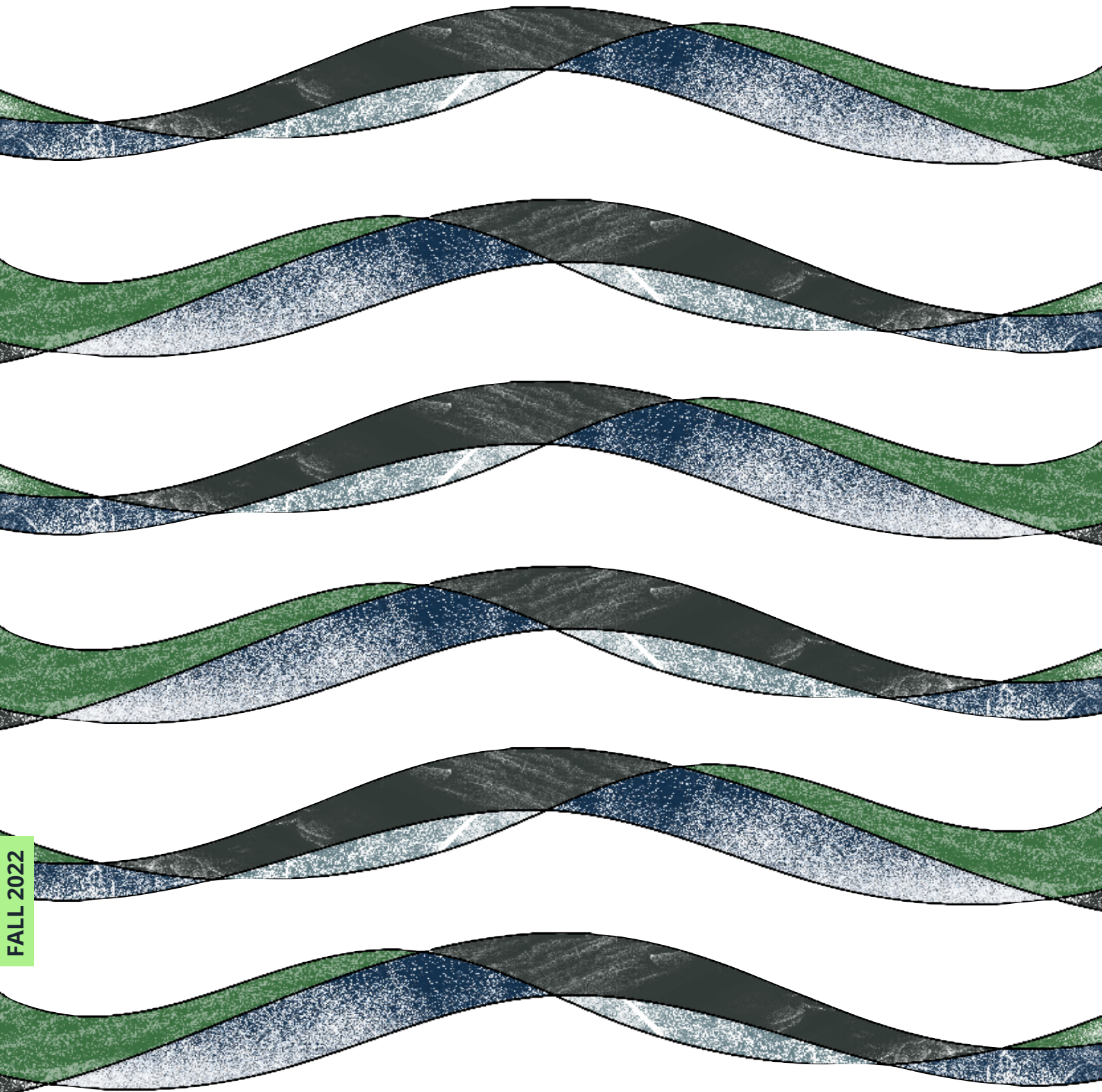


OPEN ENVIRONMENTAL DATA PROJECT

DESIGN BRIEF: ENVIRONMENTAL DATA AS A PUBLIC GOOD



FALL 2022



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Recommended citation:

Williams, E. (2022). Design Brief: Environmental Data as a Public Good. <https://www.openenvironmentaldata.org/research-series/design-brief-environmental-data-as-a-public-good>



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Michelle Cheripka

THE INTRODUCTION

What do future environmental data ecosystems look like to you? What looks differently in those ecosystems and who is involved? What tools can we build and what values propel their design?

A critical aspect of creating real change in the environmental data space is re-imagining how to get there and imagining what it might look like when we do. The prototypes in this Design Brief do just that – offering ideas and schemas to take and adapt in different contexts and with different populations.

During Summer 2022, OEDP helped a Design Trust, a brainstorming session bringing together designers and design-adjacent folks. Together, we explored avenues for expanding opportunities about environmental data as a public good and environmental data's role in local government planning. We examined "How might we?" questions in relation to the insights delineated in our opportunity briefs, explored ideas stemming from those questions, and imagined how those ideas could be applied in practice. From those ideas, the designers participated in a Future Headlines exercise, where they each came up with a headline related to environmental data's potential applications in five to ten years.

The prototypes featured in this brief are from a subset of designers who wanted to expand on an idea sparked in the Design Trust, and cover the gamut of environmental data topics, all with a goal of fostering environmental data as a public good. Our designers come from varied backgrounds, with experience in community-building, creative technology, local government, policy, and the environmental sciences, and the prototypes created reflect those expertise. We encourage you to engage with the prototypes as you see fit: reading and learning about the designs, reaching out to the designers with questions or avenues for expansion, and adapting ideas for use in your contextual sector or place.

INCREMENTAL ENGAGEMENT: ONE WAY TO INVITE RESIDENTS TO HELP SOLVE HYPER-LOCAL ENVIRONMENTAL ISSUES TOGETHER

REED VAN BEVEREN AND DEBORAH TIEN

The New York Times

The World Wide Web of lived experiences: bringing communities together with shared knowledge

B B C

Former NYC Data Fellow is appointed to head new US Data Equity Agency in Washington

 **REUTERS**

Every Citizen An Expert - Local Environmental Database Drives Intl Policy Change

n p r

Communities equipped with enviro data continue to win big against proposed injustices

Los Angeles Times

Los Angeles AiR, a participatory game, has contributed to the new clean air act

Your local newspaper 

it's a bright sunny day, & everyone is free and able to breathe clean air, eat safe food, and enjoy time with their people

PROPUBLICA

Data for the People: Ohio River Watershed Community Members Decide Their Own Data Sharing Futures

Your local newspaper 

Local teen uses art to help farmers understand their long term impacts on the environment

THE HILL

Federal enviro agencies finally modernize data practices and use!

 **ALJAZEERA**

Zanzibar president agreed to sign blue economy policy People promise their support

Vox

Houston City Council Makes 50 Million \$ Budget Amendments Based on Community Feedback

 **NBC NEWS**

undergraduate students key in tackling local environmental policy issues

DESIGN STATEMENT

“Improving local environmental conditions is hard and often requires collaboration between government, organizations, and residents. However, many residents do not have the capacity to engage and seek out information on local environmental issues, from water to air quality. Recognizing these limitations and the responsibility of the knowledge-holders to effectively break down the complexity of interdependent environmental issues and systems, we propose an 'incremental engagement' approach. This approach engages residents with simple questions, keeps communications short and simple, and invites residents to share observations and ideas at a pace that better matches their busy lives. Then, maybe we can engage more than the usual people who show up to city meetings and events. Our prototype above is an example of how this might apply to lead service lines.

Reed Van Beveren (he/him) spent 8 years at the U.S. Government Accountability Office reviewing federal government programs as part of the Natural Resources and Environment team, prior to joining EPIC as a Senior Manager. His work has included reviews of EPA's air quality monitoring program and technology transfer at multiple agencies, and efforts to make better use of data and build capacity at GAO. As a graduate student, he helped NGOs in Tanzania and Indonesia refine strategies for tackling human-wildlife conflict around a national park and improving urban water sources. Reed holds a Masters of Public Administration from Cornell University, where he focused on science, technology, and infrastructure policy, and BA in International Political Economy from Georgetown University.

Deborah Tien (she/her) works at the intersection of regenerative networks, participatory design, and technology for impact. Her current focus is understanding the question of how humanity can reach higher potential by coordinating better as a species. She was and continues to be inspired by her 5 years building ecosystems for inclusive innovation in Africa at Twende, a Tanzanian design hub for local-scale innovation, first as Director of Development, then as its first Executive Director. She holds a Masters of Management Science (Public Policy) from Tsinghua University, China, where she studied as a Schwarzman Scholar, and a BA from Wellesley College, US, where she majored in astrophysics.

Fig 1. This image is a screenshot from the digital whiteboard we used during the Future Headlines exercise in the Design Trust.

Incremental Engagement

Improving local environmental conditions is hard and often requires collaboration between government, organizations, and residents.

However, many residents do not have the capacity to engage and seek out information on local environmental issues, from water to air quality.

Recognizing these limitations and the responsibility of the knowledge-holders to effectively break down the complexity of interdependent environmental issues and systems, we propose an **incremental engagement** approach.

This approach engages residents with simple questions, keeps communications short and simple, and invites residents to share observations and ideas at a pace that better matches their busy lives.

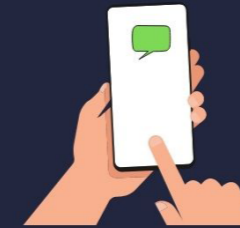
Then, maybe we can engage more than the usual people who show up to city meetings and events.

What follows is an **example** of how this might apply to lead service lines.

Once a week...



I get a text from my neighbor.



They're always so different. I like the surprise.

How did you first meet people in this neighborhood?

What are your favorite pick-up sports to play?

Did you know we have had 10+ car-related accidents every year for the past 5 years? What should we do about this?

They're from different neighbors. Some have been here for decades. Other just moved here. We call it our Neighborhood Network.



At the end of the week, all our answers are shared on the Neighborhood Website.

I learn a lot from reading people's answers, especially hearing from the quieter neighbors.



To be honest, I'm usually a lurker myself. But getting asked a question I know a neighbor cares about is really nice. It feels more intimate, and I'm more likely to answer.

For example, once I got a curious text from one of my neighbors on my city's volunteer sustainability committee:

Jo here: What's your water pipe made of: plastic, copper, lead?
Here's how to find out: <https://bit.ly/3QCIWzs>

I had no idea, but I trusted my neighbor. So I clicked on the link.



I realized I could have a lead pipe!



I replied back...

I might have a lead pipe! I'm worried about my health. How do I find out more?

At the end of the week, I checked the Neighborhood Website...



...I wasn't alone

The next text came from the same neighbor:

Jo here: Lots of interest about lead pipes. Want to sign up to learn more? Text PIPES for a daily message.

PIPES

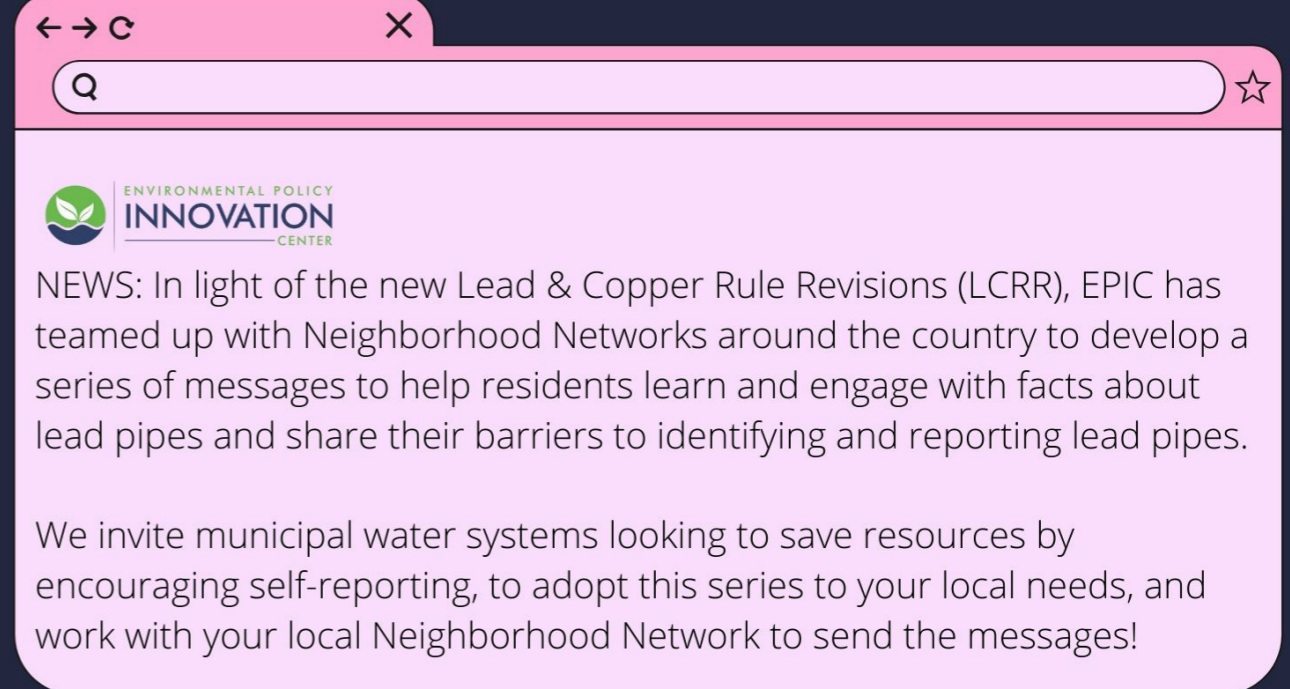
I signed up!

Thanks for signing up to learn more about lead pipes. The Neighborhood Network has partnered with the Environmental Policy Innovation Center (EPIC) and your local utility to bring you more information.

Learn more about EPIC: www.policyinnovation.org



I did some research on EPIC - and as I looked online, I learned about what this 'partnership' looked like.





This actually sounded like a pretty cool and useful collaboration. One of my friends in a nearby city was also concerned about lead, so I shared the link with them. They shared it with their municipal water system.

The next day, in my town, the lead pipe series continued!

Knowing if you have a lead pipe helps the water utility prioritize. Once you determine what your pipe is made of, share the result with us. [See how here.](#)

If you have a lead pipe, you may want to test your water. Not all tests are the same though. [Get more info on testing here.](#)

The government website links helped, but questions remained. I replied back and checked the Website at the end of the day...

This is really complicated.

TESTS TOO EXPENSIVE

I'm really worried about the results!!! Will this affect my property value?

The next day, the next text came:

We really appreciate you sharing your concerns.

We have to figure this out together, so we've created a new resource tailored to your feedback.

Check them out:
www.xyzwatersystem.com/community

I looked at this new website. It was personalized to what would happen in my town, with my water system!

Thanks for sharing your concerns! Let us address the most frequently discussed issues:

- If you find a lead pipe, it may not mean that there is lead in your water. By making your water less corrosive we reduce the chances of that. [Learn more here.](#)
- Still, you may want test your water using a quality test, and we are happy to cover the cost of one test per household. Read more about the best way to test [here.](#)
- If lead is found based on the test, we can work with you to get a filter installed until your pipe is replaced.
- ...

Reading further down, I learned that each homeowner has control over and responsibility for the water pipes on our property but also that there is some financial assistance for those that need it! I was so curious what my other neighbors would say...

You all know I hate government intervention, but I hate lead pipes more.

Well, I'm glad they told us that there's a literal law where Water Systems NEED our data. They should compensate us for this labor! Not just pay for the water tests.

Seeing the whole process in one place helps. Let's get started!

The next day's text...

Looks like a lot of people are interested in checking their pipes and testing water. If you want a test, fill out www.abcform.com/yourname, and we'll send you a free test!

Wow, I have rarely been so excited to fill out a form before. But this one felt like I had asked for it. AND it was pre-populated with my information, amazing!

Please verify your information:

NAME: Yourname Lastname
ADDRESS: 1234 Leadfree Dr.
Watertown, MA 98765
PHONE NUMBER: 123-456-7890

Do you agree to share test results with the municipal water system?
Do you agree to follow through, should you find lead in your pipes?

I agree and verify my information!

GO



Every state, municipality, or utility has their own processes for creating lead pipe inventories, testing residential water, and replacing lead pipes, so each part of the story would need to be customized in partnership with government agencies and water utilities.

Let us know if you're interested in learning more about EPIC at reed@policyinnovation.org, or partnering with a Neighborhood Network (about any topic) at hello@commonagency.org

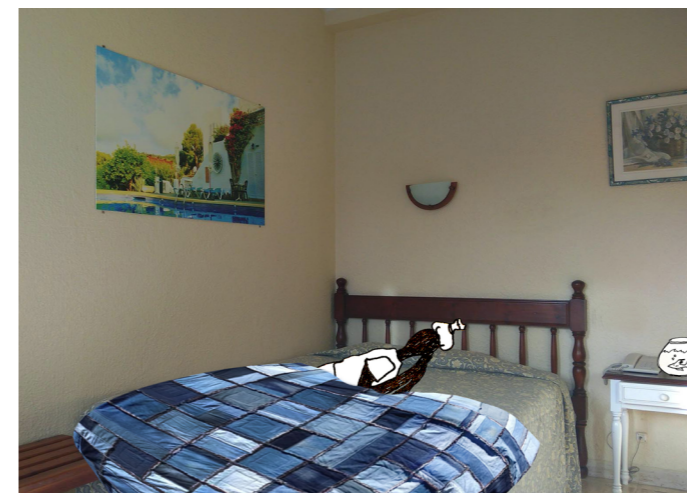
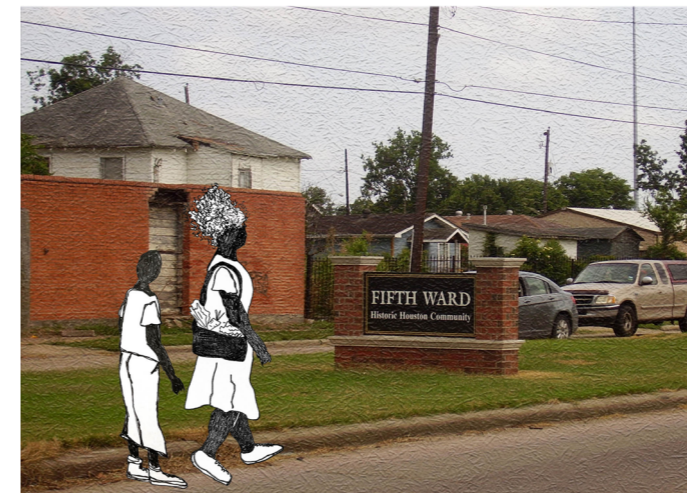
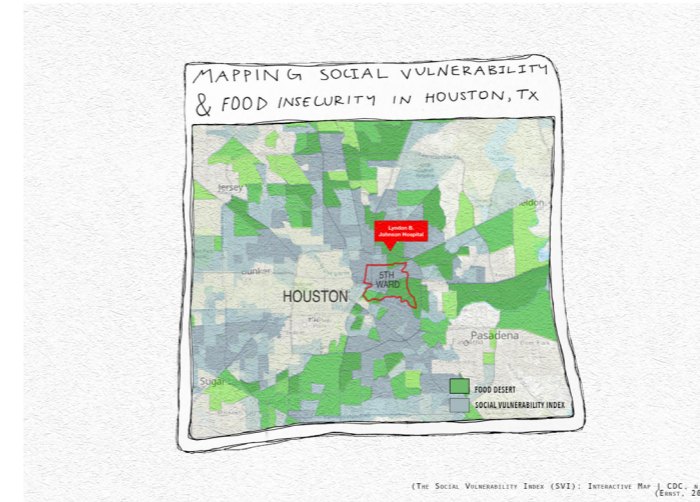
HOUSTON URBAN AGRICULTURE PROJECT

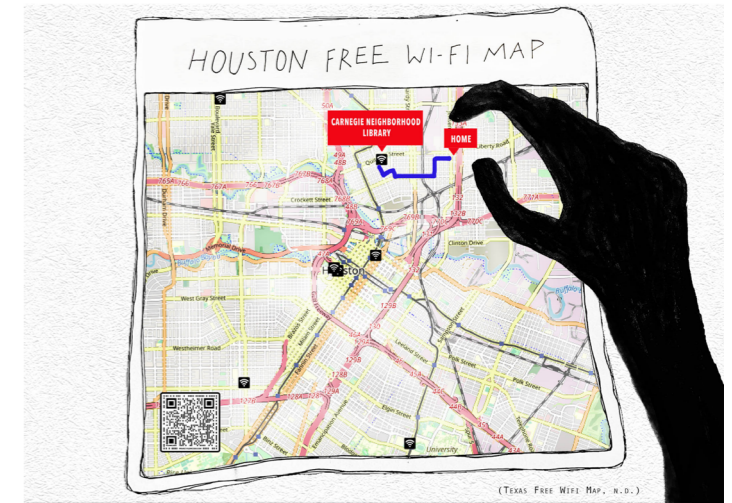
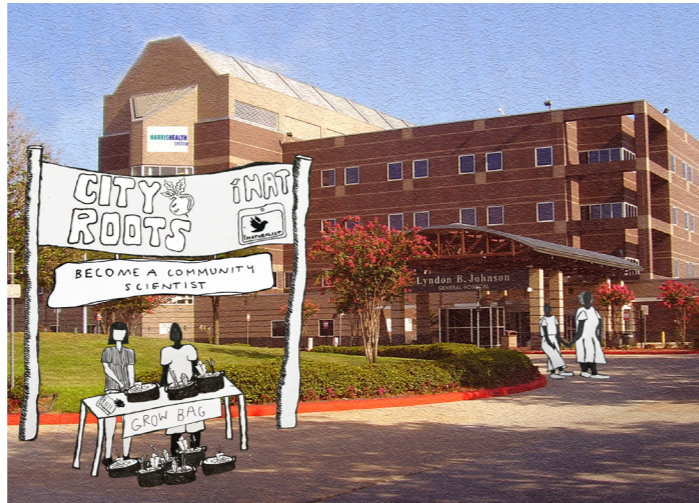
ANNE-CHARLOTTE GILLARD

DESIGN STATEMENT

“Inspired by “Creating the Urban Farmer's Almanac with Citizen Science Data,” a 2019 publication from Insects, “Houston Urban Agriculture Project” demonstrates the capacity of citizen science applications like iNaturalist and the USA National Phenology Network’s Nature’s Notebook to promote urban agriculture. This visual narrative--composed of ink sketches and digital images--aims to imagine a future in which community science digital tools can connect with local, on the ground initiatives to combat factors that jeopardize community and environmental health in Houston, TX. While this narrative is currently unrealized, all the tools necessary towards achieving these goals exist. Hopefully, this story can provide Houston and similarly at-risk/food insecure communities across the US with a model for how to combat insecurity with strategies that encourage community resilience and promote food autonomy.

Anne-Charlotte Gillard (she/her) is a second year student at Harvard College from Houston, Texas previously involved with the OEDP as a “Research and Policy Fellow.” She is interested in cultural ecology and plans on studying the intersection of history of science, anthropology and studio art in school. Anne-Charlotte has a strong commitment to creative thinking and collaboration as it relates to promoting climate resilience and envisioning climate solutions that support a sustainable and equitable approach to global decarbonization. Outside of academics, she enjoys making pottery and tiny art for friends, hoarding paper scraps, and taking long night walks.

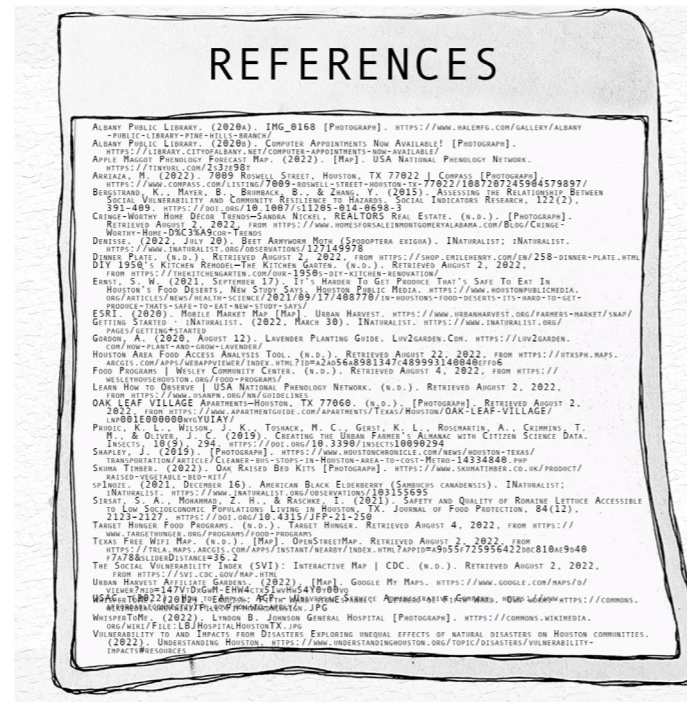
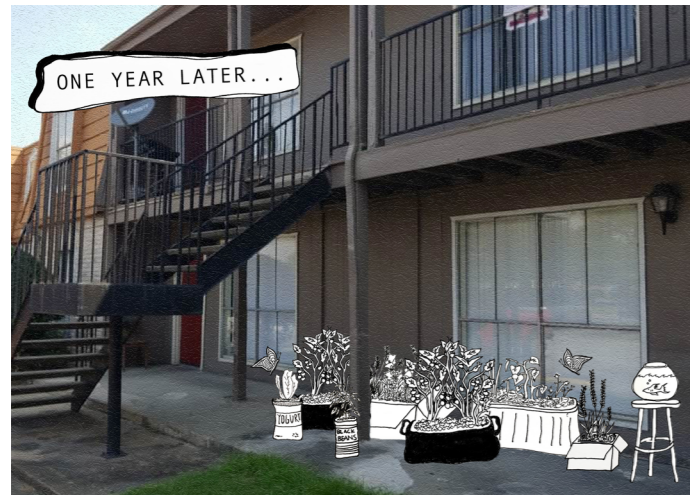






DATA AS A KEY FOR SUCCESS: THE BLUE ECONOMY IN ZANZIBAR

MUSSA KHAMIS



DESIGN STATEMENT

“Zanzibar is a semi-autonomous archipelago off the coast of Tanzania consisting of two major islands, Unguja and Pemba, and many smaller islands with a population of about 2 million people. In Zanzibar, ocean-based activities contribute over 29% to GDP and employ 33% of its labor force, while tourism accounts for another 30% of its GDP. Additionally, 98% of Zanzibar’s foreign trade is maritime-based.

The Blue Economy Policy (2020 – 2022) is a nationwide guiding framework for the implementation of a sea-based economy in Zanzibar. It includes policies related to the better stewardship of ocean resources, effective utilization of maritime and marine resources, sustainable use of the economic potential of the sea without depleting the ecosystem, protection of the marine environment through the sustainable use of biodiversity, carbon sequestration, and coastal resilience. During the initial stage of policy development of the Blue Economy Policy, “Blue Economy” the involvement of stakeholders was highly encouraged, and policymakers incorporated the concerns and priorities of all development sectors in the final policy.

Continued on next page

Mussa Khamis (he/him) is a civil society actor currently working with Good Neighbors International in Zanzibar island implementing development projects mostly in the education sector. With a BA in Education and Community Development, he is very passionate about humanitarian and development programs targeting rural communities. He is a highly motivated and committed professional with experience in program implementation and management, with local and international organizations.

He previously worked as a teacher at Alharamain International school in Tanzania, teaching geography for secondary students and advanced level. In 2018, with BGP International, he worked as a public relation officer, establishing a complete, efficient and harmonious media and community relation system resulting in project success through community involvement. Passionate and experienced in volunteering programs, like with UNICEF Tanzania in 2020, he is able to work under pressure and meet deadlines, and has the ability to adapt to multicultural and multidisciplinary environments.

The Blue Economy Policy aims to work with the following priority sectors:

- Fisheries and aquaculture
- Maritime trade and infrastructure
- Energy
- Tourism
- Marine and Maritime governance

Policymakers consulted non government organizations, public authorities, academics, research bodies, and individuals, in order to design the Blue Economy Policy with full consideration of local circumstances and concerns.

Data as a key for the success of the blue economy in Zanzibar

The Blue Economy Policy provides new hope for those working in sea-based sectors. Data collection and coordination with the public is key to the success of the policy. Policymakers should make every attempt to sit with people, hear what they are saying, and solicit their feedback as early and often as possible. Collecting relevant environmental and social data from diverse communities and sectors increases government transparency and accountability and creates a relationship between the policymakers and the public, increasing public trust in the government. Data collected can act as a basis for the evaluation and strengthening of the policy and support planning for other development activities. Additionally, data is crucial for disaster preparedness, an increasingly relevant aspect of the sea-based economy.

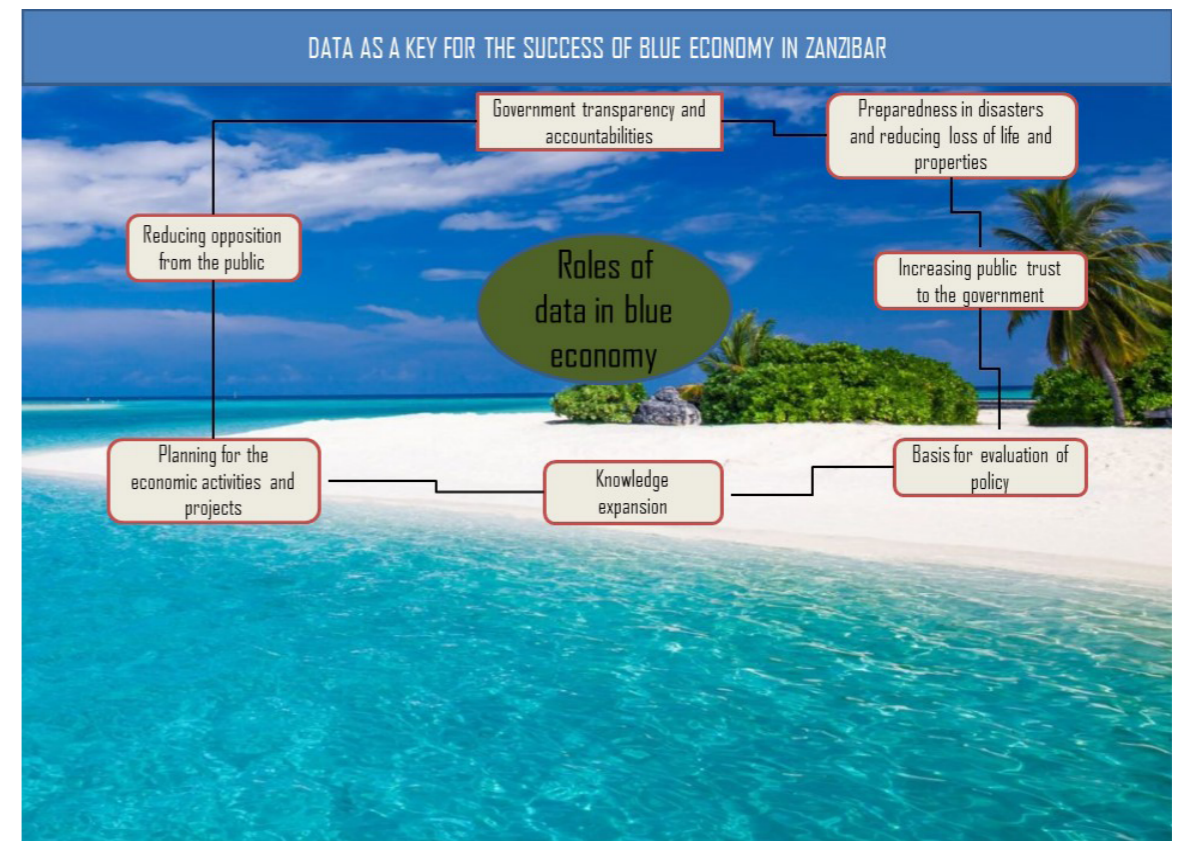
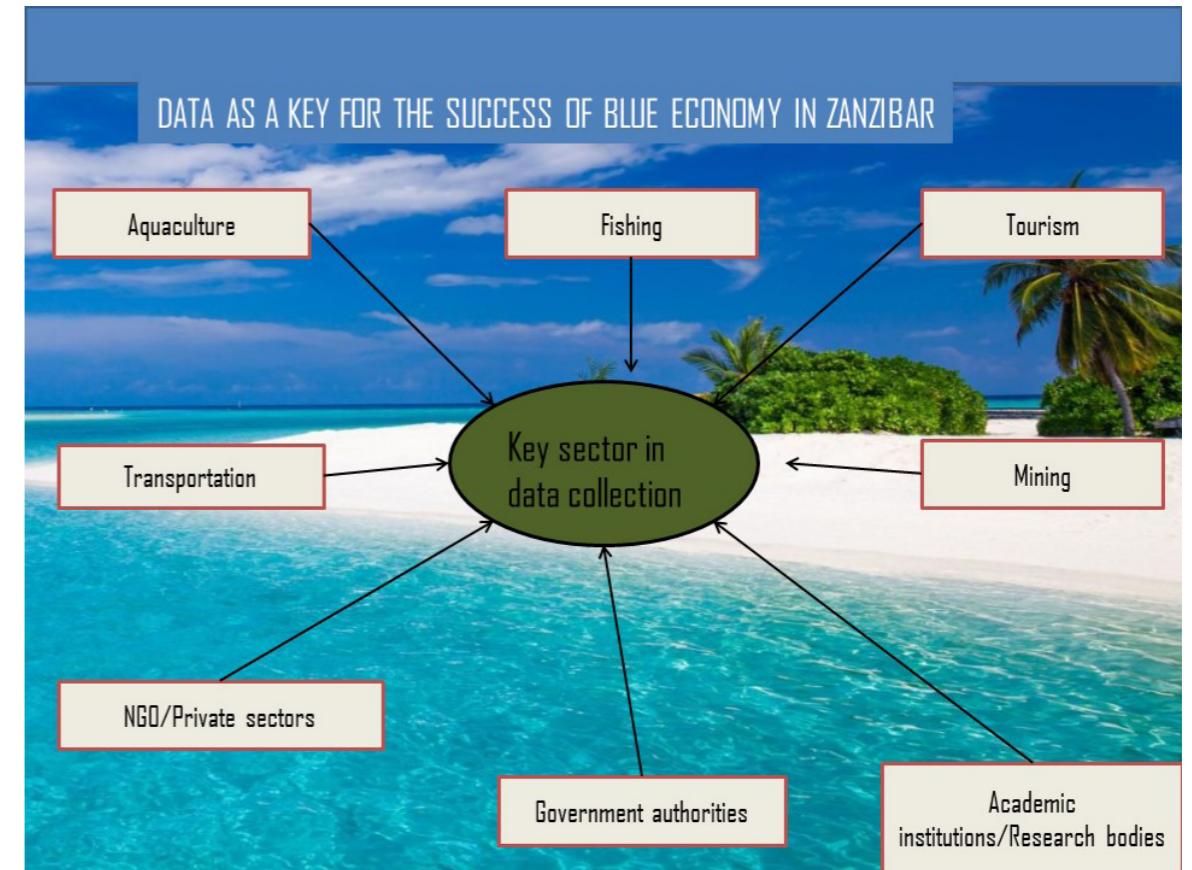
Recommendations for data access for all

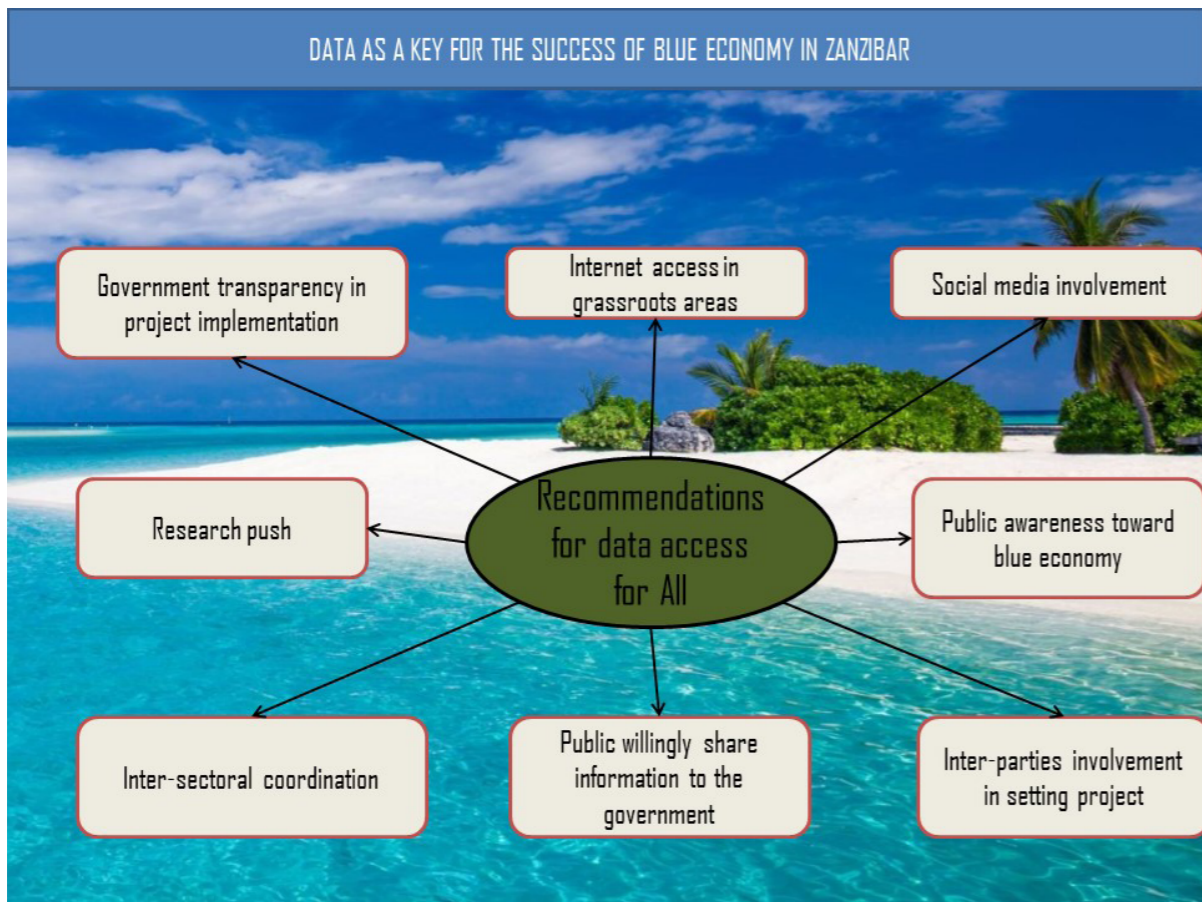
It is important for the public, especially those who are involved in the sea-based economy, to have access to the data collected in the creation of the Blue Economy Policy.

To achieve data access for all, my prototype suggests the following recommendations for implementation:

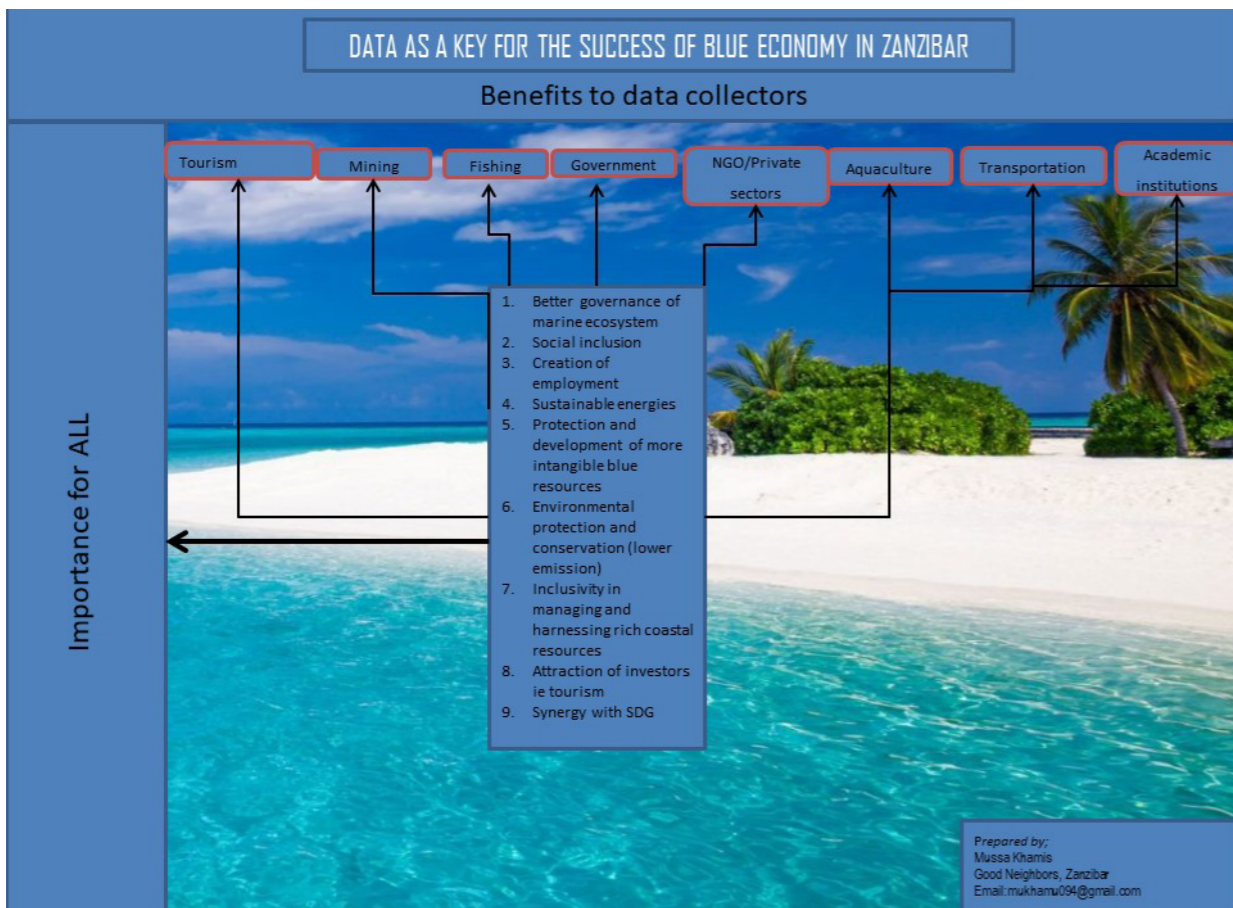
- Create an awareness program that informs the stakeholders and general public of key information about the project activities throughout policy implementation
- Increase access to high quality internet services to ensure community participation in data access and sharing
- Organize governmental stakeholders participation at all stages of the project and data lifecycle
- Encourage the use of social media in outreach and data collection methods
- Focus on government transparency as an accountability mechanism

Designing this prototype and the topic of my selection came from my hope for the Blue Economy Policy, but more importantly from what I know about the importance of community involvement in accessing and sharing the data. It is only through good cooperation between policymakers and the general public that the process of collecting and sharing data can be easy, which simplifies the process of developing and implementing development intervention across all sectors.





Benefits to data collectors



SOMETHING IN THE AIR

BIAYNA BOGOSIAN

DESIGN STATEMENT

“The World Health Organization reported that in 2022, 99% of the world's population lived in places where pollution exceeded the standard, resulting in approximately one in nine global deaths, categorizing air pollution as the world's most significant environmental health risk. Since the establishment of the first Clean Air Act in 1963, many cities have adopted policies to control the emission of pollutants into the atmosphere as well as to promote sustainable urban development. However, experts and literature suggest that long-term success would not only require top-down and data-driven systematic approaches but would also require investing in the general population's environmental literacy.

Continued on next page

Biayna Bogosian's (she/her) academic and professional background extends in architecture, urban design, environmental design, computational design, data science, spatial computing, and immersive media design. Biayna's interdisciplinary research focuses on innovation in design within a broader environmental context to explore data-driven and citizen-centric approaches to analyze and improve the built environment and health of our cities.

Biayna is currently a doctoral candidate in the Interdisciplinary Media Arts and Practice (iMAP) program at the University of Southern California (USC). She holds a Master of Science in Advanced Architectural Design from Columbia University GSAPP (2010) and a Bachelor of Architecture and Urban Design from Woodbury University SoA (2008). Biayna's Ph.D. research focuses on the development of interactive and immersive information visualization media for environmental citizen-science initiatives. Her dissertation, entitled "Exploratory Environmental Interfaces," focuses on the socio-spatial and political dynamics of environmental pollutant monitoring and representation using readily available sensors and immersive representation methods. She is currently an Assistant Professor of Architectural Technology at Florida International University (FIU) in Miami, where her research is supported through interdisciplinary teaching and several National Science Foundation (NSF) grants.

Something in the AiR, is an investigation into the sociotechnical, spatial and political dynamics of air pollution data monitoring in urban spaces. This research leverages two existing and open source technologies to imagine an alternative mode for engaging with open environmental data. These technologies are: 1) Niantic Lightship Augmented Reality (AR) Developer Kit, which has been utilized to build participatory mobile AR games, such as Pokémon GO, and was recently opened to the public; and 2) PurpleAir, which consists of low-cost and high-caliber indoor/outdoor air quality sensing kits connected to open access API and a browser-based map for empowering citizen scientists. Combining these scalable yet niche platforms, Something in the AiR aims to explore the affordances and limitations of exploratory and participatory methods for closing air pollution data and knowledge gaps. Something in the AiR is in the research and development phase for future deployment in various cities, starting with Los Angeles, a city with severe air pollution issues, and Miami, a city with severe water issues. The Design Trust prototype of the Something in the AiR demonstrates an encounter in Miami where most citizens' preoccupation with water-related issues overshadows any other environmental concerns. The demonstration occurs on the Florida International University's campus, where students are encouraged to locate and interact with Purple Air sensors embedded in urban furniture.



CONCLUSION

Policy-making and -thinking inherently requires a degree of future thinking, which can be fraught with uncertainty – especially when it comes to environmental questions. Our goal for the Design Trust as a convening space (and this Design Brief as its output) is to open up a generative space for policy insights related to the current and future application of environmental data. With this in mind, we encourage you to engage with both the prototypes and the model itself. This model could be adapted to address other insights stemming from policy briefs related to any topic - public health, education, media, etc. Collectively re-imagining the potential for any given policy recommendation can inspire adaptations, expand the scope, or offer fresh perspectives on a specific piece. Utilizing the design principles to explore policy insights allows for a value-driven and collaborative iteration, one that moves policymaking from a projection- and politically-based model to one based on responsive engagement.

DESIGN TRUST PARTICIPANTS

The following collaborators joined us for a Design Trust on June 16, 2022 to discuss to brainstorm the applications of OEDP's environmental data insights using design principles and methods. We thank them for their participation and insight.

Jag Ashcraft	
Biayna Bogosian	Assistant Professor, Florida International University
Marc Burnett	Product Designer, Gusto
Mussa Khamis	Project Officer, Good Neighbors International - Tanzania
Liz Kramer	Principal, Public Design Bureau
Vivian Li	University of Southern California
Jessica Mahr	Director of Technology, Environmental Policy Innovation Center
Jarah Moesch	Lecturer, Rensselaer Polytechnic Institute
Deborah Tien	Co-Founder, Common Agency

OEDP TEAM

We want to acknowledge the work of the OEDP team broadly. It's difficult to capture the labor of each insight, discussion, and encouragement that went into the Design Trust and compiling this Brief. For the capacities we can name, OEDP team members supported the development of the Design Trust and Brief through organization and conceptualization,¹ event design and facilitation,² writing and revision,³ and visual design.⁴

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Michelle Cheripka^{1,2,3,4}
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FALL
2022

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