Supplementary Material

Assessment of the Water Footprint in Low-Income Urban Neighborhoods from Developing Countries: Case Study Fátima (Gamarra, Colombia)

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2. Materials and Methods

2.1. Sample size

Water consumption in the Fátima was estimated following a strategy proposed by García and Toro [1], consisting of a household survey applied to a population sample during July 2022 to capture information on socioeconomic conditions and water consumption patterns. The questionnaire used was designed by García and Toro [1] and validated by lecturers from Universidad Popular del Cesar – Aguachica (Colombia) with expertise in water resources. The questionnaire included closed and open questions. The sample size was established through simple random probability sampling. Thus, the entire population has the same probability of being part of the sample [2]. For this, Equation S1 was used to obtain an initial sample size.

$$\boldsymbol{n} = \frac{N * Z^2 * P * Q}{e^2 * (N-1) + Z^2 * P * Q} \qquad (\boldsymbol{S1})$$

n= Sample size.
N= Population size.
Z^2= Statistical parameter dependent on the confidence level.
P= Probability of occurrence of the studied event.
Q= (1-p) probability of non-occurrence of the studied event.
e^2= Maximum accepted population error.

Since the studied population was relatively small, a maximum error of 10% and a confidence level of 95% were selected (Z = 1.96). Regarding Q, 50% was selected since this value allows calculating the maximum possible value of the sample size (n).

$$\boldsymbol{n} = \frac{137 * 1.96^2 * 0.5 * 0.5}{0.05^2 * (137 - 1) + 1.96^2 * 0.5 * 0.5} = 101.2\ households \approx 101\ households$$

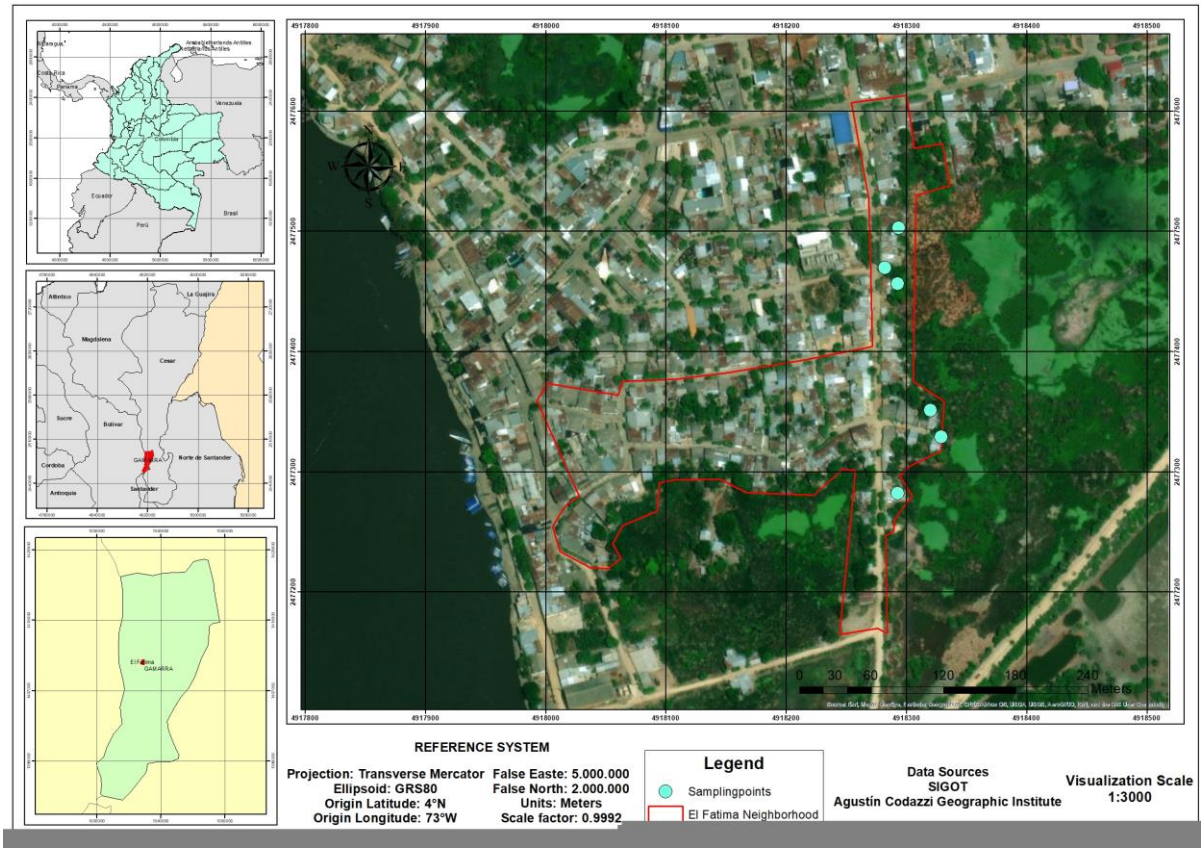

Figure S1. Sampling points of water quality monitoring in the critical areas of pollution in the Baquero wetland.

3. Results

Figure S2 shows the number of inhabitants according to socioeconomic stratum and Figure S3 shows the distribution of the population (adults and children) according to socioeconomic stratum

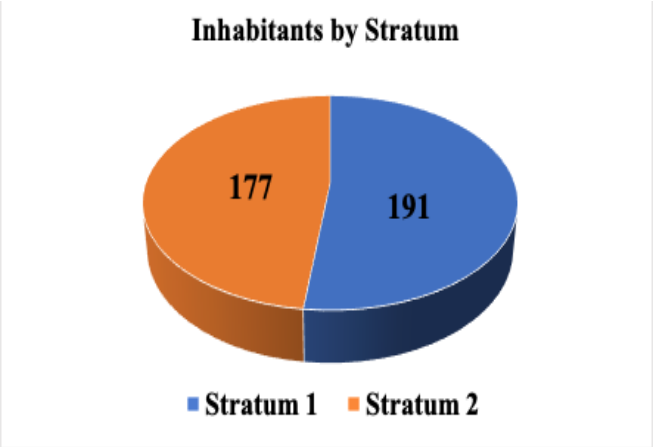

Figure S2. Number of inhabitants according to socioeconomic stratum.

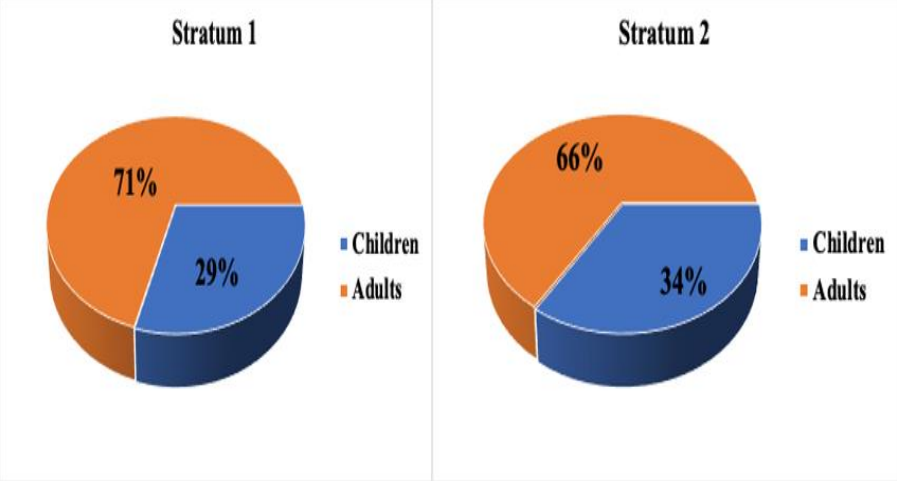

Figure S3. Distribution of the population (adults and children) according to socioeconomic stratum.

Figure S4 shows the distribution of pets according to stratum, which has similarities in both strata.

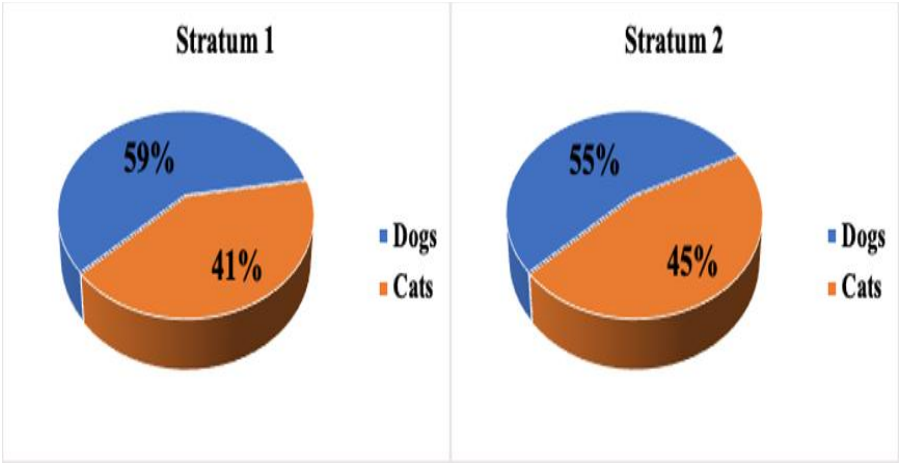

Figure S4. Distribution of the pet population according to socioeconomic stratum.

Table S1 includes the mean water footprint values by activities and stratum.

Table S1. Mean (μ) of the water footprint according to activities and stratum (m^3/month).

N°	Activities	Stratum 1	Stratum 2
1	Water consumed by children	0.034	0.031
2	Water consumed by adults	0.158	0.130
3	Water used for cooking	0.303	0.263
4	Water consumed by dogs	0.012	0.011
5	Water consumed by cats	0.004	0.004
6	Water used in brushing teeth	1.111	0.582
7	Handwashing	2.528	1.155
8	Face washing	1.793	0.871
9	Water used for shaving	0.047	0.023
10	Water used in the shower	29.872	12.815
11	Water used in toilet	7.117	3.261
12	General household cleaning	0.943	0.329
13	Clothes washing	4.354	1.662
14	Washing dishes	23.620	13.766
15	Garden irrigation	0.226	0.062
16	Car washing	0.182	0.131
Total		4.519	2.193

Table S2. Pearson correlation matrix for Water Footprint types.

	WF_{green}	WF_{blue}	$WF_{graywithsink}$	$WF_{graywithoutsink}$	$WF_{graywithoutshower}$	$WF_{graywithshower}$	$WF_{graycleaning}$	$WF_{grayothers}$
WF_{green}	1	0.78	0.63	0.91	0.77	0.67	-0.45	-0.34
WF_{blue}	0.78	1	0.92	0.73	0.59	0.9	-0.52	-0.48
$WF_{graywithsink}$	0.63	0.92	1	0.64	0.7	0.85	-0.66	-0.75
$WF_{graywithoutsink}$	0.91	0.73	0.64	1	0.81	0.69	-0.44	-0.33
$WF_{graywithoutshower}$	0.77	0.59	0.7	0.81	1	0.92	-0.79	-0.35
$WF_{graywithshower}$	0.67	0.9	0.85	0.69	0.92	1	-0.57	-0.66
$WF_{graycleaning}$	-0.45	-0.52	-0.66	-0.44	-0.79	-0.57	1	0.72
$WF_{grayothers}$	-0.34	-0.48	-0.75	-0.33	-0.35	-0.66	0.72	1

WF_{green}: Green Water Footprint; WF_{gray}: Gray Water Footprint; WF_{blue}: Blue Water Footprint

Table S3. Pearson correlation matrix for Blue Water Footprint types.

	VWCC	VWCA	VWUC	VWCD	VWCCo
VWCC	1	0.470	0.165	-0.044	-0.033
VWCA	0.470	1	0.214	0.111	-0.058
VWUC	0.165	0.214	1	0.045	-0.15
VWCD	-0.044	0.111	0.045	1	0.065
VWCCo	-0.033	-0.058	-0.15	0.065	1

VWCC: Volume of water consumed by children; VWCA: Volume of water consumed by adults; VWUC: Volume water used by cats; VWCD: Volume water used by dogs; VWCCo: Volume of water consumed for cooking

Table S4. Pearson correlation matrix for the types of Green Water Footprints.

	$WF_{greenfruits}$	$WF_{greenvegetables}$	$WF_{greencarbohydrates}$	$WF_{greendrinks}$	$WF_{greenmeat}$	$WF_{greenmilk}$	$WF_{greeneggs}$
$WF_{greenfruits}$	1	0.152	0.234	-0.069	0.229	0.345	0.268
$WF_{greenvegetables}$	0.152	1	0.055	-0.032	0.284	0.138	0.033
$WF_{greencarbohydrates}$	0.234	0.055	1	-0.07	0.009	0.095	0.329
$WF_{greendrinks}$	-0.069	-0.032	-0.07	1	0.029	0.016	-0.004
$WF_{greenmeat}$	0.229	0284	0.009	0.029	1	0.041	0.036
$WF_{greenmilk}$	0.345	0.138	0.095	0.016	0.041	1	0.16
$WF_{greeneggs}$	0.268	0.033	0.329	-0.004	0.036	0.16	1

WF_{green}: Green Water Footprints

Table S5. Pearson correlation matrix for the types of Gray Water Footprints.

	$WF_{graypersonal\_hygiene}$	$WF_{grayshower\_toilet}$	$WF_{graycleaning}$	$WF_{grayothers}$
$WF_{graypersonal\_hygiene}$	1	0.353	0.062	-0.025
$WF_{grayshower\_toilet}$	0.353	1	0.245	-0.056
$WF_{graycleaning}$	0.062	0.245	1	0.005
$WF_{grayothers}$	-0.025	-0.056	0.005	1

WF_{gray}: Gray Water Footprints

References

1.García SIN, Toro MJ. Evaluación de la Huella Hídrica Generada por los Sectores Comerciales y Vivienda del Barrio La Florida (Bogotá D.C.). Ingeniería Ambiental. Bogotá D.C.: Universidad de Libre 2013.
2. Montgomery DC. Diseño y Análisis de Experimentos. México D.F.: John Wiley & Sons; 2004.