

# VLIR PROJECT!!!

Sustainable water management  
under climate change in  
Southern Ecuador



SWACH





# SWACH

**Manejo sostenible del agua bajo  
escenarios de cambio climático en Cuenca**





# Profesores e investigadores



Patrick Willems



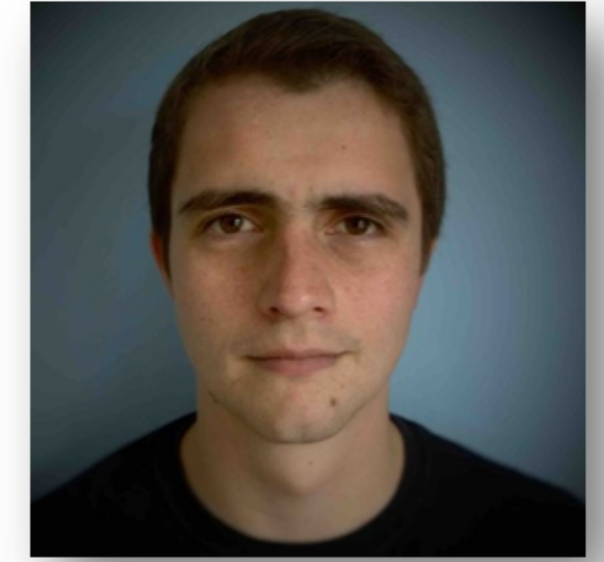
Patricio Crespo



Rolando Céleri



Javier Fernández de Córdova



Eduardo Villagómez



Jorge García



Ana Ochoa Sánchez



Pablo Guzmán



María Cecilia Alvarado



Johanna Ochoa



# Investigadores y estudiantes

## Doctorantes, maestrantes y pregrado



Santiago Mendoza

Sotirios Moustakas



Jairo Cabrera



Santiago Núñez



- Hossein Tabari
- Danitza Salazar
- Joke De Meester
- Laurens Breugelmans
- Daan Bertels

**KU LEUVEN**

**Doctorado**  
**RECURSOS  
NATURALES  
RENOVABLES**

Maestría en  
**Recursos Naturales  
Renovables**

**Maestría**  
**HIDROLOGÍA  
MENCIÓN  
ECOHIDROLOGÍA**

**MAccCARD**   
Master in Climate Change, Agriculture and Sustainable Rural Development



Co-funded by the  
Erasmus+ Programme  
of the European Union





# Members social part

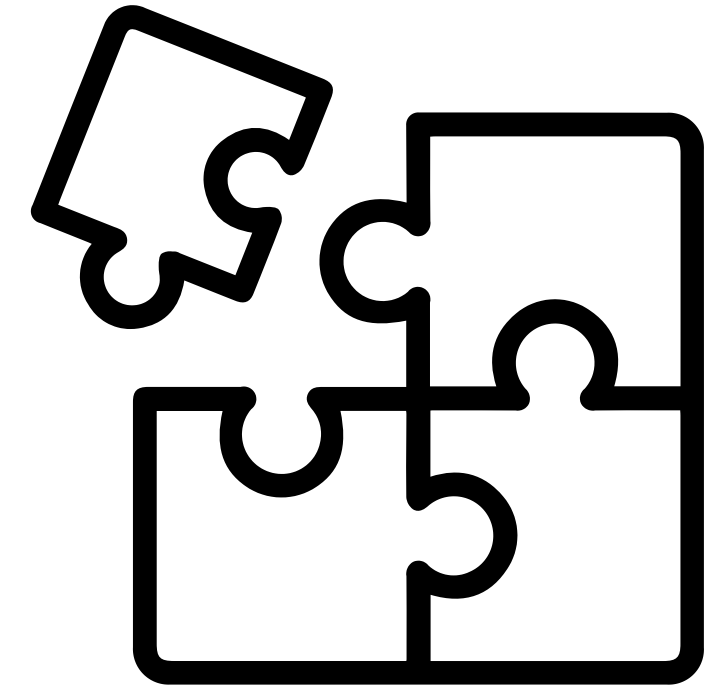


- **Ma. Cecilia Alvarado**
- **Ma. Fernanda Samaniego**
- **Jairo Cabrera**
- **Santiago Núñez**
- **Johanna Ochoa**



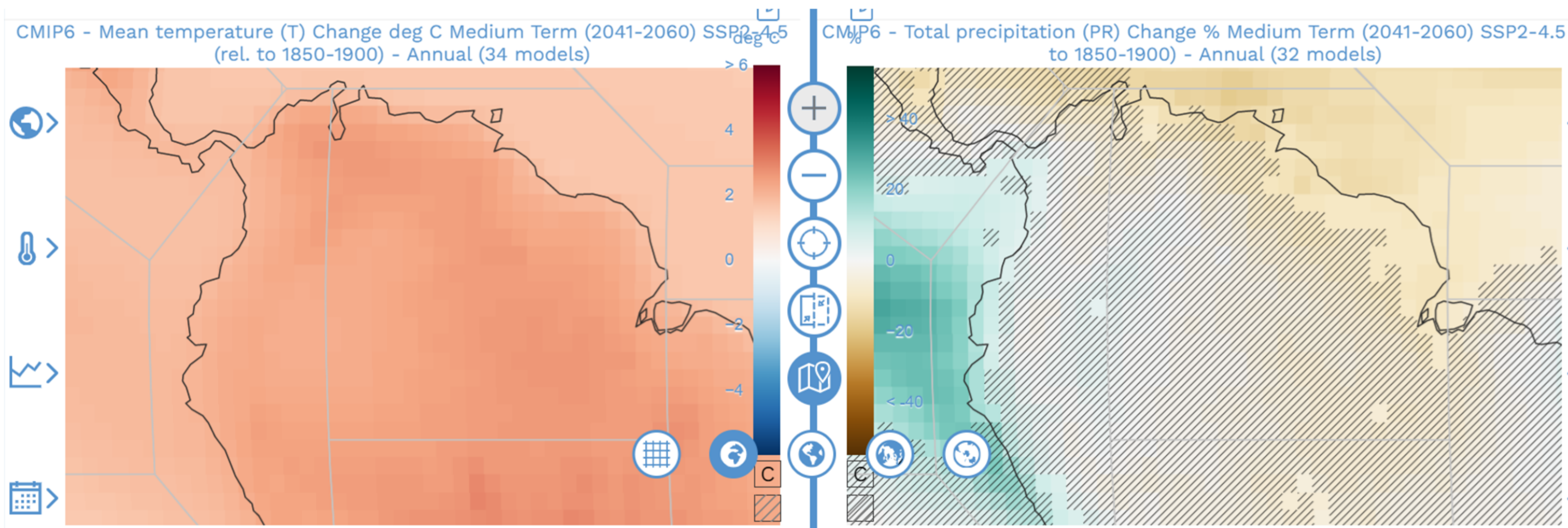


- 1. GENERALITIES**
- 2. INTRODUCTION (SECOND PHASE)**
- 3. OBJECTIVES**
- 4. ACCOMPLISHED ACTIVITIES**
- 5. RESULTS YEAR 1**
- 6. PENDING ACTIVITIES FIRST YEAR**
- 7. WHAT'S NEXT**
- 8. PUBLICATIONS**





# Manejo sostenible del agua bajo escenarios de **cambio climático** en Cuenca



**Calentamiento!!**

**Alta incertidumbre!!**



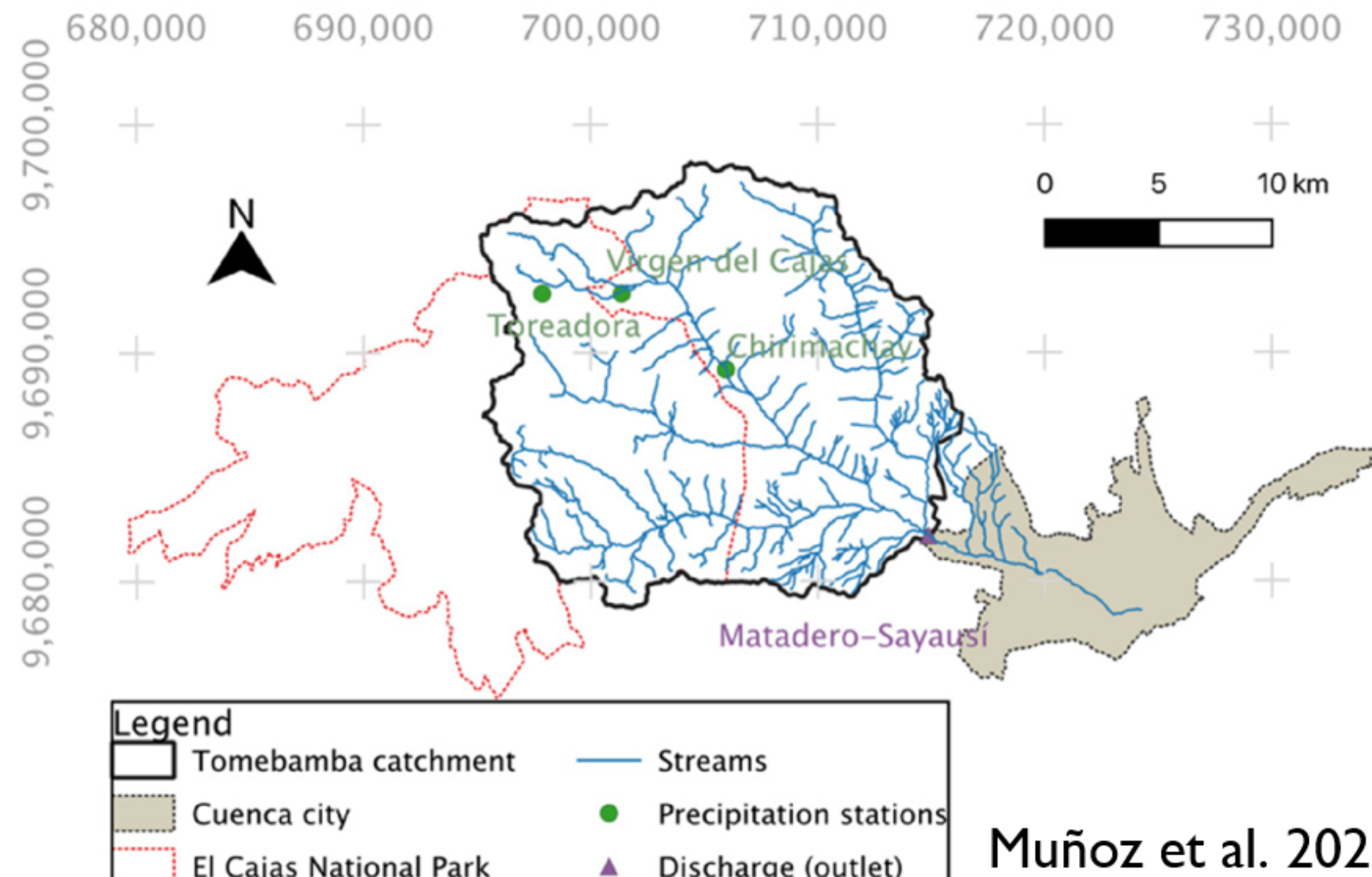


# Manejo sostenible del agua bajo escenarios de cambio climático en Cuenca

## Objetivo

**Asegurar la disponibilidad de agua para Cuenca considerando cambio climático e incremento en la demanda**

## Sitio de estudio



Muñoz et al. 2021

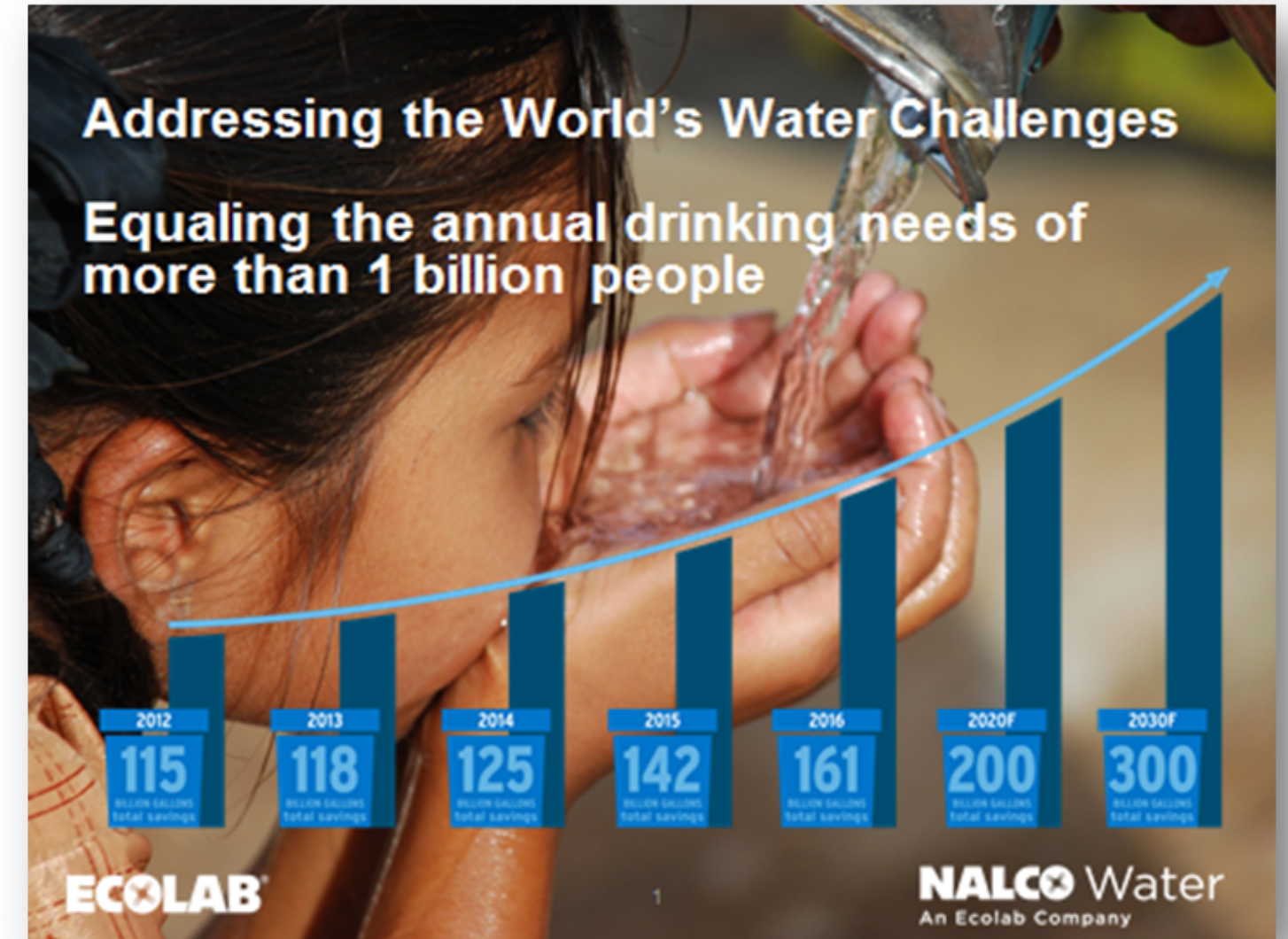
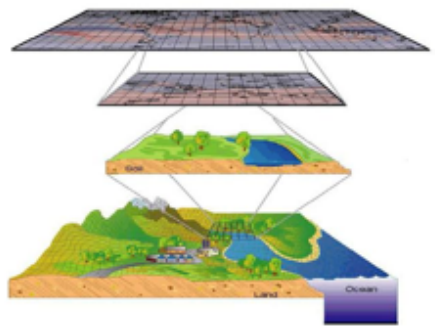


# Manejo sostenible del agua bajo escenarios de cambio climático en Cuenca

## Primera fase

### Disponibilidad de agua

- **Proyecciones de clima**
- **Proyecciones hidrológicas**
- **Demanda de agua**

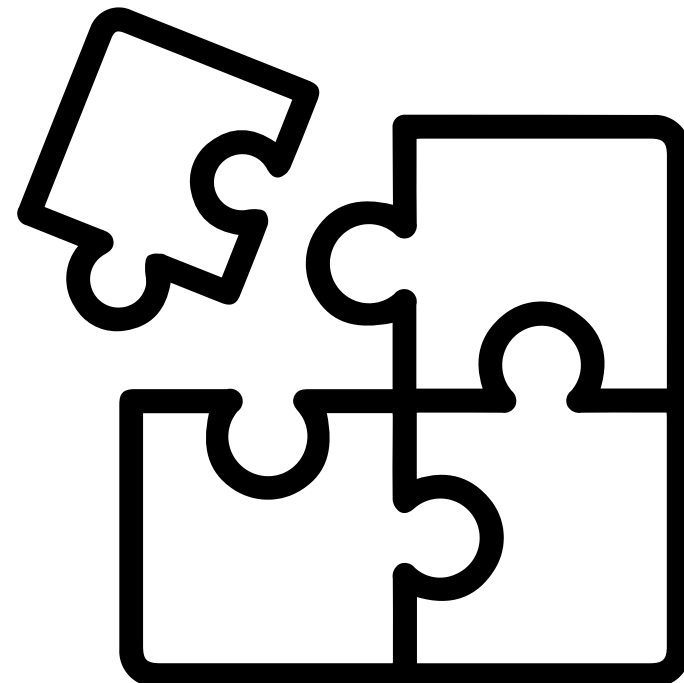




# INTRODUCTION (SECOND PHASE)



- **We want to contrast consumption, experiences, and habits**
- **Identify possible strategies to reduce drinking water consumption.**
- **Look at gender-differentiated habits during the qualitative research and determine the primary managers at home by sex.**
- **Propose alternatives for a better water management collectively with team members, ETAPA EP technicians, academics, citizens and other stakeholders**





# OBJECTIVES



i) learn their **habits** and reasons behind water use,

ii) **educate** the target community on issues related to water and economic benefits of water savings

iii) **identify appropriate solutions** that are welcomed and fully implemented by the local population.

Test solutions for reducing drinking water consumption as a pilot project in a sector of the city of Cuenca

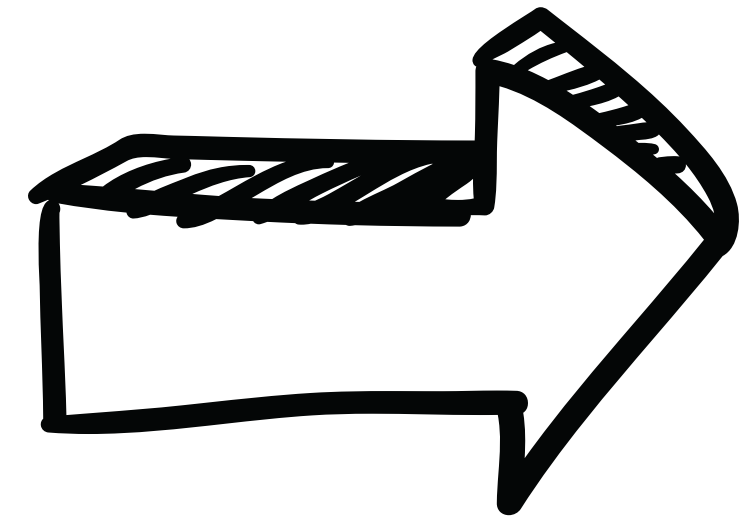




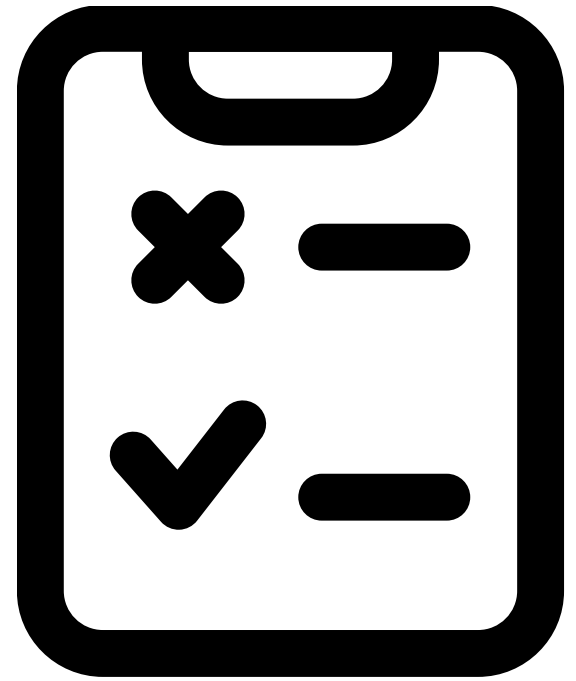
# ACCOMPLISHED ACTIVITIES



## Surveys

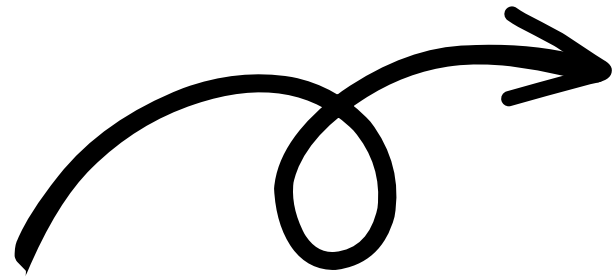


[HTTPS://SWACH.UAZUAY.EDU.EC/](https://swach.uazuay.edu.ec/)



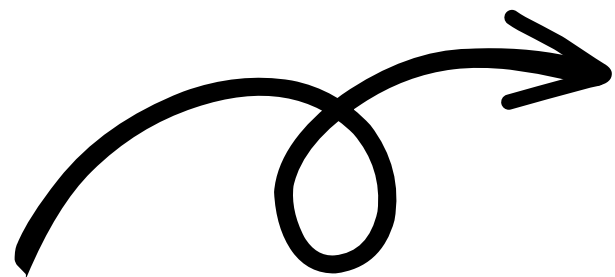
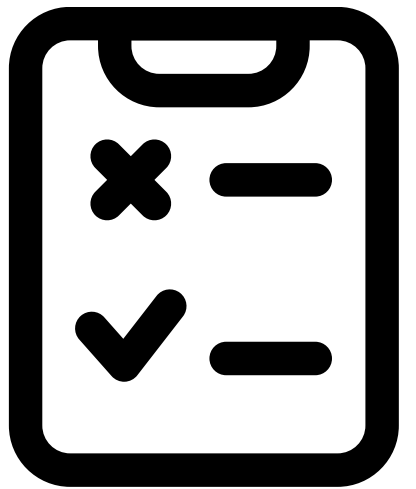
The screenshot shows a web browser displaying the SWACH survey website. The browser's address bar shows the URL [swach.uazuay.edu.ec](https://swach.uazuay.edu.ec/). The website header includes the Universidad del Azuay logo and navigation links for 'Docente', 'Estudiante', 'Portal', and 'Correo'. A search bar with the text 'Buscar' and a 'Home' link is visible. Below the header, a progress indicator shows seven steps: 1. Ubicación, 2. Información Básica Hogar, 3. Percepción sobre el consumo mensual de agua, 4. Percepción sobre la cantidad y calidad de agua de Cuenca frente al CC, 5. Actividades familiares que inciden en el consumo de agua en el hogar, 6. Actividades/prácticas/imj que inciden en el ahorro de agua en el hogar, and 7. Completo. The first step, 'Ubicación', is currently active. Below the progress indicator, there is a section titled 'Dirección' with a text input field labeled 'Enter a location' and a grey button below it.





## **Location:**

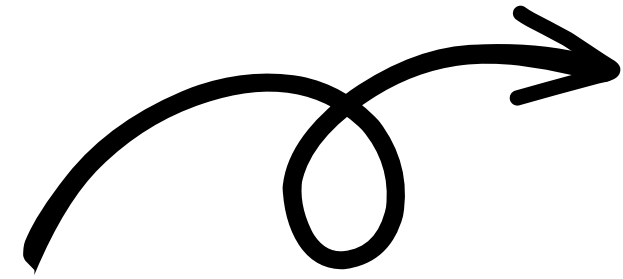
**Address, water meter, coordinates, etc**



## **Basic Home Information**

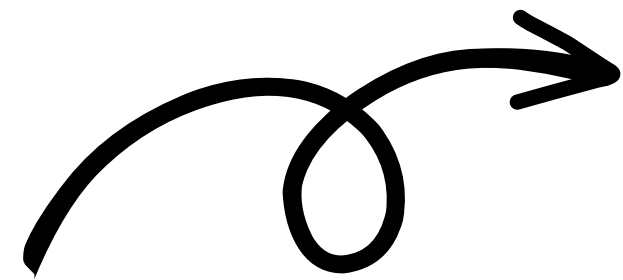
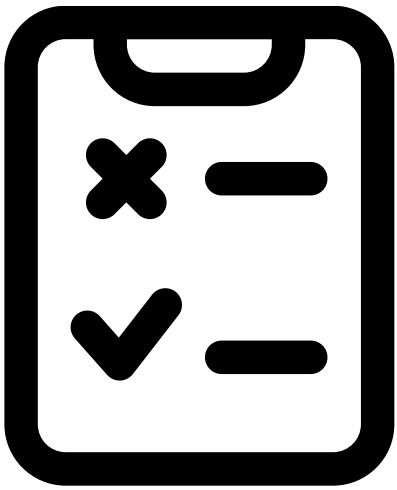
**Members living in the house, area, pipe type  
(copper, galvanized steel, (PVC), polyethylene (PEX),  
etc**





# **Perception of monthly water consumption**

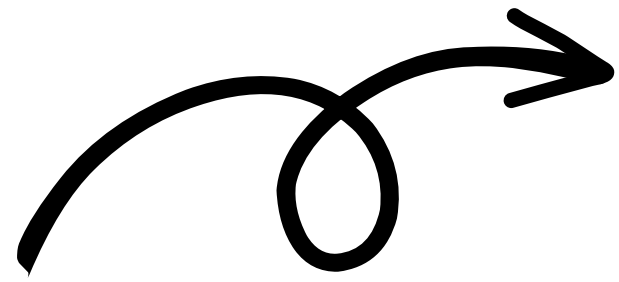
**Monthly amount consumed (m<sup>3</sup>), monthly paid price,  
differentiated rates**



# **Perception of quantity and quality towards CC**

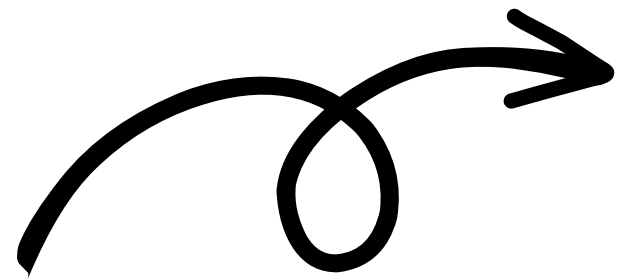
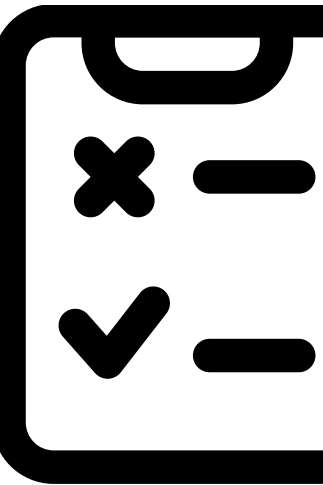
**Availability, secure, enough, future projections,  
water origin**





# **Family activities that affect water consumption at home**

**Household habits for water consumption (laundry,  
food preparation, showers)**



# **Activities and practices for water saving at home**

**Water reuse and recycling habits and willingness to  
adopt new habits**



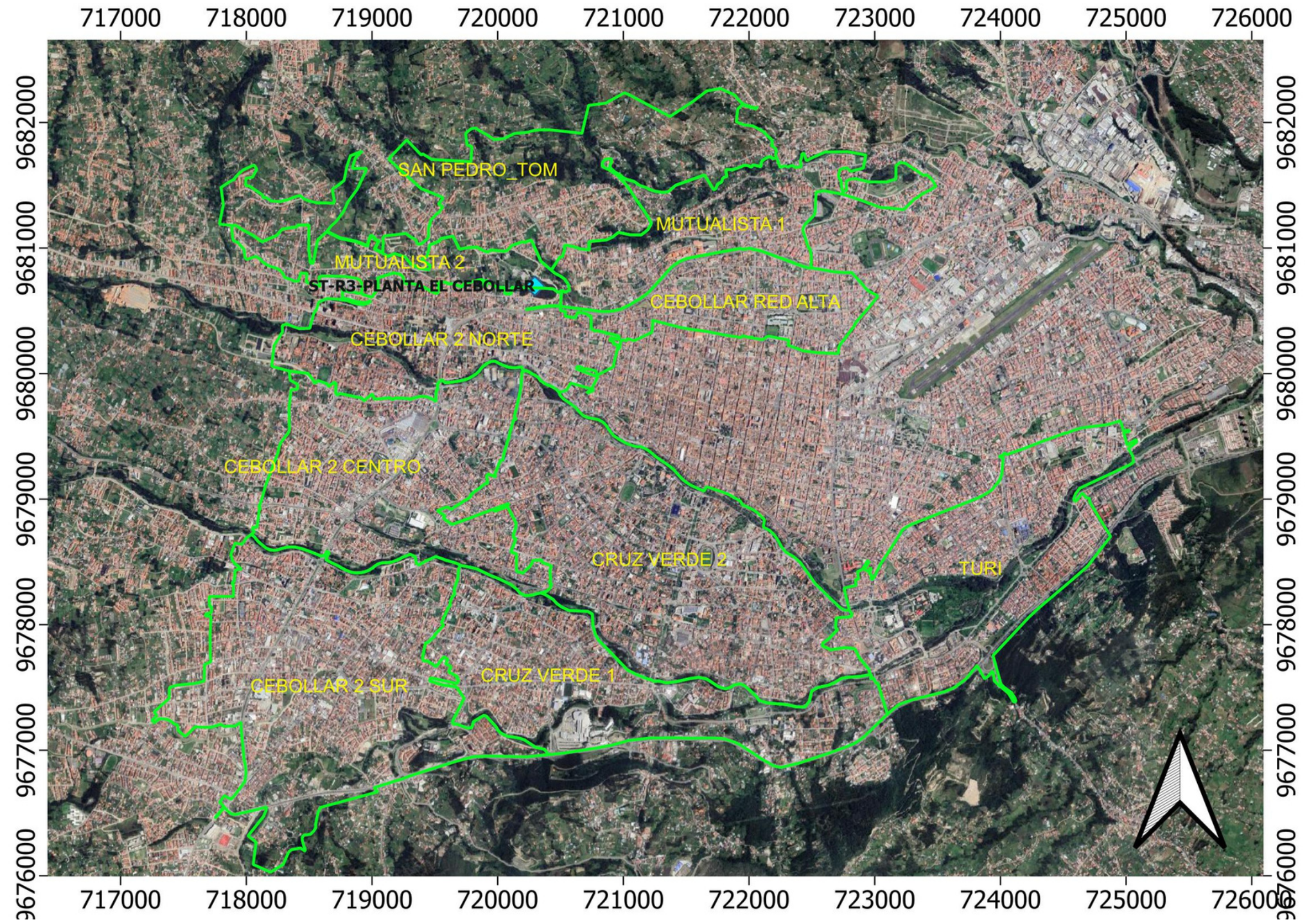


# Pilot places



## Objective:

Identify optimal neighborhoods for the pilot phase of the SWACH Project.



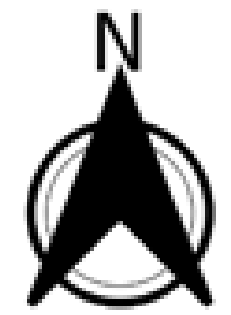
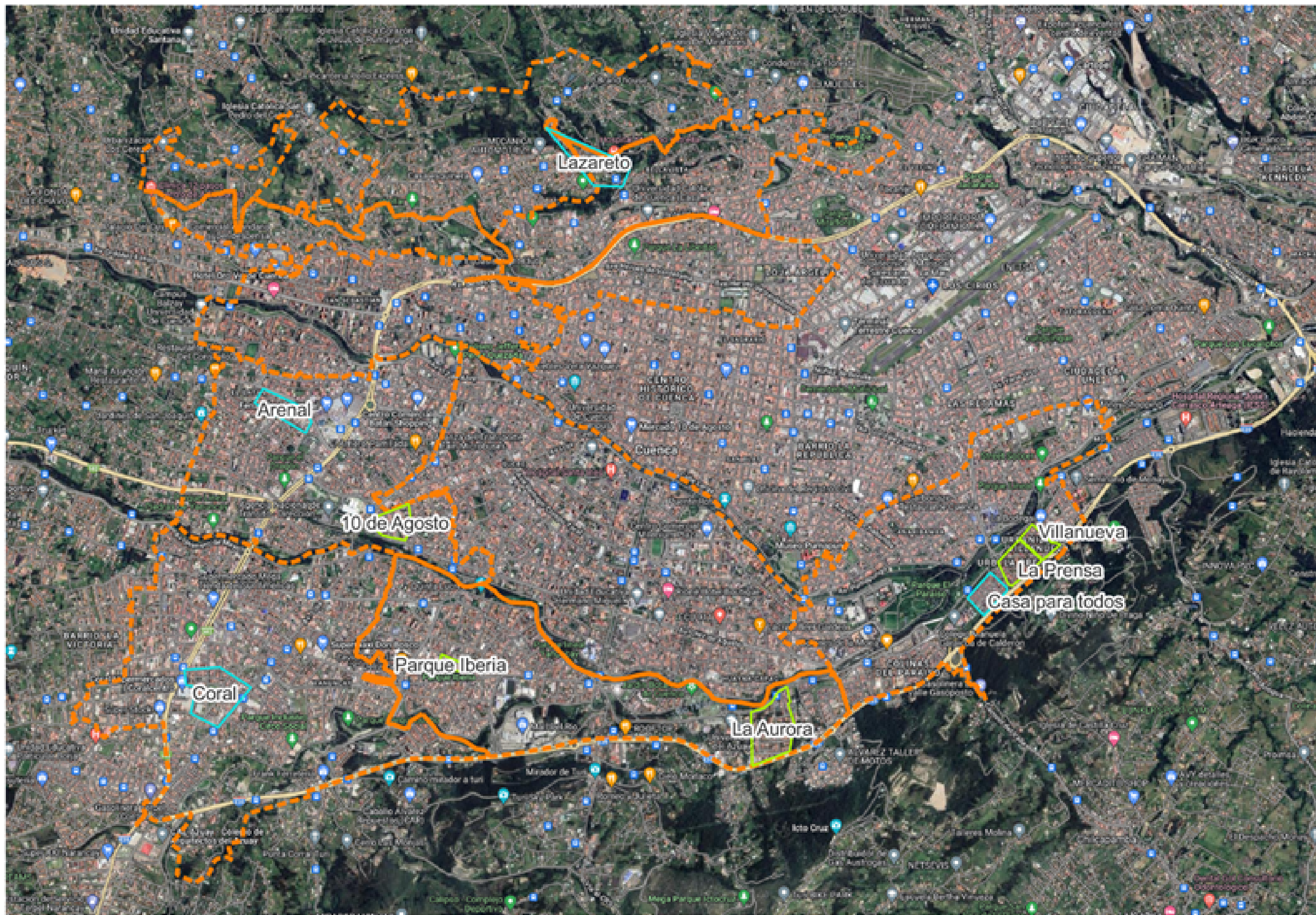




# Find places with the following criteria

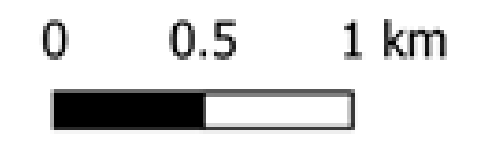
- **Residential area**
- **No businesses**
- **Clear neighborhood definition**
- **Have some level of organization**
- **Have similar socioeconomic characteristics**
- **No agricultural areas in these places**
- **Have internet reception**



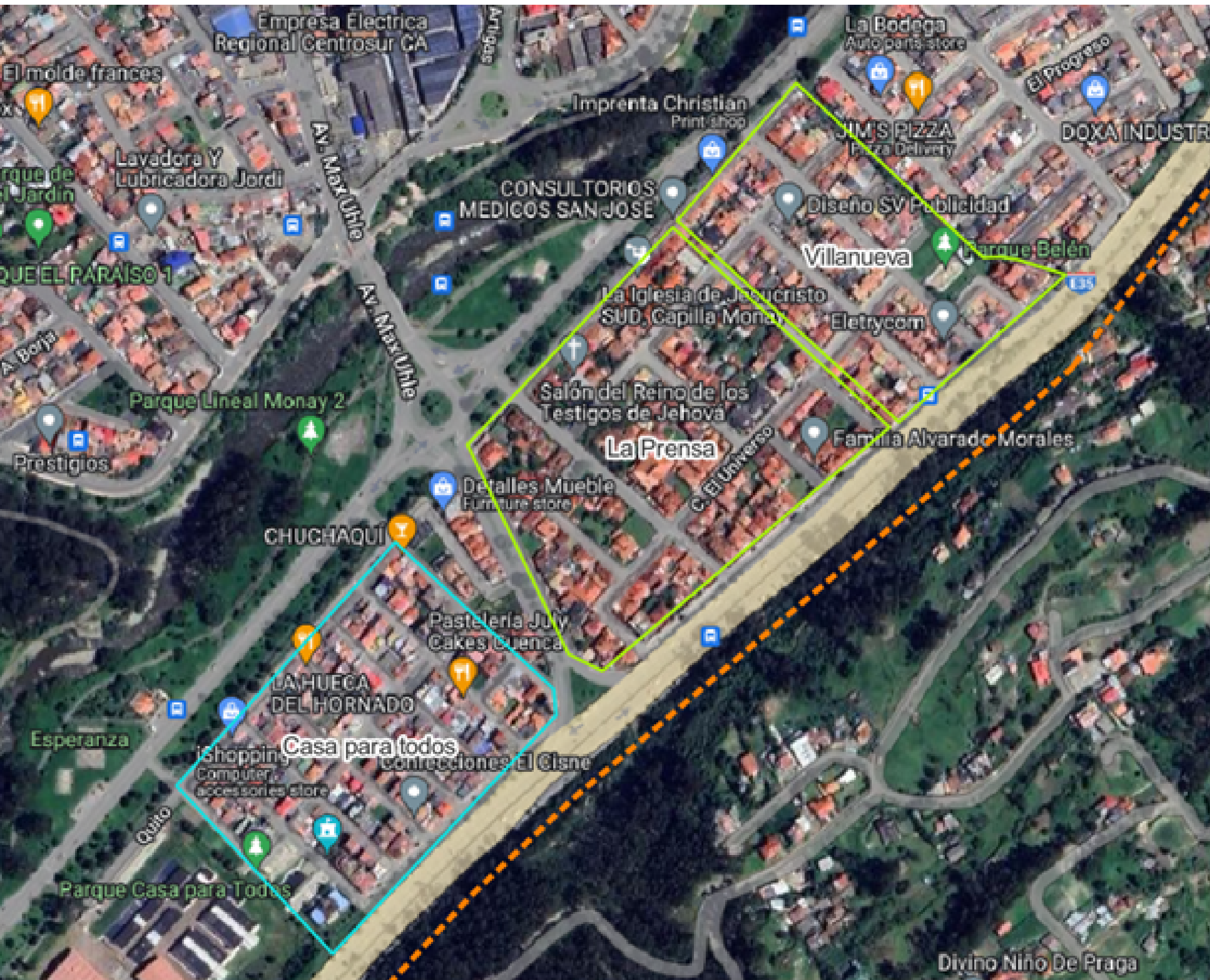


-  Sectores1
-  Sectores2
-  Sectores Tomebar

Google.cn Satellite







- **3 areas**
- **3 Different socioeconomic sectors**
- **All together**
- **Close to UDA (Few miles away)**



# VILLANUEVA



# LA PRENSA



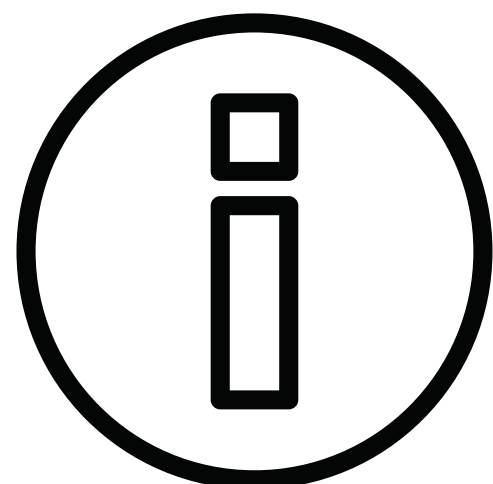
# CASA PARA TODOS





# ETAPA

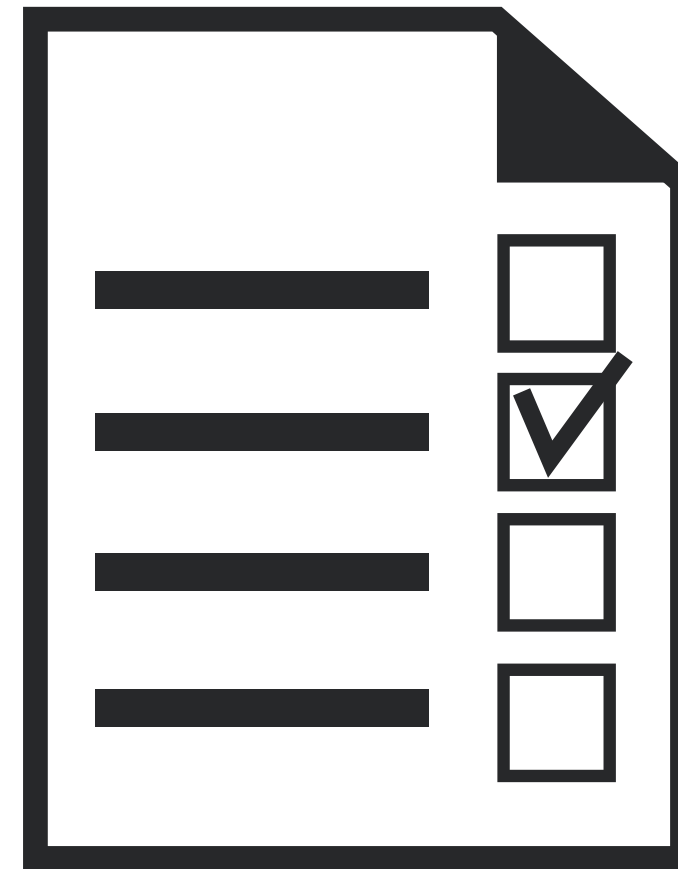
## Information



	MEDIDORES RESIDENCIALES
Sistema Tomebamba	51543
Sector Turi	5626
Casa para todos	341
La Prensa	163
Villanueva	169
<b>Total</b>	<b>673</b>
Porcentaje respecto a Sector Turi (%)	12,0
Porcentaje en Sistema Tomebamba (%)	1,3
Media consumo Turi Noviembre 2022 (m3)	16,45
Media consumo Cuenca Noviembre 2022 (m3)	15,83

# RESULTS YEAR 1

- **Tabulated, processed, contrasted and systematized data (ETAPA and Interviews)**
- **Methodology used (qualitative and quantitative)**



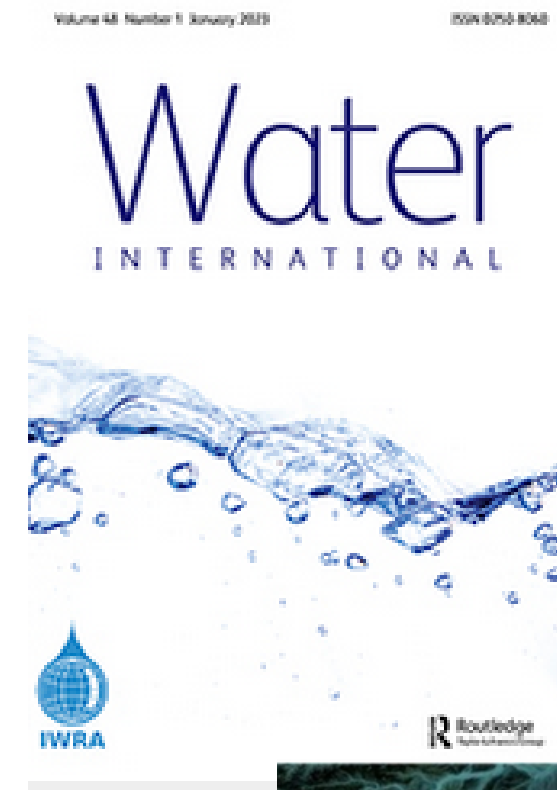



# PUBLICATIONS



- Potential journals:
1. Water international
  2. Water alternatives

Q1 and Q2 journals



 **Water International** >  
Volume 45, 2020 - Issue 7-8

[Submit an article](#) [Journal homepage](#)

Enter keywords, authors, DOI, ORCID etc This Journal   [Advanced search](#)

7,430 Views  
10 CrossRef citations to date  
5 Altmetric

Water security

## Water: consumption, usage patterns, and residential infrastructure. A comparative analysis of three regions in the Lima metropolitan area

Daniel R. Rondinel-Oviedo  & Jaime M. Sarmiento-Pastor 

Pages 824-846 | Received 13 Mar 2019, Accepted 27 Sep 2020, Published online: 04 Nov 2020

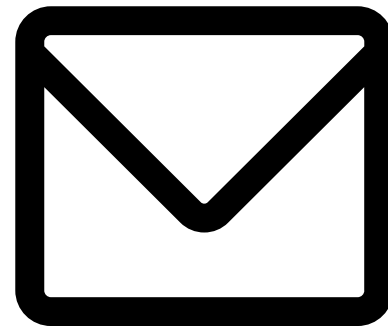
[Download citation](#) <https://doi.org/10.1080/02508060.2020.1830360>

[Full Article](#) [Figures & data](#) [References](#) [Supplemental](#) [Citations](#) [Metrics](#) [Licensing](#) [Reprints & Permissions](#) [Twitter](#) [Facebook](#) [Email](#) [+](#)

 Open access

**GRACIAS**

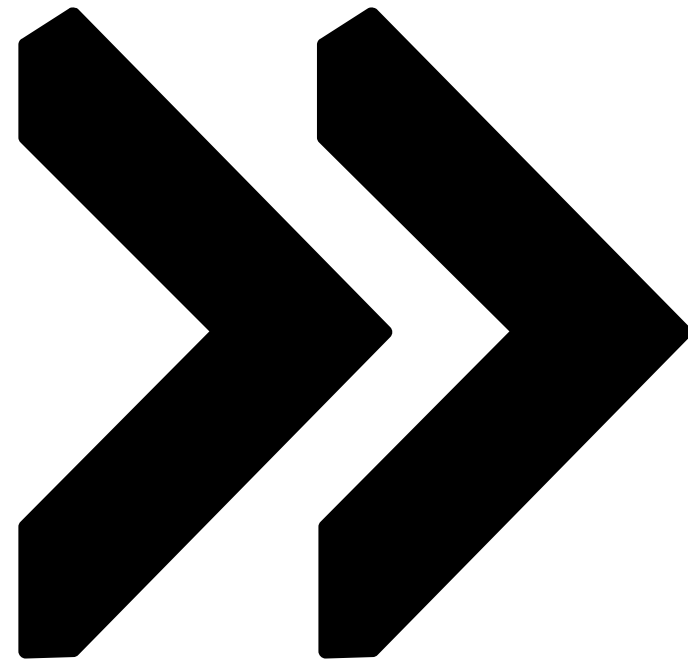
**swach@uazuay.edu.ec**  
**aochoa@uazuay.edu.ec**





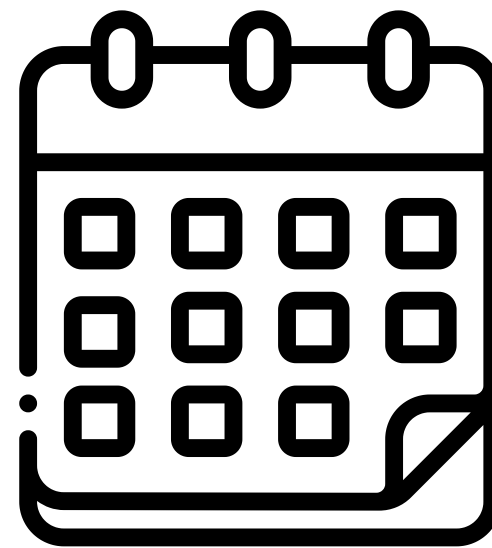
# PENDING ACTIVITIES

## 1ST YEAR



- **Confidentiality agreements**
- **Survey Validation**
- **Buy tablets for surveys**
- **Contact community directives**
- **Meetings between stakeholders**
- **Train interviewers**
- **Start the pilot surveys with the help of interviewers (March 2023)**
- **Process gathered information**
- **Start thinking of strategies**
- **Publications**

# WHAT'S NEXT



- **Look at gender-differentiated habits**
- **With results from the pilot project and from modelling of natural and grey infrastructure, we will propose alternatives for a better water management collectively with team members, ETAPA EP technicians, academics, citizens and other stakeholders. Our strategies will focus mainly in:**
  1. **Educommunicational axis:** increase citizen's awareness of water consumption, analysis of previous communication strategies implemented by ETAPA EP to innovate and use digital tools.
  2. **Normative axis:** to determine possible regulations that the city can adopt under a public policy of adaptation to climate change and citizen responsibility to avoid wasting water. Under the analysis of examples implemented in other cities, the objective is to regulate obligations and incentives for a more responsible and supportive management.
  3. **Natural and grey infrastructure:** determine cost effective strategies and technological solutions that can be implemented in the city to improve water management (circular economy schemes).