Water quality of rainwater harvesting systems and acceptance of their reuse: an exploratory approach

Pablo Vidal[1,3], Ana María Leiva[1,3], Gloria Gómez[1,3], Marcela Salgado[2,3] and Gladys Vidal [1,3*]

[1] Engineering and Biotechnology Environmental Group, Environmental Science Faculty, Universidad de Concepción, Chile

[2] Department of Territorial Planning and Urban Systems, Environmental Science, Universidad de Concepción, Chile

[3] Water Research Center for Agriculture and Mining (CRHIAM), ANID FONDAP Center, Concepción Chile

* Correspondence: glvidal@udec.cl

Supplementary Information

Supplement S1. Rainwater reuse acceptance survey

Rainwater reuse acceptance survey

The survey presents a series of questions related to your knowledge, perception and factors that influence the acceptance of the practice of rainwater reuse (domestic uses, washing, irrigation) from rainwater harvesting systems (RWHs). The survey is anonymous, your responses are of utmost importance for this study. The objective is to evaluate the acceptance of rainwater reuse in schools with RWHs installed in the Maule regions.

Background data:

Your gender	○ Male	○ Female	○ Other
Your age			
Grade			

Survey:

Item	**Strongly disagree**	**Disagree**	**Neither agree nor desagree**	**Agree**	**Strongly agree**
Perceived usefulness	1	2	3	4	5
I believe that reusing rainwater from RWHs can be beneficial for the environment and the school	○	○	○	○	○
Acceptance of RWHs	1	2	3	4	5
I think it's a good idea to recycle rainwater RWHs	○	○	○	○	○
Subjective knowledge	1	2	3	4	5
I know what RWHs are	○	○	○	○	○
I know that it is a technology that allows us to face drought	○	○	○	○	○
I know the benefits of use RWHs	○	○	○	○	○
Social Trust	1	2	3	4	5
I think my classmates and friends are open to the idea of reusing rainwater at school	○	○	○	○	○

I think my teachers are willing to support the implementation of RWHs	○	○	○	○	○
I trust those regulators who support RWHs	○	○	○	○	○
Technological environment	1	2	3	4	5
I believe that the school has the necessary spaces to install the RWHs	○	○	○	○	○
I believe that RWHs technology is reliable and safe	○	○	○	○	○
Social influence	1	2	3	4	5
Social networks (Instagram, TikTok, among others) encourage the use of RWHs	○	○	○	○	○
The attitude of my friends affects my opinion regarding the reuse of rainwater	○	○	○	○	○
My teachers' opinions may influence my use of rainwater harvesting systems	○	○	○	○	○
Perceived risk	1	2	3	4	5
I am concerned that using recycled rainwater will affect my health and that of my family	○	○	○	○	○
I am concerned that the treated rainwater is not as safe tap water	○	○	○	○	○
Perceived cost	1	2	3	4	5
I believe that reusing water from RWHs can save costs compared to using tap water	○	○	○	○	○
I believe that the investment in the installation of RWHs is justified	○	○	○	○	○

Table S1. Physicochemical parameters in RWH systems

RWH systems	Samples	Physicochemical Parameters (mg/L)												
		COD	TP	TN	NH_4^+-N	Na^+	K^+	Ca^{2+}	Mg^{2+}	Li^+	F^-	NO_2^-	SO_4^{2-}	Br^-
RWH1	Flush Diverter	372.9 ± 350.3	<LOQ	<LOQ	0.06 ± 0.02	0.4 ± 0.6	0.3 ± 0.1	0.3 ± 0.3	2.5 ± 2.1	ND	ND	ND	ND	ND
	Storage tank	91.3 ± 123.2	<LOQ	<LOQ	0.03 ± 0.02	0.2 ± 0.4	0.9 ± 1.3	0.1 ± 0.2	1.5 ± 0.5	ND	ND	ND	ND	ND
	Outlet tap	137.2 ± 143.7	<LOQ	<LOQ	0.03 ± 0.01	0.8 ± 0.8	1.5 ± 1.5	5.0 ± 7.1	3.6 ± 4.2	ND	ND	ND	ND	ND
RWH2	Flush Diverter	115.4 ± 73.9	<LOQ	<LOQ	0.5 ± 0.1	1.5 ± 0.7	5.8 ± 2.1	0.5 ± 0.7	1.3 ± 2.3	ND	ND	ND	ND	ND
	Storage tank	65.9 ± 83.4	<LOQ	<LOQ	0.3 ± 0.1	0.3 ± 0.4	0.2 ± 0.2	0.5 ± 0.5	0.6 ± 0.5	ND	ND	ND	ND	ND
	Outlet tap	318.2 ± 493.9	<LOQ	<LOQ	0.1 ± 0.2	ND	2.0 ± 3.4	ND	0.6 ± 0.5	ND	ND	ND	ND	ND
RWH3	Flush Diverter	201.9 ± 258.3	<LOQ	<LOQ	0.1 ± 0.1	1.0 ± 0.2	1.6 ± 1.3	0.4 ± 0.4	0.9 ± 0.0	ND	ND	ND	ND	ND
	Storage tank	7.3 ± 8.2	<LOQ	<LOQ	0.05 ± 0.02	0.6 ± 0.8	0.2 ± 0.2	0.9 ± 0.9	0.6 ± 0.2	ND	ND	ND	ND	ND
	Outlet tap	107.3 ± 137.2	<LOQ	<LOQ	0.03 ± 0.01	1.6 ± 0.1	0.6 ± 0.6	1.4 ± 0.7	0.3 ± 0.2	ND	ND	ND	ND	ND

Notes: COD: chemical oxygen demand; TP: total phosphorus; TN: total nitrogen; NH_4^+-N: nitrogen ammonium; Na^+: sodium; K^+: potassium; Ca^{2+}: calcium; Mg^{2+}: magnesium; Li^+: lithium; F^-: fluorine; NO_2^-: nitrite; SO_4^{2-}: sulphate; Br^-: bromide; <LOQ: limit of quantification; ND: non detected, N=3