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Tourism-driven Water Metabolism in Coastal Destinations: Governance Tensions and Sustainability Implications from Puerto Vallarta, Mexico

*By José Luis Cornejo-Ortega**

Tourism growth in coastal destinations has intensified pressure on local water systems, generating complex tensions between economic development, territorial equity and environmental sustainability. Despite increasing academic attention to tourism–water interactions, integrated socio-ecological analyses remain limited, particularly in tourism-dependent regions of Latin America. This article critically examines the relationship between tourism development and water governance through a qualitative case study of Puerto Vallarta, Mexico. The research adopts a systematic documentary analysis combining scientific literature and institutional sources to identify structural patterns linking tourism expansion, water demand dynamics, governance arrangements and socio-environmental impacts. The findings suggest that tourism functions as a key driver of the socio-hydrological metabolism of coastal destinations, reinforcing territorial redistribution of water resources, increasing dependence on groundwater extraction and externalizing environmental and financial costs to public institutions and local ecosystems. Although recent policy responses emphasize circular water strategies focused on efficiency improvements and wastewater reuse, their implementation remains largely incremental and insufficient to offset rising total consumption levels associated with tourism growth. As a result, adaptation strategies tend to reinforce functional forms of territorial resilience oriented toward maintaining tourism competitiveness rather than addressing structural socio-ecological vulnerabilities. By integrating the analytical perspectives of political ecology of water, circular economy and territorial resilience, this study proposes a socio-hydrological framework for understanding tourism-related water governance in coastal destinations. The article contributes to tourism sustainability debates by highlighting the need for systemic policy approaches that incorporate ecological limits, promote equitable resource allocation and address the structural drivers of tourism-induced water demand.

Keywords: *Water governance; Tourism water use; Socio-hydrology; Circular economy; Territorial resilience*.

Introducción

Water constitutes a strategic resource for the functioning of coastal tourism destinations, both in terms of meeting the basic needs of resident populations and sustaining the operational requirements of contemporary tourism infrastructure. Hotels, restaurants, recreational complexes and urban services associated with tourism depend on a continuous and high-quality water supply, positioning the

*Professor, University of Guadalajara, Mexico.

sector as one of the most intensive users of water resources in many coastal territories (Gössling et al. 2012, Becken 2014).

Over recent decades, the accelerated expansion of international tourism and the consolidation of large-scale urban–tourism development models have significantly increased pressure on local water systems, particularly in regions characterized by limited availability, strong seasonality of demand and growing climate vulnerability. In such contexts, water management has evolved from a primarily technical challenge to a complex socio-environmental issue shaped by tensions between economic growth, territorial equity and ecological limits. Recent studies highlight how the interaction between tourism development, climate change and water availability intensify structural vulnerabilities in highly tourism-dependent coastal regions (Hall et al. 2020, Gössling 2021).

Tourism-related water consumption often exceeds domestic levels, generating persistent asymmetries in access and functional redistribution of water resources toward economically prioritized areas (Cole 2012, Gössling et al. 2015). At the same time, the environmental and financial costs associated with infrastructure expansion, groundwater extraction and wastewater treatment are frequently externalized to local governments and communities, while economic benefits remain concentrated among private tourism actors (Becken 2014, Navas & Cuvi 2015). From a political ecology perspective, these dynamics reflect institutional arrangements and power relations that shape unequal patterns of water allocation and governance.

In response to these challenges, sustainability-oriented approaches have gained relevance, particularly the circular economy of water, focused on efficiency, reuse and resource loop closure, and the concept of territorial resilience, understood as the capacity of socio-ecological systems to adapt and transform in the face of environmental and climatic disturbances (Geissdoerfer et al. 2017, UN-Water 2013). However, critical scholarship argues that such strategies are often implemented in a technocratic and incremental manner, prioritizing operational optimization without addressing absolute levels of consumption or the structural drivers of tourism growth (Cole 2014, Cruz et al. 2019).

Despite the growing international literature on tourism and water sustainability, integrated empirical analyses remain limited in Latin American coastal destinations, where institutional constraints, strong tourism dependency and socio-environmental pressures frequently converge. In Mexico, major coastal tourism poles are experiencing accelerated urbanization and increasing water demand, yet studies adopting critical and multi-scalar perspectives remain scarce.

Puerto Vallarta, one of the most consolidated tourism destinations on Mexico's Pacific coast, represents a paradigmatic case of these tensions. Sustained hotel expansion, real estate development and a marked dependence on groundwater sources have intensified pressure on the local water system, revealing conflicts between tourism service provision, urban needs and long-term environmental sustainability.

Against this backdrop, this article aims to critically examine the relationship between tourism development and water management in coastal destinations through a systematic documentary analysis applied to the case of Puerto Vallarta, Jalisco. By integrating the analytical frameworks of political ecology of water,

circular economy and territorial resilience, the study seeks to assess the scope and limitations of circular water strategies and their potential contribution to socio-ecological sustainability.

The article contributes in three main ways. First, it articulates theoretical perspectives that are rarely analyzed jointly within tourism studies. Second, it suggests the analytical value of critical documentary analysis for understanding complex socio-ecological processes at the territorial scale. Third, it provides empirical evidence from a Latin American destination, contributing to the geographical diversification of research on tourism and water governance. The paper is structured into four sections: theoretical framework, methodology, results organized around six analytical axes, and discussion of implications for sustainable water governance in coastal tourism destinations.

Theoretical Framework

The relationship between tourism development and water use has gained increasing attention in sustainability research, particularly in coastal destinations where resource availability is limited and tourism demand is highly seasonal. The expansion of tourism infrastructure — including hotels, recreational facilities and urban services — intensifies water consumption and reshapes territorial patterns of access, generating tensions between economic growth, social equity and environmental conservation (Gössling et al. 2012, Becken 2014).

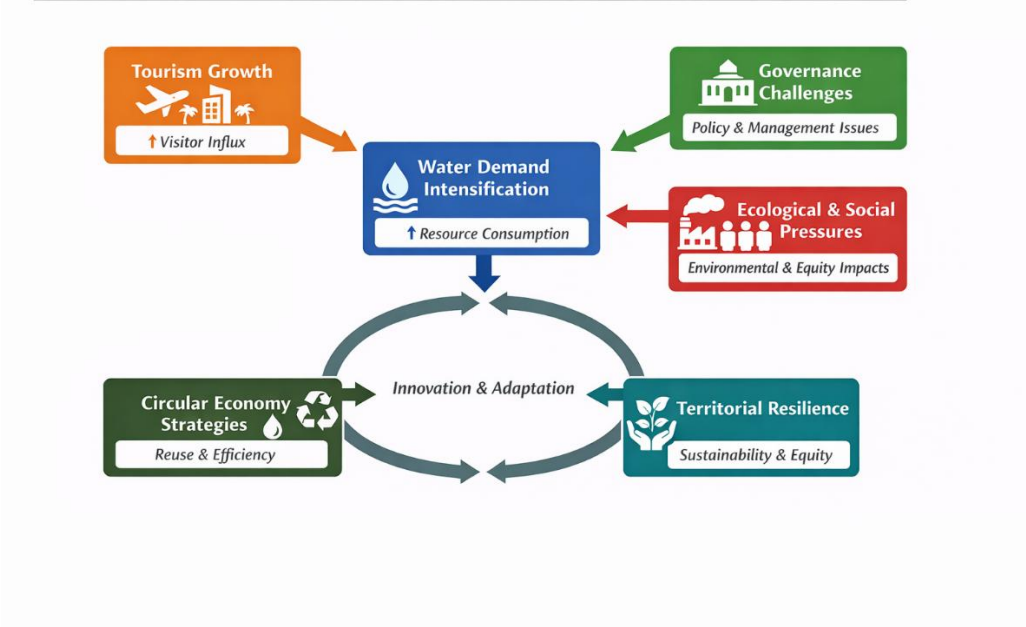
Empirical evidence shows that tourism-related water consumption frequently exceeds domestic use, especially in medium and high category accommodation establishments where services such as swimming pools, laundry operations, landscaping and golf courses significantly increase demand (Rico-Amorós et al. 2009). In many destinations, these dynamics contribute to spatial prioritization of water supply toward economically strategic tourism areas, reinforcing unequal access to resources and increasing pressure on groundwater systems.

From this perspective, water management in tourism destinations cannot be understood solely as a technical challenge of supply provision but must be analyzed as a socio-political process shaped by institutional arrangements and power relations. The political ecology of water provides a relevant analytical framework by conceptualizing water as a common resource whose distribution is mediated by governance structures, territorial conflicts and competing development priorities (Cole 2012, 2014). This approach highlights how allocation decisions often favor economically dominant sectors such as tourism, consolidating patterns of functional redistribution and environmental inequality.

In parallel, the concept of circular economy has emerged as a key sustainability paradigm aimed at reducing resource extraction and minimizing waste through efficiency improvements, reuse and the closure of material cycles (Geissdoerfer et al. 2017). In tourism contexts, circular water strategies, including wastewater treatment, leakage reduction and technological optimization, have been promoted as mechanisms to enhance environmental performance and reduce operational costs (Figure, 1). However, when circularity is limited to incremental efficiency gains

without addressing absolute consumption levels or structural drivers of tourism expansion, its transformative potential remains constrained (Cruz et al. 2019, Styles et al. 2015). This distinction between weak and strong circularity is crucial, as efficiency improvements may be offset by continued growth in tourism demand, reproducing overall water stress (Kirchherr et al. 2017).

Figure 1. *Circular Water Management Model in Tourism Destinations*



Source: Authors' own elaboration.

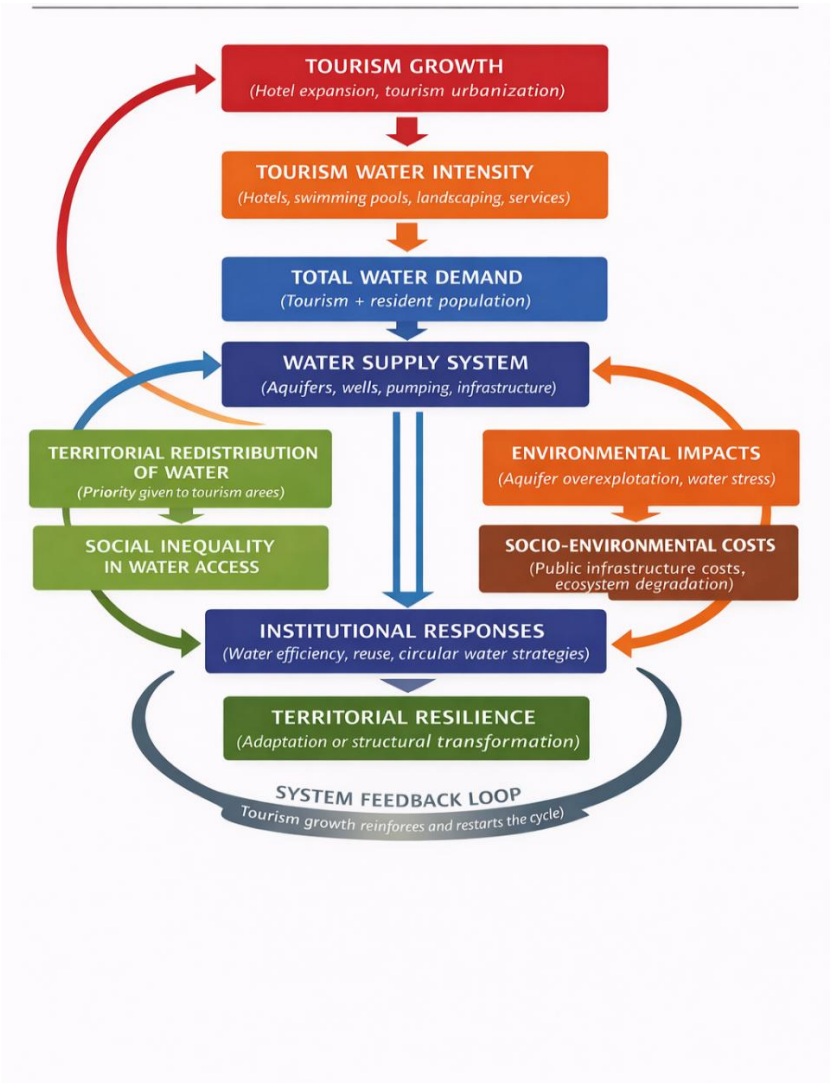
Complementing these perspectives, territorial resilience offers a systemic lens to assess the capacity of tourism destinations to adapt to environmental, climatic and socio-economic disturbances. Beyond ensuring technical reliability of supply systems, resilience involves the ability to transform development pathways and reduce long-term vulnerabilities (Scott et al. 2012, UN-Water 2013). In highly tourism-dependent coastal regions, such transitions are particularly challenging due to economic specialization and institutional inertia associated with maintaining tourism competitiveness.

Rather than operating as independent analytical lenses, political ecology of water, circular economy and territorial resilience are understood in this study as mutually constitutive dimensions of a single socio-hydrological system shaped by tourism development. Political ecology provides insight into the power relations and institutional arrangements that determine how water is allocated across territories and social groups, particularly under conditions of tourism-driven demand (Cole 2012, 2014, Navas & Cuvi 2015). Circular economy approaches, in turn, define the operational logic through which water flows are managed, optimized and potentially reconfigured within the tourism system, revealing both the possibilities and limits of efficiency-based interventions (Geissdoerfer et al. 2017, Kirchherr et al. 2017, Styles et al. 2015). Territorial resilience integrates these dynamics temporally and spatially, capturing how governance structures and resource management strategies

either reinforce or transform existing development trajectories (Scott et al. 2012, UN-Water 2013). From this perspective, tourism-driven water metabolism emerges from the interaction between distributive conflicts (political ecology), resource flow management (circular economy) and adaptive capacity (resilience), generating feedback loops between social and hydrological systems that may stabilize or intensify socio-ecological pressures (Di Baldassarre et al. 2019, Gössling et al. 2012). This relational articulation allows for a more comprehensive understanding of water governance in coastal tourism destinations, moving beyond fragmented interpretations toward a systemic and process-oriented analytical framework.

This integrated socio-hydrological framework guides the empirical analysis by enabling the identification of structural interactions between tourism development, water demand dynamics, institutional responses and territorial sustainability outcomes (Figure 2).

Figure 2. *Integrated Socio-hydrological Framework of Tourism and Water Governance in Coastal Destinations*



Source: Authors' own elaboration.

Methodology

This research adopts a qualitative approach grounded in a critical-interpretive paradigm within the social sciences. From this perspective, water management is understood not merely as a technical issue of supply efficiency but as a socio-ecological process shaped by institutional arrangements, power relations and territorial conflicts related to resource allocation.

An instrumental case study design was employed, focusing on Puerto Vallarta, Jalisco, Mexico. The case was selected due to its consolidation as a highly specialized coastal tourism destination, its strong economic dependence on tourism and the increasing pressure exerted on local water supply systems. These characteristics make it representative of broader dynamics observed in tourism-dependent coastal regions of Latin America.

The research strategy is based on systematic critical documentary analysis. This methodological approach enables the integration of theoretical insights from scientific literature with empirical evidence derived from institutional sources, allowing for a multi-scalar interpretation of tourism–water interactions.

Two complementary documentary corpora were constructed. The first corpus consists of peer-reviewed academic publications addressing tourism water consumption, environmental governance, circular economy and territorial resilience. These sources provided the analytical categories guiding the study (Table 1).

Table 1. *Scientific Literature Corpus used for Analytical Framework Construction*

Author(s)	Year	Document type	Main focus	Contribution to the study
Gössling et al.	2012	Journal article	Tourism and water use	International comparative basis on tourism water intensity
Becken	2014	Journal article	Water equity in tourism	Tourism–local community water uses relationships
Cole	2012	Journal article	Political ecology of water	Unequal distribution of water resources
Cole	2014	Journal article	Water governance	Political dimension of water supply management
Rico-Amorós et al.	2009	Journal article	Tourism land use and water demand	Water intensity in Mediterranean destinations
Scott et al.	2012	Academic book	Climate change and tourism	Structural vulnerability of tourism systems
Gössling et al.	2015	Academic book	Tourism and water	Conceptualization of tourism water metabolism

Geissdoerfer et al.	2017	Journal article	Circular economy	Circularity as a sustainability paradigm
Kirchherr et al.	2017	Journal article	Strong vs weak circularity	Transformational limits of circular economy approaches
Styles et al.	2015	Journal article	Environmental performance in hotels	Resource efficiency in tourism accommodation
Di Baldassarre et al.	2019	Journal article	Socio-hydrology	Interaction between social and hydrological systems
UN-Water	2013	Institutional report	Water security	International governance framework
Vera	2006	Journal article	Coastal water management	Territorial conflicts over water resources
Milano et al.	2021	Journal article	Overtourism	Limits of tourism growth
Hall et al.	2020	Journal article	Sustainable transformations	Structural change in tourism systems
Cruz et al.	2019	Book chapter	Circular tourism	Critique of incremental efficiency approaches
Navas & Cuvi	2015	Journal article	Water conflicts in Latin America	Political ecology perspective in the region
Hernández et al.	2020	Journal article	Tourism and water accumulation	Socio-environmental externalization dynamics

The second corpus includes institutional and technical documents related to water production, infrastructure capacity, seasonal demand patterns and urban planning instruments in Puerto Vallarta. These documents allowed for the empirical characterization of local water supply structures and demand dynamics (Table 2).

Table 2. *Institutional and Technical Documents used in the Empirical Analysis*

Document type	**Issuing institution**	**Main content**	**Contribution to the analysis**
Annual report on water production and consumption	Municipal water utility	Extraction volumes and territorial distribution	Evidence of groundwater dependence
Hydraulic infrastructure report	Drinking water utility system	Number of wells and installed capacity	Supply expansion dynamics
Seasonal demand statistics	Water utility operator	Monthly consumption variations	Tourism-related water intensity

Municipal Development Plan	Municipal government	Urban growth priorities	Tourism–planning relationship
Territorial land-use planning program	State/municipal government	Zoning and urban expansion patterns	Territorial redistribution of water resources
Water quality certification reports	Public health authority	Water quality standards and service continuity	Operational supply priorities
Financial reports of the water system	Water utility operator	Public investment in infrastructure	Externalization of socio-environmental costs
Local academic technical studies	Universities and research centers	Technical diagnoses of water management	Analytical complement and contextual validation
Institutional communications during peak seasons	Water utility operator	Operational adjustments under high demand	Territorial prioritization strategies

The analytical process involved comparative and interpretive reading of both corpus in order to identify recurring patterns, tensions between policy discourse and operational practices, mechanisms of socio-environmental cost externalization and structural interactions between tourism growth and ecological limits.

The analytical process involved a theoretically informed interpretive approach based on iterative interaction between conceptual frameworks and empirical evidence. Rather than emerging purely inductively, the six analytical axes were identified through a process of analytical refinement in which patterns observed in the documentary corpus were interpreted in light of the theoretical perspectives of political ecology of water, circular economy and territorial resilience. This approach allowed for both the recognition of empirically grounded regularities and their conceptual articulation within a broader socio-hydrological framework. To enhance analytical rigor, the study incorporated source triangulation, cross-scalar comparison and documentary traceability, while also considering convergent and, where present, divergent evidence across the analyzed sources. Given its qualitative nature, the research does not aim to establish statistical causality but to provide a structurally informed interpretation of tourism–water interactions in coastal destinations.

This approach aligns with qualitative research traditions that emphasize the co-construction of analytical categories through continuous dialogue between theory and empirical material.

Results

To empirically contextualize the relationship between tourism development and water management in Puerto Vallarta, key structural indicators of the local water system and tourism activity are presented in Table 3. These indicators illustrate the magnitude of seasonal demand pressures, the strong dependence on groundwater

sources and the significant role of tourism as a driver of water consumption dynamics in the destination.

Table 3. *Water System Indicators and Tourism Pressure in Puerto Vallarta*

Indicator	Approximate value	Institutional source	Analytical interpretation
Resident population (municipality)	~291,000 inhabitants	INEGI (2020)	Demographic baseline of urban water demand
Annual tourist arrivals	~6.4 million	Jalisco Ministry of Tourism (2023)	High tourism intensity relative to resident population
Registered hotel rooms	~25,000	Jalisco Ministry of Tourism (2023)	Large installed capacity of the tourism system
Average daily drinking water production	~1,300–1,400 liters per second	SEAPAL Vallarta (2022)	Operational capacity of the supply system
Groundwater sources share	>80% of total supply	CONAGUA (2020)	Strong dependence on local aquifers
Approximate number of supply wells	~30 wells	SEAPAL Vallarta (2021)	Core groundwater extraction infrastructure
Average domestic water consumption	180–220 liters per capita/day	CONAGUA (2022)	Standard urban consumption level
Estimated hotel water consumption	300–800 liters per tourist/day	Gössling et al. (2012); Rico-Amorós et al. (2009)	Significantly higher tourism water intensity
Seasonal increase in water demand	10–20%	SEAPAL Vallarta (2022)	Tourism-driven peak demand pressure
Economic dependence on tourism	>70% of local economic activity	Jalisco Ministry of Tourism	Structural prioritization of water supply

The documentary analysis also allowed the identification of six analytical axes that synthesize the main structural dimensions through which tourism development reshapes water use, governance arrangements and socio-environmental pressures in the destination. Table 4 summarizes these axes and their implications for water sustainability.

Table 4. *Analytical Synthesis of Tourism–Water Interactions in Puerto Vallarta*

Analytical axis	**Documentary evidence**	**Structural interpretation**	**Implications for water sustainability**
Territorial appropriation and redistribution of water	Priority supply continuity in hotel zones during peak demand periods; dependence on groundwater sources	Tourism appears to operate as a spatial driver of selective water allocation and functional redistribution of the resource	Reinforces territorial inequalities and increases vulnerability of peripheral residential areas
Water intensity of the tourism model	Seasonal peaks in water production and higher per capita consumption in hotels compared to residential use	The evidence suggests that tourism may function as a structural multiplier of water demand linked to high-comfort service provision	Efficiency measures alone are insufficient to offset increasing total water consumption
Externalization of socio-environmental costs	Public investment in wells, pumping systems and wastewater infrastructure to sustain tourism growth	Environmental and financial costs are transferred to public institutions and local ecosystems	Distorts real economic valuation of tourism and delays recognition of ecological limits
Institutional water governance	Centralized decision-making and operational prioritization of supply continuity in tourism corridors	Technocratic governance frames water scarcity as a supply problem rather than a demand regulation issue	Limits participatory planning and weakens regulatory capacity over intensive tourism consumption
Circular water strategies	Implementation of efficiency improvements, leakage reduction and limited wastewater reuse	The evidence suggests that circularity operates mainly as incremental optimization without reducing absolute water demand	Weak circular transition risks legitimizing continued tourism expansion
Territorial water resilience	Expansion of supply infrastructure as the main adaptation strategy to seasonal demand increases	Resilience is predominantly functional and oriented toward maintaining tourism growth dynamics	Long-term socio-ecological vulnerability remains structurally unresolved

Territorial Appropriation and Redistribution of Water

Documentary evidence indicates that water supply continuity is strategically prioritized in tourism corridors and high-density hotel zones, particularly during peak demand periods. This operational prioritization contributes to functional redistribution of water resources within the urban territory, often resulting in intermittent supply conditions in peripheral residential areas. Such patterns reflect the spatial influence of tourism development on water allocation decisions and reinforce territorial inequalities in access to basic services.

Water Intensity of the Tourism Model

Tourism appears to operate as a structural multiplier of water demand due to the service requirements associated with accommodation, recreational infrastructure and landscape maintenance. Institutional data reveal seasonal increases in water production linked to peak tourist arrivals, while the literature consistently documents higher per capita consumption levels in tourism establishments compared to residential use. These dynamics intensify pressure on local aquifers and increase the operational complexity of supply systems.

Externalization of Socio-environmental Costs

The expansion of tourism infrastructure has required sustained public investment in wells, pumping systems, distribution networks and wastewater treatment facilities. Documentary sources show that environmental and financial costs associated with maintaining supply capacity are largely absorbed by public institutions and local ecosystems, while tourism-related economic benefits remain concentrated among private actors. This externalization of costs delays recognition of ecological limits and may distort the long-term sustainability of tourism development.

Institutional Water Governance

Water management in the destination is characterized by centralized decision-making structures focused on ensuring supply reliability in economically strategic areas. Planning instruments and operational practices tend to frame water scarcity as a technical supply challenge rather than a demand regulation issue. This governance configuration limits participatory mechanisms and reduces the capacity to implement structural measures aimed at moderating intensive tourism consumption patterns.

Circular Water Strategies

Recent institutional initiatives emphasize efficiency improvements, leakage reduction and the gradual incorporation of wastewater reuse practices. While these strategies contribute to operational optimization, documentary evidence suggests that their implementation remains incremental and insufficient to offset growing total water demand driven by tourism expansion. Consequently, circular approaches

risk legitimizing continued growth without fundamentally transforming consumption patterns.

Territorial Water Resilience

Adaptation strategies in Puerto Vallarta are predominantly oriented toward expanding supply infrastructure in response to seasonal demand increases. Although such measures enhance short-term system reliability, they reinforce a functional form of resilience aimed at maintaining tourism growth dynamics rather than addressing structural socio-ecological vulnerabilities. This pathway may increase long-term exposure to water stress under conditions of climatic variability and continued urban–tourism expansion.

Discussion

The findings of this study should be interpreted as theoretically informed insights into the socio-hydrological dynamics of tourism-dependent coastal destinations rather than as direct empirical verification of causal relationships. The patterns identified in Puerto Vallarta suggest that tourism development is associated with intensified water demand, territorial redistribution of supply and the externalization of socio-environmental costs, in ways that are consistent with existing theoretical perspectives in political ecology and socio-hydrology (Gössling et al. 2012, Cole 2014). Similarly, the observed limitations of circular water strategies can be interpreted as indicative of a predominance of incremental efficiency-oriented approaches, which may be insufficient to offset increasing total consumption levels associated with tourism growth, as discussed in the literature on weak circularity (Geissdoerfer et al. 2017, Kirchherr et al. 2017). From this perspective, the apparent reinforcement of growth-oriented trajectories may be understood as a form of functional territorial resilience that stabilizes existing development patterns rather than transforming underlying structural conditions. These interpretations are consistent with broader debates on socio-hydrological feedbacks and path dependency in resource-intensive systems (Di Baldassarre et al. 2019).

The results suggest that tourism development in Puerto Vallarta significantly reshapes local water dynamics through processes of intensified consumption, territorial redistribution of supply and externalization of socio-environmental costs. These patterns are consistent with international evidence showing that tourism operates as a structural driver of resource metabolism in coastal destinations, particularly where economic specialization reinforces dependence on high-consumption service models (Gössling et al. 2012, Becken 2014).

From a political ecology perspective, the prioritization of water allocation in tourism corridors reflects governance arrangements that favor economically strategic activities, often at the expense of residential access and long-term ecological sustainability. Similar dynamics have been documented in Mediterranean destinations such as the Balearic Islands and coastal Spain, where tourism growth has historically contributed to increased groundwater extraction and spatial inequalities in water

distribution (Rico-Amorós et al. 2009, Cole 2014). These patterns suggest that water scarcity in tourism-dependent regions is not solely a function of physical availability but also of institutional decision-making and development priorities.

The results also indicate that circular water strategies in the destination remain largely oriented toward incremental efficiency improvements rather than structural demand regulation. While measures such as leakage reduction and wastewater reuse contribute to operational optimization, their capacity to offset rising total consumption driven by tourism expansion is limited. This finding aligns with broader debates in sustainability research highlighting the risk of "weak circularity," whereby technological solutions improve resource efficiency without reducing absolute pressures on ecosystems (Geissdoerfer et al. 2017, Kirchherr et al. 2017).

In this context, territorial resilience emerges as a contested and unevenly distributed process. Adaptation strategies based on expanding supply infrastructure enhance short-term system reliability but may reinforce long-term vulnerability by sustaining growth-oriented tourism models. From a socio-hydrological perspective, feedback loops between tourism demand, infrastructure development and ecological stress can lock destinations into trajectories of increasing resource dependency (Di Baldassarre et al. 2019).

While some institutional documents report improvements in efficiency and service continuity, these advances do not necessarily translate into reductions in overall water demand, particularly under conditions of sustained tourism growth.

Overall, the integrated framework applied in this study suggests the analytical value of combining political ecology of water, circular economy and territorial resilience perspectives to understand tourism-related water governance as a complex socio-ecological process. This articulation allows for moving beyond purely technical interpretations of water management and highlights the need for policy approaches that address structural drivers of demand, promote equitable allocation mechanisms and incorporate ecological limits into tourism planning.

Conclusions

This study examined the relationship between tourism development and water management in a coastal destination characterized by strong economic dependence on tourism and increasing pressure on local water resources. Through systematic documentary analysis applied to the case of Puerto Vallarta, the research identified structural interactions between tourism growth, intensified water demand, territorial redistribution of supply and the externalization of socio-environmental costs.

The findings suggest that tourism functions as a key driver of the socio-hydrological metabolism of coastal destinations, reinforcing patterns of unequal access to water and increasing reliance on groundwater extraction. Although institutional responses have increasingly incorporated circular water strategies focused on efficiency and reuse, their implementation remains predominantly incremental and insufficient to offset rising total consumption levels associated with tourism expansion.

From a governance perspective, water management continues to be framed primarily as a technical challenge of infrastructure provision rather than as a

structural issue linked to demand regulation and development planning. This orientation limits the transformative potential of sustainability initiatives and contributes to the persistence of functional forms of territorial resilience aimed at maintaining tourism competitiveness rather than addressing long-term socio-ecological vulnerabilities.

By integrating the perspectives of political ecology of water, circular economy and territorial resilience, this article contributes to tourism studies by providing a comprehensive socio-ecological framework for understanding water governance in coastal destinations. The research also expands empirical evidence from Latin America, a region where tourism dependency, institutional constraints and environmental pressures frequently converge.

The results suggest the need to move beyond efficiency-oriented approaches toward more systemic policy interventions that incorporate ecological limits, promote equitable water allocation and encourage demand management strategies within tourism planning processes. Future research could further explore comparative socio-hydrological dynamics across coastal destinations, as well as the role of climate variability and urban growth in shaping long-term water sustainability trajectories.

Ultimately, achieving water sustainability in coastal tourism destinations requires moving beyond efficiency-based adaptation toward transformative governance capable of redefining the limits and trajectories of tourism development

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