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# Sustainable Governance Networks in The Literature From 2019 To 2022

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**Abstract:**

Within the framework of Sustainable Development, the governance of water resources turns out to be a management model that would include factors related to beliefs, attitudes, values, norms, perceptions, skills, knowledge, decisions and actions oriented by the availability of water and the standard consumption of 200 liters per day. However, studies related to the psychology of sustainability warn that availability is not only mediated by cognitive dimensions, but is also determined by the relationships between local authorities and users of municipal services. In this sense, the present work aimed to specify the relationship between cognitive factors to establish a model that allows the study of tandem policies as an effect of the surrounding information in the media about droughts, natural disasters, environmental catastrophes. or water conflicts. For this purpose, a review was carried out in databases with ISBN and DOI registration considering the aforementioned constructs. In reference to the state of knowledge, the specification of the model was discussed.

**Key Words:** water resources; public services; governance; specification; local development

## Introduction

From an economic perspective, the Sustainable Development of water in Mexico, Federal District, is indicated by a tariff system that has been adjusted as water availability has gone from 300 liters per person per day with a unit cost of 0.025 pesos in 1950 to 120 liters per day per capita in the year 2000 when it reached an average of 50 pesos per bimonthly consumption volume (Conagua, 2008). However, the collection system has been questioned by the psychosocial approach which warns of a series of conflicts derived from the drinking water service and the corresponding rates (Leff, 2010). From the perspective of the psychology of sustainability, the media, by emphasizing the conflicts between local authorities and users of the public drinking water service, influence public opinion (Leff, 2011). In this sense, the Systems, Technological, Informational and Communicational Theories have advanced in the hypothesis of setting the agenda from the analysis of the framing of the facts to reveal the media as producers of information, as a mediator of opinion. citizen and as an objective to the political initiatives of law (García, 2010). This paper exposes the panorama of water availability in reference to human consumption to contrast the economic approach against the psychosocial approach in order to highlight the conflicts derived from the local supply and collection policy, conceptualize and discuss its impact on public opinion, as well as in the lifestyles of users. Once the axes of debate and analysis have been established, the relationships reflecting behavior favorable to the sustainability of water resources and services are then specified. If the media, according to the psychology of sustainability, present conflicts as central issues of the water problem, since they hold the authorities responsible for the inefficiency of the rates and expose them to the closure of avenues, boycotts of facilities or kidnapping of pipes as evidence of ungovernability that inhibit local sustainable development, then.

Within the framework of the transformation of the State and the bureaucracy, the emergence of citizen participation poses governance as an administrative system in which two actors prevail, governors and governed depending on the degree of conformity or innovation.

In the first case, management is determined by domination and social control through political power spread over civil spheres (Abramo, 2012). In this sense, consensus is established from the coercion of collective action and social mobilization exposed in the media as obstacles to the construction of public peace, agreements and conventions that will support structural reforms (García, 2010). On the contrary, the governance established through innovation suggests the participation of citizens as a fundamental actor both

in the execution and in the design of socio-environmental policies and programs (Carreón, 2012). In this process, influence is the instrument through which the topics of debate are established, agreements are created and opportunities, capacities and civil responsibilities are oriented around the design of inclusion strategies and the right to resources and services. urban (Garcia, 2011). In the case of the governance of water resources and services, the conflicts generated by the imbalance between availability and consumption are considered as scenarios of scarcity and shortages, against which municipal policies establish tandem and collection systems in order to reduce the differences. between rulers and ruled (García, 2012). However, depending on the degree of supply and cost of the unit price of water, water conflicts acquire an inequitable dimension that can escalate to a conflict of equitable order when authorities and users agree to deplete or compromise the capacities of future generations (García, 2013). Rather, distributive inequity can be lessened through the conflicts that social dissuasion supposes around the breaking of regulations between users who share the resources, or, alternatively, the subsidies that persuade the most radical sectors to rule out violent acts such as closure of avenues, kidnapping of pipes or boycotts of hydraulic installations.

In this way, the increase in rates does not necessarily correspond to the real cost of water services (Martínez & Montero, 2010), but rather derives from dissuasive consumption strategies (Martínez & Monero, 2011), but they are also subsidy instruments of the sectors identified as more radical due to their ability to mobilize and confront the authorities (Acosta, 2010). Related to subsidies, forgiveness is an instrument that enables public peace and subsequent renegotiation with those vulnerable, marginalized or excluded sectors that allocate up to 20% of their income to water supply (García, 2010).As a result of inequitable conflicts, the monopolies of the supply units known as pipes exacerbate the differences between those who have a regular supply and pay a slightly higher price and those who are under a tandem regime and are exposed to a disproportionate increase in the unit price (Carreón, 2013). In this scenario, lifestyles are more coercive because there is a double exclusion after the tandem policy and is known as water hoarding in those areas of high marginality (García, 2012).In contrast, the governance that would arise from the conflicts and agreements shows possibilities for the management, consumption and treatment of wastewater, insofar as there are mechanisms for citizen participation and negotiation with their local authorities regarding the cost of the service and recycling (Manríquez & Montero, 2011). These are consensual lifestyles in which users pay a higher price than the service implies, but have the guarantee of a regular supply, although this administrative modality can lead to monopolies of the organized sectors over the peripheral areas that would suffer the shortage of water (García, 2013).Regarding the dimension related to dissuasion as an instrument of water governance, it would be indicated by the domination of management groups that guarantee the supply and maintenance of the drinking water service by exponentially increasing rates, or else, eliminating subsidies or forgiveness (Carosio, 2010). It is a scenario in which the media set the topics of discussion and legitimize tariff policies before public opinion (Duerden & Witt, 2010). Even in this governance model, the establishment of a public agenda is a preponderant factor for the exclusion of opinions in favor of cooperativism (Corral & Domínguez, 2011).

Lastly, the dimension related to persuasion consists of the promotion of environmental civic values that guide water saving, but without questioning the asymmetries between the consumption of agribusiness and residences (Carreón, 2014). It is a precautionary strategy against natural disasters caused by droughts or floods that would lead to social instability and subsequent competition for water resources. The persuasion lies in promoting lifestyles favorable to water conservation, although the rates are increased, they do not generate inflation in the local economy (García, 2014).

However, water management is inherent in the violence that comes with disagreements, ignorance of agreements, ambivalence and hostility as preponderant factors in relations between users and local authorities.The invisible violence implied by xenophobic discourses about vulnerable, marginalized or excluded minorities seems to incentivize subsidy policies that prevent mobilizations or violent actions, but also legitimize the subsidies or forgiveness that the authorities can direct as recruitment of militants (García, 2012). In contrast, violence by consensus implies not only the participation of all sectors, but also the exercise of power by the majority against the uses and customs of migrant communities (Barkin & Lemus, 2011). This is a scenario in which the rates regulate the differences between residential, native or migrant sectors by establishing a unit price considering per capita income, or the degree of human development (García, 2013).

However, the hostile violence in terms of water supply and tandem policies is oriented towards those groups that close avenues, confront authorities, kidnap pipes or intervene in the municipal supply (Carreón, 2012). It is a policy of frontal combat against crime that appropriates facilities under the emblem of the rights to the city and free water, but which establishes water trade networks in areas with less availability and supply, encouraging these users spend up to 20% of their income on the purchase of water (García, 2013). Finally, the administration of water resources would have an ambivalent dimension in those zones and sectors due to its lack of supply and low cost of service. Precisely, its ambivalent character consists in that the quantity and quality of the water corresponds to its low cost and consumption, for this reason they are colonies that live under constant stress because the State does not increase the cost or improve the service (García, 2010). In summary, the governance of water resources is made up of four dimensions according to the relationships between sectors and their degree of supply and unit price of water supply and treatment. Each dimension is based on an administration considering predictable levels of conflict and violence due to scarcity, shortages and cost.If the governance of water resources and services consists of an administration strategy according to the degrees of conflict and violence that would arise from four dimensions of analysis that go from inequity to consensus, then the studies related to the construction of agreements or resolution of asymmetries deals with those processes inherent to management that, due to their degree of civil participation, would be close to the democratization of municipal services, but highlights their disconnection between residential sectors, indigenous peoples and migrant peri-urban areas.Self-management is a social phenomenon that would explain the collective action and social mobilization around droughts or floods that, by generating a shortage, would force the civil organization, but it also supposes the opportunity to market a product of first necessity through the hoarding of water. (Blunda, 2010). In this sense, storage would be compromised since the tandem system works under a periodic regime that is complemented by water storage rather than by its reuse, treatment or rainwater harvesting, indicators of future propensity or sustainability-oriented behavior (Farmyard, 2010).

It is precisely in this phase that the tandem system loses relevance since storage does not correspond to dosed use of water, which is a lifestyle oriented by eco- peripheral values rather than anthropocentric as is the case with hoarding (García, 2010).For its part, reuse would have a link with dosage insofar as, once the water has been used in an austere manner, a new use of it would be an alternative to the inefficiency of batching, but reuse is rather part of the undertaking that it supposes the commercialization of water independent of its quality and quantity (Behancourth, 2010).The price of the pipe service, once the water has been used and is now intended to be sold as first use, or it is noted that it has already been treated, filtered or processed, would be related to the cooperative ways in which the pipes or vendors of the water are organized, although the treatment supposes a complex processing of the water that the user would be willing to pay for before organizing a collective environmental protest (Jiménez, 2010).The sustainable behavior that emerges as a product of a consensual administration of water resources and services has been established as a preponderant factor in the prediction of scenarios of conflict and violence as the levels of action favorable to the environment decrease, but anticipate scenarios of pacification. and cooperation at times when participation levels

increase or dosing and reuse actions intensify (Bertoni & López, 2010).However, a governance model would require more binding dimensions that anticipate the reappropriation of nature and not only its conservation for economic or political reasons, but also its restoration through biophilia or ecoperipherism as ideological factors of permanent respect and care for the environment and that In turn, they would indicate a transgenerational environmental and water culture (Flores & Parra, 2011).The study of governance goes through dimensions that would not only be related, but would also anticipate scarcity, shortage, conflict and violence scenarios to establish the axes of discussion, agreements and co-responsibilities among the actors involved.The governance of water services involves the analysis of self -managed factors that reveal collective actions in situations of uncertainty or risk, but above all in the face of eminent differences between the quantity, quality and price of water. Self-management is not only the result of a shortage, but is the product of citizen initiative that, through its mechanisms of influence, generates supply options that will allow it to anticipate unfavorable environmental or administrative scenarios. Unlike the state of knowledge in which self-management is measured by its degree of reaction, in the specification of the present model it is proposed that it be weighted by its degree of anticipation. In this way, the dosage of water is a consequence of anticipation rather than reaction to droughts or floods. These are strategies that derive from preventive rather than reactive lifestyles, opportunities rather than threats, capabilities rather than dispositions, and responsibilities rather than conventions, but a significant degree of dosage is necessarily linked to a certain level of reuse because in an ecoperipheral system austerity is an identity rather than a reaction.In this way, austerity encourages reuse because once the use of water has been optimized, the next logical action is to extend its usefulness to show future generations that it is not enough to take care of it or save it, but that it must also be introduced into daily dynamics as a factor of entrepreneurial identity. In these communities, water, when considered as part of a cultural heritage, does not have a cycle that defines it, but rather symbols and meanings with a sense of belonging and rootedness in the environment.It is about the ancestral cooperativism that the communities adopt as livelihood in the face of the incommensurability and unpredictability of natural disasters and environmental catastrophes. In this sense, innovation is a resource for action in the face of the magnitude of the environment. The governance of water in the communities would consist of the study and promotion of new ideas as a hallmark of the community in the face of changes in the environment.Once entrepreneurship and innovation are established, the next process is related to biophilia, which is based on predictive identity of the relationship between resources and communities with the aim of reappropriating nature, no longer as resources, but as heritage of the environment, the species and the human groups that inhabit it.The governance of water resources and services is actually a management system of knowledge and rationalities that make it possible to replace the domination of nature with a sense of belonging, the exploitation of its resources for its conservation, but, above all, the substitution of consumer lifestyles for an ideology of coexistence between resources and species.Are there significant differences between the findings reported in the literature and the criteria of expert judges regarding the theoretical and empirical structure of governance during the pandemic?The premises that guide the present work warn that the events of risk, crisis and contingencies impact the relations between governors and governed whose differences are reflected in the literature of the period in question. In this sense, the criteria of expert judges regarding the selected publications will have asymmetric relationships. In other words, the findings reported in the literature will reflect the impact of the health crisis on sustainable governance, but the criteria of the expert judges will be oriented towards a balance between risks and governance indicators.

## Method:

The conceptualization of the role of the media will contribute to the discussion about the role of the media, authorities and users as actors in an agenda aimed at the sustainability of water in the demarcation.The methodology used for documentary research is based on a search for information in DIALNET, LATINDEX and REDALYC based on keywords; water resources, governance, Sustainable Development, Local Development, conflict, availability and rate that were published from 2019 to 2022Global and local water problems share the imbalance of per capita consumption and availability. In this asymmetric relationship, the collection system restores the balance, but as the differences between those who pay with subsidies and those who can afford their excessive cost intensify.However, the distance between availability and consumption warns that in developed countries its volume per capita is oriented towards residential and industrial use, while most of the demand is oriented towards agriculture in emerging countries.In reference to Brazil, Spain and the US, Mexico uses a greater volume of water for agriculture, but its residential use is only lower than that of Brazil. Regarding the volume of water destined for industry, Mexico occupies the last place, but unlike the US, where it is recycled, its intensive use does not have a treatment. Regarding the analysis by country, Mexico has a higher volume of availability among the selected OECD countries, but ranks seventh in terms of per capita water consumption. Compared to Denmark, which is in the last places of availability and consumption, Mexico has a gap between availability and consumption since it overexploits its aquifers and does not follow Denmark's sustainability policy.The imbalance between the volume available and the consumption of water has generated a collection system in Mexico that varies depending on the region, although due to its degree of population density the problem is concentrated in the capital of Mexico.A mathematical model that can provide us with a lot of information to allow the use of water is through the Hopf bifurcation. The Hopf bifurcation is a type of bifurcation that some systems present, in such a way that by varying the value of the bifurcation parameter of system, this undergoes a change in the stability of the critical point under study, this is given some parameters we can see:

$$P = KP\left(1 - \frac{P}{N}\right)$$

**Where:**

P(t). It is the amount of water that exists in an area over time.

K. is the extraction constant of that water.

N. They are the conditions of the place where the water is found.

We add a value that represents the amount of water that is extracted represented by C, then:

$$P = KP\left(1 - \frac{P}{N}\right) - C$$

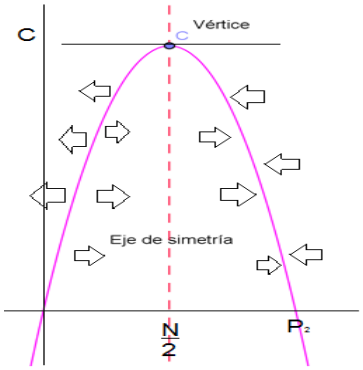
Now it is required to know how much water must be extracted to maintain the place:

$$\mathrm{P} = KP - \frac{KP^2}{N} = 0$$

We solve the equation and from this we obtain;

$$x = \frac{-K \pm \sqrt{K^2 - 4KC}}{\frac{-2K}{N}}$$

Once our equation is solved, it is drawn and we observe:




This means that if we draw a little more water where our apex is, without letting it recharge, we run the risk of not having enough for the next season (Marsden 1976).

Precisely, the local water problem can be inferred from the substantial increase in the collection of water services. In a period of 15 years, the unit price of water increased by 400%, implying the exclusion of sectors that earn less than 2 dollars a day and facing the loss of purchasing power of the salary that was devalued by 200%.In summary, the local water problem consists of 1) imbalance between availability and consumption indicated by the overexploitation of its aquifers and 2) the exponential increase in tariffs and subsidies that exacerbate differences between sectors.However, both aspects are linked to public policies of tandem, subsidies and forgiveness that are implemented as social assistance programs to reduce conflicts between the rulers and the ruled.

## Results:

Figure 1 shows the centrality values that enunciate the asymmetries between the nodes and the edges. Each asymmetric relationship suggests that the criteria of the expert judges regarding the findings of the reviewed literature converge in a crisis scenario that impacts the governance of ethics for sustainability.

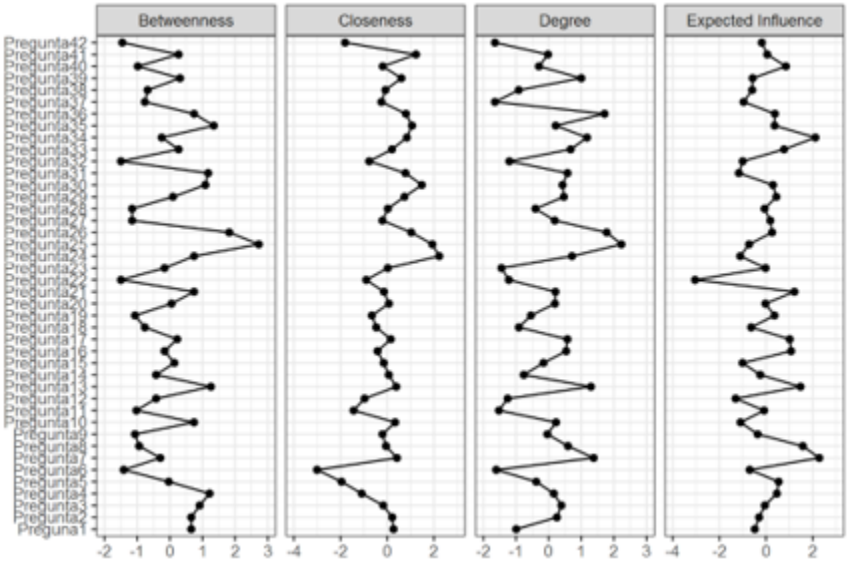



**Figure 1**: Centrality of sustainable governance in the literature from 2019 to 2022 Source: Prepared with study data.

Figure 2 shows the convergence of the criteria of expert judges regarding the problems stated in the selected literature. Learning and unlearning processes indicated by trajectories of relationships between nodes and edges are noted. In this way, an apprenticeship can be seen that goes from the scarcity of water and its care to waste due to despair.

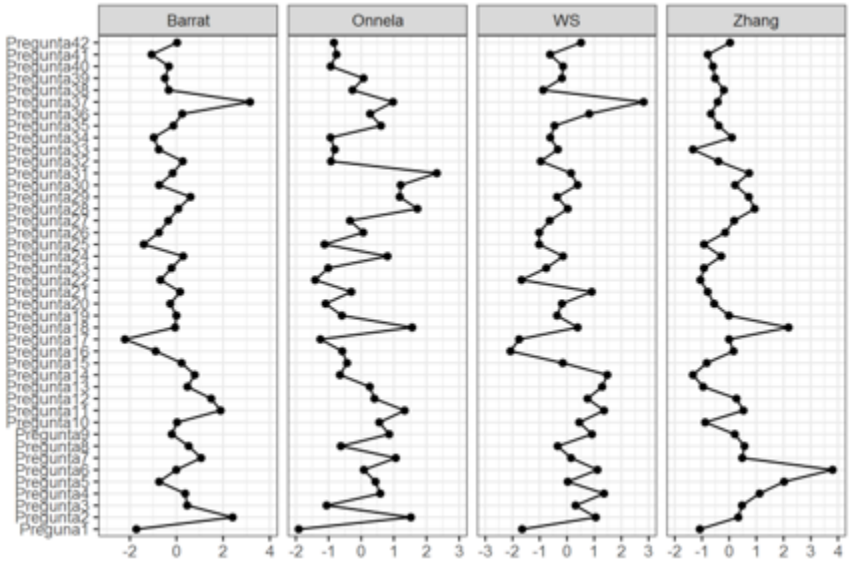



**Figure 2:** Clustering of sustainable governance in the literature from 2019 to 2022 Source: Prepared with study data

Figure 3 shows the structure of nodes and edges that reflect the grouping criteria of the expert judges regarding the findings established in the reviewed literature. Asymmetric learning processes are shown in which the scarcity of resources corresponds to savings, but as the lack of water intensifies, hopelessness and waste of water resources emerge.

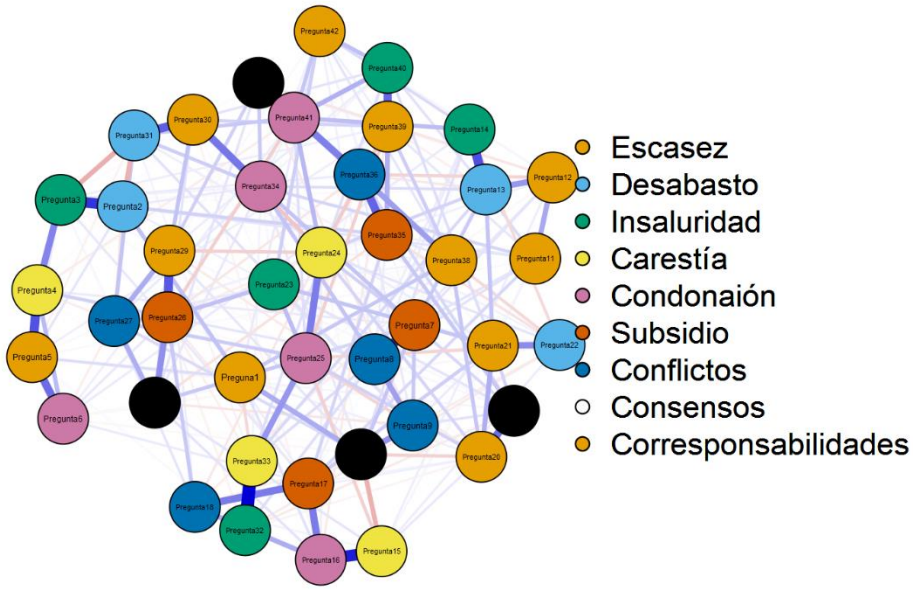



**Figure 3**: Sustainable governance networks in the literature from 2019 to 2022 Source: Prepared with study data

## Discussion

Theoretical and conceptual frameworks, as well as empirical evidence, warn that governance is a system for managing the degrees of conflict and levels of violence generated by the imbalance between availability and consumption that the local tandem and collection system have not been able to stabilize and more well exacerbate water exclusion.In the specification of the governance model, it is stated that the revised asymmetries indicate a reappropriation of nature as a cultural and transgenerational purpose, but there are critical positions that are rather for the deregulation of municipal services.In the review of Jaén & Barbudo, [2010] it is argued that human development, mainly volitional, is generated from anthropocentric values that will determine socialization with natural resources and municipal services through sociopolitical representations of conformity, obedience, indignation or violence. In this sense, the specification of the governance model should consider the formation of representations and habits that allow guiding, from childhood, the care and preservation of resources without having to use violence, but by virtue of the fact that communities develop representations and habits ecoperipherals , local development would suppose the socialization of empathy, trust, commitment and satisfaction with the environment rather than the adjustment of anthropocentric lifestyles to the levels of water availability per capita.For its part, the position of Londoño &

Cardona [2011] about the opportunities and resources for human development, nature is conceived as a provider of tools for the formation of capacities that encourage conservation, but adjusted to the expectations and development needs. In the present work, rather, the State is assumed as an interlocutor of civil society in the face of the scarcity of resources. Local Development, unlike Human Development, depends on community values and principles more than consumer lifestyles. Finally, in the review of the environmental agenda, Moreno [2013] argues that cooperation schemes between nations are conditions for the development of technology and generation of knowledge that allow resources to be transformed into opportunities for choice and transgenerational action. Regulated by carbon bonds, human activities would access emission reduction agreements in order to guarantee the sustainability of the model, but in this paper, it is proposed that governance does not lie in public policies, but in the management of risks, conflicts and violence contingent on the continued scarcity of natural resources.Governance is a model determined by the global and local situation, although its emphasis on the local level supposes guidelines for the international concert without excluding future generations or the other species that coexist with human groups (Hernández and Jiménez, 2010). in particular with the communities who, having a significant degree of identity and influence, are the object of consensus of the policies, programs, models and management and self-management strategies (Zapata & Castrechini, 2011). The dissemination of the axes of discussion, agreements and responsibilities will allow greater efficiency in the administration of water resources and services, since at least the rates and the tandem will be based on the opportunities and capacities of the communities rather than individuals (Hidalgo & Pisano, 2010). As scarcity and shortages are within the perceptual reach of users, governance will intensify in terms of reducing risks, conflicts and violence (Jaén & Barbudo, 2010).

## Conclusion:

The contribution of this work to the theoretical and conceptual frameworks, as well as to the state of knowledge, lies in the specification of a governance model in situations of scarcity, uncertainty, conflict and violence. In this sense, it is argued that water resources, due to their degree of importance for daily life, are instruments of opportunity, capacity and responsibility between authorities and users. In this way, the specification of the model will allow the study of the phenomenon based on psychosocial parameters rather than economic, sociopolitical or health parameters.

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