platform is comment on spikes or the levels of COVID infection at all. Journalists ask us many times about [it], and our response is always, 'whatever you want to know is on the dashboard, or ask the spokesperson from the municipal office,'" (Public Health Bangalore, 2022).

So, providing open data, but leaving interpretation to the general public, has several important ramifications, one of the big ones being the spreading of misinformation, and this was a big fear that a lot of scientists expressed to us. So, there was an example in Gujarat, that highly... There was a story that circulated widely in the media, earlier on in the pandemic, where some data was misinterpreted to say that there was live COVID virus floating in the Sabarmati River and some local lakes, and so, the scientist said that this created quote "a lot of havoc in a public who are already scared".

A second concern is around the trend of hotspotting, scapegoating, and over surveillance of marginalized communities. And so, some scientists and public officials were hoping, you know, when you're talking about the future applications of this data, of this technology, a lot of public health folks were like it'd be great if we could get the catchment size down and be able to narrow down exactly where problems are, that's the only way it'll be useful. But this also raises, you know, ethical concerns for others.

So, here's a quote: "Scientists quickly want to get down to identifying hotspots. But what are the consequences of this? The Indian Government was already blaming super, spreading events on Muslim communities, as if these people were to blame for the entire pandemic. Who's responsible for the consequences of data? And how should we work in a public domain where this data needs to be taken with great care?" (Urban planner, Bangalore). It's a great question.

So, this slide I'm going to skip through, for time. But briefly, there was quite divergent views by different people involved in this wastewater surveillance work around how effective this data was in actually informing health policy. Some folks thought it was like, really had a lot of impact, and others thought that there wasn't, it wasn't able to be used in a meaningful way due to institutional conflicts with like, how wastewater is collected, what ward boundaries are, versus how a pandemic spreads, versus like what the political boundaries are of wards, versus how the pandemic moves, and like also like what are the sewerage sort of infrastructures in the city, and how do those intersect? So? Yeah, I can talk a bit more about that later. But I'm going to skip it for now.

So, as some like broad implications of this piece, although WBS has been globally heralded as the future of governing public health and predicting disease outbreaks, we came to understand the social, political, and material practices of actually producing and maintaining these networks and data infrastructures in South Asia, were collectively producing uncertainty for the future sustainability of these programs. And that's like, I think that's a big deal, because we have been told in the international context that… we've been told in the international context that, this is the future of governing public health and preventing future pandemics. But the funding is so insecure, and these infrastructures are insecure. So, there's implications there.

Finally, as citizens, lives are increasingly datafied, especially in this era of smart cities, we argue that the relationship between trust and transparency within these data practices need to be constantly assessed across geographies that are striated with power that are, you know... there's shifting funding infrastructures and levels of political support. And we need to think about these in order to ensure that oversurveillance of certain populations isn't enacted through and beyond crises.

I'm going to take a few more minutes here at the end to talk about some future work that I'm doing. And so, I'm inspired to look beyond urban sewage treatment plants and urban population, like surveillance of urban populations, towards the outflows and outfalls of wastewater and its downstream users, uses, and impacts.

So, a few months back I was in India, working with some colleagues looking at two projects the government of Karnataka has launched to pump treated wastewater out of the cities to fill lakes and recharge groundwater in drought, prone peri-urban areas northeast of the city. So, these projects the Casey Valley and HN Valley projects collectively aim to fill over 200 existing lakes, and by formally transferring treated wastewater from the urban to rural areas, these projects aim to ensure water availability in these drought, prone districts and bolster resilience, food security, all these different things.

However, beyond the implementation of this large-scale program, not much social science work has been done on the ongoing environmental surveillance of wastewater in these contexts, or on the more general, polarized representations and discussions around these projects in the media and in communities themselves. So, wastewater here is seen often as being either a climate solution or a public health threat, and there's not much in between.

So emerging from these discussions around wastewater injustice that have emerged from our other project, and actually a journal article that we are publishing with all of the key informants from our project about justice in wastewater, I'm now thinking about these political and ethical dimensions of this reuse project with an explicit focus on community experiences and practices of like the downstream, recipients of urban wastewater. And I have a picture here of my colleague Vishwanath from Biome Environmental Trust, who I'm working with and kind of trying to implement this justice-centred framework for wastewater reuse.

And then I've also moved to Newfoundland and Labrador in Eastern Canada. You can see in the big map of Canada. It's the island up at sort of the top right side the eastern side of Canada, which is all red on this map. This province experiences significant infrastructural inequalities. In Canada, the federal wastewater systems effluent regulations came into force in 2012 and imposed national effluent standards and required secondary treatment of wastewater, but you can see on this map, all of the red dots there means that there's no treatment of wastewater at all. And so, this island is fairly remote, and it has a lot of small communities and a really high concentration of municipalities with no wastewater treatment. And that's, you know I mentioned before, most of the sewage is pumped directly into the ocean.

So, here's a graph of the treatment types by territory and province; on the left, and you can see again, Newfoundland has a lot of red meaning that there's no treatment in relation to other provinces. And so, municipalities… Newfoundland has described wastewater as a huge crisis, and municipalities here are under-resourced, deemed to be noncompliant with the federal rules, and are struggling with multiple barriers and burdens around financing, administering, and monitoring their sewage outfalls.

And you know it doesn't even start to tackle the cost of building the required facilities which in the city that I live, Cornerbrook, it's about 110 million dollars is the estimate for how much it would cost to bring them into compliance. And the graph on the right here shows here, like we're the tiny little blip in the middle, 3% of our municipalities are in compliance, and you can see that in relation to the broader picture in Canada.

So, as some final conclusions here beyond thinking about wastewater surveillance, I am seeing some really important synergies regarding the broader political, ecological, and infrastructural

context of wastewater management and governance at a global scale. And so, I think there's some... It's important to bring these two very distinct contexts, in India or South Asia and in Newfoundland in Canada together to talk about these politics and practices around infrastructural transformation, and I want to facilitate some global knowledge sharing and expertise sharing between India's wastewater management projects, where there has been a lot of this sort of like working out of surveillance and of programs, there was the rapid sewering of Bangalore and the reduction of the open drains in the last few years, the building of new treatment facilities at different scales, from just individual apartments to big city infrastructures.

And I think there's a lot to be said and a lot to be learned from that context of doing these multiple kinds of wastewater projects for places like Newfoundland, where we are quite rural and remote, and have, you know, we need support and help thinking about how we can creatively put together wastewater facilities and monitoring practices as well, which India has done quite, quite well.

And so, I'm in the initial stages of kind of developing both of these projects. But I'm seeing a lot of ways to speak across them, and maybe enhance climate resiliency, thinking, and conversations between these communities and thinking about how to make things work, because in both cases there's a lot of like making things work and trying not to get fined by the state or whatever it is. But there's a lot of making things work and doing things with wastewater in these sort of like, under-resourced settings, where the universal sort of infrastructural ideal is not the norm.

So, I think there's much to learn from rural and remote communities in Canada, from these experiences in India, and lots of, you know, implications to share around community science development, approaches to monitoring for public health, and even multi-species relations. So, I'm going to leave it there, because I'm already over time, and thank you for having me here again.

Sharada Srinivasan

Thank you, Josie. I think the recording can stop now.

[End of transcript]