

# Understanding Water and Sanitation challenges among Mexico City's Homeless Population through Co-created Citizen Science



Rachel Pateman, Stockholm Environment Institute, University of York, UK  
Carla Liera, Nhilce Esquivel, Stockholm Environment Institute, HQ  
Claudia Coleoni, Stockholm Environment Institute, Latin America



# Background

**Public Water, Sanitation, and Hygiene (WASH)** services play a crucial role in urban areas. However, many of these facilities are frequently unsafe, inadequately maintained, or difficult to access.

This lack of clean and secure WASH services disproportionately affects marginalized populations, particularly the homeless, who heavily rely on these facilities.

Homeless populations are frequently excluded from decision-making processes, and their perspectives and needs are often disregarded.

Citizen science can be a potentially effective approach to involve marginalized communities, including homeless populations, in scientific and decision-making processes. This method can help amplify their voices and create more inclusive services.



# Our project

In partnership with the Mexican non-governmental organization **El Caracol**, we collaborated with a group of eight people experiencing **homelessness** on a **co-created citizen science** project to assess their **water** and **sanitation conditions**.

In this poster we will share the methods we used to engage with this community.



# Process overview



**Knowledge  
Exchange**

**Co-design**

**Data Collection**

**Data analysis**

**Communication**

## Knowledge Exchange

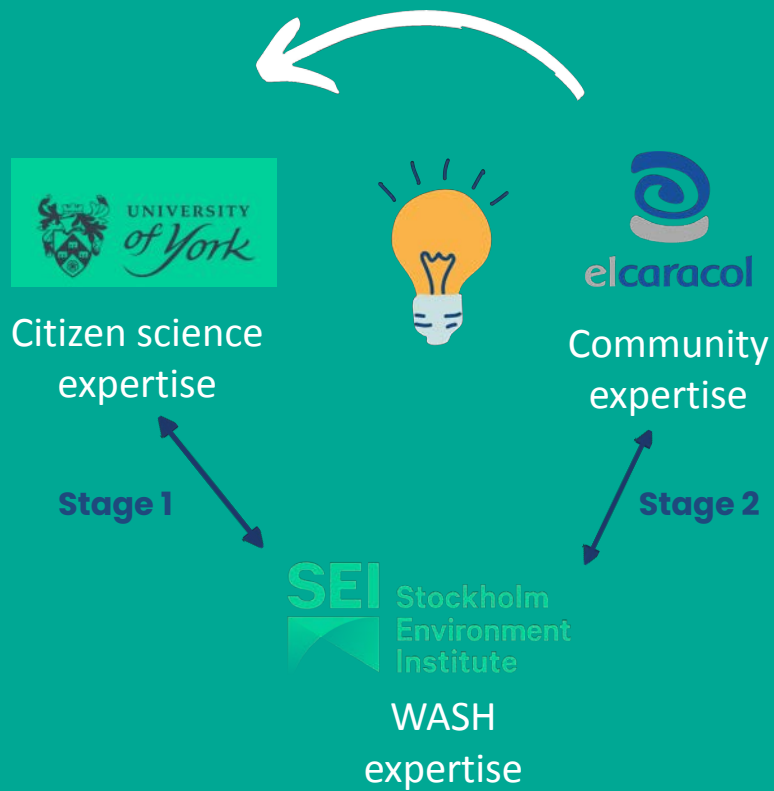
Knowledge exchange activities took place between the project partners who were:

- SEI HQ staff based in Stockholm, Sweden - experts in WASH
- SEI York staff based at the University of York, UK - experts in citizen science
- Staff and volunteers of El Caracol, an organisation which cares and advocates for people experiencing homelessness in Mexico City.

Each session ran over a week and took place online.

**Session 1:** knowledge exchange both ways between SEI's WASH and citizen science experts.

**Session 2:** SEI HQ researchers trained El Caracol staff and volunteers in WASH and citizen science. El Caracol shared WASH-related challenges faced by the community. An initial plan for community engagement was co-developed.



## Knowledge Exchange and Co-design

SEI HQ researchers travelled to Mexico and spent one week based at El Caracol.

**Monday:** Rapid co-design of community engagements between El Caracol and SEI.

Using the plan that had been developed during the online knowledge exchange sessions, activities were refined to suit the community based on El Caracol's recommendations. This included shortening sessions due to the community members' capacities and to accommodate El Caracol staff and volunteers' other priorities. It also included simplifying and gamifying planned activities as illiteracy and substance abuse are common in the community.

El Caracol had already recruited 8 community members who then participated throughout the rest of the week and the rest of the project.

**Tuesday: WASH day** – to encourage community members to think about their Human Rights to Water and Sanitation

**Activity 1:** Dice game – each number had a question to answer about WASH services in the city.



**Activity 2:** Design game – each person was asked to use images provided to design their ideal toilet and a toilet they wouldn't want to use.

**Activity 3:** WASH use game – each person was asked to use images to describe their use of water throughout the day, including how much they used and how far they had to walk for it in the morning, afternoon and evening.



# Knowledge Exchange and Co-design

**Wednesday: citizen science day** – to encourage community members to think about different methods for collecting data to generate evidence.

## Activity 1: What is a scientist?

Community members were asked to describe the attributes of a scientist and the types of things they do.



**Activity 2:** The group went to the park. They worked in teams and had 10 items to collect data on in different ways e.g. photos, drawings, surveys. Afterwards they discussed how this data had helped them to generate evidence of something.



**Thursday: survey co-development** – to generate a survey the community could use to assess WASH services.

We began by asking “What would you like to ask your community about water problems?” We then looked at the Human Rights to water and sanitation.



For example, for toilets, they should be safe, affordable, accessible and ensure dignity.

The group then discussed what each of these rights means to them and what information would be needed to find out if a toilet meets this or not. After this, SEI and El Caracol drafted a survey

**Friday:** community members **tried** the survey after which it was updated. The team co-created safety protocols for the data collection.



## Data collection

Data collection took place on a Monday and Wednesday over a period of 6 weeks. Community members gathered at El Caracol's offices and were accompanied by El Caracol staff while they were doing data collection.

They asked other people experiencing homelessness which facilities they use for water and sanitation and to describe their experiences and coping strategies.



They then visited these facilities to complete a survey. A GPS location of the facility was shared via WhatsApp.



They wore bags and hats with logos they had designed with El Caracol.



"Water is life, is community, is ours"



Citizen science logo



## Data analysis and dissemination

The team **mapped** and **assessed 14 public toilets** across three boroughs (Cuauhtémoc, Venustiano Carranza, Gustavo A. Madero).

SEI researchers compiled the data collected by community members. El Caracol ran a session with community members to use this data to produce a rating (1-5 stars) for each toilet.

SEI researchers digitised this information using Epicollect to produce open access online maps.



## QR for Maps



## Dissemination



**“Un baño tiene que estar disponible para todas las personas en cualquier momento que lo necesiten”**  
Participante | Ciencia ciudadana

**¿Conoces las características de un baño digno?**

- Disponible, cerca y de fácil acceso.
- Limpio y seguro.
- Puerta con seguro.
- Agua, papel de baño y jabón.
- Agua para lavarse las manos.
- Espacio iluminado y un cesto de basura.
- Costo razonable (si es público).

**Tener acceso a un baño digno es tú derecho.**

**SEI** Stockholm Environment Institute

**elcaracol**

**Rafael Heliodoro Valle 333**  
Col. Lorenzo Boturini,  
Venustiano Carranza, C.P. 15820,  
Ciudad de México  
**55 7914 3609**  
**@elcaracolac**  
f @ X d

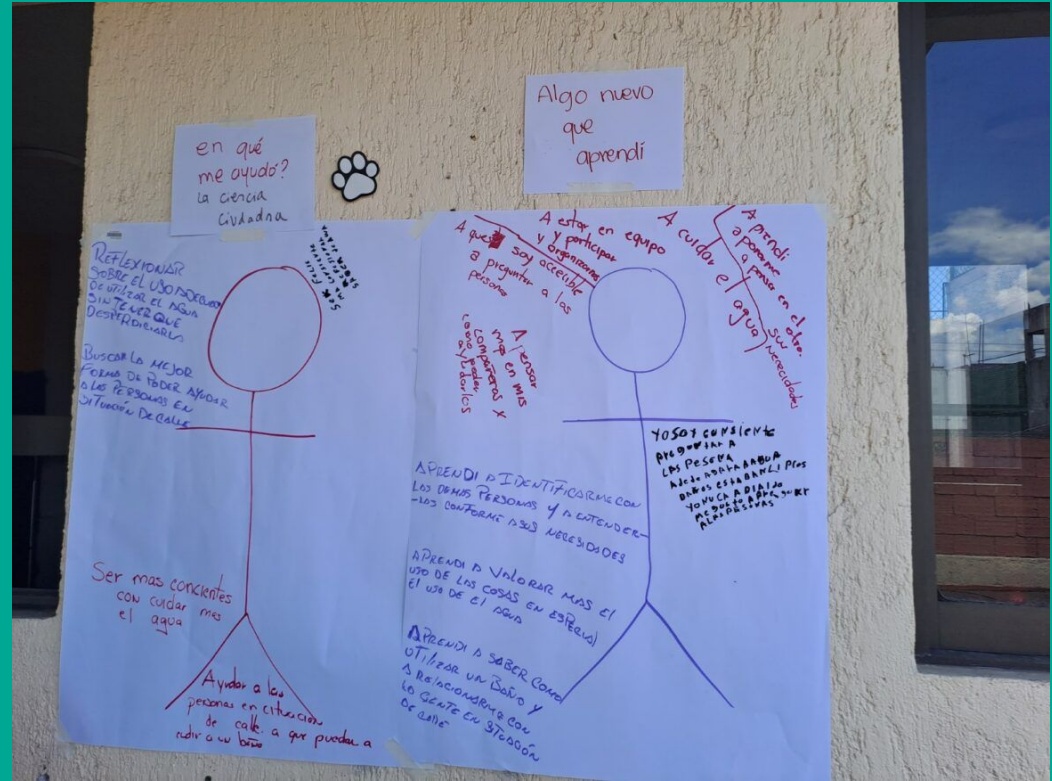
The team co-designed a postcard to share with people experiencing homelessness in Mexico City. The intention was to highlight people's rights to water and sanitation and to direct them to sources of support.

# Evaluation

We held evaluation activities with El Caracol and community participants at several points throughout the process. We also had reflection sessions for the research team.

We held a final reflections workshop for community members at the end of the project. They were asked if the project helped them and how and what, if anything, they learnt.

Overall, it was felt that the co-creation process provided a platform for people to learn about their water and sanitation rights, fostering a unique knowledge-generation space for a population often excluded from such spaces.



## Evaluation

**Our key recommendations for working with very vulnerable communities are:**

- **Pick** your local partner **wisely**. In particular make sure they have **in depth** knowledge of and are **trusted** by the target population.
- **Take time to build trust** between the research organization and community partner and participants.
- **Adapt** to local conditions, requirements and knowledge, drawing on knowledge of the community partner
- **Be prepared to be flexible** - be open to change your data collection methods and complex vocabulary during the process.



# Thanks to



## Citizen scientists

Gabriela Santiago Jiménez

Juan Javier Vizcaya Xilotl

Julio Martín Tovar Sánchez

María del Rocío Chávez Murillo

Joel Cruz Vega

Jaime Pastrana Hernández

## Community partner



<https://elcaracol.org.mx/>