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Artículos Científicos

Analfabetismo hídrico en el municipio de Xalisco, Nayarit: El reto para mejorar la gobernanza del agua y la seguridad hídrica

Water Illiteracy in the Municipality of Xalisco, Nayarit: The Challenge to Improve Water Governance and Water Security

Analfabetismo hídrico no município de Xalisco, Nayarit: o desafio de melhorar a governança da água e a segurança hídrica

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Resumen

El valor del agua tiene un limitado reconocimiento en México. El poco conocimiento de los ciudadanos acerca de la disponibilidad del recurso ha propiciado desperdicio, sobreexplotación y deterioro de la calidad del agua. El objetivo de este estudio fue visibilizar el nivel del analfabetismo hídrico en el municipio de Xalisco, Nayarit. Se recurrió a un enfoque mixto, diseño explicativo y nivel aplicativo; y se aplicó una encuesta a una población basada en una muestra no probabilística de 1000 personas de la cabecera municipal. Dicha encuesta constó de 65 preguntas distribuidas en cinco dimensiones de análisis. El criterio de aplicación se basó en ocho rutas, cubriendo la totalidad de la zona geográfica, la cual se conforma por 29 colonias. El análisis estadístico se realizó con el *software* Dyane versión 4, mediante tabulaciones simples.

La mayoría de la población encuestada fueron mujeres (54.9 %). Del total, 96.8 % tiene conexión de agua potable. Respecto de los habitantes por domicilio, de uno a tres representan 50.4 % y de cuatro a seis 46 %, lo que indica un alto porcentaje de habitantes por hogar. De la visibilidad de la problemática, las respuestas indican que desde 57.1 % hasta 91.3 % de la población reconoce en diferentes aspectos la situación que guarda el recurso hídrico. Entre las actividades en las que se utiliza el recurso con mayor frecuencia se encuentran las relacionadas al aseo personal (80. 6 %) y las relacionadas con el uso doméstico, las cuales se encuentran entre porcentajes de 52.2 % hasta 56.8 %. De los servicios, 52.8 % desconoce cuál es el organismo que lo provee; 84.8 % señala que el servicio es de bueno a regular. Un dato relevante es la falta de pago por el servicio, representada por 6.8 %, del cual 3.8 % señala como causa la falta de consecuencias. Sobre el cuidado y conservación, 40.7 % señala la desinformación como razón para no cuidar el agua, 39 % no se da cuenta que la desperdicia y 33.8 % por desinterés. Además, 47.5 % desconoce algún método para reutilizar el agua y 63.9 % no lo hace; la sumatoria de los niveles medio, poco y nulo de responsabilidad para cuidarla representa 77.7 %. Asimismo, 49.7 % considera que la población en general es la principal responsable de cuidarla, mientras que 30.7 % señala a los usuarios, organismo operador y Gobierno. Del conocimiento y participación, 61 % no conoce información suficiente para cuidar y preservar el agua, 81.4 % consideran importantes las campañas informativas y 77 % estaría dispuesto a participar en actividades para cuidarla. Por último, más de 80 % desconoce las leyes relacionadas con el recurso hídrico, 75.5 % considera importante que existan, 86.8 % que la autoridad las aplique y 88.9 % que los usuarios las cumplan.

En los resultados obtenidos se observa un alto índice de analfabetismo hídrico en la población. Sin embargo, se encontraron aspectos de disposición en la ciudadanía para su

disminución a través de una participación más activa e involucramiento en actividades para el cuidado, preservación y una verdadera cultura del agua. En suma, se reconoce la importancia de la problemática y la necesidad de realizar acciones conjuntas entre la sociedad y el Gobierno.

Palabras clave: conservación del agua, derecho del agua, educación no formal, gestión de los recursos hídricos, participación social, política gubernamental.

Abstract

The value of water has a limited recognition in Mexico. The little information that citizens know about the availability of the resource has led to inefficient use, waste, overexploitation and deterioration of water quality. The objective of this study was to make visible the impact of water illiteracy in the municipality of Xalisco, Nayarit. A mixed approach, explanatory design and application level was used; and a survey was applied to a population based on a non-probabilistic sample of 1000 people from the municipal capital. The above mentioned survey consisted of 65 questions distributed in five dimensions of analysis. The application criterion was based on eight routes, covering the entire geographical area, which is made up of 29 colonias. The statistical analysis was performed with the DYANE V4 software through simple tabulations.

The majority of the surveyed population were women (54.9%). Of the total, 96.8% have a drinking water connection. Regarding the inhabitants by domicile, from one to three they represent 50.4% and from four to six 46%, which indicates a high percentage of inhabitants by domicile. About the visibility of the problem, the answers indicate that from 57.1% to 91.3% of the population recognizes in different aspects the situation related to water. Among the activities that use the resource most frequently are those related to personal hygiene 80.6% and those related to domestic use, which are between 52.2% to 56.8%. Related to the services, 52.8% do not know which is the agency that provides it, 84.8% indicate that the service is good or regulate. A relevant fact is the lack of payment for the service, represented by 6.8%, of which 3.8% indicate as cause the lack of consequences. About the care and conservation, 40.7% indicate misinformation as a reason for not taking care of water, 39% do not realize that they waste it and 33.8 because of lack of interest. Further, 47.5% do not know any method to reuse water, and 63.9% do not reuse; the sum of the medium, little and no responsibility levels to care it represents 77.7%. Also, 49.7% believes that the general population is the main responsible for caring, whereas 30.7% indicates the users, organization and government. About knowledge and participation, we found that 61% do not know enough information to care for and preserve water, 81.4% consider information

campaigns important, and 77% would be willing to participate in activities to care for it. Finally, more than 80% do not know the laws related to water resources, 75.5% consider important that they exist, 86.8% that the authority applies them, and 88.9% that users comply with them.

The results obtained show a high rate of water illiteracy in the population. However, aspects of disposition of the citizens for its reduction were found, through a more active participation and involvement in activities for the care, preservation and, a true water culture, recognizing the importance of the problem and the needs for joint actions of society and government.

Keywords: water conservation, water law, nonformal education, water resources management, social participation, government policy.

Resumo

O valor da água tem um reconhecimento limitado no México. O pouco conhecimento dos cidadãos sobre a disponibilidade do recurso levou ao desperdício, à superexploração e à deterioração da qualidade da água. O objetivo deste estudo foi tornar visível o nível de analfabetismo hídrico no município de Xalisco, Nayarit. Uma abordagem mista, design explicativo e nível de aplicação foram utilizados; e uma pesquisa foi aplicada a uma população baseada em uma amostra não probabilística de 1000 pessoas da sede municipal. Este levantamento consistiu em 65 questões distribuídas em cinco dimensões de análise. O critério de aplicação foi baseado em oito rotas, cobrindo toda a área geográfica, composta por 29 colônias. A análise estatística foi realizada com o software Dyane versão 4, utilizando tabulações simples.

A maioria da população pesquisada era do sexo feminino (54,9%). Do total, 96,8% possuem conexão com água potável. Em relação aos habitantes por domicílio, de um a três eles representam 50,4% e de quatro a seis 46%, o que indica um alto percentual de habitantes por domicílio. A partir da visibilidade do problema, as respostas indicam que de 57,1% a 91,3% da população reconhece em diferentes aspectos a situação que o recurso hídrico comporta. Entre as atividades em que o recurso é mais utilizado estão as relacionadas à higiene pessoal (80,6%) e aquelas relacionadas ao uso doméstico, que estão entre 52,2% a 56,8%. Dos serviços, 52,8% não sabem qual é a agência que o fornece; 84,8% indicam que o serviço é bom para regular. Fato relevante é a falta de pagamento pelo serviço, representada por 6,8%, dos quais 3,8% indicam como causa a falta de conseqüências. Sobre o cuidado e a conservação, 40,7% indicam desinformação como motivo para não cuidar da água, 39% não percebem que é desperdiçado e 33,8% por falta de interesse. Além

disso, 47,5% não conhecem nenhum método de reutilização de água e 63,9% não o utilizam; a soma da média, pouco e nenhum nível de responsabilidade para cuidar dela representa 77,7%. Da mesma forma, 49,7% consideram que a população geral é a principal responsável por cuidar dela, enquanto 30,7% indicam os usuários, a agência operacional e o governo. De conhecimento e participação, 61% não conhecem informações suficientes para cuidar e preservar a água, 81,4% consideram importantes as campanhas de informação e 77% estariam dispostas a participar de atividades para cuidar dela. Por fim, mais de 80% não conhecem as leis relacionadas aos recursos hídricos, 75,5% consideram importante que existam, 86,8% que a autoridade as aplica e 88,9% que os usuários as cumprem.

Os resultados obtidos mostram um alto índice de analfabetismo hídrico na população. No entanto, aspectos da disposição dos cidadãos para diminuir foram encontrados através de uma participação mais ativa e envolvimento em atividades de cuidado, preservação e uma verdadeira cultura da água. Em suma, reconhece a importância do problema e a necessidade de realizar ações conjuntas entre a sociedade e o governo.

Palavras-chave: conservação da água, legislação sobre a água, educação não formal, gestão dos recursos hídricos, participação social, política governamental.

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Introduction

Where, how and when does the problem arise? For a long time it was thought that natural resources, including water, were inexhaustible and would always be available for the satisfaction of our needs; Even today, there are many people who think that they can be accessed as things that have no owner and that no one would have to worry about their care and renewability, the belief that they are self-renewing. Concerns about natural resources focused on using them to promote economic growth and improve the quality of life. At the beginning of the 21st century, a global water crisis arises that substantially impacts the security, stability and balance of the environment. Therefore, the environmental problem of the present times has confronted us with a different panorama, many natural resources are in serious danger due to overexploitation, and with regard to water, illegality in its use, improper occupation of the channels and protection zones, conflicts over their use and the increasingly uncontrolled contamination of water resources, jeopardize the availability of this vital liquid in terms of quantity and quality (United Nations Educational, Scientific and Environmental Organization Culture [Unesco], 2018).

The value of water has a limited recognition in our country. The knowledge that citizens have about the availability of the resource has led to inefficient use, waste, overexploitation and deterioration of water quality. Therefore, education and culture are substantial elements for the transformation of attitudes, values and behaviors for their protection, conservation and preservation (National Water Commission [Conagua], 2013). Given the described scenario, the term water illiteracy arises, which we can interpret as the ignorance or lack of information related to the water that supplies the localities, as well as the lack of knowledge about who are responsible for the administration, that is, substantial elements to facilitate the understanding of the importance of the vital liquid and contribute to its use in a sustainable way.

The state of Nayarit is included in two administrative hydrological regions: the III North Pacific and the VII Lerma Santiago Pacífico. The first has an average natural availability of 25,681 hm3 / year and the second with 34 003 hm3 / year. Its annual rainfall is 1061.6 mm, which contrasts with the 175.6 mm of Baja California Sur and 2424.1 of Tabasco (National Water Commission [Conagua], 2013). Nayarit's condition for the availability of water is privileged in all the states. It is the state of the Central-West region with greater water availability. However, it suffers from serious deficiencies in its management; area in which an important lag has been generated.

In this regard, 95% of the state's communities, mainly in rural areas, do not have the vital liquid, even though 91% of the total homes have piped water, which speaks of the main lags being observed in the marginalized areas mainly from the mountain areas, where the topography and the remoteness of the communities makes water disposal very difficult.

However, according to the data of the National Municipal Information System [SNIM] published in 2010, the municipality of Xalisco has 37 locations. It has an area of 504 km2 and represents 1.79% of the surface of the state of Nayarit. The municipal seat Xalisco has 35,702 inhabitants, of which 17 363 are men and 18 339 women. The geographical coordinates of the municipal capital are the following: 21 ° 26 '39' 'N, 104 ° 54' 06 " W, and with an altitude of 995 meters above sea level. In the municipality, as in the state, the lack of resources in operating agencies has been identified as main problems; lack of maintenance of the hydraulic infrastructure; operational insufficiency of the operating agencies; obsolescence of hydraulic systems; high costs of hydraulic infrastructure; lack of training of operational personnel; lack of a culture of water and its efficient use, as well as the existence of a culture of non-payment of the service. Since water is an essential factor in development and strong support to reduce inequalities, the existence,

availability and management of water turn out to be first-rate elements to guarantee the progress and progress of societies.

The problem of water, one of the pressing factors of the present century, revealed in the IV World Water Forum in Marseille, France, in 2012, is essentially a problem of governance and governance, therefore, a political problem in the first place. instance; it is not only a conflict of scarcity of the element or of the financing for its availability, since for an adequate administration of the resource solid institutions, cooperation efforts and decision-making capacity at all levels are necessary (Organization for Economic Cooperation and Development [OECD], 2012). The main challenge to consider, in accordance with the above, lies in the implementation of solutions based on the specificity of the localities, with broad participation of the actors involved, accountability mechanisms and the acceptance of risks and responsibilities to achieve results. in the framework of equity and the sustainability of the resource and its sanitation. Hence, more than a generalizable policy to the entire State, there is a need to design contextualized municipal policies that take into account the specificities of their territories and the involvement of society.

The World Water Association (GWP) defines water governance as "the set of political, social, economic and administrative systems established to develop and manage water resources and the provision of water services in different strata of society "(OECD, 2012, p. 29). Therefore, it is necessary to strengthen the governance of water resources through democratic processes, that is, considering governance (OECD, 2012). In this purpose, governance refers to a series of changes that arise between the Government and society, which reconstruct meaning, capacity and direction in relation to the environment. Likewise, as a greater capacity for decision and influence of non-governmental actors in the definition, creation and implementation of public policies or the provision of water-related services. Also, it refers to the processes and mechanisms of interaction between governmental and non-governmental actors. It is therefore a dynamic concept.

Governance is conceived as a process and not as an end. Flexible approaches are proposed to adapt to the circumstances, and priority issues related to both the resource itself (pollution, scarcity, deterioration, overexploitation) and management (absence of legislation, scarce resources, information, etc.) are addressed. In addition to the above, it is conceived as a reactive process in the absence of political will to make substantial changes that benefit society (Organization of American States [OAS], 2017). Public administration, from this perspective, must be inclusive, democratic and responsible, considering citizens not only as taxpayers, but also as consumers, customers, evaluators and voters; derived from the above, they will be assumed as responsible and

supportive, even actively participating in the processes related to the resource (Rosas, Campos y Calderon, 2012).

In this sense, water governance in Mexico in the last 30 years has been carried out through the implementation of two different models (Musetta, 2009). The first of them characterized by a strong state, which planned and sought development through the construction of large hydraulic infrastructure works, such as dikes, dams, irrigation systems, while organizing the other actors in the economy and of the society. During this period (1960-1990), the State acts as a legitimate authority over water without a different actor being conceived. The second model, that of governance, emerges as a consequence of the neo-liberal reforms of the 1990s and is due to a change in the conception of the State as rector and organizer of the general order: a State that begins to share this role with other actors ; and various forms of state intervention are developed, but not necessarily of a withdrawal from the State and its power, so that currently the two models coexist. Thus, it is one of the mechanisms that consolidate and where the assumptions of the governance model, that of social participation, are developed.

This participation is contemplated in the Law of National Waters and allows the design of a new system of negotiation with the economic, private and civil society actors that are summoned to be part of said water management model, with the promotion by of the State. Thus, the Conagua mission, the highest national organization that has to do with water resources, focuses on managing and preserving national waters with the participation of society with a view to achieving sustainable water use. However, the implementation of this mixed model has not been without difficulties (Domínguez, 2013): problems have been detected in terms of overlapping federal and state government programs, lack of coordination or lack of infrastructure, personnel or resources for water; lack of intramunicipal communication, allocation of poor rates, lack of environmental management capabilities, among others.

The Sustainable Development Goals (SDGs) that were adopted and promoted by the United Nations Organization (UN) in 2015 gave rise to a unique opportunity for countries to promote a variety of critical issues, especially in environmental matters. Particularly, the current proposal of the sixth objective, namely: "Guarantee the availability of water and its sustainable management and sanitation for all" (Programa de las Naciones Unidas para el Desarrollo [PNUD], 2016).

Therefore, it is considered that water security is a fundamental factor in affirming and maintaining, in addition to improving, the quality of life of human beings. It emphasizes joint actions in the fields of politics, education, research and practice. In addition, it aims to improve

knowledge of the quantity, quality and use of the water resource. And to that end, it advocates the development of mechanisms that allow for the prediction, control, efficiency of the use of the resource and the establishment of a parameter so that demand corresponds to availability; coupled with improving water governance (Jimenez, 2015).

In contrast to the economic growth obtained in recent decades, we are witnessing the exacerbation of many social problems, including those related to the availability and use of water. While it is true that the infrastructure, rational use of the resource and the formation of technical agencies for its distribution continue to be of extraordinary importance to guarantee access to this asset in a sustainable way and with gender criteria, human resources are an element of great value to guarantee access to the vital liquid. Therefore, this study aims to make visible the level of water illiteracy in the municipality of Xalisco, Nayarit,

Based on the foregoing, it is suggested that the less the population is informed about the use, care and preservation of the water resource, the more the possibility of establishing routes of action for the redesign, regulation, implementation and effective evaluation of the existing mechanisms is limited. effects of promoting improvements that allow implementing a governance model appropriate to the needs of society.

Method

For the development of the study and organization of knowledge the systematic, inductive, deductive, analytical, synthetic and scientific methods were used, in addition to the documentary and field research techniques, since, due to the complexity of the problem to be faced, it demands to be observed from several dimensions. It is expected to serve as a basis for the formulation and implementation of improvements in public policies aimed at strengthening access to information, citizen participation and application of existing laws, and thereby promote the use of the resource with criteria of equity, efficiency, Efficiency and sustainability The central category of this work was water illiteracy in the population of the municipal capital of Xalisco, Nayarit.

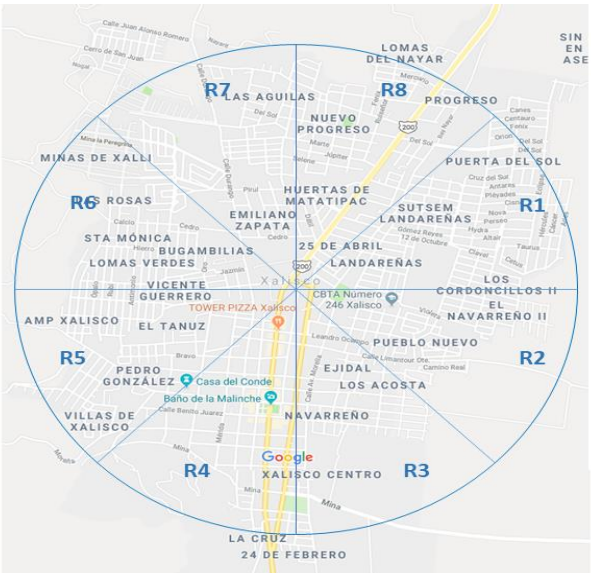
A mixed approach, an explanatory design was used and work was done at the application level. A survey was applied to a population based on a non-probabilistic sample. The above based on the geographical distribution of the municipality and for being an initial diagnosis of the problem. Therefore, it was made up of 1000 people from the municipal seat. It should be noted that the survey consisted of 65 questions distributed in five dimensions of analysis; The application

criteria were based on eight routes (see figure 1), which covered the entire geographical area, which is made up of 29 colonies.

The dimensions in which the questions were distributed are the following:

- D0. General information.
- D1. Visibility of the water problem.
- D2. Services.
- D3. Care and conservation.
- D4. Knowledge and Participation
- D5. Legal framework.

Figura 1. Distribución de rutas para aplicación en la zona geográfica



Fuente: Elaboración propia con imagen de Google Maps

Statistical analysis was performed with Dyane software version 4 and simple tabulations were performed. Likewise, an informed consent was established in order to guarantee the ethical aspects of the study, which are based on the confidentiality of the personal data of the participants, as well as the detailed information obtained through the questionnaires, which were for use exclusive to researchers and for academic purposes.

Results

According to the results obtained from the application of the information collection instrument, the following is observed:

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RICSH

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D0. General information

Tabla 1. Cuestionamientos y respuestas relativos a la información general

Sexo
451 (hombres), 549 (mujeres)
Edad
317 (18-30 años), 474 (31-50 años), 209 (51 o más)
¿Tiene conexión de potable?
968 (sí), 32 (no)
Escolaridad
18 (ninguna), 137 (primaria), 260 (secundaria), 337 (bachillerato), 248 (universidad)
¿Cuántas personas habitan su domicilio?
504 (1-3), 460 (4-6), 36 (más de 6)
¿Cuenta con jardín en su domicilio?
476 (sí), 524 (no)
¿Cuántos baños tiene su domicilio?
320 (1), 474 (2), 181 (3 o más), 25 (letrina)

Fuente: Elaboración propia

In Table 1, we observe that the majority of the population surveyed were women. The age with the highest category is between 31 and 50 years of age. Almost all have a potable water connection and the highest schooling was high school. With respect to the people who live by domicile, we find that the highest categories are between 1-3 and 4-6. Also, most do not have a garden within their home and the number of bathrooms in the home that presented the highest categories was two and one per household; however, 181 people have 3 or more and 25 have a latrine. This allows us to indicate, in the present dimension, as relevant data, that there is a high index of inhabitants per home, which represents a greater amount of water used to meet the needs of the service, together with the water used to maintain the gardens. Almost half of the population rises who do have one. Finally, with respect to the bathrooms at home, the sum of those in the category of two and three or more, is greater than the people who only have a service bathroom. In addition, there is still a population that uses latrines to meet that need, which represents an aspect to consider as part of the improvement in the services provided by the agency.

D1. Visibility of water issues

Tabla 2. Cuestionamientos y respuestas relativos a la visibilidad de la problemática del agua

¿El agua que pueden consumir las personas es un recurso que se puede acabar?
913 (sí), 87 (no)
¿Si seguimos como ahora, nuestros hijos o descendientes no tendrán agua para consumir en el futuro?
818 (sí), 182 (no)
¿Las personas que tienen servicio de agua potable en sus casas, la desperdician?
862 (sí), 138 (no)
¿El calentamiento global está reduciendo las fuentes de agua en el mundo?
870 (sí), 130 (no)
¿Actualmente hay problemas de escasez de agua potable en el mundo?
894 (sí), 106 (no)
¿Todas las personas en el país tienen acceso al agua potable?
620 (sí), 380 (no)
¿Si las persona utilizaran mejor el agua que llega a sus hogares, más personas tendrían acceso al agua potable?
863 (sí), 137 (no)
¿Hay escasez de agua en Xalisco?
786 (sí), 214 (no)
¿La problemática del agua es una de sus preocupaciones para el futuro inmediato?
817 (sí), 183 (no)
¿El agua con que se cuenta para abastecer al municipio de Xalisco se puede acabar?
841 (sí), 159 (no)
¿Conoce de dónde proviene el agua que llega a su domicilio?
571 (sí), 429 (no)
¿Conoce de qué manera llega el agua a su domicilio?
659 (sí), 341 (no)
¿Conoce en qué condiciones y calidad llega el agua a su domicilio?
620 (sí), 380 (no)
¿Cuál es el principal problema que enfrenta el mundo actualmente con respecto del medio ambiente?
716 (contaminación de ríos/mares), 284 (la falta de agua)

Fuente: Elaboración propia

With respect to the visibility of the water problem, in Table 2 it can be observed that the population clearly expresses that they are aware of those situations that put access to the vital liquid at risk; they also indicate that causes such as climate change influence the decrease in access to the resource; Also, there is a consideration for water scarcity in the municipality for the immediate

future, recognizing that access to water resources can be finite. In addition to the above, it is observed that they have knowledge of where, how and the conditions of how they obtain the water supply in their homes. Finally, they consider that water pollution in rivers and seas is a problem that impacts the environment.

Tabla 3. El resto de cuestionamientos y respuestas relativos a la visibilidad de la problemática del agua

¿Por qué o para qué considera que el agua es importante?
Considero que los seres vivos necesitamos agua para vivir (709), Es lo principal, sin agua no hay nada (423), Para la salud e higiene (383), Es necesaria para bañarse y lavar cosas (300), Es necesaria para cualquier población (297), Porque es vital para las personas (290), Para beber y cocinar (258), Porque en el cuerpo tenemos 70 % del agua y la necesitamos (220), Porque es una necesidad para nuestros hijos (208), Porque sin agua habría sequía en el mundo (124)
¿Para qué usa con mayor frecuencia el agua?
Aseo personal (806), Lavar ropa (568), Limpiar el hogar (542), Lavar trastes (534), Baño (522), Cocinar (480), Lavar alimentos (424), Regar las plantas (302), Lavar transporte (193)
Si en un futuro inmediato hubiera una emergencia y el agua escasea ¿quiénes serían los más afectados?
Toda la población (846), Las personas de recurso bajos (187), Enfermos y hospitales (112), Ancianos (90), Las personas con recursos medios (72), Niños (71), Empresas (63), Comercios (62), Las personas con recursos altos (43), Nadie (36)

Fuente: Elaboración propia

In the same dimension, it is also highlighted in Table 3, that the answers most frequently are found in the recognition of the need for the vital liquid, also considering the importance of water for any activity, including health and hygiene and domestic activities, followed if it is considered a necessity for the family and the consequences due to drought that may be represented by the lack of water resources. In addition to expressing the highest frequency for the use of water in daily domestic activities; Personal grooming is the one with the highest number. With respect to who would be affected in case of an emergency to obtain water, they express mostly that the entire population, regardless of the fact that some others point to specific groups of people such as low-income people, the sick, hospitals and the elderly. An important fact is that 36 people believe that no one would be affected if such a situation existed.

Revista Iberoamericana de las Ciencias Sociales y Humanísticas

RICSH

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D2. Services

Tabla 4. Cuestionamientos y respuestas relativos a los servicios de agua

¿Conoce cuál es el operador de agua potable y alcantarillado en su localidad?
Siapa (391), Conagua (137), Oromapas (472)
¿Cuál es la fuente de agua potable en su domicilio?
816 (agua entubada), 135 (toma comunitaria), 49 (pozo)
¿Cuál es el medio(s) de almacenamiento de agua potable?
699 (tinaco), 437 (cisterna/aljibe), 173 (pileta), 41 (tambos), 15 (garrafones o cubetas)
¿Con qué frecuencia llega el agua entubada a su domicilio?
141 (las 24 horas del día), 240 (de manera interrumpida, pero diariamente), 561 (cada tercer día), 58 (dos veces por semana)
¿Considera que el agua recibida es?
571 (suficiente), 429 (insuficiente)
¿Cómo considera que es la calidad del agua que se le suministra?
113 (excelente), 786 (buena), 101 (mala)
¿Ha percibido problemas en la calidad del agua?
Ninguno (643)
Color (164)
Olor (127)
Tiene residuos (80)
Sabor (40)
Es riesgosa (38)
¿Cómo califica el servicio que brinda el organismo operador de agua potable y alcantarillado de Xalisco?
368 (bueno), 152 (malo), 480 (regular)
¿Cuándo no tiene servicio de agua potable, de qué manera se abastece?
706 (compra servicio de pipa de agua), 294 (compra garrafones de agua)
¿Cómo realiza el pago por el servicio del agua?
462 (anualmente), 470 (mensualmente), 68 (no lo paga)
En caso de no pagar el servicio ¿cuál es la razón?
20 (no tiene tiempo para pagarlo), 10 (no tiene suficiente dinero para pagarlo), 38 (no tiene consecuencias, pues no cortan el agua)
¿Considera que el costo por el servicio del agua es?
233 (elevado), 694 (justo), 73 (bajo)
¿Pagaría una cantidad extra por la mejora en el servicio?
566 (sí), 434 (no)
¿En qué considera que se pudiera destinar el pago extra por el servicio?
484 (Mejor calidad del agua)

463 (Reparar fugas en la calle con mayor rapidez)
220 (Mejor continuidad y presión del agua)
176 (Mejora de las oficinas para atención)
¿Cuál considera que es el/los problemas más constantes en la prestación del servicio?
198 (atención al cliente), 484 (atención a fugas de agua), 455 (abastecimiento de agua), 151 (calidad del agua)
¿Ha presentado en el último año alguna reclamación en relación con el suministro del agua por alguna de las siguientes causas?
173 (problemas en el cobro), 286 (corte de suministro), 348 (condiciones en el servicio), 344 (fugas no atendidas)
¿Considera que si tuviera un medidor de consumo de agua, utilizaría el recurso de mejor manera?
882 (sí), 118 (no)

Fuente: Elaboración propia

This dimension (see Table 4) allowed us to discover that there are high levels of ignorance about the information related to the operating agency. Likewise, the source of drinking water indicated most frequently is that of piped water and the lowest, through wells. Another important aspect is that although most have water tanks as a storage medium, there are also people who use jugs or buckets because of the lack of means.

In relation to the provision of the service, the majority receive the liquid every third day, considering that it is sufficient and with good quality, although data are observed that allow determining the presence of aspects that, without a doubt, manifest problems in the quality of the Water, such as smell, color, taste and waste, therefore, there may be risks in use.

Regarding the perception of the service offered by the operating agency, it can be seen that the majority of the population finds it regular. And it is possible to establish, from this consideration, the origin of the problem that the population has to face when there is a shortage of the resource, which entails making an additional investment for the purchase of water pipes or water bottles to satisfy the needs. Consequently, it is inferred that the foregoing directly impacts the payment culture, because, although the majority pays annually, there are 62 people who do not make any payment for the service because they have no consequences. Within the situation presented, however, a favorable point stands out: the population considers that the cost is fair and would be willing to pay more for the improvement of the service, specifically indicate that this resource is used to improve water quality, repair leaks and improve continuity and pressure for supply.

Among the problems related to the service, the answers most frequently indicate attention to leaks and the supply of water resources, situations that have greater interference to submit claims to the drinking water and sewerage operating agency. An important aspect is the availability they express about the possibility of implementing water consumption meters for an adequate measurement of the use and collection of the service.

D3. Care and conservation

Tabla 5. Cuestionamientos y respuestas relativos al cuidado y conservación del recurso

¿Cuál o cuáles considera que son las razones por las que no cuida el agua?
407 (desinformación)
390 (no me doy cuenta cuando la desperdicio)
338 (desinterés)
231 (no me enseñaron a cuidarla)
152 (el servicio es económico y no hay sanciones si la desperdicio)
133 (otras prioridades)
50 (no sé)
48 (no creo que el agua se acabe)
¿Cuál de las siguientes acciones realiza para cuidar el agua?
539 (cerrar adecuadamente las llaves para que no se desperdicie)
420 (no usar agua de más)
403 (minimizar su uso)
304 (enseñar a la familia sobre el cuidado del agua)
238 (no durar mucho tiempo bañándome)
213 (cuidar el estado de las llaves o tuberías para no desperdiciar)
122 (reutilizar el agua)
79 (utilizar agua de lluvia)
¿Conoce algún método para reutilizar el agua?
525 (sí), 475 (no)
¿Reutiliza el agua?
361 (sí), 639 (no)
¿Cuál o cuáles acciones realiza para conservar limpia el agua almacenada?
642 (lavar por lo menos una vez al año el tinaco)
296 (lavar el tinaco en un periodo mayor a un año)
201 (lavar por lo menos una vez al año el aljibe)
109 (lavar el aljibe en un periodo mayor a un año)
86 (lavar por lo menos una vez al año los depósitos del inodoro)

37 (lavar los tambos o cubetas de almacenamiento cuando se vacían)
¿El nivel de responsabilidad que tiene para cuidar el agua es?
223 (máximo), 548 (medio), 200 (poco), 29 (nulo)
¿Cuáles son los motivos por los que considera que se desperdicia el agua?
567 (no hay conciencia en la población o por ignorancia)
508 (mal uso)
323 (poca importancia para cuidar el agua)
216 (falta de campañas para concienciar sobre la importancia del agua)
214 (se usa el agua para cualquier actividad)
174 (ausencia de regulación para el uso del agua)
157 (mucho uso para esparcimiento o diversión)
150 (el agua es barata)
104 (infraestructura en mal estado)
69 (no sé cómo cuidarla)
30 (el agua abunda y es inagotable)
15 (no sé)
¿Quién considera que es principal responsable de cuidar el agua?
497 (la población en general)
307 (todos los anteriores)
174 (el gobierno y los políticos)
149 (los usuarios)
83 (el organismo que otorga el servicio)

Fuente: Elaboración propia

In Table 5, it is possible to observe that the lack of information is one of the substantial aspects so that the population does not take care of the water resource, coupled with the fact that they are not yet aware of when they are wasting the liquid; Another aspect is disinterest. It is appropriate to point out that, although to a lesser extent, they also point out the fact that, since there are no real sanctions for those who incur waste or misuse, they take advantage of this circumstance to waste it. On the other hand, with regard to care, most frequencies indicate that they are pending activities to avoid wasting and taking care of it, and a small part of the population makes use of methods for the use of water from other sources such as rain. . In addition, in relation to the reuse of the resource, although they claim to know methods, these are not used. Another important aspect is the actions to maintain the storage media in adequate conditions, where the frequencies indicate that at least once a year they maintain the storage media such as water tanks, reservoirs, toilets or buckets.

In the case of the responsibility they assume towards water care, a little more than half of the population established a medium level of responsibility, followed by a maximum and little; However, 29 people point out that their level is zero.

With regard to the reasons for wasting it, the higher frequencies indicate that there is no awareness for care and ignorance about ways to care for it. Therefore, there is a bad use and little importance to take care of the vital liquid. Likewise, the lack of campaigns, lack of regulation, the use for any activity, the low cost, infrastructure in poor condition and the thought that it is inexhaustible are causes to waste it. Finally, they consider that the main person responsible for care is the same population, followed by the Government and politicians, users and the body as a whole.

D4. Knowledge and participation

Tabla 6. Cuestionamientos y respuestas relativos al conocimiento y participación

¿Considera que conoce información suficiente para cuidar y preservar el agua?
390 (sí), 610 (no)
¿Conoce el portal de información de OROMAPAS?
239 (sí), 761 (no)
¿Considera que es necesario que el gobierno municipal implemente campañas de información para cuidado del agua?
814 (sí), 186 (no)
¿Ha consultado información acerca de la situación de la problemática del agua en el mundo?
381 (sí), 619 (no)
¿Conoce el alto riesgo en que se encuentra nuestro país en los próximos años para abastecer de agua a la población?
532 (sí), 468 (no)
¿Estaría dispuesto(a) a participar en pláticas o actividades para informarse acerca de los temas relacionados con el agua?
770 (sí), 230 (no)

Fuente: Elaboración propia

In the knowledge and participation dimension (see Table 6), it highlights that they do not have enough information to carry out activities that allow them to care for or preserve water. Likewise, they do not know the official means to obtain information from the operating agency, and also point out the importance of the municipality implementing information campaigns. Another aspect to highlight is that in a local context they have knowledge of the problem of water resources, therefore, they are aware of the risk in our country for water supply; However, in a global context there is a lack of knowledge of the subject.

D5. Legal framework

Tabla 7. Cuestionamientos y respuestas relativos al marco legal

¿Conoce las leyes relacionadas con el agua para nuestro estado?
179 (sí), 821 (no)
¿Conoce las leyes relacionadas con el agua para el municipio de Xalisco?
132 (sí), 868 (no)
¿Ha consultado alguna vez las leyes existentes en materia de agua para nuestro estado o municipio?
187 (sí), 813 (no)
¿Considera importante que existan leyes, normas o reglamentos que regulen de forma estricta el consumo de agua?
755 (sí), 245 (no)
¿Considera importante que las autoridades cumplan las leyes existentes en materia de agua potable y alcantarillado?
868 (sí), 132 (no)
¿Considera importante que los usuarios cumplan las leyes existentes en materia de agua potable y alcantarillado?
889 (sí), 111 (no)

Fuente: Elaboración propia

Finally, Table 7 shows, with respect to information related to the legal framework, a very high level of lack of information or consultation on the existence of regulations. However, it is important for the population that exists, as well as for the authority to comply with its application. Likewise, that the user also complies with that stipulated in the regulatory framework.

Discussion

Because the term water illiteracy is not commonly used in current studies, references refer to environmental education. The spectrum of this, however, encompasses endless problems. As we have seen, the present project is limited to the water resource, and the results indicate that the population is not informed about those aspects that are related to water. Therefore, this limits the action of the population and the Government itself through the drinking water, sewerage and sanitation operator of the municipality of Xalisco, Nayarit, for the use, care and conservation of the resource, in addition to the possible implementation of a governance model that meets the needs of demand. It is suggested that in future studies the 43 localities be considered, in order to have a complete overview of the problem in the municipality.

According to the Unesco International Hydrological Program, the present study contributes at the local level in the identification of possible routes of action for the fulfillment of the specific objectives that indicate the importance of developing new strategies of water education in the communities (Organization of the United Nations for Education, Science and Culture [Unesco], 2016). On the other hand, an approach to this study is found in the master's thesis entitled Towards a sustainable culture of water in the adult population of the municipality of Naolinco, Veracruz, developed by Araceli Mora Castillo (2016), where it stands out that most of the Population surveyed (a sample of 416 people) is not considered responsible for finding or collaborating in the solution. Respondents also state that those who participate because they consider themselves responsible think that such participation will not influence a substantial change. In this sense, we found a substantial difference in the findings of our project, where the population does recognize their responsibility and considers their participation in informative activities or campaigns for the care and conservation of the water resource. On the other hand, there is a coincidence in the consideration of education to promote a change in attitudes, values, beliefs and ways of life to move towards a culture of water (Mora, 2016).

Another study published in the Mexican Journal of Public Opinion of Márquez and Ortega (2017), “Social perception of the drinking water service in the municipality of Xalapa, Veracruz”, developed a survey that was applied to 280 people from the Xalapeña community, and It presents among the results the majority acceptance of the agency that provides the service, although areas of the service were identified as vulnerable, so it is proposed to develop strategic actions for a better quality in the service. In relation to the results of our research, we found similarities in the perception of citizenship with respect to the variables analyzed in the study indicated. However, the difference in variables does not allow us to establish an analysis beyond how they visualize the service provided by the agency (Márquez and Ortega, 2017).

With regard to access to water, the authors of the project entitled "Access to water for domestic use in the case of Berriozabal, Chiapas", published in 2016 in the Mexican Journal of Agricultural Sciences, surveyed 1099 domestic groups, and noted among the results that Access to water in rural areas is greater than in urban areas, where they must buy pipes or extract wells to cover domestic needs. A relevant fact is that the water comes from springs, therefore, rural areas have access to the water resource. In reference to our research, the water supply is mostly through the infrastructure of the operating agency, however, there is also a part of the population that

extracts it from wells and, in most cases, when there is shortage they require buy water pipes or jugs to meet demand (Gutiérrez, Ayala, Zapata, Salvatierra y Nazar, 2016).

Finally, it is appropriate to mention that, according to the results, co-responsibility becomes a fundamental aspect for the care and preservation of water resources. However, the participation of society requires an action carried out jointly with the municipal government through public policies established and based on water governance and governance (National Water Commission [Conagua], 2014). This challenge can be faced from the decrease in water illiteracy and the involvement of all actors related to water issues, such as government, private sector and community. With this, the policies that have an impact on human development may be impacted; empower communities and citizens; collectively agree on both common problems and how they should be addressed; measure and evaluate the impacts that public policies have on human development, in addition to promoting active participation for the conservation of water resources.

Conclusions

Water illiteracy is a reality present in the surveyed population of the municipality of Xalisco. Undoubtedly, the characteristics related to housing conditions represent a substantial aspect to consider possible action scenarios regarding how to solve the demand for water resources. In addition to this consideration, the lack of information related to services, care and conservation is evident, as well as alternative methods for obtaining water. Although the results indicate that the population has information on the problem of water, which can put the access to vital fluid at risk, it is necessary to strengthen access to information for the entire population. This with the purpose of substantially impacting the perception of the reality that exists in the municipality, the country and the world on access to water.

A relevant point is also the little information on the operating agency that provides the service to the population, and that there is still part of the population that is supplied from wells. Undoubtedly, it is noted that the means used for storage can be considered adequate. However, it will be necessary to establish criteria of attention for that population that currently uses unsuitable means such as garrafones or buckets. In addition to the above, the supply presents deficiencies that generate nonconformity in the population, therefore, this has a direct impact on the culture of payment, which substantially affects the income of the agency, and, by not applying the existing regulation in such a way that the population is subject to the consequences, it will continue to evade

the responsibility that comes with the provision of the service. However, we found acceptance for the implementation of water consumption meters, which would favor an adequate measurement of the resource used and, therefore, the collection in a more objective way.

In addition, the lack of information in the population generates an attitude that results in the lack of care and conservation of water, therefore, the implementation of campaigns is required to assume the corresponding responsibility and that these promote citizen participation. It is also important to note that the information must be accessible to all types of population, that is, from traditional media to digital media; The main purpose is to provide an overview from the international, national, regional and local contexts on water issues, existing legislation and the corresponding sanctions. The foregoing in order to influence the way they perceive it, in addition to promoting the generation of a more active and appropriate participation to the needs to strengthen the culture on water in the population. Finally, what is required is a responsible decision to make necessary changes. Water illiteracy forces us to promote an education for care and a new culture of water. The above based on a new scale of values, perception of nature, ethical principles, lifestyles and a cultural change brought about by those responsible for the management of water resources.

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