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Saving Water in the Literature From 2021 To 2024

Abstract

The establishment of a tariff system related to water consumption is a central issue in the environmental public policies of economically developed countries and emerging countries. In the case of developed countries, scientific and technological advances have facilitated a significant reduction in water consumption reported in censuses, meters and rate receipts. On the contrary, in emerging countries, consumption and establishment of rates is determined by the sociopolitical relationship between the State and the users of the drinking water service. The discretion of charging regarding the drinking water service is an assignment of governments and state and even municipal authorities. Such a charging system inhibits water savings and encourages waste since a standard charge does not consider the cubic volume of water consumed. In cases of irregular neighborhoods in which the drinking water service, meters and water receipts are insufficient to establish a rate, residents have developed a skill known as consumption dosage to optimize the resource and reduce costs. The objective of the present study. It is to establish the causal relationship between socioeconomic, demographic and cognitive factors on dosed water consumption. For this purpose, a cross-sectional and correlational study was carried out with a sample of 100 users from the Los Ángeles and El Manto neighborhoods. Based on the theories of reasoned action and planned behavior, an instrument was constructed which was reliable (alpha of .90) and validated (factor weights greater than .300). The results show that community identity is the main determinant of water dosage (β= .29) in a multiple linear regression model (X 2 = 156.152, 28df, p = .000; GFI = 1.000; AGFI = .830; PGFI = .675; RMR = .000; RMSEA = .124). Under the tariff systems of the Metropolitan Zone of the Valley of Mexico (standard, volume, situation, intervals, thresholds, self-financing and subsidy), the relevance of a consumption charge is discussed based on the causal relationship between economic income and consumption dosage.

Research Article

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Introduction

The availability of freshwater in the world varies considerably depending on the region and the available water resources [1]. About 70% of the Earth's surface is covered by water, but only about 2.5% is freshwater, and most of that water is trapped in glaciers and ice caps [2]. Fresh Water Resources: Fresh water is found in rivers, lakes, groundwater and glaciers. However, only about 30% of this resource is easily accessible for use by humans. Geographic Distribution: The availability of freshwater varies significantly by region [3]. Some areas, such as parts of South America, Canada, Russia, and northern Europe, have abundant freshwater resources [5]. Meanwhile, other regions, such as parts of Africa, the Middle East and South Asia, are facing water shortages [5]. Climate Change and Water Stress: Climate change is affecting the availability of freshwater due to phenomena such as drought, melting glaciers and altered precipitation patterns [6]. This has increased water stress in many regions, exacerbating water scarcity [7]. Water Consumption: Population growth and industrial development have increased the demand for fresh water [8]. Agriculture is one of the largest consumers of water, followed by domestic use and industry [9]. Water Management: Sustainable water management is essential to ensure the continued availability of this vital resource. Strategies such as water conservation, reuse and wastewater treatment, as well as the implementation of more efficient technologies, are key to addressing water scarcity [10]. International Agreements and Conflicts: The availability of freshwater can also generate tensions between countries that share water resources, which has led to the signing of international agreements for the shared management of river basins and the resolution of conflicts [11]. Comprehensive Water Management (IAM) is a holistic approach that seeks to address water-related challenges in a comprehensive manner, considering social, economic and environmental aspects [12]. This theory recognizes the interconnection between the different uses of water and the need for coordinated and sustainable management of water resources [13]. Integrated Approach: Considers all aspects related to water, such as supply, quality, distribution, efficient use, risk management and protection of aquatic ecosystems [13]. Promotes coordination between different sectors and actors involved in water management [14]. Participation and Governance: Involves various actors, such as governments, local communities, non-governmental organizations and the private sector, in making decisions about water management [15]. It encourages transparency, accountability and public participation in the planning and implementation of water-related policies Sustainability: [16] Seeks to guarantee the availability of water for present and future generations, considering the conservation of water resources, the protection of water quality and the minimization of environmental impact [17]. Demand Focus: Prioritizes the efficient use of water and demand management through practices [18] such as water conservation, reuse, recycling, and the adoption of more efficient technologies [19]. Hydrographic Basin Approach: Recognizes the importance of managing water at the hydrographic basin level, considering the interrelationship between the different aquatic systems within a basin [20]. Adaptation to Climate Change: Considers the impact of climate change on water resources and develops strategies to adapt to changes in precipitation patterns, melting glaciers and other climate-related phenomena [21]. Comprehensive Water Management is essential to address the global challenges of water scarcity, ensure an adequate and equitable supply of freshwater, and preserve aquatic ecosystems. Its implementation requires the collaboration and commitment of multiple stakeholders at local, national and international levels [22]. The objective of this work was to establish the neural structure of learning related to water saving in a town in central Mexico.

Are there significant differences between the theoretical structure with respect to the empirical observations of this work?

Hypothesis. Given that the policies of confinement and distancing of people impacted the water supply to residences, significant differences are expected between the theoretical structure with respect to empirical observations [22].

Method

An exploratory, transversal and psychometric work was carried out with a sample of 100 students (M = 22.21 SD = 2.3 years and M = 7’893-00 SD = 789’00 monthly income) assigned to the internship and professional service system in institutions and public health organizations in central Mexico.

Self-Report was used, which includes four aspects related to 1) Water consumption at home, 2) Water use habits, 3) Awareness and education, 4) Attitudes and commitments. All questions were coded according to the distance or proximity of the global and local per capita average, which ranges around 250 cubic liters per day per person. Sphericity and adequacy [x2 = 1650.058 153 df) p = 0.001; KMO = 0.78] of the instrument allowed the analysis of validity which ranges between

Respondents were contacted via email. They were guaranteed the confidentiality and anonymity of their responses through a contract document. They were informed about their functions and responsibilities, as well as the non-remuneration for their responses to the questionnaire. They were told the objective of the study and the social and scientific responsibility of the project. Focus groups were organized to discuss the concepts and the Delphi technique for evaluating the items. The surveys were administered at the public university facilities.

The data were captured and processed in JASP version 18. The estimated coefficients allowed the hypothesis to be tested. Values close to unity were assumed as evidence of a dependency relationship between the variables, as well as non-rejection of the hypothesis that establishes significant differences between the theoretical structure and the observed structure.

Results

The eigenvalues suggest that the largest percentage of the total variance is explained by four variables. That is, water saving is explained from four questions related to the frequency of water use, the installation of technology, reuse and water collection. In this sense, the instrument used can be considered and reconfigured from indicators of these four variables.

Consequently, the factor structure of water saving is explained by three factors and their corresponding observable variables. The first factor related to water consumption includes indicators 4, 11, 13, 16 and 17. The second factor referring to consumption habits includes variables 6, 10 and 14. The third factor referring to awareness and education includes the indicators 9 and 15.

The adjustment and residual coefficients [x2 = 458.268 (102 df) p = 0.001; TLI = 0.654; RMSEA = 0.199] indicate non-rejection of the hypothesis regarding the differences between theoretical relationships and empirical observations.

Discussion

The contribution of this work to the state of the art lies in the establishment of a structural model in which the factors and indicators that explain the total variance of water savings are explored. The results demonstrate the prevalence of nine indicators distributed in three factors. In relation to the reviewed literature, the theoretical structure includes four factors that are related to 17 indicators [23] Consequently, the hypothesis of significant differences between the theoretical structure and the empirical structure is not rejected. The implications of this finding in future research suggest the reduction of the theoretical model and its adjustment to three factors and nine indicators. This issue is indicative that water savings are explained with observations after the health crisis [24]. In this sense, it is recommended to include the factors and indicators that explain the variance of savings and its prediction from sociodemographic, socioeconomic and sociocultural factors.

Conclusion

The objective of this work was to establish the differences between the theoretical structure with respect to the observed structure. The findings suggest the adjustment of the theoretical model to three factors and nine indicators which explain the greatest percentage of the variance relative to self-reported water savings in the sample. The literature consulted indicates that there are four factors and 17 variables that explain local water savings, but the results of this study differ and recommend a reduction. Consequently, the hypothesis is not rejected and the reduction of factors and indicators reflecting consumption, use and scarcity awareness is recommended.

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