

## Water utility networks in the COVID-19 era

### Research Article

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**Abstract:** The public services have been the objective of research in the literature on governance since it was proposed to conceptualize them as common goods and thus be able to anticipate scenarios of collaboration and solidarity, but in the case of water supply and the payment of tariffs the panorama is complex since in the more developed cities the policies of tariff increase have been favorable while in the suburbs and rural areas it has been a catastrophe. The objective of this paper is to discuss such issues, investigating the contributions of literature and its proximity to the meanings of the actors. A non-experimental, cross-sectional and exploratory study was carried out with a non-probabilistic selection of informants from different sectors. An integral meaning that would contribute to governance was found, but the type of study, sampling and analysis can only be applicable to the interviewees, suggesting the inclusion of other more complex categories such as hyperopia and helplessness.

**Keywords:** Structure, model, variable, correlation, consumption

## Introduction

Until May 2022, the pandemic has been related to 20 million deaths if deaths from atypical pneumonia are counted. The impact of the pandemic on public services was documented in the literature during the period of the pandemic from 2019 to 2022. In the case of the effects on water services, the following stand out: scarcity, unhealthiness and high cost. The consulted literature addresses the water problems from the agenda, the framework, the intensity and the participation. Agenda setting consists of media bias regarding water issues. The frame consists of the bias of the media regarding topics of discussion. Intensity is the impact of media biases on audiences. Participation suggests the influence of electronic networks in traditional media regarding residential water use.

The objective of this work was to interpret the discourses to understand the narratives around the meaning of local water

services, considering a review of the literature in international repositories such as Dialnet, Latindex, Redalyc and Scielo.

What is the meaning of the discourses and narratives around local water services in residents with a context of scarcity, shortage, unhealthiness and famine?

Simplicity assumption: The meaning of the discourses and narratives around water services is associated with a symbol of scarcity, lack of supply, unhealthiness and famine that will legitimize civil mobilization for the defense of the right to water.

Complexity assumption: The meaning of the discourses and narratives around water services is associated with a symbol of abundance and scarcity, supply and shortage, unhealthiness and potability, as well as scarcity and subsidy or forgiveness that legitimizes the differences between the actors, politicians and civilians, public and private sectors.

## Theories of water services

The present work exposes the EPS to discuss the inclusion of exogenous variables in reference to endogenous variables through theoretical and structural models. EPS are described considering the Ibero-American context in which they were carried out. The work reviewed specialized studies on the impact of local policies on residential water consumption, mediated by psychological factors such as perceptions, dispositions, motives and intentions in order to be able to generate a conjunctural panorama and participate in scenarios of conflicts between the actors (Juárez et al., 2018)

The Psychological Studies of Sustainability (EPS) suggest that the associations between situational, cultural, cognitive and behavioral variables show their dependency relationships that, for the development of Environmental Social Work (TSA), built from objective indicators, would complement their research and intervention models (Sandoval et al., 2018).

In this way, the EPS carried out in Mexico show that the reasons for saving water are associated with dosage behaviors. To the extent that users of the public supply service want to pay less for the volume consumed, they develop skills and styles of austerity. The discussion around the EPS will allow the establishment of a consumption rate system based on the correlations between water situations and consumption styles, thus contributing to the construction of models for the TSA (García, 2018).

Within the framework of Sustainable Development, Social Work has established areas and fields of intervention around which social services have been developed, mainly those related to water care with respect to quality of life and subjective well-being, determinants of evaluation of public policies, environmental programs and attention strategies for migrant communities (Quintero, 2018).

In this scheme, Environmental Social Work acts as a mediator of supply policies and civil demands considering the limitations

of space, time and infrastructure, but the generality of its dimensions, categories and variables inhibit the analysis of the subjectivity inherent in the objective indicators. of sustainability. Therefore, it is necessary to delve into the psychological, cognitive and behavioral dimension, in order to be able to establish the needs, expectations, demands and individual or community capacities in the face of environmental crises and the shortage of water resources (García, 2018).

Psychology has devoted itself to the study of the relationships between water availability per capita and water consumption. The Psychological Sustainability Studies (EPS) have shown significant associations between the amount of water supplied and waste or savings according to volume per capita. EPS have also established relevant associations between cultural and cognitive factors. Based on the aforementioned findings, the EPS have opened the discussion regarding the cost of the public drinking water service estimated by conventional tariff criteria in which the inclusion of dispositional, situational, cultural, cognitive and behavioral factors would make the collection system more efficient, sanctions and subsidies.

The logic of the EPS would also affect the design and implementation of public policies that allow the financing of Government Public Action (APG) in the face of the increase in the problems of water scarcity, shortage and unhealthiness. Based on causal and correlational diagnoses, the EPS propose theoretical-structural models that make it possible to increase or decrease the consumption rate considering the causal and associative relationships between the variables involved.

The statistical bivariate correlation estimated with Pearson's "r" parameter allows an abstraction of the concrete relationships associated with a variable X and a variable Y. The strength of association between a variable X and another variable Y is known as correlation. It is an analysis in which the associated relationships between the variables that make up a cultural, social, community, economic, political, institutional, corporate, educational or family structure are established.

This structure is evidenced in a model in which the variables and constructs explain the influence of the structure on individuals. The model is built from the associated relationships between the variables to infer their causal relationships. Regarding water scarcity, the exogenous and endogenous associations between values, beliefs, perceptions, attitudes, abilities and intentions, guide its modeling as determinants of water waste or saving.

However, the EPS seem to be oriented to the establishment of tariffs by considering water as a resource and users as consumers. In a supply system, the State provides public supply services without considering the availability trend per capita. In other cases, the administrative authorities discretionally determine consumption rates. The EPSs have established significant relationships between intermittent supply and the austere use of water. However, such findings are unrelated to the rate systems since the research projects have not considered the possibility of exploring the conformity or non-conformity of the users with respect to the public service and the local environmental policy carried out by their rulers.

Precisely, exposing the scope and limits of the EPS regarding water problems will open the discussion regarding conflicts between authorities in charge of providing the drinking water service and users who receive a lower volume compared to other localities and regions.

Within the framework of Sustainable Development, the water problems of scarcity, irregular supply and unhealthiness seem to be sufficient to inhibit water comfort defined as the minimum volume per capita to carry out activities and satisfy basic needs associated with capabilities, skills, skills and knowledge will allow humanity to overcome the thresholds of extreme poverty and their inclusion in public services will be an indicator of local and regional development.

From the findings reported in the state of knowledge of the EPS, it is possible to outline the axes and topics of discussion for Environmental Social Work and to be able to contribute to the

construction of an agenda on municipal housing and water services to increase quality of life, subjective well-being and social responsibility.

Public services oriented towards sustainability can be analyzed from a logic of centrality and periphery.

From this nomenclature, it is possible to notice that Sustainable Development is a central issue or node that involves climate change, global warming, the greenhouse effect and carbon emissions as environmental factors that have a direct impact on the quality of the environment. air and respiratory health in economically developed cities and economies, but in addition to air pollution, water and municipal waste problems are central issues in the economic and urban periphery because the natural resources of the southern hemisphere they are transformed into satisfiers for the northern hemisphere, as is the case of crude oil and its derivatives (Abramo, 2012).

In this system of centrality and periphery, the psychology of sustainability seems to be divided into two aspects in which the psychology of the South tries to understand and explore the knowledge and rationalities, spaces and risks that derive from the impact of the exploitation and transformation of the nature on the lifestyles of the communities (Acosta, 2010).

For its part, the psychology of sustainability in the northern hemisphere is more concerned with describing and explaining the effects of climate change on management, innovation and entrepreneurship networks that are developed in developed economies than in emerging economies.

In the northern hemisphere, the psychology of sustainability began the description of the quality of the environment and environmental awareness to arrive at the study of trajectories and structures of variables in equation models in order to predict unfavorable behaviors or those linked to sustainability, equity and happiness (Behancourth, 2010).

The models of structural equations, trajectories, structures and disturbances had their antecedents in correlation and regression

studies from which the associations that allowed the modeling of dependency relations between variables were established (Blunda, 2010).

Although structural equation models are based on covariances, correlations and regressions allowed the specification of models (Carosio, 2010). For this reason, in a sustainable development scenario, the agents around the central node of knowledge interact to shape a balanced system where centrality depends on the periphery, north from south, and east from west.

However, the state of knowledge tends to configure a descriptive network of environmental problems, although the studies are also oriented towards the explanation of trajectories and structures in which the themes are integrated into models in order to be able to anticipate the effects of the problems. in the psyche and behavior.

Thus, a review of psychological studies on sustainability from 2010 to 2014 shows that values, perceptions and beliefs are the determining variables of consumption. In this sense, the three variables are considered exogenous to attitudes, intentions, skills and use (Corral, 2010).

Values imply relationships of interdependence between nature and communities (biosphereism), rooted relationships between groups based on ecosystem diversity (communitarianism), competitive relationships between human beings (individualism) based on the scarcity of resources and balanced relationships between generations (sustainability) based on the austerity of current humanity, future technologies and the availability of resources (Nozica, 2011).

Perceptions denote involuntary exposure to risk, the absence of control of the situation (uncertainty) and skepticism towards the information generated by civil protection institutions (Quiroz, 2013). In this sense, the perception towards normal and strange risk situations is explicitly represented from experiences and non-experienced information (Sharples, 2010). Therefore, it implies indication of danger, prevention, contingency, management and protection; expectation that determines an

action, and quick solution reaction (Barkin & Lemus, 2011). They can be defined as an immediate and simplified response to the dangers and uncertainties that determine judgments, decisions and behaviors (Bertoni & López, 2010).

Beliefs are presented as disorienting (dominant social paradigm, paradigm of the human exception, anthropocentrism, materialism, progressivism and utilitarianism) and as guiding (new environmental paradigm, conservatism, ecocentrism, naturalism and austerity) of human behavior towards the protection of the environment. Environment (Corral & Domínguez, 2011).

The beliefs that prevent sustainable development denote that human behavior and economic growth are exempt from the laws of nature and therefore such growth is only determined by technological progress (Duerden & Witt, 2010). In contrast, the beliefs that favor sustainable development imply the rethinking of anthropocentric visions, the establishment of limits to economic growth, the importance of ecological balance, the necessary sustainable development (Flores & Parra, 2011).

The beliefs about the supremacy of human needs over the processes of nature, the consequent conception of the balance or imbalance of human needs with the processes of nature and the consequent unlimited or limited economic growth, are presented with a different degree inter culturally, economically and generationally (García & Corral, 2010).

## Studies of water services

The status of research on the psychological effects of water services in cities warns: 1) the prevalence of an asymmetric relationship between the rulers and the ruled with respect to risk perceptions in the face of water scarcity and shortages; 2) the defenselessness of the vulnerable sectors around the supply, subsidy and forgiveness policies; 3) the extrinsic motivation of users with respect to the increase in fees and penalties—

(See Table 1).

**Table 1.** Study of water services

	Author	Findings
2010	Mcright	Political ideology and perception of understanding negatively determined knowledge about climate change and concern about its consequences on gender ( $\beta = -0.372$ and $\beta = 0.336$ , respectively).
2010	Sharples	The main source of information on climate change was television news (23.9%), food and beverages were the most consumed by the sample (83.8%), light bulbs were the object most used to combat climate change climate (88.7%),
2010	Hidalgo and Pisano	attitude was related to knowledge ( $r = 0.454$ , $p = 0.001$ ), self-efficacy with knowledge and attitudes ( $r = 0.303$ and $r = 0.882$ , $p = 0.001$ respectively), risk perception with knowledge, attitude and self-efficacy ( $r = 0.475$ ; $r = 0.589$ ; $r = 0.547$ ; $p = 0.001$ respectively), intention with knowledge, attitude, self-efficacy, perception and intention ( $r = 0.206$ ; $r = 0.317$ ; $r = 0.390$ , $r = 0.382$ ; $p = 0.001$ respectively). Risk perception was determined by attitude ( $\beta = 0.305$ ; $p = 0.000$ ) and intention was influenced by self-efficacy ( $\beta = 0.259$ ; $p = 0.001$ ).
2010	Jimenez	They established three factors of the four possible dimensions. The first factor explained 46.4% of the variance while the second factor explained 28.6% of the variance and the third factor explained 25.15% of the variance. They established differences between men and women [ $X^2 = 10.088$ (2gl) $p = 0.007$ ], by years [ $X^2 = 176.77$ (8gl) $p = 0.000$ ] and habitat [ $X^2 = 21.657$ (6gl) $p = 0.001$ ]
2010	Gissi & Soto	The appropriation of the space is carried out from the tequio, which is the personal work carried out by a member before entering the guatza or community work.
2010	Molini & Salgado	Regarding the discussion of the differences between compact and dispersed cities, population density is a relevant factor since the low concentration in compact cities makes them more sustainable than dispersed cities, but their high density increases costs to the government entity. Responsible for regulating it. Such a panorama affects the creation of single-family houses because they are produced in communities with more than 500 thousand inhabitants and put pressure on the availability of resources.
2011	McCright & Dunlap	Beliefs about the null effects of climate change determined confidence in white men with conservative ideology ( $\gamma = 0.82$ , $p = 0.000$ ). On the other hand, the basic political ideology determined the denial of the effects of climate change ( $\gamma = 0.47$ ; $p = 0.000$ ), race determined the belief about the lack of consensus on the effects of climate change for conservative whites ( $\gamma = 0.38$ ; $p = 0.000$ ), however, gender had a negative effect on the belief in the null effects of climate change in the base respondents ( $\gamma = -0.67$ ; $p = 0.000$ ) as well as the identification with the environmentalism on the same belief in the same group ( $\gamma = -0.81$ ; $p = 0.000$ ).
2011	Touginha & Duck	Ecological behavior correlated with age ( $r = 0.30$ ) while ecocentric beliefs were related to universal values ( $r = 0.20$ ). On the other hand, age and universal values determined ecological behavior ( $\beta = 0.24$ ; $\beta = 0.21$ ; $p = 0.001$ respectively).
2011	Nacif & Espinosa	They found a relationship between national identity and urban pragmatism of central spatial rearrangement and architectural designs. The buildings represented symbols of national reconstruction that would spread to other pampas and South American cities; Brazil, Peru, Colombia and Venezuela. The architectural proposals of the time proposed greater mobility from east to west, trying to integrate the periphery with the center. In this way, the countryside would be articulated with the city and the water systems could have a better use, although the mining region was increasingly separated from public services. In such a scheme, the railways were essential to incorporate the primary, secondary and tertiary sectors. For this reason, the warehouses had to be transferred to the agro-industrial zones. Due to the fact that the city was devastated by an earthquake and the shelter spaces were null or insufficient, recreational parks were designed that fulfilled the seismic and recreational spatial function. To avoid transport clumping, the construction of an arch was proposed. Regarding the neighborhood reorganization, the creation of neighborhoods of 15 blocks in rented spaces guaranteed the socio-spatial control of the State. Other proposals consisted of concentrating citizens in multicultural areas to avoid segregation. Two issues were fundamental: environmental conservation and the privatization of the territory.

2011	Malmod	He systematized the reorganization plans based on a logic of exclusion and inclusion. The first consisted in differentiating the spaces; privatization of goods and services. In contrast, the second proposal consisted of establishing connections between sectors, spaces and services to reduce spatial segregation. The logic of inclusion implies a design of networks in which each node is interconnected with one another and allows the interrelation between spatial elements, as well as the construction of an urban identity that favors tolerance of diversity.
2011	Nozica	The tourism policy will encourage the connection between bi-oceanic and peri-urban corridors. For this purpose, the desirable scenario will consist of a road network that articulates both areas. Such a strategy will increase the competitive advantages in terms of tourist, technological and commercial services in the region.
2012	Markowitz	They established differences between ethical, non-ethical and undecided regarding their concern ( $F = 102.52$ ; $p = 0.000$ ), risks ( $F = 51.68$ ; $p = 0.000$ ), consensus ( $F = 26.83$ ; $p = 0.000$ ), efficacy ( $F = 34.67$ ; $p = 0.000$ ), responsibility ( $F = 69.41$ ; $p = 0.000$ ). Environmental intentions were determined by beliefs ( $\beta = 0.506$ ).
2012	Cravino	He found a degree of risk perception in Buenos Aires residents at the time of migrating to the periphery. In this sense, the perception of the habitat is related to the services and investments that the State has oriented towards centrality. Another factor in the perception of housing is spatial socialization, since a change of neighborhood implies the loss of social capital. Renting is a phenomenon closely related to the expectations of appropriation of space since a good root guarantees permanence in the neighborhood and the establishment of a higher quality of life. The proximity between the houses has led to the development of a spatial identity that increases reciprocity and even the transformation of the environment.
2012	Cave	Four indicators of the symbiotic were; accessibility. Mobilization, exchange and appropriation. In the first, pedestrianization is the public strategy to dilute segregation and encourage the inclusion of visitors in events in public squares. In the second, the spaces are equipped with furniture that allows coexistence and the exchange of ideas for the symbolic appropriation of the space. Collective transportation is based in these spaces and this facilitates the transit from passage to pedestrian or recreation. In the third, the construction of a church, town hall, banks, restaurants and other businesses facilitate social exchange. Finally, the appropriation of space is the result of accessibility, mobilization and exchange. Public squares are centers of meeting, coexistence, commerce, transportation and recreation.
2012	Urquieta & Campillo	They established a relationship between economic resources and social stratification with respect to the representation of the city. The lower classes perceived centrality as an insecure area. The middle classes were concerned about the expansion of the city and its effects on the environment. Regarding the expectation, they expressed an ideal of a city in which the spaces would allow coexistence as an element of inclusion; recovery of spaces, tranquility and enjoyment. Regarding the right to the city, it was represented as a scenario of freedoms in which access to employment, education and universal health are essential.
2013	Vinnetta & Maharaj	Self-transcendence was positively and significantly related to attitudes towards oneself (0.73).
2014	Carreon,	They established three axes of discussion around the appropriation of spaces and water services, as well as with respect to the formation of participatory citizenship in local decision-making, focused on observation and proposals for co-responsibility.
2015	Carreon et al.,	They established the direct, positive and significant association between attitudes and intention to vote in favor of proposals for the conservation of natural resources in the framework of federal presidential elections.
2015	Garcia et al.,	The state of the issue was reviewed around the establishment of a local agenda on water sustainability, focused on rates and quality of service, concluding that management has been overtaken by demand and municipal collective action.
2015	Garcia, Carreon & Quintero	They defined the institutional agenda based on criteria of consensual management of water resources and services in order to establish the axes of discussion focused on the low availability and growing demand for water, shortages and conflicts between political and social actors. .
2015	Garcia et al.,	They established significant differences between coffee growers with respect to their expectations of risk in the face of the effects of climate change on food security, mainly the local farmer, as is the case of floods, droughts or landslides that affected agricultural production and local and regional trade.
2016	Garcia et al.,	They found two factors related to the quality of the drinking water supply service and the system of tariffs, subsidies and forgiveness in the framework of future elections, the results anticipate a scenario of electoral contest focused on the promise of regular supply and reduction of tariffs. , increase in subsidies and forgiveness in exchange for the electoral support of the party or candidate to govern the demarcation.

2016	Garcia et al.,	They reviewed the literature concerning the management and administration of municipal water resources and services, establishing axes of discussion and sociopolitical analysis scenarios around co-responsibility in water preservation, but highlighting the asymmetries between the political and social actors with regarding social responsibility and the establishment of a public agenda.
2016	Garcia et al.,	Premises related to the establishment of a local agenda were established regarding the social representations of peri-urban residents around the collection system and public supply of drinking water, finding a prevalence of conflicts between political and civil actors.
2017	Garcia et al.,	They found significant differences between groups structured according to sex, age, income, marital status and length of residence with respect to stress and resilience in a context of floods due to the overflow of a river near the study community, classified as vulnerable to effects of climate change on environmental public health.
2017	Sandoval et al.,	They established the reliability and validity of an instrument that measures the perception of risks, stress and resilience, finding that age determined the perception of risks and this, resilience. In other words, older adult residents develop a greater perception of risk that anticipates them to face the contingencies of the environment to the extent that rains, floods or landslides are exacerbated.

**Source:** Elaborate with literature review

In this framework of politics and collective inaction, psychological studies have advanced towards the establishment of an agenda focused on governance, an equitable system of rates and co-responsibility materialized in eco-taxes, but it detaches from identity, attachment and sense of community.

The psychology of water sustainability has established three axes of discussion around the governance of water resources and the corresponding municipal services, centered on the presumption of public and private goods as the cause of the formation of consumers and equity as an effect. of co-responsibility in urban projects of large or compact cities (García, et al., 2014).

Psychological studies of regional water sustainability indicate that the risks associated with the effects of climate change on the local farmer generate a system of strategies focused on loss prevention, since financial resources disentail threats do not include natural disasters (García et al., 2015)

The psychology of local water sustainability, focused on the effects of climate change on local food security, warns that risk perceptions in coffee growers intensify to the extent that droughts, floods and landslides prevail, which affect local agricultural production. and reduce the entrepreneurial and

commercialization capacities of migrants in the Huasteca region of central Mexico (García et al., 2015).

Psychological studies of local water sustainability warn of a growing demand, but a significant reduction in the availability and quality of water services in the framework of local tandem policies, conflicts between users and authorities, as well as the emergence of indicators of corruption such as the deterioration of the facilities, the prevalence of leaks and the sale of water (García et al., 2015).

The psychology of sustainability has shown that municipal policies for supplying and charging for water services are not centered on an agenda of co-responsibility, but on an agenda of growing supply in response to local market demands (García et al., 2015).

The psychological studies of sustainability have been disseminated in the public agenda based on criteria of co-responsibility in decision-making and in actions aimed at the conservation of municipal water resources and services, but based on the asymmetries in terms of access and dissemination of issues in the media, the rulers have a greater penetration and interference in the establishment of issues such as the increase in rates and the promotion of voting through policies of subsidies and forgiveness (García et al., 2016 )

The psychology of sustainability has shown that the associations between factors exogenous to the lifestyles and behaviors of the users of the public supply system are related, but not in a specific or direct sense, but rather are generally mediated by the local policies such as the system of fees, subsidies and forgiveness (García et al. 2016)

The psychological studies of sustainability warn that the relationships between cultural variables (values) and ideological variables (beliefs) are the axes of discussion in the local public agenda. That is to say, it is considered that both culture and ideology influence the individual through the values and beliefs that are amplified in the discourses of the people and that the individual captures, learns and reproduces in a specific situation (Gissi & Soto, 2010). In this sense, the irregular supply of water characteristic of modern cities and peripheral cities is associated with values and beliefs regarding its exclusive availability for human consumption or its shared availability among species (Hernández & Jiménez, 2010).

The psychology of water sustainability warns that, at the local and municipal level, the prevalence of social representations focused on water scarcity as a result of local corruption explains the sociopolitical identity that is distinguished by its high degree of farsightedness and helplessness (García et al., 2016).

Collectivist societies such as the Asian, Latin and Eastern European ones are characterized by lithospheric-altruistic values and egocentric beliefs that favor caring for the environment by considering it as their habitat and the species as their fellow sisters of coexistence (Hidalgo & Pisano, 2010). Regarding unhealthiness due to deficient or non-existent hydrological infrastructure, communities and popular neighborhoods show solidarity for the self-care of children (Izasa & Enoa, 2010).

To the extent that unhealthiness increases, community solidarity also increases. European and North American societies, in contrast, are characterized by individualistic values and anthropocentric beliefs. Even in collectivist migrant groups

residing in these societies, a change in values and beliefs is observed that brings them closer to individualism and anthropocentrism (Jaén & Barbudo, 2010). The availability of water, associated with the values of overexploitation and the beliefs of abundance of the resource, guides the elaboration of a model in which the increase of the two cultural and ideological variables is evidenced to the extent that the information on the abundance of water (Kalantari & Asadi, 2010).

The influence of the individualistic and anthropocentric social structure is also observed in the countries with emerging economies (Brazil, Russia, India, China) that will be developed in the coming decade. These are economies that move from collectivism to individualism, from biosphereism to industrialism, from ecocentrism to anthropocentrism (Londoño & Cardona, 2011). Economic growth is associated with public investment in hydrological infrastructure. The energy and hydrological projects are correlated with the needs of the cities. The investment around the public water service is associated with the increase in the population in the cities, its dimensions, services and migration (Manríquez & Montero, 2011). Water consumption registers an increase in its rates associated with scarcity in peripheral neighborhoods (Martínez & Montero, 2011). The shortage of water linked to unsanitary conditions and implicated in epidemics increases infant deaths.

Psychological studies of sustainability, focused on the relationships between spatial variables (designs), economic variables (risk and utility), educational variables (knowledge) and individual variables (attitudes, skills, intentions, behaviors) have shown that The effects of climate change on environmental public health are centered on the high levels of stress and resilience, which reflect the asymmetry between civil protection policies and the collective actions of vulnerable groups such as communities and neighborhoods affected by floods, landslides or flooding (García et al., 2017).

In the case of community resilience, understood as a response shared by a group of people facing a common extreme situation, this was mostly observed in groups of older adults with respect



to landslides, floods and storms, indicators of the effects of climate change on local public health (Sandoval et al., 2017).

The psychology of water sustainability has shown that attitudes, in terms of dispositions against or in favor of local nature conservation policies, is a determinant of decision-making centered on the preference and intention to vote for candidacies and parties oriented towards conservation. Social responsibility (Carreón et al., 2015)

Studies on the influence of buildings on individual perception have shown that aesthetics, functionality and design have a direct, positive and significant effect on customer satisfaction (McCright & Dunlap, 2011). Subsequently, studies on the influence of masses inside buildings on human behavior showed that overcrowding, noise or density are factors that determine customer stress (Milfont & Duckitt, 2010). Finally, studies on the influence of events inside buildings on individual cognition have shown that people form attitudes towards events, buildings, and spectators (Montalbetti & Chamarro, 2010). Buildings linked to hydrological biosafety (drinking water reserves) demonstrate the relevance of health policies, epidemic contingencies, pandemic catastrophes, competition for resources, and community solidarity (Montalvo & Chábves, 2011).

In industrial economies with neoliberal policies, polluting behaviors have been associated with utilitarian perceptions, rational attitudes, and technological knowledge (Touguinha and Pato, 2011). Hydrological projects are designed to increase personal utility rather than social utility. That is, the drinking water service is only available for those areas that can pay the cost of the service (García, 2014). In post-industrial economies with social policies, conservative behaviors have been linked to risk perceptions, affective attitudes, and social knowledge. Hydrological projects are linked to services of all kinds. It is about supplying commercial areas linked to tourism (Zapata & Castrechini, 2011).

In informational economies with sustainable policies, ecological behaviors have been linked to perceptions of

responsibility, global attitudes and organizational knowledge. Hydrological projects are linked to sustainable regulations that require equitable hydrological availability between areas and species (García, 2012).

From associative studies, both exogenous and endogenous, economic, political and social structures that influence individuals have been abstracted (Leff, 2010). The correlation analyzes show the consumption models that blame individuals for the global deterioration and place isolated actions as the solution to the global problem. In the face of environmental scarcity, shortages and unhealthiness, it is argued that environmental education is the indicated action to prevent such situations and eco-taxes (fines and incentives) are effective fiscal strategies for sustainable development (García, 2011).

Associations, both exogenous and endogenous, guide the design of structural theoretical models. A causal relationship between a variable X and a variable Y underlies an exogenous association between a variable W and a variable X. Or, the determinants of a variable Z underlie the associations between W, X and Y. That is, from causal relationships are inferred from associations. If there is a significant association between the independent variables, there may be causal relationships between them. If there are spurious associations between the independent variables, there may be causal relationships with a dependent variable. A positive and significant correlation between scarcity, shortages and environmental unhealthiness allows the elaboration of a model in which water saving is determined by the three environmental situations. A negative and significant correlation between the three variables allows a design in which the waste of water is the expected effect. A spurious correlation between the three environmental situations guides the design of a model in which other variable situations would be explaining the waste or saving of water.

## Method

A documentary study was carried out with sources indexed with ISSN and DOI registration in international databases

(DIALNET, LATINDEX, REDALYC) in order to establish the central issues on the water agenda. Subsequently, the information was processed in content analysis matrices to specify the relationships between variables that would contribute to the intervention of Social Work in situations of scarcity, shortage, risk and uncertainty.

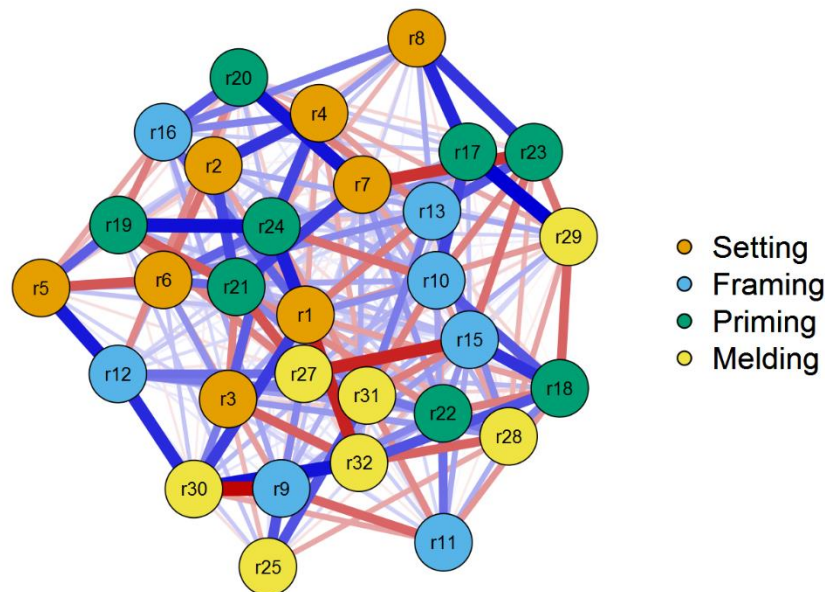
Once the axes and topics of the agenda in terms of water services were established, a second cross-sectional, exploratory and comprehensive study was carried out with a non-probabilistic sample of 10 informants, considering their experience in intermittent, regular and negotiated supply.

The Delphi technique was used, which consists of: 1) synthesizing the selected discursive extracts, 2) inferring their meaning; 3) contextualize the speeches; 4) compare the scenarios and 5) integrate the data.

The data was captured in excel and processed in JASP version 15. The parameters of structuring, centrality and grouping were calculated. The values close to zero allowed the non-rejection of the null hypothesis regarding the significant differences between the theoretical structure with respect to the appreciations of the present work.

## Results

Figure 1 shows the meanings around the discourses and narratives that have focused on the availability, supply and rates of water services without assuming the consequences of the system on environmental public health, as is the case of waterborne diseases. .

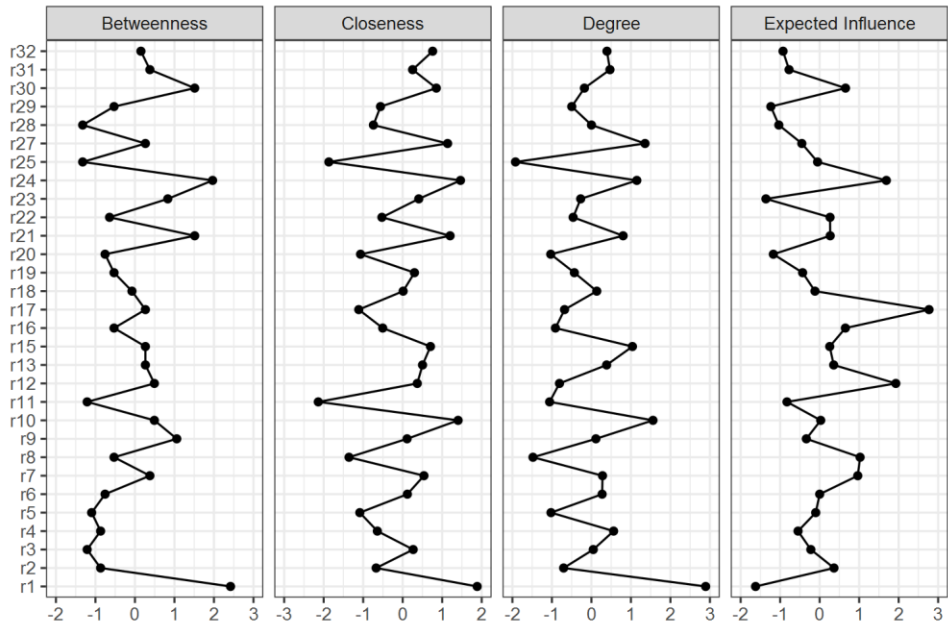


**Figure 1.** Media networks of water services in the COVID-19 era

**Source:** Elaborated with data study

Figure 2 show discourses and narratives seem to converge on a logic of water service supply that is based on quality and the

corresponding rate based not on availability or consumption, but on the reduction of the water footprint.

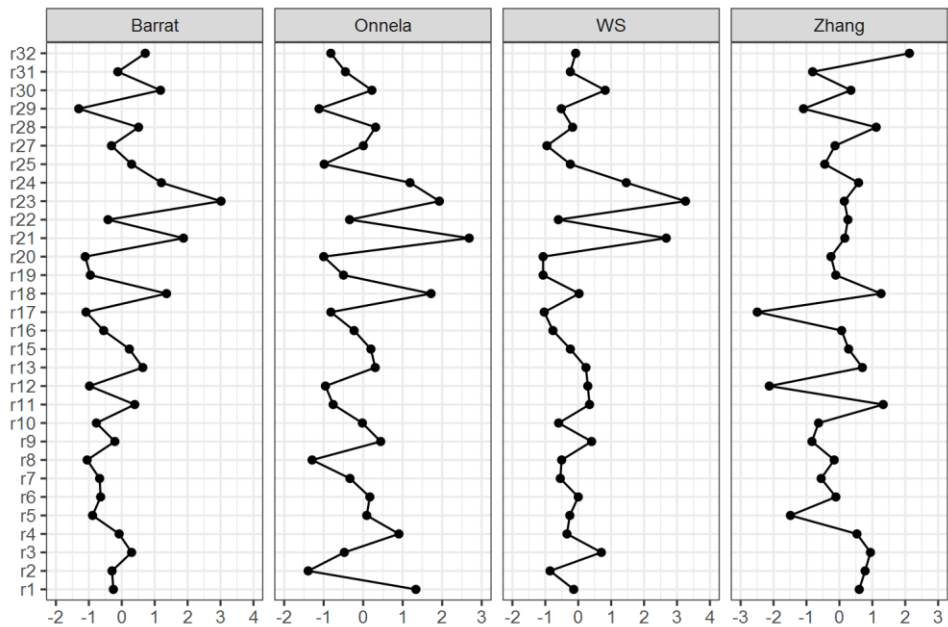


**Figure 2.** Media centrality of water services in the COVID-19 era

**Source:** Elaborated with data study

Figure 3 show regarding the quality of the service, assimilated as a meaning of comfort based on a constant supply, a reduction in illnesses and a corresponding cost, the interviewees seem to

legitimize the supply policy contrary to the demand of excluded sectors and the expectations of sectors such as academics that seek a supply based on availability per capita.



**Figure 3.** Media grouping of water services in the COVID-19 era

**Source:** Elaborated with data study

In short, the structuring, centrality, and clustering coefficients suggest direct, consistent, and homogeneous relationships between edges and nodes. In other words, the media coverage of water services begins with the establishment of the agenda and culminates with the effect of intensity between the press releases regarding the readers. The network of findings reported in the literature suggests a structure of nodes and edges related to scarcity, unhealthiness and scarcity water services.

## Discussion

The contribution of this work to the state of the matter lies in the unveiling of a common meaning between three actors who share a scenario of scarcity, shortage, unhealthiness and high water service costs, but from such a context they have built the legitimacy of a policy of offer that consists of achieving a quality service to establish even more differences between excluded sectors with respect to sectors that aspire to recover comfort.

There is a trend towards the prediction of rational, deliberate, planned and systematic behavior that, however, is dissociated from cooperative and supportive lifestyles.

From the EPS it is possible to delimit an intervention model in which social services include the relationships between spatial, temporal, cognitive and behavioral variables with respect to quality of life.

The EPS warn that the prediction of behavior favorable to ecological balance and, consequently, to saving water is determined by a deliberate, planned and systematic information processing system in which beliefs, perceptions, motives and attitudes determine the intentions of lead sustainable lifestyles.

This is the case of the study carried out by Barranco, Delgado, Melin and Quintana (2010) in which equity and habitability are indicators of the perception of subjective well-being. In this

model, citizen demands for housing are articulated with real estate public policies through the assumption that social protection and security is inherent in the perceptual construction of the habitat. In this way, socio-economic studies or the mediation of conflicts over water supply use the relationships between availability and consumption. The beliefs, attitudes and perceptions are linked to the perception of an efficient service and the equitable distribution between neighbors and between species are indicators of the quality of municipal services that are reflected in the evaluation of government action and the performance of its ministries. Environmental.

In the case of the training of social workers for the undertaking of social services oriented to water sustainability, the EPS warn that it is the categorizations that the students make that will determine their self-management capacities. In this sense, the research by Ferrer, Cabrera, Alegre, Montané, Sánchez and Alais (2014) shows that social responsibility is a central factor in the training of social entrepreneurs.

In this area, the EPS indicate that social responsibility is the product of categorizing information concerning the abundance or scarcity of water. That is, social responsibility emerges in the face of intermittent supply as an individual response to anticipate social problems or conflicts between authorities and users of the drinking water service. If the individual considers that it is unfair to pay an increasingly higher rate per water unit, then he will be more willing to confront the authorities for an intermittent supply at a lower cost.

Finally, with respect to the Environmental Social Work proposal of Liévano (2013), it is possible to note that the quality of life in its objective dimensions of resources and public services can be complemented with a subjective dimension related to well-being and social responsibility.

However, social responsibility alludes to civic virtues that the Psychological Studies of Sustainability have recently incorporated, but have not empirically demonstrated. It is necessary to delve into these dimensions in order to establish a more comprehensive research and intervention model that links the environmental, economic, political, social and cognitive dimensions not only for a better diagnosis and evaluation of public policies, but also to establish a public agenda aimed at Sustainable development.

The present work has exposed the correlational studies of the Psychology of Sustainability (PS). Based on significant associations between cultural, dispositional, situational, cognitive and behavioral factors, SP has established causal models to predict water waste or savings. Mainly, it is the extrinsic and intrinsic reasons for saving water that affect the care, optimization and reuse of the resource.

The diversification of austerity is due to a system of beliefs or exogenous factors that, associated with attitudes, determine water saving. To the extent that beliefs of abundance intensify, users of the drinking water service seem to trust that the public service will supply them with a volume of water greater than the expected average. Such expectation affects the waste of water when using it in their residences. In contrast, beliefs related to scarcity and the prolongation of droughts are linked to dispositions favorable to the care of water. Even for extrinsic reasons such as economic benefits, people are satisfied with the shortage situation and adapt to the circumstances by significantly reducing their consumption.

However, the diversification of austerity also leads to extreme water reuse behaviors that are not favorable to the health of communities and neighborhoods on the periphery of development. Coupled with scarcity and shortages, unhealthiness complements the cycle of water catastrophe. In the areas surrounding the cities, the public water supply and sanitation service is innocuous. Faced with such a situation, the communities face the problem through extreme unhealthy strategies that consist of reusing soapy water or rainwater for

the toilet. In the medium and long term, children from communities and peripheral neighborhoods develop water-borne diseases, which represent five million deaths in economically emerging countries.

So far, PS has not explored the effects of diversification of frugality and austerity, as well as the consequences of environmental public policies on tariff systems, conflicts, clientelism and corruption reported by the media. The EPS in the field of correlations have only reported the relationships between cognitive and behavioral factors. That has been his main contribution to environmental problems.

The EPS have contributed to the demonstration of hypothetical relationships and the construction of causal models that allow the development of interdisciplinary theories, methods and techniques. The PS has established significant relationships between cultural, dispositional, spatial and situational variables with cognitive and behavioral factors. Such findings have made it possible to delineate consumer tariff systems as an instrument of legitimacy of the State and its public policies regarding environmental problems.

Attitudinal Theories of Reasoned Action and Planned Behavior, the main frames of reference for EPS, have been developed from the exposed discoveries. If beliefs are exogenous factors that explain the diversification of water frugality, then they would be linked to socioeconomic and sociodemographic factors from which it would be possible to infer profiles of users of the public drinking water and sanitation service. Such inventories would serve to update the rate systems, subsidies and sanctions.

However, the EPS seem to move towards neurocognitive models that explain prospective situations of water scarcity to predict future behavior and, consequently, water supply, consumption and price systems.

The psychological studies of sustainability carried out in the northern hemisphere have been influenced by liberal economic

approaches in which the rates of public resources and services are deregulated by the State, but establish their conservation based on their scarcity. This perspective guarantees the capacities of future generations for their development in the face of imminent climate change. In developed and emerging economies, or rather, economic centrality, sustainability is synonymous with regulation of the energy and water market. In this way, northern psychology has been able to anticipate the impact of fatalistic scenarios on human behavior.

In contrast, psychological studies of sustainability taking place in the southern hemisphere have established the effects of state deregulation on communities. As public resources and services intensify, subsidy systems increase not as a function of the scarcity of resources, but as a function of the relationship between the governors and the governed. In this sense, psychological studies of the sustainability of the South have tried to understand the symbols, meanings and meanings of local development in order to link community knowledge with city rationalities, respect for nature and its species with the consumerism of urban services. The psychological studies of sustainability in the northern hemisphere have established the topics of debate on the agenda of those who govern in developed and emerging economies to warn about the energy crisis that is coming. In contrast, psychological studies of sustainability in the southern hemisphere have established the axes of discussion for the understanding of communities and the exploration of neighborhoods in terms of public resources and services in a situation of scarcity, vulnerability, marginality

and exclusion. However, psychological studies in the South seem to be moving closer to describing and explaining climate change as its effects intensify in communities and neighborhoods on the outskirts of cities and economic and financial capitals. This is so because those who suffer more and more from natural disasters, environmental catastrophes, droughts, hurricanes, floods or overcrowding will have to develop lifestyles in accordance with the scarcity of water and food, the proliferation of water-borne diseases and conflicts over supply of public services. Therefore, Environmental Social Work has before it the opportunity to integrate the findings reported in the state of knowledge in a comprehensive model that allows an efficient evaluation of public policies based on the subjectivity of the users of the drinking water service.

## Conclusion

The objective of this work has been to reveal the integral meaning of municipal water services in diverse actors and sectors that share in common an unfavorable scenario for their human development, but the type of interpretive study, the type of non-probabilistic sampling and the type of Hermeneutic analyzes limit the results to the interviewees and informants, suggesting the inclusion of other categories that the consulted literature identifies as defenselessness and farsightedness to denote a scenario not only of scarcity, shortage, unhealthiness and famine but of indifference and inaction in the face of common water problems.

## References

Abramo, P. (2012). The city com-fusa: market and production of the urban structure in the great Latin American metropolises. *Eure*, 38 (114) 35-69

Acosta, A. (2010). Only by imagining other worlds will this one be changed. Reflections on the good life. *Sustainability*, 2, 5-21

Barkin, D. and Lemus, B. (2011). The solidarity ecological economy. A proposal in the face of our crisis. *Sustainability*, 5, 4-10

Barranco, C., Delgado, M., Melin, C., and Quintana, R. (2010). Social Work in housing: research on perceived

quality of life. *Bible*, 10 (2), 101-112 [DOI::10.5218/prts.2010.0020]

Behancourth, L. (2010). Green consumers and the promotion of green markets; an alternative towards spirit, mind and health well-being based on the adoption of healthy lifestyles. *Eleuthera*. 4, 193-210

Bertoni, M. and Lopez, M. (2010). Values and attitudes towards the conservation of the biosphere reserve. *Tourism Studies and Perspectives*. 19, 835-849

Blunda, Y. (2010). Perception of volcanic risk and knowledge of emergency plans in the surroundings of the Poas volcano, Costa Rica. *Geological Magazine of Central America*. 43, 201-209

Carosio, A. (2010). The culture of consumption against the sustainability of life. *Sustainability*, 2, 39-52

Carreón, J., Bustos, JM, García, C., Hernández, J. and Mendoza, D. (2015). Use of SPSS and AMOS in a study of environmental thinking and voting intentions in a sample of students. *Multidiscipline*, 20, 75-95

Carreón, J., García, C. and Morales, ML (2014). Towards a consensual management of water resources in ecocities. *Interdisciplinary*, 31(1), 163-174

National Water Commission (2005). *Water statistics in Mexico*. Mexico: Conagua

National Water Commission (2008). *National Water Program. 2007-2012*. Mexico: Conagua.

National Water Commission (2012). *Water banks in Mexico*. Mexico: Conagua

Corral, V. (2010). *Psychology of sustainability. An analysis of what makes us proecological and prosocial*. Mexico: Threshing

Corral, V. and Dominguez, R. (2011). The role of antecedent and consequent events in sustainable behavior. *Mexican Journal of Behavior Analysis*. 37, 9-29

Duerden, M. & Witt, P. (2010). The impact of direct and indirect experiences on the development of environmental knowledge, attitudes and behavior. *Journal of Environmental Psychology*, 30, 379-392

Ferrer, V., Cabrera, O., Alegre, R., Montané, A., Sánchez, C. and Alais, E. (2014). The profile of the social entrepreneur of the student body of the degrees of Social Education, Pedagogy and Social Work at the University of Barcelona. *REIRE*, 7 (1), 11-29 [DOI: 10.1344/reire2014.7.1712]

Flores, M. and Parra, M. (2011). Characterization of domestic water savings in the region of Murcia based on sociodemographic components. *Contributions to the Social Sciences*. 13, 1-13

Garcia, C. (2010). Hydrological exclusion. *Interdisciplinary Journal Entelequia*, 11, 41-59

Garcia, C. (2011). Psychosocial theories to explain conflicts arising from water supply in Mexico, Federal District. *Pampedia Magazine*, 8, 56-68

Garcia, C. (2012). Lifestyles around water problems. *Sustainability*, 7, 84-92

Garcia, C. (2013). Structure of the perception of risk around the scarcity and shortage of global and local water. *Xihmai*, 15 (8) 95-118

Garcia, C. (2013). Psychological studies of water sustainability. Applications to the consumer tariff system. *Journal of Social Sciences*, 139, 65-90

Garcia, C. (2014). Attitude theory towards sustainable water consumption. *Sustainability*, 8, 33-41

- García, C. (2018). Specification of a model with sources from 1987 to 2017 for the study of water co-responsibility in a locality in central Mexico. *Dialogues of Law and Politics*, 19, 18-38
- García, C. (2018). Interpretation of speeches around the water supply subsidy for the understanding of tariff narratives. *Social Sciences*, 4(2), 25-40
- García, C. and Corral, V. (2010). Social identity and locus of control in poor inhabitants of southern Nuevo León, Mexico. *Journal of Social Psychology*. 25, 231-239
- García, C., Aguilar, JA, Rosas, FJ, Carreón, J. and Hernández, J. (2015). Differences in sociopolitical reliability in the face of water conflicts between civil actors. *Invurnus*, 10(2), 3-13
- García, C., Bustos, JM, Juárez, M., Rivera, BL, and Limón, GA (2016). Expectations of users of the drinking water service regarding supply, quality and rates in the framework of future elections in a locality in Mexico City. *Compendium*, 4 (7), 35-54
- García, C., Carreón, J. and Quintero, ML (2015). Governance dimensions for water sustainability. *Towns and Borders*, 10 (20), 195-203
- García, C., Carreón, J., Bustos, JM and Juárez, M. (2016). Scenarios related to agenda setting for transgenerational governance of water resources and services. *Civilize*, 16(31), 83-112
- García, C., Carreón, J., Bustos, JM, Hernández, J. and Salinas, R. (2015). Specification of a communication model for environmental risks in the face of climate change. *Entreciencias*, 3 (6), 71-90
- García, C., Carreón, J., Hernández, J., Bustos, JM, Bautista, M., Aguilar, JA and Valdés, O. (2016). Social representations about 84andem periurban anthropocentrism and neighborhood: Water impacts of leaks in local development. *Academy Journal of Environmental Science*, 4 (69), 101-104
- García, C., Carreón, J., Hernández, J., Mejía, S., García, E. and Rosas, FJ (2015). Towards a water agenda for sustainable local governance. *International Journal of Social Science Research*, 11(1), 130-154
- García, C., Juárez, M., Sandoval, F... R. and Bustos, JM (2017). A psychological approach to environmental complexity: Specification of a model of community stress and resilience. *Community*, 14, 75-95
- Gissi, N. and Soto, P. (2010). From stigmatization to neighborhood pride: Appropriation of space and social integration of the Mixtec population in a neighborhood in Mexico City. *INV*. 68, 99-118
- Hernandez, L. and Jimenez, E. (2010). Attitudes and environmental behavior of marine conservation area personnel. *Biocenosis*. 23, 1-12
- Hidalgo, C. and Pisano, I. (2010). Predictors of risk perception and behavior in the face of climate change. A pilot study. *Psychology*, 1, 36-49
- National Institute of Statistics, Geography and Informatics (2010). *Women and men in Mexico*. Mexico: Inegi
- Izasa, L. and Enao, G. (2010). Performance in social skills in children, two and three years old, and its relationship with parental interaction styles. *Journal of Research in Educational Psychology*. 8, 1051-1076
- Jaen, J. and Barbudo, P. (2010). Evolution of environmental perceptions of secondary school students in an academic year. *Eureka Magazine, Teaching and Scientific Research*. 7, 247-259



- Jimenez, M. (2010). Definition and measurement of environmental awareness. *International Journal of Sociology*, 68, 735-755
- Juárez, M., Bustos, JM, Quintero, ML, García, C. and Espinoza, F. (2018). Governance of water sustainability: Specification of a model for the study of cooperative reuse. *Invurnus*, 13(2), 33-43
- Kalantari, K. & Asadi, A. (2010). Designing a structural model for explained environmental attitude and behavior of urban residents. *International Journal for Environmental Research*. 4, 309-320
- Leff, E. (2010). Ecological economy, rationality and sustainability. *Sustainability*, 2, 106-119
- Leff, E. (2011). Sustainability and environmental rationality: towards "another" program of "environmental sociology". *Mexican Journal of Sociology*, 73, 5-46
- Leon, S. (2013). Third generation indicators to quantify urban sustainability. Progress or stagnation? *EURE*, 39, (118), 173-198
- Lievano, A. (2013). Scenarios and perspectives of Social Work in the Environment. *Journal of Social Work*, 15, 219-233
- Londono, C. and Cardona, H. (2011). State of the art of resources for development. *Strategic Science Magazine*, 19, 35-54
- Lucca, E. (2010). Urban, rural natural sustainability. *Sustainability*, 2, 120-142
- Machado, C. (2012). Approaches for the physical and social restructuring of popular housing in Caracas. In Teolinda, Bolivar. And Erazo, Jaime (85oord.). *Dimensions of the Mexican popular habitat*. (pp.337-352). Quito: Clacso
- Malmud, A. (2011). Logics of occupation in the conformation of the territory. Territorial planning as an instrument of planning. *Ibero-American Magazine of Urbanism*. 6, 18-30
- Manriquez, J. and Montero, M. (2011). Motivation towards water care in the Mexican population. *Quaderns of Psychology*. 13, 25-34
- Markowitz, E. (2012). Is climate change and ethical issue? Examining young adult's beliefs about climate and morality. *Climate Change*, 1, 1-19
- Martinez, J. and Montero, M. (2011). The perception of environmental restoration of housing and family functioning. *Quaderns of Psychology*. 13, 81-89
- McCright, A. (2010). The effects of gender of climate change knowledge and concern in the American public. *Population and Environment*, 32, 66-87
- McCright, A. and Dunlap, R. (2011). Cool dudes: the denial of climate change among conservative white males in the United States. *Global Environmental Change*, 1, 1-10
- Milfont, T. & Duckitt, J. (2010). The environmental attitudes inventory: a valid and reliable measure to assess the structure of environmental attitudes. *Journal of Environmental Psychology*, 30, 80-94
- Montalbetti, T. and Chamarro, A. (2010). Construction and validation of the rock climbing risk perception questionnaire. *Sports Psychology Notebooks*. 10, 43-56
- Montalvo, R. and Chabves, M. (2011). The reignification of space and generic identity in the agricultural region of Tepeyanco, Tlaxcala. In A. Conde, Ortiz, P. and Delgado, A. (85oord.). *The environment as a socio-environmental system. Reflections on the human-nature relationship*. (pp.143-176). Tlaxcala: UAT

Moreno, M. (2013). A prospective reading of the Rio+20 agenda. The emergence of governance for sustainable development. *Xihmai*, 15 (8) 57-74

Nozica, G. (2011). Planning for territorial integration. Desirable scenarios for the insertion of the province of San Juan into Mercosur. *Ibero-American Magazine of Urbanism*. 6, 43-54

Quintero, ML, Garcia, C., Rivera, BL, Sandoval, FR, Figueroa, O., and Molina, HD (2018). Awareness model for sustainability. *Academic Integration in Psychology*, 6(16), 4-19

Quiroz, D. (2013). Cities and climate change: the case of climate policy in Mexico City. *Demographic and Urban Studies*, 28(83), 343-382

Sandoval, FR, Bustos, JM, & Garcia, C. (2018). Exploratory contrast of a local water sustainability governance model. *People and Technology Management Magazine*, 31, 72-87

Sandoval, FR, Carreón, J., García, C., Quintero, ML, and Bustos, JM (2017). Model of the determinants of

resilience based on the perception of risk and perceived stress in relation to the governance of civil protection. *Invurnus*, 12(1), 30-35

Sharples, D. (2010). Communicating climate science: evaluating the UK public's attitude to climate change. *Earth and Environment*, 5, 185-205

Touguinha, S. and Pato, C. (2011). Personal values, ecocentric environmental beliefs and ecological behavior of Brazilian workers: the case of the public ministry of the Federal District and territories. *Quaderns of Psychology*. 13, 35-45

United Nations Habitat (2010). *Sickwater? The central role of wastewater management in sustainable. A rapid response assessment*. Birkiland: UN-Habitat

United Nations Water (2013). *Water security & the global water agenda*. Ontario: United Nations University

Zapata, R. and Castrechini, A. (2011). Pro-environmental behavior and personality: Analysis of a neighborhood in Lima. *Quaderns of Psychology*. 13, 47-61