Journal of the International Society for the Systems Sciences | 68th Meeting of the International Society for the Systems Sciences
Wilby, J., Makar, J. and Friend, M., eds.

A SYSTEMIC PERSPECTIVE ON SUSTAINABLE WATER MANAGEMENT FOR TOURISM VENTURES IN RURAL COMMUNITIES IN MEXICO

Zeltzin Pérez-Matamoros, Ricardo Tejeida-Padilla, Isaías Badillo-Piña
Instituto Politécnico Nacional, México. Grupo de Investigación en Sistémica y Turismo
Department of Systems Engineering, SEPI, ESIME-Z
zperezm1501@alumno.ipn.mx, rtejeidap@ipn.mx, ibadillop@ipn.mx

Abstract
Sustainable water management and social entrepreneurship are fundamental pillars to promote sustainable development in rural communities, especially in the context of tourism. The availability of quality water in adequate quantity is essential both to meet the daily needs of local inhabitants and to maintain the integrity of ecosystems. This involves promoting conservation, awareness and reuse practices of this water resource. Likewise, it is important to consider aspects of equity and community participation in sustainable water management, involving community members in the planning and execution of water-related initiatives. Collaboration between the tourism sector, local authorities, community organizations and other relevant actors is essential to guarantee sustainable water management and promote tourism development in an equitable and environmentally responsible manner. This research uses the Soft Systems Methodology (SSM) to achieve a synthesis of the current situation of complexity between sustainable water management, social entrepreneurship and sustainable tourism in rural communities. The findings reveal challenges in the relationships between government entities, businesses, rural tourist communities and sustainability. The lack of effective policies to support social enterprises limits their ability to contribute to sustainable development. In this way, social entrepreneurship plays a crucial role in sustainable development by promoting autonomy and empowerment in various spheres, including business and society at large. The interaction between social entrepreneurship and sustainable tourism can generate positive impacts on social and environmental aspects, improving the quality of life of local communities. Adopting a systemic approach provides a deeper understanding of this complex relationship, and approaching entrepreneurship from this perspective can drive economic, social and environmental development in communities, maintaining homeostatic balance between economic growth, social well-being and environmental preservation.

Keywords
SSM, Water Management, sustainability, tourism, social entrepreneurship, rural communities.

1 | Introducción

Human activity, spreading across different regions of the planet, not only tends to exploit natural processes but also exerts a destructive influence on water and land resources, leading to irreversible losses in biodiversity. This behavior puts significant pressure on ecosystems, triggering profound changes that prompt societies to adapt their behavior to the new emerging environmental conditions (Petrosillo et al. 2006).

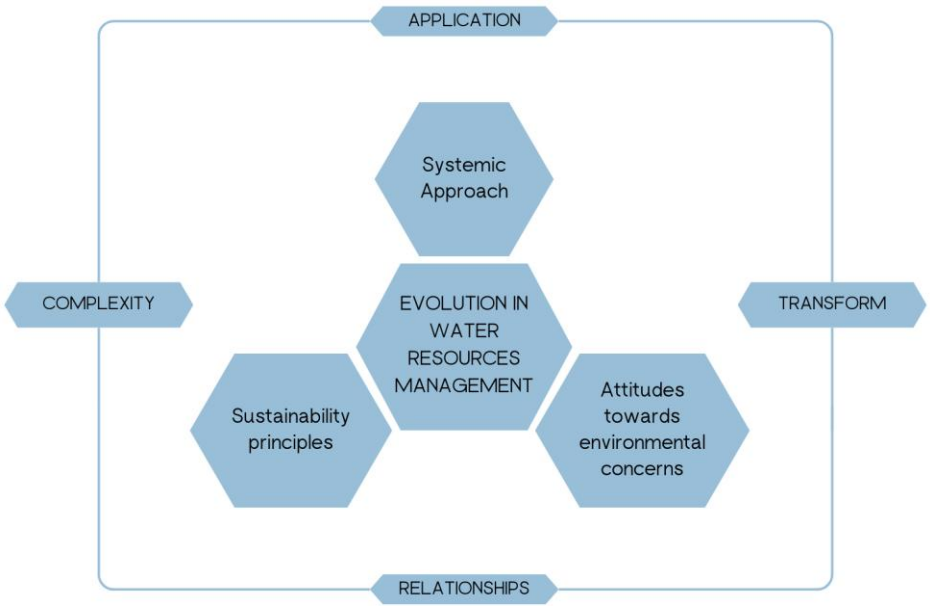
Despite the efforts made in this regard, initiatives to address global water issues have been conceived and implemented in isolation, lacking effective collaboration among them. This lack of coordination and synergy limits their potential to generate sustainable solutions that comprehensively address the challenges related to water management worldwide, implementing an integrated and holistic approach that encompasses ecological, economic, social, and technological aspects (Mishra et al. 2021).

The management of water resources should be fundamentally reassessed because natural systems do not fluctuate within a constant variability envelope observed in the past (Oki 2015). In the current context

of climate change and increasing anthropogenic pressure, hydrological patterns and natural water cycles are experiencing unprecedented alterations (Amoah and Simatele 2021; Ouyang and Panda 2022; Papadaki and Dimitriou 2021).

Over the years, water management practices have been based on assumptions of stability and predictability of natural systems, which are no longer applicable in the context of current environmental fluctuations generated by the increasing urban demand for water (Rushforth, Messerschmidt, and Ruddell 2020). A challenge for water planning and management in cities is the adaptation of a more systemic approach that is applicable to foster significant change (Brown et al. 2015).

Exhibit 1. Water Resources Management from a Systemic Perspective. Source: Based on Simonovic (2020).



The Systemic Approach in water resources management is one of the most significant advancements because it provides an opportunity to understand the interrelationships between existing ecological, economic, and social factors (Simonovic 2020). Looking beyond individual components and considering the system as a whole is crucial for developing solutions that are sustainable in the long term and that take into account:

- Balance between use and conservation: Finding a balance between water use for human activities and the preservation of ecosystems.
- Mitigation of negative impacts: Identifying and minimizing the adverse effects of human activities on the environment and society.

1.1 | The role of water and social entrepreneurship in the dynamics of tourism

Rural communities, especially those dependent on tourism, are in a vulnerable situation, as their economic and ecological sustainability is intimately linked to the availability and quality of water (Cabral 2023). To integrate tourism into rural communities, it is essential to adopt a systemic perspective that recognizes the interconnection and complex dynamics between water management and human activities, in this case, tourism. This perspective is fundamental for creating new forms of water resource management for the benefit of the components of tourism dynamics (Delves et al. 2021).

When tourism develops responsibly, it can be a tool to promote environmental conservation, leading to a significant improvement in environmental quality. However, when it is not developed

responsibly, it puts pressure on non-renewable natural resources and causes environmental degradation if not properly managed (Meldayanoor et al. 2022).

Under this idea, in recent years, social entrepreneurship has emerged as a dynamic and adaptable approach to address the various challenges that the tourism sector faces in terms of sustainability and social responsibility. It stands out for its ability to innovate in solving social and environmental problems, combining profitability with a positive impact on society and the environment (Khan et al. 2021; Kummitha et al. 2021).

Social entrepreneurship has the capacity to involve rural communities in participatory decision-making processes, leading to positive outcomes in the field of sustainable tourism by promoting the creation of products and services that contribute to improving the quality of life of rural communities, especially in social and environmental spheres (Aquino 2022). This quality makes it a powerful tool for promoting sustainable water management in tourist destinations, offering creative and adaptive solutions for water conservation and efficient use.

The convergence between social entrepreneurship and the dynamics of tourism creates a conducive space for generating innovative solutions that go beyond conventional approaches to tourism development. This intersection opens up new opportunities for the development of inclusive and sustainable business models that benefit both tourists and host communities (Sharma and Bhat 2023).

The application of a systemic approach allows for the development of more resilient and adaptive water management strategies capable of sustaining both biodiversity and local economies in rural Mexican communities dedicated to tourism. By including the needs of diverse groups in policy and planning, and avoiding approaches limited to specific disciplines, the complexity of multidimensional and multidisciplinary problems can be addressed, thus promoting sustainable development (Sebestyén, Czvetkó, and Abonyi 2021).

Therefore, it is essential to implement policies and practices of sustainable tourism that minimize negative impacts on natural resources and maximize benefits for local communities and the environment. This involves adopting a comprehensive approach that balances the economic and social needs of tourism with the conservation and protection of natural resources, thus ensuring that tourism contributes positively to long-term sustainable development (An and Alarcón 2020).

1.2 | Context

The tourism system in Mexico City has had limited involvement in water resources management. This is especially the case in rural areas with a tourist vocation, where communities depend on this resource for their functioning. Rural tourism, defined as tourism activity that takes place in rural areas and often relies on natural and cultural resources, can have a significant impact on water availability, management, and quality (Romão 2018).

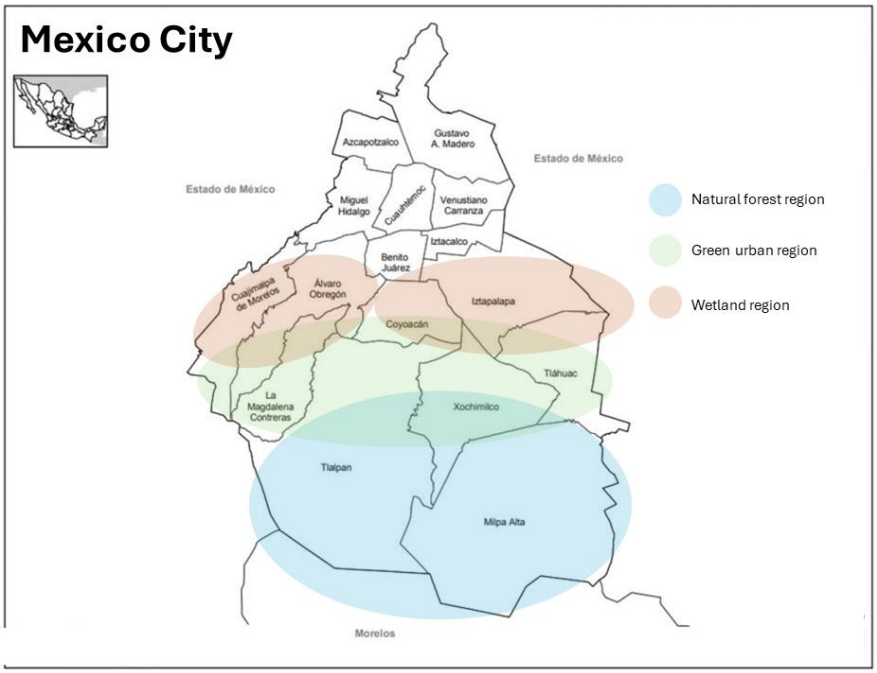
The sustainability of water resources refers to the ability to use water in appropriate quantities and quality to meet the needs of humans and ecosystems, both now and in the future, with the aim of maintaining and protecting the hydrological functioning of watersheds (Cervantes-Jiménez et al. 2020). It is emphasized that social sustainability can focus on three main orientations: promoting behavior change to achieve environmental goals, preserving socio-cultural patterns and practices, and mitigating poverty and inequality (Santos and Moreira 2021).

The growth of rural tourism can exert additional pressure on local water resources, especially in areas where water infrastructure is limited or inadequate. The demand for water for tourist use, such as supplying hotels, restaurants, and recreational activities, can overload existing supply systems, contributing to water scarcity and contamination of the resource. Additionally, tourism can produce solid and liquid waste that deteriorates water quality and requires effective wastewater management and treatment systems (Grison et al. 2023; Liu et al. 2021). Therefore, it is urgent to carry out comprehensive water planning and management to address the challenges related to its use in rural areas of Mexico City. This involves adopting comprehensive approaches that consider both the needs of tourism and the objectives of conservation and sustainable management of water resources. It is crucial to implement appropriate policies and regulations,

as well as to foster active participation of local communities and relevant stakeholders, to ensure tourism development that is compatible with the protection and preservation of water and the environment.

Mexico City, with an area of 1,494.3 km2 that is part of the Neovolcanic Axis, represents 0.1% of the country's surface. Divided into 16 territorial demarcations, most of its territory has a sub-humid temperate climate (87%), while the rest has a dry and semi-dry climate (7%) and humid temperate (6%). Rainfall mainly occurs in summer, with a total annual precipitation ranging from 600 mm in the dry region to 1,200 mm in the humid temperate part (INEGI 2024a).

Exhibit 2. Map of Mexico City. Source: Based on (INEGI 2024b; SEDEMA 2024)



The communities located in natural forest regions, urban green areas, and wetlands are detailed in the following table. Additionally, the type of social entrepreneurship tourism developed in these rural communities near bodies of water is included.

Exhibit 3. Rural communities belonging to the municipalities under study in the system. Source: Based on (Gobierno de la Ciudad de México 2023; PAOT 2024).

Municipality	Rural Community	Proximity to bodies of water	Type of social entrepreneurship tourism
Álvaro Obregón	San Bartolo Ameyalco	Río Magdalena y del Parque Nacional Desierto de los Leones.	Ecotourism, guided tours (cultural and natural), local gastronomy, handicrafts, camping areas, and cabins.
Cuajimalpa de Morelos	San Pablo Chimalpa	Río Magdalena	
Magdalena Contreras	San Nicolás Totolapan	Río Magdalena y del Parque Nacional Desierto de los Leones.	

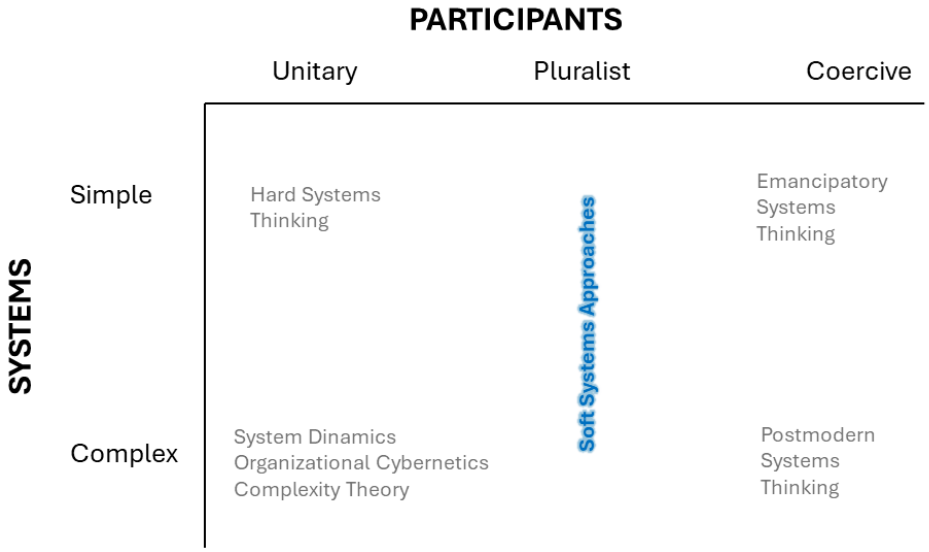
Milpa Alta:	• San Pedro Atocpan	Río Magdalena y del Parque Nacional Desierto de los Leones.	
Tláhuac:	• Santa Catarina Yecahuitzotl. • San Andrés Mixquic.	Lago de los Reyes Aztecas.	
Tlalpan:	• San Miguel Topilejo. • San Andrés Totoltepec.	Río Magdalena y del Parque Nacional Desierto de los Leones.	
Xochimilco	• San Gregorio Atlapulco. • San Luis Tlaxialtemalco.	Lago de Xochimilco	

2 | Method

Human activity is influenced by the backgrounds, interests, and environment of each individual; moreover, due to its complexity, it can be interpreted in multiple ways (Yolles 1996). In the field of tourism study, various methodologies and systemic models contribute to the understanding and interpretation of its phenomena, aiming to generate proposals to transform reality and improve the tourism system (Tejeida, Coria, and Juárez 2016). The Metamethodology Total Systems Intervention (TSI) allows visualizing the main problems and challenges faced by an organization or a situation involving multiple agencies (Jackson 2003).

Jackson (2003) identified seven principles that underpin TSI. Specifically, the sixth principle refers to three phases: creativity, choice, and implementation. These phases serve as a guide for the informed selection of the most suitable systemic methodology or model to address the system. Through the Context-Problem Matrix and the System of Systems Methodologies, the taxonomy and selection of methodologies related to the context of the problem and the perspective of the participants are developed.

Exhibit 2. Context-Problem Matrix. Source: Based on Jackson (2003)



This matrix helps identify the relationship of participants with the decision-making process and the type of system in which the problem arises. There are three categories to classify participants' relationships: unitary, where all involved agree on objectives, share interests, beliefs, and the same values; pluralist, where participants have different beliefs and values, different interests and objectives, yet they generate agreements to achieve goals; coercive, characterized by minimal common interest among participants, presence of conflicts, and decisions reached through imposition and domination of one or more groups over others.

The social entrepreneurship system immersed in sustainable tourism presents phenomenological and hermeneutic characteristics with nonlinear relationships among its actors. Additionally, participants manifest different beliefs and values; however, agreements can be generated to achieve objectives. By placing the current situation of the system under study within the Context-Problem Matrix, it appears that a complex system is addressed that fluctuates between pluralistic and unitary, so the approach to be used will be that of soft systems.

2.1 | Soft Systems Methodology

Soft Systems Methodology (SSM) is a flexible methodology that integrates a seven-stage synthesis process, using the concept of the system of human activities as a means to investigate the situation and take improvement actions. Furthermore, the order of the stages can be adjusted depending on the characteristics of the problem being studied (Ramírez-Gutiérrez, Cardoso-Castro, and Tejeida-Padilla 2021; Simental et al. 2023).

According to Checkland (1999), the first two stages expose the current problematic situation to identify a variety of possible and relevant options. These stages are developed in the real world and depend on perception. Stages 3 and 4 integrate the formal use of systems ideas and are focused on prediction, while stage 5 focuses on comparing the model with reality. Stage 6 consists of deciding what actions to take based on the previous comparison, and stage 7 is responsible for implementation. This process is iterative, as stage 7 often becomes stage 1 to address a new problematic situation.

3 | Results and discussion

The current problematic situation was identified without any type of structured situation. Specifically, the following subsystems that compose it, as well as the participants of the system under study, are shown.

Exhibit 4. Sustainable water management in rural tourist communities and their environment

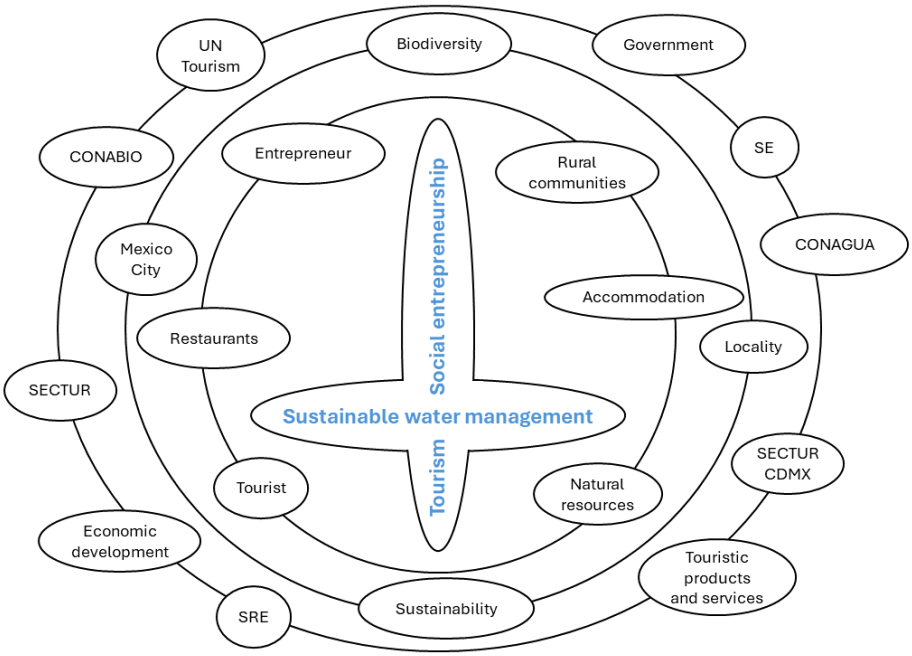


Exhibit 5. System under study

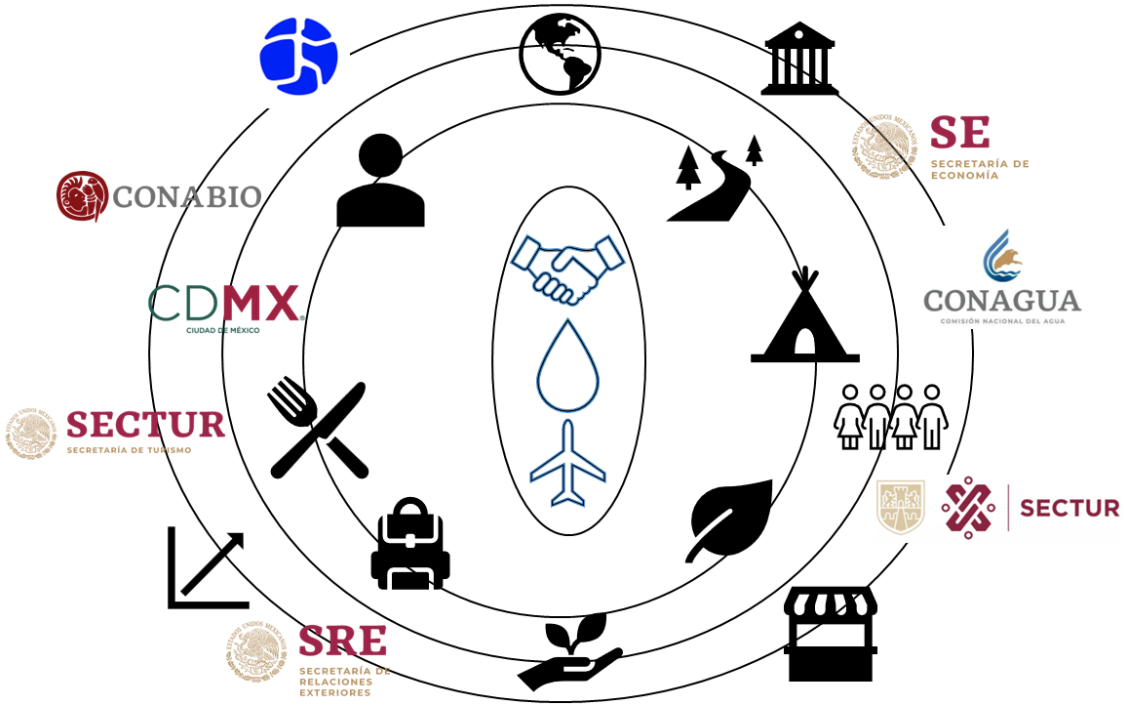
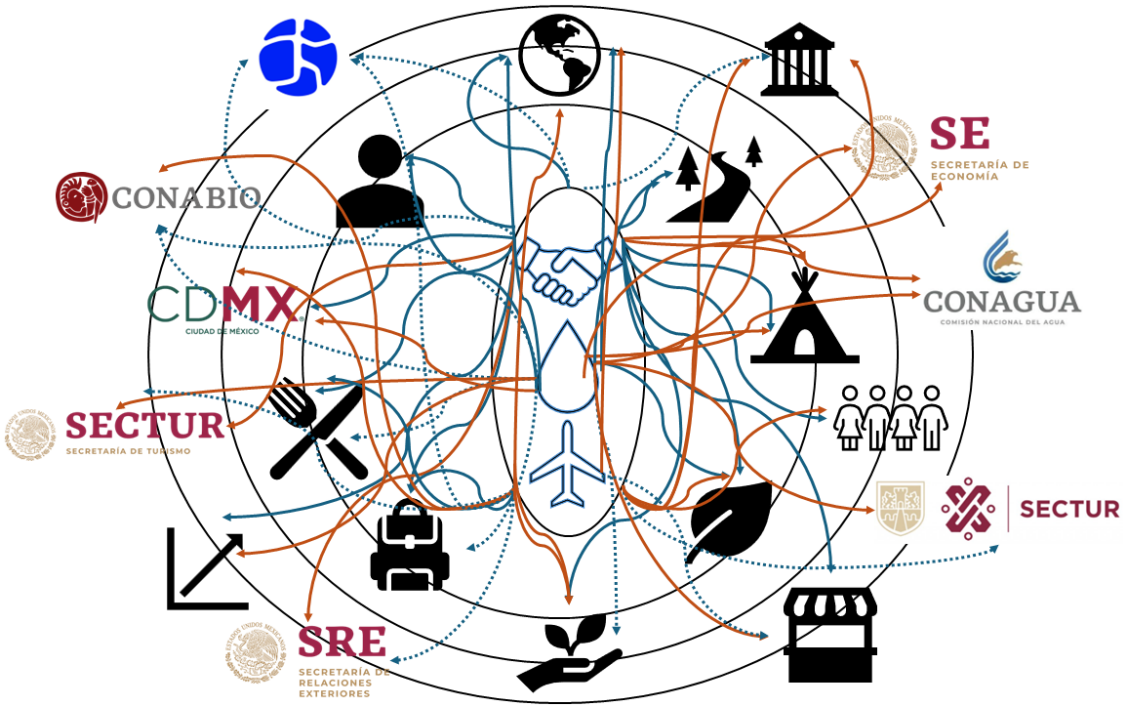


Exhibit 6. Problem situation expressed

Element	Icon	Element	Icon
Social entrepreneurship		Sustainability	
Sustainable water management		Mexico City	CDMX CIUDAD DE MÉXICO
Tourism		Government	
Rural communities		SE (Secretaría de Economía)	SE SECRETARÍA DE ECONOMÍA
Accommodation		CONAGUA (Comisión Nacional del Agua)	CONAGUA COMISIÓN NACIONAL DEL AGUA
Natural resources		SECTUR CDMX (Secretaría de Turismo de la Ciudad de México)	SECTUR
Tourist		UN Tourism	
Restaurants		CONABIO (Comisión Nacional para el Conocimiento y Uso de la Biodiversidad)	CONABIO
Entrepreneur		SECTUR (Secretaría de Turismo)	SECTUR SECRETARÍA DE TURISMO
Biodiversity		SRE (Secretaría de Relaciones Exteriores)	SRE SECRETARÍA DE RELACIONES EXTERIORES
Locality		Economic development	
Touristic products and services			

Derived from the definition of the focal system with its actors and entities, below is the interpretation of the relationships between these components in the enriched vision.

Exhibit 7. Enriched vision of sustainable water management in social entrepreneurship within rural tourist communities



The blue lines indicate relationships that function adequately, the dotted lines indicate relationships that lack communication processes, and the red lines indicate relationships that generate conflicts. The latter two types of relationships are described in the following table.

Exhibit 8. System Relationships

Element	Conflictive relationships	Element
Social entrepreneurship	Social problem-solving is not prioritized, and differences prevent objectives such as regulations, funding, recognition, and innovative approaches from deviating from society.	Government
	There are no effective strategies that economically benefit entrepreneurs from rural communities.	SE
	The predominant use of resources prevails without caring for the biodiversity of the areas involved.	CONAGUA
	There are no effective strategies promoting tourism dynamics from a sustainable approach in conjunction with economic activity.	SECTUR CDMX y SECTUR
Sustainable water management	Irregularities in policies, regulations, financing, and priorities in the conservation and distribution of water resources.	Government
	There is no synergy between the policies generated for the conservation, management, and distribution of this resource with the communities.	CONAGUA

	The regulations for water use in lodging establishments are not being met.	Accommodation
	There is no adequate training for tourism service providers and regulations for tourism companies.	SECTUR CDMX y SECTUR
	There is no openness to integrate sustainable water management into economic development.	Economic development
	Poor infrastructure is observed to carry out sustainable water management.	Mexico City
Tourism	There is no application of strategies to eradicate the problems generated by urban development.	Government
	Excessive exploitation and environmental degradation due to the depletion of natural resources generated by traditional tourism.	Natural resources
	Habitat destruction, pollution, and overexploitation of natural resources.	Biodiversity
	There is a weak synergy between the effective application of sustainable practices for the conservation and preservation of the environment where tourism dynamics take place.	Sustainability
	There are no regulations provided by CONABIO for tourism dynamics in Mexico City.	CONABIO
	Traditional predatory tourism creates an environment that undermines the quality of life for communities, the environment, natural resources, and culture.	CDMX
	There are no regulations provided by SRE for tourism dynamics in Mexico City.	SRE
	The phenomena of community exclusion prevail, leading to displacement from their places of origin.	Locality
Element	**Discontinuous relationships**	**Element**
Social entrepreneurship	Lack of incentives and training specifically focused on social entrepreneurship in rural tourist communities.	UN Tourism
	Need to increase CONABIO's intervention in rural tourist communities as an intermediary and protector of biodiversity.	CONABIO
Sustainable water management	Improvement in aligning practices promoting sustainable water management in rural communities.	UN Tourism
	Improvement in water management to avoid waste and eradicate harmful practices that damage the environment.	Restaurants
	Improving tourist awareness in the tourist destination (rural community) and promoting the responsible acquisition of tourism products and services.	Tourist
	There is a need for improvement in the application of regulations focusing on environmental care in rural communities.	CONABIO
Tourism	Little recognition and support for rural communities that generate tourism products and services for the preservation and care of the environment.	SECTUR CDMX y SECTUR
	Lack of promotion or interest in the consumption of products and services.	Touristic products and services

Derived from the implementation of the TSI in the system under study, the positive influence of social entrepreneurship and water management on tourism dynamics was identified. This reveals that enterprises promote an improvement in system relationships and its components. Additionally, the application of this systemic approach allows addressing and understanding the challenges faced by the system.

In synthesizing the interpretations of actors and relationships within the system, a complex system is typified where decision-making relationships fluctuate between unitary-pluralistic, where actors in enterprises, in some cases, coincide in processes to improve the local economy and preserve culture and the environment in the context of tourism activities.

This balance is reflected in the high cohesion of the community to protect the water resource, considered essential for tourist attraction. On the other hand, when there are differences in values and beliefs among actors, agreements emerge that demonstrate a shared commitment to environmental care, integrating ecosystems and recognizing water as a fundamental resource and essential part of local cultural identity.

4 | Conclusions

Water management in the rural communities of the Álvaro Obregón, Cuajimalpa de Morelos, Magdalena Contreras, Milpa Alta, Tláhuac, Tlalpan, and Xochimilco boroughs in Mexico City plays a crucial role in sustainability and overall well-being, especially within the framework of sustainable development. The convergence of tourism and social entrepreneurship offers a unique opportunity to address the challenges associated with sustainable water management. Integrating principles of social and environmental responsibility into tourism-focused social entrepreneurship can positively influence the environmental awareness and education of tourists, fostering a culture of responsible tourism and promoting individual or collective actions to protect water resources. Social entrepreneurship can improve equitable access to water, especially in tourist regions where rural communities face challenges related to water availability and quality.

The present study highlights the urgent need to address the challenges related to water management in the rural tourist communities of Mexico City. It is recognized that tourism can exert additional pressure on local water resources, emphasizing the importance of a comprehensive approach that balances the needs arising from this dynamic to achieve the goal of conservation and sustainable management of water resources.

SSM emerges as a flexible and effective tool to address this complex issue, allowing for a deep understanding of the relationships between the various actors and components of the system under study. With the application of SSM, the positive influences of social entrepreneurship and water management on tourism dynamics were identified, highlighting the potential of these interventions to improve relationships within the system under study and promote sustainable development.

It is crucial to adopt appropriate policies and regulations, as well as to encourage active participation of local communities and relevant actors, to ensure tourism development compatible with the protection and preservation of water and the environment. This holistic and collaborative approach is essential to ensure that tourism contributes positively to long-term sustainable development while protecting natural resources and promoting social equity in local communities.

As a future work, once the bases of the relevant systems have been defined, the system design will be generated using the principles of Organizational Cybernetics with the Viable System Model.

Acknowledgements

This article is supported by Instituto Politécnico Nacional of México through of projects SIP 20242464 and SIP 20241727 granted by Secretaría de Investigación y Posgrado and Consejo Nacional de Humanidades, Ciencias y Tecnologías of México.

References

Amoah, Laura Novienyo Abla, and Mulala Danny Simatele. 2021. "Food Security and Coping Strategies of Rural Household Livelihoods to Climate Change in the Eastern Cape of South Africa." *Frontiers in Sustainable Food Systems* 5(August). doi: 10.3389/fsufs.2021.692185.

An, Wookhyun, and Silverio Alarcón. 2020. "How Can Rural Tourism Be Sustainable? A Systematic Review." *Sustainability* 12(18):7758. doi: 10.3390/su12187758.

Aquino, Richard S. 2022. "Community Change through Tourism Social Entrepreneurship." *Annals of Tourism Research* 95:103442. doi: 10.1016/j.annals.2022.103442.

Brown, Casey M., Jay R. Lund, Ximing Cai, Patrick M. Reed, Edith A. Zagona, Avi Ostfeld, Jim Hall, Gregory W. Characklis, Winston Yu, and Levi Brekke. 2015. "Scientific Framework for Sustainable Water Management." *Water Resources Research* 6110–24. doi: 10.1002/2015WR017114.Received.

Cabral, Berta. 2023. "Local Communities at the Heart of Tourism Development: The Azores Tourism Strategy 2030." *Worldwide Hospitality and Tourism Themes* 15(6):656–63. doi: 10.1108/WHATT-09-2023-0113.

Cervantes-Jiménez, Mónica, Carlos Díaz-Delgado, Enrique González-Sosa, Miguel Ángel Gómez-Albores, and Carlos Alberto Mastachi-Loza. 2020. "Proposal of a Water Management Sustainability Index for the 969 Sub-Basins of Mexico." *Journal of Maps* 16(2):432–44. doi: 10.1080/17445647.2020.1763486.

Checkland, P. 1999. "Systems Thinking, Systems Practice: Includes a 30-Year Retrospective." *Wiley*.

Delves, Jess L., V. Ralph Clark, Stefan Schneiderbauer, Nigel P. Barker, Jörg Szarzynski, Stefano Tondini, João de Deus Vidal, and Andrea Membretti. 2021. "Scrutinising Multidimensional Challenges in the Maloti-Drakensberg (Lesotho/South Africa)." *Sustainability (Switzerland)* 13(15). doi: 10.3390/su13158511.

Gobierno de la Ciudad de México. 2023. "Ciudad Sustentable." Retrieved (https://informedegobierno.cdmx.gob.mx/ejes/02-ciudad-sustentable-2/).

Grison, Chloé, Stef Koop, Steven Eisenreich, Jan Hofman, I. Shin Chang, Jing Wu, Dragan Savic, and Kees van Leeuwen. 2023. "Integrated Water Resources Management in Cities in the World: Global Challenges." *Water Resources Management* 37(6–7):2787–2803. doi: 10.1007/s11269-023-03475-3.

INEGI. 2024a. "Ciudad de México, Territorio, Superficie, Clima y Agua." *Instituto Nacional de Estadística, Geografía e Informática*. Retrieved (https://cuentame.inegi.org.mx/monografias/informacion/df/territorio/default.aspx?tema=me&e=09).

INEGI. 2024b. "Mapa de La Ciudad de México Por Demarcación Territorial." *Instituto Nacional de Estadística, Geografía e Informática*. Retrieved (https://cuentame.inegi.org.mx/mapas/pdf/entidades/div_municipal/cdmx_demarcaciones_byn.pdf).

Jackson, M. 2003. *Systems Thinking: Creative Holism for Managers*. England: John Wiley & Sons.

Khan, Mustafa Rehman, Haseeb Ur Rehman Khan, Chen Kim Lim, Kian Lam Tan, and Minhaz Farid Ahmed. 2021. "Sustainable Tourism Policy, Destination Management and Sustainable Tourism Development: A Moderated-Mediation Model." *Sustainability* 13(21):12156. doi: 10.3390/su132112156.

Kummitha, Harshavardhan Reddy, Naveen Kolloju, András Jancsik, and Zsófia Csilla Szalók. 2021. "Can Tourism Social Entrepreneurship Organizations Contribute to the Development of Ecotourism and Local Communities: Understanding the Perception of Local Communities." *Sustainability* 13(19):11031. doi: 10.3390/su131911031.

Liu, Huaxian, Yanling Jiang, He Zhu, Yuansheng Chen, Wenfei Lyu, Wenzhe Luo, and Weiwei Yao. 2021. "Analysis of Water Resource Management in Tourism in China Using a Coupling Degree Model." *Water Policy* 23(3):765–82. doi: 10.2166/wp.2021.155.

Meldayanoor, G. M. Hatta, A. Nugroho, and A. S. Hidayat. 2022. "A High Conservation Value Analysis of Ecotourism Areas: A Case Study in Tanah Laut, South Kalimantan, Indonesia." *IOP Conference Series: Earth and Environmental Science* 976(1):012025. doi: 10.1088/1755-1315/976/1/012025.

Mishra, B. K., P. Kumar, C. Saraswat, S. Chakraborty, and A. Gautam. 2021. "Water Security in a Changing

Environment : Concept ,." *Water* 13(4):490.
Oki, Taikan. 2015. "Water Resources Management and Adaptation to Climate Change." Pp. 27–40 in *Water Security, Climate Change and Sustainable Development*. Springer.
Ouyang, Ying, and Sudhanshu Sekhar Panda. 2022. "Linking Climate-Change Impacts on Hydrological Processes." *Climate* 10(7):1–5.
PAOT. 2024. "Programa Delegacional de Desarrollo Urbano de Cuajimalpa de Morelos." Retrieved (https://paot.org.mx/centro/programas/delegacion/cuajima.html).
Papadaki, Christina, and Elias Dimitriou. 2021. "River Flow Alterations Caused by Intense Anthropogenic Uses and Future Climate Variability Implications in the Balkans." *Hydrology* 8(1):7. doi: 10.3390/hydrology8010007.
Petrosillo, I., G. Zurlini, E. Grato, and N. Zaccarelli. 2006. "Indicating Fragility of Socio-Ecological Tourism-Based Systems." *Ecological Indicators* 6(1):104–13. doi: 10.1016/j.ecolind.2005.08.008.
Ramírez-Gutiérrez, Ana Gabriela, Pedro Pablo Cardoso-Castro, and Ricardo Tejeida-Padilla. 2021. "A Methodological Proposal for the Complementarity of the SSM and the VSM for the Analysis of Viability in Organizations." *Systemic Practice and Action Research* 34(3):331–57. doi: 10.1007/s11213-020-09536-7.
Romão, João. 2018. *Tourism, Territory and Sustainable Development*. Vol. 28. Singapore: Springer Singapore.
Rushforth, Richard R., Maggie Messerschmidt, and Benjamin L. Ruddell. 2020. "A Systems Approach to Municipal Water Portfolio Security: A Case Study of the Phoenix Metropolitan Area." *Water* 12(6):1663. doi: 10.3390/w12061663.
Santos, Eleonora, and Jacinta Moreira. 2021. "Social Sustainability of Water and Waste Management Companies in Portugal." *Sustainability* 14(1):221. doi: 10.3390/su14010221.
Sebestyén, Viktor, Tímea Czvetkó, and János Abonyi. 2021. "The Applicability of Big Data in Climate Change Research: The Importance of System of Systems Thinking." *Frontiers in Environmental Science* 9(March):1–26. doi: 10.3389/fenvs.2021.619092.
SEDEMA. 2024. "Programa Infraestructura Verde." *Secretaria Del Medio Ambiente*. Retrieved (https://sedema.cdmx.gob.mx/programas/programa/infraestructura-verde).
Sharma, Vivek, and Dada Ab Rouf Bhat. 2023. "The Role of Community Involvement in Sustainable Tourism Strategies: A Social and Environmental Innovation Perspective." *Business Strategy & Development* 6(2):119–27. doi: 10.1002/bsd2.227.
Simental, Esthela Salas, Ricardo Tejeida Padilla, Escuela Superior De Turismo, and Oswaldo Morales Matamoros. 2023. "Una Perspectiva Sistémica En El Proceso de Enseñanza- Aprendizaje de Las Matemáticas En El Nivel Educativo Superior A Systemic Perspective in the Teaching-Learning Process of Mathematics at the Higher-Level Education Uma Perspectiva Sistêmica No Processo ." 12.
Simonovic, Slobodan P. 2020. "Application of the Systems Approach to the Management of Complex Water Systems." *Water* 12(10):2923. doi: 10.3390/w12102923.
Tejeida, Ricardo, Erika Cruz Coria, and Abraham Briones Juárez. 2016. *Sistémica y Turismo*. Editorial Miguel Ángel Porrúa.
Yolles, M. I. 1996. "Critical Systems Thinking, Paradigms, and the Modelling Space." *Systems Practice* 9(6):549–70. doi: 10.1007/BF02169213.