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Social acceptance of rainwater harvesting systems in rural areas: case study; Los Santos (Santander, Colombia)

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**EQUITABLE AND SUSTAINABLE WASH SERVICES:
FUTURE CHALLENGES IN A RAPIDLY CHANGING WORLD**

**Social acceptance of rainwater harvesting systems in rural
areas: Case study, Los Santos (Santander, Colombia)**

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Currently, many water supply systems worldwide face problems to provide their users due to increase in water demand and reduction of water availability (Bocanegra-Martínez, *et al.*, 2014; Imteaz *et al.*, 2012; Islam, *et al.*, 2010). This problem has focused attention on alternative water resources, including rainwater harvesting (RWH), which has gained popularity in developing countries since it represents a reliable, economical and low-energy source of water compared to traditional systems and also, in water-scarce contexts, it can be the main source of supply (Chiu, *et al.*, 2009; Cowden *et al.*, 2008; Muklada, *et al.*, 2016).

In the rural area of Los Santos, in Santander (Colombia), high water demand for productive uses, unfavorable hydrological characteristics, and limited access to groundwater resources, exacerbated by climate change, represent for people a historic and ongoing experience of water shortages and intermittent services (INGEOMINAS, 2009). As result, people have diversified water sources, including buying from tanker trucks, construction of wells, cisterns and RWH, among others. In particular, 53% of the population practices RWH, either through artisanal systems, or using buckets during rainfall events. The collected rainwater is typically used for crops and garden irrigation and, in a small proportion, for drinking and cooking. Due to the empirical nature of these RWH systems, aspects regarding social acceptance, valuing, motivations, and technical criteria considered to install the existing systems, and operation and management practices remain unknown (INGEOEXPLORACIONES S.A.S., 2016). Thus, this research aims to analyze the perceptions and practices about RWH in the water-scarce rural area of Los Santos.

As part of this research, a questionnaire was prepared based on literature review and expert opinion regarding the social dimension of RWH implementation; tests were carried out with randomly selected people to ensure that all the questions were understandable, and context-appropriate. The population was previously identified through a social map prepared with help from local leaders. Due to the small population (a total of 38 households), a census was conducted. The questionnaire was divided into four sections: i) demographic information and household characteristics; ii) available water sources; iii) water uses and demand; iv) perceived risk of rainwater and end-uses. The third section, only applied to people who already practiced RWH, and questions in this section addressed issues such as the perceived benefits of using rainwater, end-uses, technical characteristics of their RWH system, financial aspects, maintenance and operation practices; and knowledge on the rainfall regime. All surveys were conducted face-to-face. Data analysis involved organizing, categorizing and coding according to themes. As a result, information relevant for implementing RWH was collected such as: the degree of acceptance and confidence on the available supply sources, the percentage of people willing to use RWH, barriers and motivations to implement RWH systems and local knowledge. In addition, in dwellings where rainwater was already used, information was captured on levels of satisfaction with the quality and quantity of the collected rainwater, investments, operation and maintenance practices, among others.

Our results contributed to increase the understanding on the social dimension of RWH, which is a critical factor for scaling-up these systems, since attitudes, uses, operation, and maintenance practices can represent either a barrier or a driving force for implementation (Domènech, *et al.*, 2013; Domènech & Saurí, 2011;

Mankad & Tapsuwan, 2011). The information obtained is a key input for a second phase of our research which addresses the feasibility assessment of a RWH system for a typical household in Los Santos, considering social, technical, financial and environmental criteria. It is expected that this project provides information for users, practitioners, decision-makers and researches that help to improve implementation of RWHS and to increase the level of social acceptance. In the academic sector, these results could improve the understanding of researchers on the role of users in water management, the development of theories about public acceptance, identification of gaps between the declared and actual behavior of users on water management, formulation of technical guides around RWH, recognition of factors that could favor the expansion of RWH, among others.

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