




Mapping the Nexus of Urban Water Crisis, Social Capital, and Social Determinants of Health: A Bibliometric Analysis

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ABSTRACT. Urban water crisis is one of the major problems of the twenty-first century, which is worsened by climate change. Social capital is a key element in community resilience. This study will perform a bibliometric analysis and produce a scientific map of the field. This study uses a bibliometric analysis of a number of relevant scientific publications. We looked at metrics like yearly scientific output, citation patterns, keyword co-occurrence analysis, and author impact. The results indicate a significant surge in publications starting around 2020, reaching a peak of 20 articles in 2024. Research from those years had a significant impact, as evidenced by a notable citation surge in 2005 with over 120 citations and a secondary, notable peak in 2023 with over 80 citations. The Core Crisis (water, climate, risk), The Urban and Geographic Context (city, urban), The Social Dimensions and Impacts (social, capital, policy), and The Research Approach (case study, impact) were the four primary clusters found by keyword analysis. Writers like L. and S. Blancafort. He was determined to be the most influential researcher. Urban water crisis and social capital research is a multidisciplinary and expanding field. Understanding the function of social networks in sustainable water resource management is an area of growing research interest. Future developments should focus on integrating social tactics with advances in infrastructure and technology. © 2025 Published by Public Knowledge Project (PKP).

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Introduction

A number of factors, including aging infrastructure, rapid urbanization, climate change, and sociopolitical inequality, have contributed to the urban water crisis by endangering equitable and safe access to water in densely populated urban areas (Kapucu et al., 2024). These difficulties are obvious examples of the Social Determinants of Health (SDOH), which are the factors that affect people's health and well-being and shape their everyday environments (CSDH, 2008). This complex crisis calls for comprehensive and innovative solutions beyond technical solutions (Buchanan & Denyer, 2013).

Social capital, which is the complex network of connections, customs, and trust between people and communities, is an essential element in building community resilience to urban water emergencies (Aldrich & Meyer, 2015). Bonding social capital, which refers to relationships within close-knit groups, bridging social capital, which spans across different social groups, and linking social capital, which involves vertical relationships with institutions and authorities, are the three main ways that social capital can appear (Story, 2013). These different types of social capital are essential to support community-driven water management initiatives and improve household strategies for managing water shortages (Irungu, 2015).

In Salatiga City, Indonesia, for example, well-established community networks and standards successfully supported the construction of infiltration wells, helping to alleviate the local water crisis (Pahl-Wostl, 2019; Suhardiman, 2008;

Suhardiman & Giordano, 2014). But it is important to understand that social capital, despite its strength, cannot solve systemic problems like political marginalization, long-standing socioeconomic inequalities, or poor infrastructure on its own (Narayan-Parker, 1999). Uneven access to linking social capital, especially ties to institutional power, can frequently reinforce exclusionary patterns (Ungar, 2011).

Although specific case studies from places like Salatiga, Indonesia, offer interesting local perspectives, the larger intellectual framework of this new and multidisciplinary field is still unknown. A methodological summary that pinpoints the main research topics, the most significant players, and the development of the academic discourse over time is lacking. Because of this knowledge gap, researchers and policymakers find it challenging to understand the current state of knowledge and identify important areas for further research. Bibliographic analysis is uniquely suited to fill this gap.

Given the increasing importance of this field, a comprehensive understanding of the dynamics and structure of the current research is essential (Daidone & Amadei, 2012). This paper uses a bibliometric approach to provide a thorough and methodical analysis of the "Social Capital and Urban Water Crisis" research area. This study will identify important trends, important themes, significant contributors, and the intellectual framework of this developing field. Social capital is essential because it affects how communities plan and maintain their water resources. Research focuses on how it affects governance, group action, and the success of water projects, particularly in a variety of social and environmental contexts.

Social capital is considered a crucial non-technical component that directly affects the effectiveness of water management solutions in response to this complex crisis (Bisung, 2014; Pretty, 2003). Important mechanisms like local conflict resolution, community mobilization, and collective action to protect water resources (Dobbin, 2021; Mirzaei, 2020). Responsibility for change and success of community-based water projects can be improved by strong social networks, mutual trust, and shared standards (Kobayashi, 2014; Person, 2017). On the other hand, a lack of capital may lead to even the best technical plans being unable. These social dynamics are necessary to build long-term resilience to the urban water crisis (Lund, 2015).

To better understand its function, it is necessary to distinguish between different aspects of social capital. Bonding social capital helps to connect communities together, while bridging social capital helps to connect disparate communities together (Narain, 2019; Nesbitt, 2024). Furthermore, the degree of participation and the effectiveness of policies are also influenced by structural factors such as networks and cognitive factors such as trust and norms (Mahaarcha, 2023; Yudiatmaja, 2020). This complexity and the multi-dimensional role of social capital have led to the formation of a broad yet fragmented field of research.

Material and methods

This study uses bibliometric analysis to review the scientific literature on the urban water crisis and social capital. The data included in the article bibliographic data, including publication year, citation counts, author keywords, and author details, were included in the data. Emporal Trend Analysis: Analyzing the number of publications and citations over time to pinpoint advancements and pivotal moments in the field. Content analysis is the process of identifying key themes and research clusters by using co-occurrence analysis and keyword frequency. Citation counts and average citations per publication are used to rank authors and nations. Data visualization techniques included network maps, bar charts, and line graphs.

This study uses bibliometric analysis to review and map the scientific literature on the urban water crisis and social capital. This study's methodology, which consists of data collection, filtering, and analysis, is structured for transparency and reproducibility.

Data Source and Search Strategy

On July 26, 2025, the bibliometric information for this study was taken out of the PubMed, Web of Science, and Scopus databases. These databases were chosen because they provide extensive coverage of peer-reviewed literature from a wide range of disciplines, which makes them appropriate for an interdisciplinary study such as this one. A thorough search query was created and implemented to find relevant documents by focusing on keywords associated with the fundamental ideas of "urban water crisis" and "social capital" found in the publications' titles, abstracts, and keyword. TITLE-ABS-KEY("urban water" OR "water crisis" OR "water scarcity" OR "water shortage") AND TITLE-ABS-KEY("community resilience" OR "community resilience" OR "social network*" OR "community-based management") was the precise search query.

Inclusion and Exclusion Criteria

The initial results underwent a multi-stage filtering process to ensure the data's quality and applicability. In the first search, we found 150 documents. Document Type: Only original research articles ("Article") and review papers ("Review") that had successfully completed a thorough peer-review process were taken into consideration to put an emphasis on validated research. The analysis was conducted on English-language publications only. Conference proceedings, book chapters, editorials, notes, or correspondence were not included in the analysis. The final dataset, which was the basis for all further analysis, was composed of 60 documents.

Data Analysis and Visualization

Several bibliometric techniques were used in the analysis process to identify themes, trends, and important players in this field of study. The VOSviewer software (version 1.6) was used to analyze and visualize the data. 20) A keyword co-occurrence network map is created using this method. For the purpose of ensuring replication, the following particular parameters were used for the co-occurrence analysis: Furthermore, a keyword had to appear at least five times in order to be included in the analysis and map. Charts pertaining to citation analysis, author impact evaluation, and annual publication trends are created using Microsoft Excel. The temporal trend of publications and citations was examined, thematic clusters were identified through content analysis using keyword co-occurrence, and author performance was evaluated based on the total number of publications and citations.

Results

Figure 1 shows the annual publication output for the period 2004 to 2025. The analysis shows that the field started to grow steadily around 2020 after a period of low publication activity in the early 2000s. This expansion led to a notable uptick in publications, which peaked in 2024 at 20 articles. This current pattern indicates a surge in interest and research activity in the area.

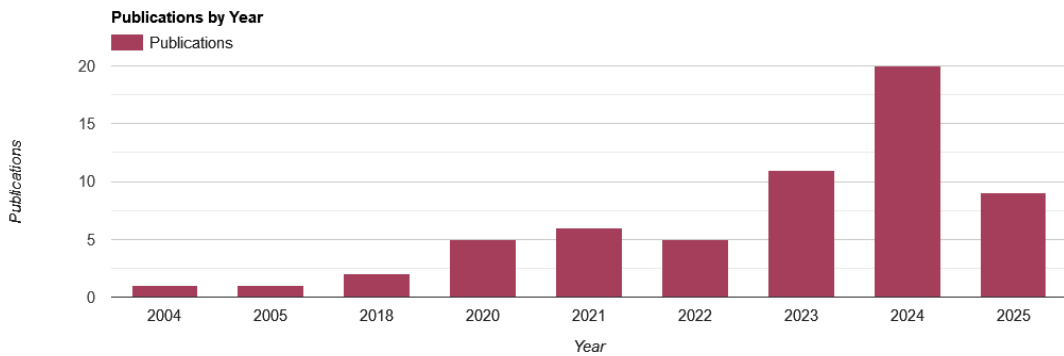


Figure 1 . Number of publications over time (Annual Scientific Output); publications by year.

Figure 2 tracks yearly citation counts to show the scholarly impact over time. The most noticeable aspect of this chart is the citation peak that occurred in 2005, when there were more than 120 citations. After that, 2023 saw a secondary, notable peak with over 80 citations. This trend suggests that certain years—2005 and 2023 in particular—produced research that attracted a lot of scholarly interest.

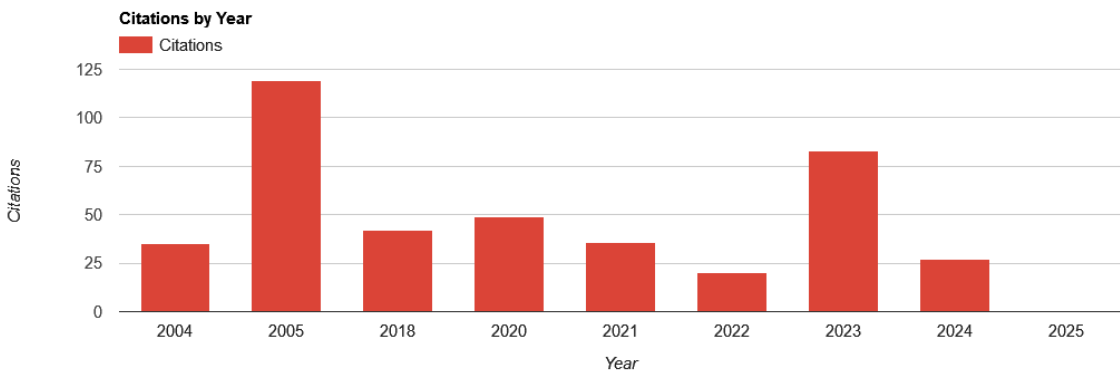


Figure 2. Citations by Year; Annual Citation Trends.

The data from the first two figures are combined in Figure 3, which shows a comparison of the total annual citations (line) and publication volume (bars). This visualization allows a direct evaluation of the relationship between research output and scholarly impact over time. Figure 4, which displays the average citations per publication, provides a more complete understanding of influence. With an average of roughly 120 citations per article, this chart clearly shows that the most significant research impact happened in 2005, indicating the publication of incredibly influential papers. The average impact per paper stayed at a much lower, though varying, level after this peak. The drop in recent years is a natural consequence of new articles' citation lag.

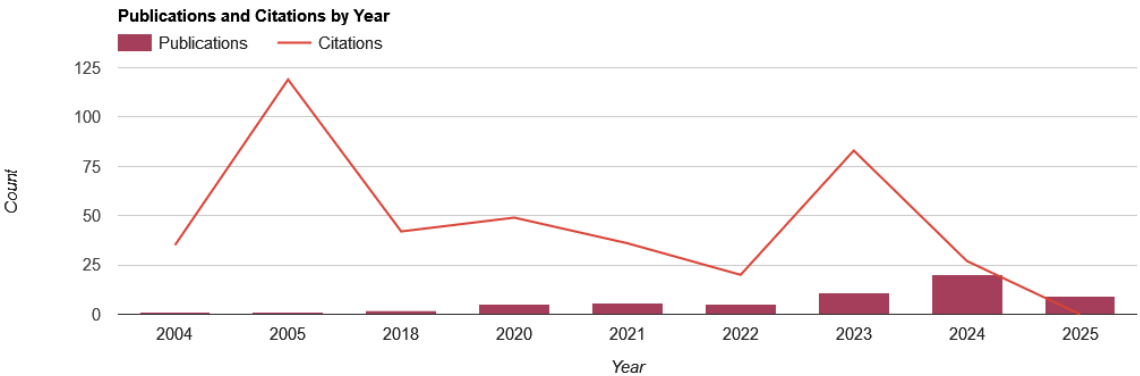


Figure 3. Publications and Citations Combined (Annual Citation and Publications Trends) Publications (bars) and citations (line) on a single chart.

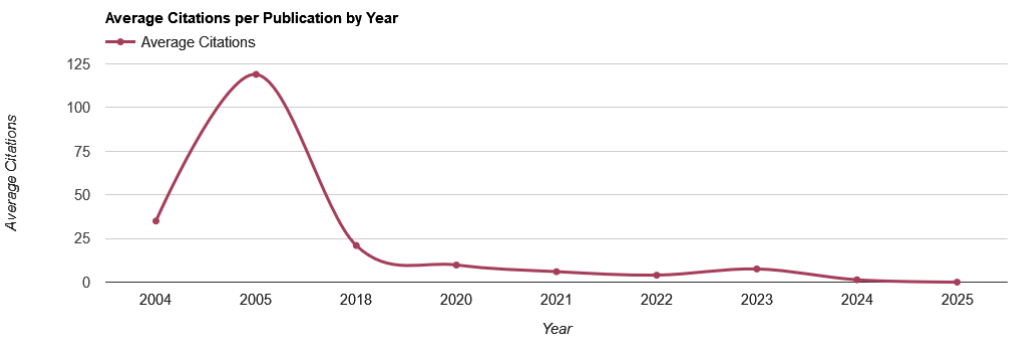
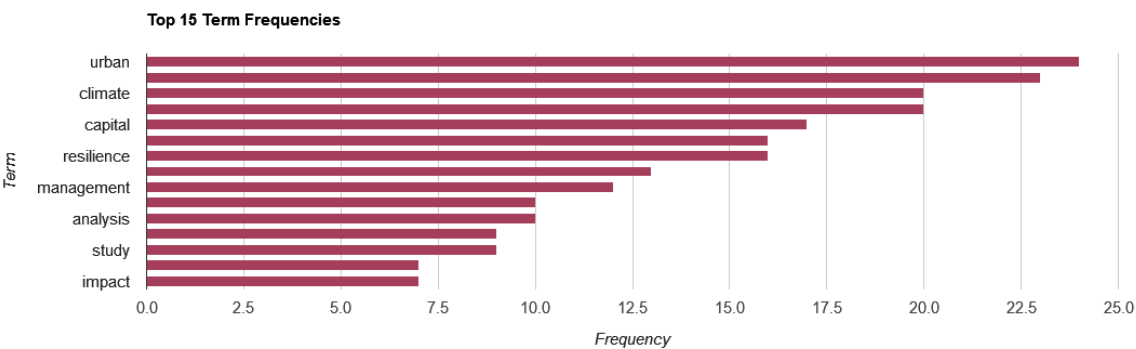


Figure 4. Impact of Citations; Average Citations by Year for Each Publication.

The most commonly used words in the field under study are quantified in Figure 5. The most commonly used terms are urban, "climate, " capital, " and "resilience " and are confirming their status as major themes in the literature. The word clouds in Figures 6 and 7 visually support this, with words like "water" "health" "social" "climate" and "urban" standing out in the article titles and abstracts.

Core Crisis Cluster: This cluster focuses on the ideas of risk, climate, and water. The main focus of the Urban Context Cluster is on cities and urban areas. Policymaking, impacts and social capital are addressed in this cluster. Contains words like data and case study. These clusters show that case studies on the social effects of the water crisis in different cities are the most common type of research.



.Figure 5. Top 15 Term Frequencies



Figure 6. Title Word Cloud Frequently used terms in the title of publications



Figure 7. Abstract Word Cloud Common terms in abstracts of publications.

The most cited authors in the field are highlighted in Figure 8. S. Blancafort and L are prominently featured on the chart. With an average of 45 citations each, Coll-Planas is the most cited person, demonstrating their substantial impact on academic discourse. Additionally, Figure 9 shows the average number of citations received per publication. With an average citation rate of more than 22 citations per article, Coll-Planas once again emerges as the most influential. According to this measure, these authors regularly release work that receives a lot of attention and is frequently cited, suggesting a high degree of scholarly influence.

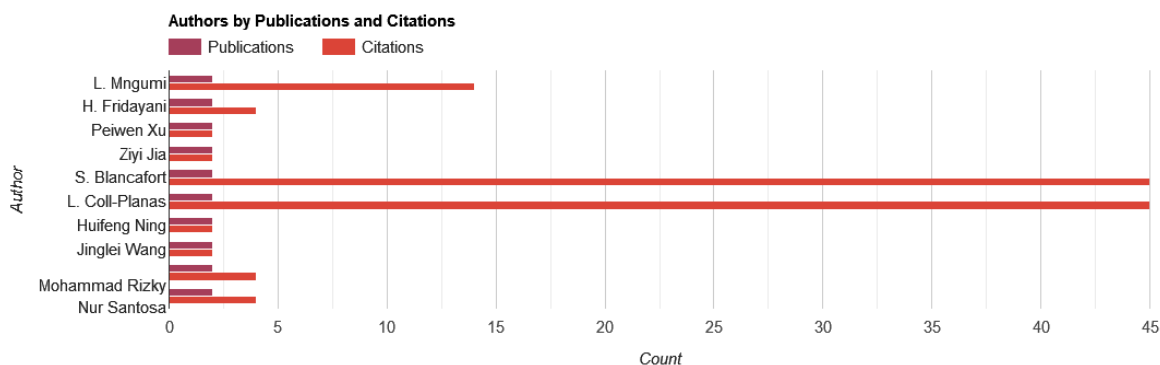


Figure 8. Citations and Publications by authors.

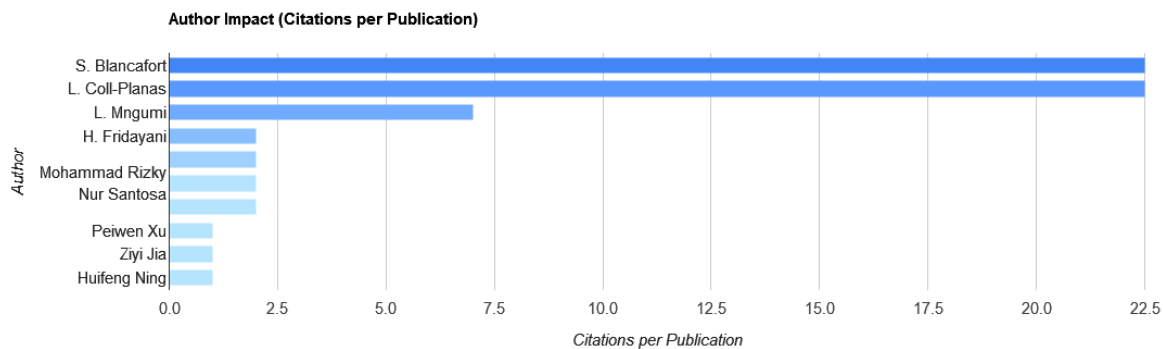


Figure 9. Impact of the Author (Citations by Publication)

Co-authorship and international collaboration networks were examined using VOSviewer software in order to understand the social structure of this field of study. Author Collaboration Network Several unique research clusters are revealed by the co-authorship network map among prolific authors. Around European institutions, a notable cluster forms, where writers like S. Blancafort and L. Coll-Planas have a close working relationship. Researchers from Southeast Asian institutions (such as H.) make up another notable cluster. Muhammad Rizky and Fridayani), who concentrate on case studies of community-based management. Notably, through their partnerships, some writers, like Peiwen Xu, serve as vital linkages between the Asian and European research clusters. The structure shows the presence of regional, specialized research groups and the significant role of people in promoting the sharing of knowledge on the one hand.

Institutional and Country Collaboration The United States, the United Kingdom, and China are the most productive and central countries in this network, according to the analysis of international collaboration. The collaboration map shows strong regional alliances, especially between organizations in Southeast Asia (like Malaysia and Indonesia) and Europe (like Spain and the Netherlands). Knowledge in this field is created and developed both globally and within regional hubs, supporting the findings of the author collaboration analysis.

Discussion

This bibliometric analysis provides a compelling and complex narrative of the research field linking social capital and the urban water crisis. The results show a clear difference in publication volume and scholarly impact: while the number of publications has increased recently, especially since 2020, the most influential research, measured by citations, dates back to an earlier time. This suggests that while interest is high, the intellectual foundations of the field were laid years earlier. A granular review of the 2005 dataset shows that this citation peak is not due to one article but to a combination of foundational works. In this paper, Pahl-Wostl argued that water management is a social process. At the same time, research on social capital in post-disaster recovery by researchers such as Aldrich & Meyer (2015) provided a theoretical link between social networks and community resilience that was widely adopted by water crisis researchers. This strong theoretical link has been the basis for much of the subsequent research.

The dramatic increase in publications since 2020 is more than just a number. This trend is strongly correlated with a greater urgency on a global scale for climate change and sustainability. It coincides with the timeline of major global policy initiatives, especially the Sustainable Development Goals (SDGs) of the UN, where funding and research have been spurred by SDGs 6 (Clean Water and Sanitation) and 11 (Sustainable Cities and Communities). Additionally, recent high-profile reports from organizations like the Intergovernmental Panel on Climate Change (IPCC) and extensively

reported urban water crises in places like Chennai and Cape Town have probably sparked scholarly interest and highlighted the topic's practical relevance.

This picture is enhanced by the clustering analysis, which shows a globalized and clustered field. The traditional academic environment is reflected in the fact that institutions from developed countries such as the US and UK produce more scientifically than any other institution. However, the growth of strong, regional research clusters, such as the one in Southeast Asia, suggests a growing body of context-specific, community-based research. The identification of "bridge authors" who link these clusters is important because they probably help to prevent knowledge silos and allow theoretical models to be transferred to different empirical contexts. This structure shows the need for more cross-regional collaborations to synthesize findings from different social and ecological environments.

Thematic analysis is used to support this transition from problem identification to solution-oriented research. The popularity of terms like "management", "resilience" and "case study" indicates that the field is now concentrating on real-world applications and interventions. These themes can also be conceptually connected to the previously discussed forms of social capital. For example, the frequent use of words like "community" and "resilience" suggests that bonding social capital is being studied. The search query's focus on "social networks" itself alludes to studies on bridging social capital, which links disparate community groups. Importantly, the cluster's high frequency of terms like "policy" and "management" directly relates to the idea of linking social capital, emphasizing the acknowledged importance of tying community initiatives into official institutions and governance frameworks.

We can gain a deeper understanding of these bibliometric trends by looking at the mechanisms and complexities of the literature on the subject. One of the major conclusions in the literature is that social capital can be a catalyst for engagement and better water management efficiency. Research indicates that increased social capital in water user groups directly correlates with increased involvement in participatory irrigation management and, as a result, increased efficiency (Suwanmaneepong, 2024). Additionally, involvement in community-based initiatives such as microlending in Kenya has been shown to strengthen social capital, which is linked to less food and water insecurity (Goodman, 2022). Participatory infrastructure design, as demonstrated in urban informal settlements, actually improves social capital by bringing people together around a "common good" (Salinger, 2024). These cooperative and trust-based systems serve as the cornerstones of efficient environmental governance and encourage environmentally friendly practices, such as conservation of water (Jin, 2013).

But social capital does not work in a vacuum, and the quality of institutional structures and governance play a role in how effective it is. The effective moderating effect of good governance can enhance the influence of social capital on efficiency and innovation (Zhang, 2022). Multisectoral partnerships, like those between NGOs and rural water committees in Nicaragua, have changed local communities' political engagement, taking them from a basic level to becoming powerful players in public policymaking (Romano, 2019). This emphasizes how crucial "linking" social capital is to tying communities to power centers. However, a study of the power dynamics in Iran's water, food, and energy nexus shows that significant barriers to successful cross-sectoral cooperation are power disparities and their concentration in the public sector (Ghafoori Kharanagh, 2020). Responsive and equitable governance systems at local level are therefore necessary to ensure the sustainability of water systems (Salazar, 2025).

Research cautions that social capital is not a panacea and may have drawbacks and complications. Social capital's efficacy is heavily context-dependent; failure can result from applying ideas like "social learning" carelessly and without taking into account particular political and cultural contexts(Grassini, 2019). stakeholder participation in water governance must be supported by well-defined goals, moral principles, and procedures(Wehn, 2018). According to an Australian study, having high social capital can encourage eco-friendly behaviors, but it can also encourage bad habits like using pesticides in gardening(Miller, 2008). Furthermore, elements like political upheavals or climate change may threaten the current rules and conventions that form the basis for social capital(Babu, 2010). These results suggest that understanding the influence of social capital requires a critical outlook and consideration of power dynamics and the social context.

In the end, this analysis concludes that social capital is a crucial enabling factor that increases the efficacy of technological advancements and infrastructure policies rather than a cure-all. A forward-thinking approach to water management must abandon oversimplified viewpoints and adopt an integrated approach that skillfully combines equitable, supportive governance with community-led action(Hellberg, 2022). Although the case study approach is crucial for capturing local contexts, its dominance also draws attention to the need for systematic reviews and meta-analyses, which are the next logical step in the field's evolution. These kinds of studies are essential for combining the data from various case studies, finding patterns that can be applied generally, and building a solid body of evidence to support extensive policy and practice aimed at sustainable urban water management.

Conclusion

The analysis shows that the enduring influence of earlier foundational works stands in stark contrast to the recent explosion of publications on social capital and urban water crises. Even though the number of publications has significantly increased since 2020, the most significant research, as measured by citation counts, comes from a time when the theoretical framework that underpins current studies was first established by major works.

The 2005 data shows that the peak in citations is not based on one article but rather on a combination of several studies. For example, social learning in river restoration by Pahl-Wostl reframes water management as a social process. At the same time, research by Aldrich and Meyer on social capital in post-disaster recovery links social networks to community resilience. The integration of these perspectives into social–ecological systems thinking and disaster recovery frameworks has provided a strong foundation that continues to shape the theoretical development of the field.

The rapid increase in publications beginning in 2020 is in line with the urgency of climate change and sustainability worldwide. This trend is in line with significant global policy initiatives like the Sustainable Development Goals of the UN, particularly SDG 6 (Clean Water and Sanitation) and SDG 11 (Sustainable Cities and Communities), which have refocused academic attention and research funding on solving actual water crises. The practical significance of incorporating social capital perspectives into water management has been further highlighted by well-publicized water challenges in cities like Chennai and Cape Town, as well as reports from organizations like the IPCC.

Analysis of collaboration networks adds to this image by showing the formation of regional clusters as well as a globalized research environment. Leading institutions in developed nations like the US and UK still produce influential work. However, the emergence of regional clusters, especially in regions such as Southeast Asia, indicates an increasing focus on community-based, context-specific research. Bridge authors are crucial in tying these clusters together because they prevent knowledge silos and make it easier to integrate theoretical models into a variety of empirical settings.

Thematic analysis is also supportive of the shift from problem identification to solution-oriented research. Keywords like "resilience," "management," "community," and "case study" are frequently used, which suggests that social capital is becoming more and more focused on connecting and bonding. Localized collective action is made possible by bonding social capital, which stands for internal community ties, and linking social capital, which supports policy and governance interventions by fostering connections between community efforts and formal institutions. The field's dedication to capturing local nuances is demonstrated by the presence of case studies, but it also emphasizes the need for systematic reviews and meta-analyses that can combine disparate empirical findings into patterns that can be applied broadly to policymaking.

The analysis agrees that social capital is a crucial enabler that enhances the efficiency of technological advancements and infrastructure policies. The urban water crisis requires an integrated approach that includes community-led projects, encouraging governance, and strong infrastructure. In order to improve policy interventions aimed at sustainable urban water management, priority should be given to future studies on cross-regional cooperation and methodical assessments.

Limitations

Despite being thorough, this study has a number of limitations that come with bibliometric analysis. Second, since the information was taken from particular databases (PubMed, Web of Science, and Scopus), related publications that were indexed in other databases might have been left out. Second, there is a language bias because the analysis was limited to English-language publications. Finally, due to the inherent "citation lag," caution should be exercised when interpreting the citation data for the most recent years.

Perform Meta-Analyses Since the field is now abundant in case studies, it makes sense to perform systematic reviews and meta-analyses to combine findings from different contexts. This will build a solid evidence base for broad policy and help in identifying patterns that can be applied broadly.

We recommend that comparative research on social capital forms focus on the unique functions of bonding, bridging, and linking social capital in boosting water resilience across cities with different sociopolitical and environmental contexts. Which types of social capital are most important in various situations.

Combining quantitative bibliometric analysis with qualitative techniques (such as participant observation or ethnography) may yield more profound understandings of the dynamics of researcher collaboration and the real-life experiences of communities dealing with water crises.

Socio-Technical Integration: The integration of technological advancements with social strategies should be examined in future research. More research is needed to understand the use of social capital to increase the uptake and equity of solutions like smart water systems, recycled water programs, and circular economy models in urban areas.

The final dataset of 60 documents is thought to represent the core body of high-quality literature on this particular topic because of the search query's extreme specificity and interdisciplinary nature, as well as the rigorous inclusion criteria that only include peer-reviewed articles and reviews. The field's recent increase in publications also supports the focused size of the dataset.

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