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# Cities in Action: Expert Conversations for Urban Hydrology Solutions

Speakers:

Moderator:



S. Vishwanath  
Biome Environmental Trust



Gerald Bright  
Mayor's Office of Clean and  
Green Initiatives, Philadelphia



Jagdish Krishnaswamy  
Indian Institute for Human  
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## Problem Setting

Urban areas often have a large water footprint, threatening increasingly depleted aquifers. Simultaneously, cities are vulnerable to rapid runoff and flooding during extreme weather events, which have intensified with climate change and sea-level rise. The risk of polluted runoff exacerbates threats to human and ecosystem health. As these challenges mount, there has never been a greater need for effective solutions. This panel explored comparative approaches to developing sustainable water systems in Bengaluru, India, and Philadelphia, USA. S. Vishwanath and Gerald Bright provided their expert insights, with the discussion moderated by Jagdish Krishnaswamy.

## Key Takeaways

### 1. Interdisciplinary teams can deliver the best urban hydrology solutions

Gathering diverse perspectives can lead to multidisciplinary solutions. S. Vishwanath highlighted the strategy of the urban lakes restoration project in Bengaluru, which drew on the expertise of hydrologists, engineers, and economists. This resulted in increased biodiversity, improved economic productivity, and reduced flooding. In addition, Gerald Bright underlined the importance of connecting community stakeholders across different city departments to advance urban hydrology projects.

### 2. Innovative data collection can ensure solution efficacy and guide project scaling

Strategic data collection enables modeling of the entire urban hydrology landscape, illuminating both challenges and opportunities. Gerald Bright explained how Philadelphia has measured the impact of green infrastructure on

stormwater runoff, groundwater replenishment, and water quality. Likewise, S. Vishwanath noted that rainfall patterns in India are being measured to tailor watering strategies and maintenance schedules. Through informed decision-making, cities in both countries have developed cost-effective management solutions.

### 3. Effective knowledge sharing can accelerate the spread of urban hydrology solutions

Cities can accelerate the implementation of their initiatives by learning from the successes and challenges of other localities. Networks of cities implementing solutions at different scales can facilitate knowledge sharing. This may lead to the accelerated adoption of urban hydrology solutions. Gerald Bright referenced the initiatives of the Green Infrastructure Leadership Exchange, which connects professionals across the United States and Canada to share project processes and outcomes.

### 4. Integrating gray, green, and blue infrastructure meets urgent hydrological needs

S. Vishwanath and Gerald Bright both highlighted the importance of gray, green, and blue solutions addressing urban hydrology challenges. Access to basic services remains a challenge for many marginalised urban neighborhoods. In these cases, traditional ("gray") infrastructure may be prioritised to save lives. Still, the integration of nature-based ("blue/ green") solutions wherever possible can ensure the full realisation of health and quality of life benefits for all communities.



A human-made lake in Bengaluru



Bioswale, a channel that manages stormwater runoffs

## Implementation Examples



### Rainfall Modeling in Bengaluru

Bengaluru is equipped with approximately 100 automatic weather stations, strategically distributed to ensure comprehensive coverage across the city. Each station monitors an area of roughly 8 square kilometers, enabling the collection of highly detailed data on rainfall patterns and intensity.

Analysis of this data has revealed that the city must now be prepared for rainfall intensities reaching 180 mm per hour—three times higher than what urban hydrologists recorded three decades ago. Armed with these insights, Bengaluru adopted a data-driven approach in designing the K-100 waterway project—a 12-kilometer drainage corridor that incorporates green infrastructure and was developed at a cost of approximately \$22 million.

#### Priority Action: Invest in building local capacity

Local institutions can transform urban hydrology— but only with the right people. This requires investing in skilled teams that effectively leverage data and technological innovations for optimal solutions. It also means strategically developing multidisciplinary partnerships. This can be achieved by incorporating cross-sectoral perspectives and utilising data-driven models to develop multidisciplinary solutions. Furthermore, as emphasised by S. Vishwanath and Gerald Bright, implementing a balance of gray, green, and blue infrastructure at varying scales promotes learning exchange and replication, resulting in more sustainable water systems.



### Bioswales in Philadelphia

Beginning with just 20 pilot bioswales in 2011, Philadelphia rapidly scaled up its green stormwater management efforts to nearly 1,500 bioswales by 2022. This expansion is part of the city's Green City, Clean Waters initiative—a 25-year plan aimed at reducing stormwater runoff into combined sewers while enhancing the city's overall stormwater treatment capacity.

Beyond physical infrastructure upgrades, the city has also strengthened its institutional capacity by building in-house expertise. Rather than relying solely on external contractors, Philadelphia established well-coordinated municipal teams dedicated to maintaining green infrastructure. This shift toward a more integrated, cost-effective model is helping the city stay on course to meet its pollution reduction goals by 2036.

#### Further Resources

- Watch the full conference panel discussion [here](#)
- Follow Indian Institute for Human Settlements (IIHS) on [Instagram](#), [LinkedIn](#), [Facebook](#), and [X \(Twitter\)](#), and the Hixon Center for Sustainability on [LinkedIn](#), for more conversations like this.
- Learn more about Jagdish Krishnaswamy's work [here](#).
- Check out the [Hixon Practitioner Toolbox](#) for more resources like this

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