

Umbul Pengging and the Emergence of Javanese Common Space: Toward a Hydro-Arboreal Commons

I Wayan Suardiana

Fakultas Ilmu Budaya, Universitas Udayana, Bali, Indonesia

i.suardiana@unud.ac.id

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ABSTRACT

Communal spring environments have increasingly attracted scholarly attention within discussions concerning hydro-sociality, environmental humanities, commons studies, and relational ecological space. Nevertheless, studies in Indonesia generally position springs primarily as ritual centers, conservation objects, tourism infrastructures, or socio-economic resources. Comparatively limited attention has been directed toward understanding springs as relational communal environments shaped through the coexistence between water, giant vegetation, spatial atmosphere, historical continuity, and everyday social occupation. This study examines Umbul Pengging, Central Java, as a hydro-arboreal commons and a specifically Javanese form of common space. The study employed a qualitative reflective approach combining bibliometric mapping, visual observation, philological interpretation, and reflective spatial analysis. Bibliometric data derived from Scopus-indexed publications were processed using VOSviewer to identify broader scholarly tendencies concerning communal water environments, sacred springs, and hydro-sociality. Field observations and photographic

documentation were conducted to examine communal interaction, arboreal presence, and lived spatial atmosphere within Umbul Pengging. Historical Javanese texts, including *Bauwarna*, *Narpa Wandawa*, and *Pahargyan Surakarta*, were interpreted hermeneutically to identify continuities between past and present communal functions of the spring environment. The findings demonstrate that Umbul Pengging functions not merely as a hydrological resource or recreational bathing site, but as a living communal environment where water, giant banyan trees, ritual memory, communal gathering, and public accessibility coexist dynamically. The study further proposes the concept of hydro-arboreal commons as an interpretive framework for understanding relational spring environments in Java, emphasizing that water and giant vegetation simultaneously operate as ecological, symbolic, and communal infrastructures sustaining collective atmosphere, social cohesion, and historical continuity.

ABSTRAK

Lingkungan mata air komunal semakin memperoleh perhatian ilmiah dalam pembahasan mengenai hidrososialitas, humaniora lingkungan, kajian commons, dan ruang ekologis relasional. Namun, penelitian di Indonesia umumnya menempatkan mata air terutama sebagai pusat ritual, objek konservasi, infrastruktur pariwisata, atau sumber daya sosial ekonomi. Perhatian terhadap mata air sebagai lingkungan komunal relasional yang terbentuk melalui keberadaan bersama antara air, vegetasi raksasa, atmosfer ruang, kesinambungan sejarah, dan penggunaan sosial sehari-hari masih relatif terbatas. Penelitian ini mengkaji Umbul Pengging, Jawa Tengah, sebagai hydro-arboreal commons dan bentuk ruang bersama yang khas Jawa. Penelitian menggunakan pendekatan reflektif kualitatif yang memadukan pemetaan bibliometrik, observasi visual, interpretasi filologis, dan analisis ruang reflektif. Data bibliometrik dari publikasi terindeks Scopus diolah menggunakan VOSviewer untuk mengidentifikasi kecenderungan ilmiah mengenai lingkungan air komunal, mata air sakral, dan hidrososialitas. Observasi lapangan dan dokumentasi fotografis dilakukan untuk mengkaji interaksi komunal, keberadaan vegetasi, dan atmosfer ruang yang dihidupi di Umbul Pengging. Teks Jawa historis, termasuk *Bauwarna*, *Narpa Wandawa*, dan *Pahargyan Surakarta*, ditafsirkan secara hermeneutis untuk mengidentifikasi kesinambungan fungsi komunal lingkungan mata air dari masa lalu hingga masa kini. Temuan menunjukkan bahwa Umbul Pengging bukan sekadar sumber daya hidrologis atau tempat pemandian rekreatif, melainkan lingkungan komunal hidup tempat air, pohon beringin raksasa, ingatan ritual, pertemuan komunal, dan akses publik hidup berdampingan secara dinamis. Penelitian ini mengusulkan konsep hydro-arboreal commons sebagai kerangka interpretatif untuk memahami lingkungan mata

air relasional di Jawa. Air dan vegetasi raksasa secara bersamaan berfungsi sebagai infrastruktur ekologis, simbolis, dan komunal yang menopang atmosfer kolektif, kohesi sosial, dan kesinambungan sejarah.

1. INTRODUCTION

Water has historically occupied a central position within the formation of human civilization, not merely as a natural resource, but also as a social, cultural, and symbolic medium shaping collective life. Contemporary scholarship increasingly recognizes that water environments cannot be understood solely through hydrological or infrastructural perspectives, since water is continuously entangled with social relations, cultural practices, political structures, and lived spatial experiences (Linton, 2010; Swyngedouw, 2009). This perspective has contributed to the emergence of hydro-social approaches that interpret springs, rivers, and communal water environments as relational spaces where ecological and social processes coexist dynamically (Linton & Budds, 2014). Simultaneously, discussions within environmental humanities and relational ecology have further emphasized that environmental spaces should not be approached as passive natural backgrounds, but as lived assemblages involving humans, non-humans, memory, atmosphere, and everyday practice (Ingold, 2000; Tsing, 2015).

Within this broader discourse, communal spring environments increasingly attract scholarly attention because of their multidimensional functions extending beyond water provision alone. Existing studies have explored sacred springs, communal bathing culture, public environmental space, participatory water governance, and commons-based ecological management across various socio-cultural contexts (Harvey, 2012; Ostrom, 1990). Bibliometric mapping generated in this study further demonstrates that contemporary discussions concerning springs and communal water environments have expanded into interdisciplinary conversations involving public space, architecture, spatial appropriation, collective participation, social resilience, environmental management, and cultural value. These developments indicate that communal spring environments are increasingly understood as socially inhabited ecological spaces rather than isolated hydrological infrastructures.

In the Indonesian context, studies concerning springs, sendang, umbul, and other communal water environments have also developed significantly across several major thematic clusters. Existing research commonly positions water environments as centers of ritual activity, spiritual practice, public gathering, environmental conservation, and socio-economic interaction. Several studies discuss bathing traditions such as *padusan*, *kungkum*, and *melukat* as ritual activities centered around communal springs and sacred water environments. Other studies examine how communities transform areas surrounding springs into social spaces, recreational environments, and local economic zones through everyday interaction and collective occupation. Additional research further highlights the role of customary law, local wisdom, ritual systems, and communal norms in protecting spring ecosystems and regulating collective access to water resources.

Table 1. Previous Studies on Communal Water Environments in Indonesia and Research Positioning of the Present Study

Previous Studies	Research Focus	Method / Approach	Key Findings	Research Gap
Jannah et al. (2022) – <i>Pemanfaatan tradisi padusan danungkum di boyolali dalam mengembangkan materi ajar ilmu pengetahuan alam di sekolah dasar</i>	Ritual bathing traditions centered around spring environments in Boyolali	Ethnoscience-based educational interpretation	Springs function as ritual and cultural learning environments through <i>padusan</i> and <i>kungkum</i> traditions	Focus remains on ritual activity and educational adaptation, without examining springs as relational communal spatial environments
Nuraini, H. (2011) – <i>Makna mitos ritualungkum di Umbul Sungsang Pengging Boyolali</i>	Spiritual practices and ascetic bathing rituals at Umbul Sungsang	Cultural interpretation of ritual practice	Springs become spaces for tirakat, blessing-seeking, and spiritual interaction with ancestral memory	Does not explore the broader relationship between communal occupation, vegetation, and spatial sociality
Setyaningsih (2020) – <i>Makna RitualKungkum di Umbul Nyai Kendat Plumbungan Kabupaten Bayolali</i>	Sacred bathing and purification rituals in Hindu perspective	Religious and ritual analysis	Spring environments function as spaces of purification and spiritual union	Focus limited to ritual meaning rather than ecological-social relationality

Previous Studies	Research Focus	Method Approach	/	Key Findings	Research Gap
<i>Perspektif Agama Hindu</i>					
Maela et al. (2022) – <i>Representasi Ruang Terbuka Hijau Kawasan Sumber Mata Air Kali Benoyo Dalam Perspektif Henri Lefebvre</i>	Green open space surrounding springs as social environments	Sociology of space using Lefebvre		Spring areas are socially produced through interaction, economy, and communal occupation	Does not discuss hydro-social relations and arboreal dimensions simultaneously
Sukowiyono (2022) – <i>Pemanfaatan sumber mata air di sempadan sungai dalam upaya pemberdayaan masyarakat</i>	Collective management of spring environments for socio-economic improvement	Community-based environmental management		Springs operate as collective assets supporting local economic activity	The study emphasizes economic utilization more than lived communal atmosphere
Mulyanti (2022) – <i>Kearifan lokal masyarakat terhadap sumber mata air sebagai upaya konservasi dan pengelolaan sumber daya lingkungan</i>	Local wisdom and environmental protection surrounding springs	Normative and cultural conservation approach		Customary prohibitions and sacred values preserve water quality and ecological continuity	Limited discussion of everyday communal occupation and spatial interaction
Bere et al. (2023) – <i>Management of Springs Based on Local Wisdom in Malaka Regency</i>	Rituals and customary governance in spring conservation	Ethno-ecological approach		Ritual systems regulate vegetation protection and communal responsibility	Focus remains on governance and conservation rather than relational communal ecology
Lubis (2018) – <i>Kearifan lokal dalam pengelolaan mata air di Desa Sungai Langka, Kecamatan Gedong Tataan, Kabupaten Pesawaran, Provinsi Lampung</i>	Ritual gatherings and communal gratitude surrounding springs	Cultural documentation and local ritual studies		Springs become centers of collective gathering through <i>kenduren</i> , <i>ambengan</i> , and <i>tirakatan</i>	Does not analyze springs as hydro-arboreal commons environments
Hastanti et al. (2019) – <i>Analysis of social capital in springs management at Ngaram-aram Hamlet, Crewek Village, Kradenan District, Grobogan Regency</i>	Social trust and collective institutions in water management	Social capital analysis		Collective water management strengthens reciprocity and solidarity	Human-centered institutional focus without ecological-spatial interpretation
Dewi et al. (2026) – <i>Integrasi Nilai Budaya dalam Sistem Irigasi Tradisional Pabbage Wae sebagai Mekanisme Resolusi Konflik Air</i>	Commons-based irrigation and collective water governance	Commons theory and cultural analysis		Shared water systems prevent privatization and strengthen communal ethics	Focuses on irrigation governance rather than lived communal spring environments
Astriani et al. (2020) – <i>Pengelolaan Sumber Daya Air Berdasarkan Kearifan Tradisional:</i>	Common-pool resource management of communal water systems	Ostromian commons approach		Water environments function through collective	Limited discussion of atmosphere, vegetation, and spatial experience

Previous Studies	Research Focus	Method Approach	/	Key Findings	Research Gap
<i>Perspektif Lingkungan</i>	<i>Hukum</i>			regulation and reciprocity	
Present Study	Umbul Pengging as hydro-arboreal commons and Javanese common space	Bibliometric mapping, visual observation, philological interpretation, and reflective spatial analysis		Springs are relational communal environments where water, giant vegetation, historical memory, sacrality, and collective occupation coexist dynamically	Integrates hydro-sociality, arboreal ecology, commons theory, philology, and lived spatial atmosphere within one interpretive framework

As shown in Table 1, previous studies concerning communal water environments in Indonesia generally focus on four dominant themes, namely ritual and spiritual activity, socio-economic interaction, local wisdom and conservation, and commons-based water governance. These studies demonstrate that springs function as important communal infrastructures within Indonesian society. However, existing scholarship largely approaches spring environments through fragmented analytical perspectives that emphasize ritual practice, institutional management, conservation systems, or socio-economic utilization separately. Comparatively limited attention has been directed toward understanding springs as relational hydro-arboreal environments in which water, giant vegetation, communal atmosphere, spatial occupation, and historical continuity coexist simultaneously within lived everyday experience. Furthermore, the integration between bibliometric mapping, visual observation, philological interpretation, and hydro-social analysis remains rarely explored within previous studies on communal spring environments in Java.

At the same time, another group of studies emphasizes commons-based approaches in the management of communal water resources. These studies examine how local communities construct collective institutions, social trust, reciprocity, and participatory governance systems to maintain shared access to water environments without complete dependence on privatized infrastructure. Ritual gatherings surrounding springs are similarly interpreted as mechanisms reinforcing collective responsibility, ecological ethics, and anti-monopolistic control over shared environmental resources. Such findings demonstrate that communal water environments in Indonesia frequently function simultaneously as ecological resources, social infrastructures, ritual centers, and collective spaces.

Nevertheless, despite the growing body of scholarship concerning springs and communal water environments, several important dimensions remain insufficiently explored. Existing studies largely position springs as centers of ritual activity, conservation practice, tourism development, or socio-economic interaction. Comparatively little attention has been directed toward understanding springs as hydro-arboreal communal environments in which water, giant vegetation, spatial atmosphere, historical memory, and collective occupation continuously interact. In particular, the relational coexistence between water environments and monumental trees as spatial anchors of communal life remains underexamined within Indonesian scholarship.

This limitation becomes particularly important in the context of Javanese communal spring culture. Throughout Java, many umbul, sendang, petirtaan, and tuk environments historically developed around natural springs accompanied by giant vegetation functioning simultaneously as ecological protection, gathering space, symbolic marker, and communal orientation point. These hydro-arboreal environments frequently operate as socially inhabited spaces where bathing, leisure, ritual activity, rest, and collective interaction coexist within a shared ecological atmosphere. Yet such relational configurations are rarely analyzed within integrated frameworks combining hydro-sociality, commons theory, arboreal ecology, and spatial humanities.

Umbul Pengging in Central Java represents an important example of this condition. Historically, philological sources such as *Bauwarna*, *Narpa Wandawa*, and *Pahargyan Surakarta* describe Umbul Pengging not merely as a spring environment, but as a communal bathing complex connected to royal infrastructure, collective social use, and public bathing culture. Contemporary observations further demonstrate that the site continues to function as an active communal environment characterized by informal gathering, recreational bathing, shaded social interaction, and the presence of gigantic banyan trees wrapped in sacred symbolic cloth. These conditions indicate the persistence of a vernacular hydro-social environment in which ecological and communal dimensions remain deeply interconnected.

Based on these considerations, this study proposes the concept of hydro-arboreal commons as an interpretive framework for understanding the relational coexistence between water, giant vegetation, communal atmosphere, and collective spatial practice within Umbul Pengging. The study argues that Umbul Pengging should not be

approached merely as a tourism site or hydrological resource, but as a living Javanese common space continuously produced through ecological interaction, historical continuity, and everyday communal occupation.

Methodologically, the study combines bibliometric mapping, visual observation, philological interpretation, and reflective spatial analysis. Bibliometric visualization generated through VOSviewer was employed to map broader scholarly tendencies concerning springs, communal environments, and hydro-sociality, while field observation and photographic documentation were used to examine the lived communal atmosphere of Umbul Pengging. Historical Javanese texts were further interpreted hermeneutically to identify continuities between past and present communal functions of the spring environment. Through this interdisciplinary approach, the study aims to contribute to broader discussions concerning commons, environmental humanities, hydro-social studies, and culturally embedded ecological space.

2. METHOD

This study employed a qualitative reflective approach situated within the interdisciplinary perspectives of environmental humanities, spatial studies, and cultural interpretation. The research was designed to examine Umbul Pengging not merely as a physical spring environment, but as a relational communal space in which ecological, social, symbolic, and historical dimensions intersect continuously within everyday life. Rather than measuring the site through quantitative indicators, the study focused on understanding how water, giant vegetation, communal activities, and historical memory collectively shape the spatial character of the spring environment. The study further adopted a relational perspective in interpreting the interactions between humans, water, vegetation, and communal space. Such an approach resonates with relational understandings of landscape and environmental dwelling emphasizing that ecological environments are continuously produced through lived interaction, social attachment, and embodied spatial experience (Ingold, 2000; Massey, 2005). Accordingly, Umbul Pengging was approached as a hydro-arboreal commons in which ecological and communal dimensions remain inseparable.

Data collection in this study consisted of four primary components, namely bibliometric mapping, visual observation, philological documentation, and reflective field interpretation. The first stage involved bibliometric mapping to identify broader scholarly tendencies concerning communal spring environments, sacred water spaces, hydro-sociality, commons studies, and public ecological space. Bibliometric data were collected from Scopus-indexed publications using several interconnected keywords, including “umbul,” “sendang,” “petirtaan,” “hydro-arboreal,” “commons economy,” “sacred spring,” “collective space,” “water-based sociality,” and “Javanese bathing culture.” The retrieved bibliographic dataset was subsequently processed using VOSviewer to visualize conceptual relationships, thematic clusters, and interdisciplinary connections relevant to the interpretation of Umbul Pengging. Bibliometric mapping in this study was not intended to produce statistical generalization, but rather to identify conceptual trajectories and scholarly tendencies surrounding communal spring environments.

Visual observation constituted the second stage of data collection and was conducted directly at Umbul Pengging, Central Java. Observation focused on the spatial relationship between water environments, giant vegetation, communal gathering areas, circulation patterns, and everyday public activities surrounding the spring complex. Photographic documentation was employed as visual ethnographic material to capture the atmosphere and spatial organization of the site. Particular attention was directed toward the presence of gigantic banyan trees adjacent to the spring environment, communal interaction patterns, bathing activities, shaded gathering spaces, and the coexistence between sacred symbolism and informal public occupation. The visual observations were not treated merely as illustrative material, but as primary spatial evidence supporting interpretive analysis of the hydro-social and communal character of Umbul Pengging. This approach reflects perspectives within visual and spatial ethnography emphasizing that environments are socially experienced through atmosphere, movement, occupation, and embodied interaction rather than solely through architectural form (Pink, 2013).

Philological documentation and textual interpretation formed the third component of data collection. The primary texts used in this study included *Bauwarna*, *Narpa Wandawa*, and *Pahargyan Surakarta*, all of which contain historical references concerning Umbul Pengging and related communal water practices. These texts were selected because they provide important information regarding water circulation systems, communal bathing culture, royal relations, and the social management of the spring environment. The philological materials were approached hermeneutically to identify historical continuities between past and present communal functions of Umbul Pengging. Hermeneutic interpretation was employed to understand how textual narratives concerning springs, bathing culture, and communal occupation reflect broader Javanese understandings of social space and ecological coexistence (Gadamer, 2004).

Reflective field interpretation constituted the fourth component of data collection and analysis. This approach emphasized experiential understanding of the spatial atmosphere surrounding Umbul Pengging, particularly concerning how communal presence, environmental comfort, arboreal surroundings, and social interaction collectively shape lived spatial experience within the site. Reflective interpretation was therefore used to examine the relational dimensions of the spring environment beyond formal architectural or infrastructural analysis. Through this perspective, atmosphere, social occupation, and ecological coexistence were positioned as important

analytical dimensions in understanding communal spring environments. Such an approach corresponds with relational perspectives within environmental humanities that emphasize the inseparability between humans, environments, memory, and everyday practice (Tsing, 2015).

The collected data were analyzed using relational and interpretive approaches emphasizing the interconnectedness between ecology, social practice, spatial organization, and cultural meaning. Rather than separating environmental and social dimensions, the analysis examined how water, vegetation, communal activity, and historical memory mutually produce the spatial character of Umbul Pengging. The bibliometric visualization generated through VOSviewer was interpreted thematically to identify dominant scholarly tendencies related to sacred springs, public space, hydro-sociality, participation, and communal environments. The resulting conceptual clusters were subsequently used to position Umbul Pengging within broader interdisciplinary discussions concerning commons and environmental space.

Visual observations and photographic documentation were analyzed through spatial reading and environmental interpretation. Particular emphasis was placed on the relational functions of water and giant vegetation in shaping social gathering, thermal comfort, communal accessibility, and symbolic orientation within the site. Meanwhile, the philological texts were analyzed hermeneutically to identify historical narratives concerning public bathing culture, communal management, and royal water infrastructure associated with Umbul Pengging. The textual findings were subsequently connected with contemporary field observations to examine historical continuity within the communal life of the spring environment.

Finally, all forms of data were synthesized through interpretive reflection to construct the concept of hydro-arboreal commons as an analytical framework for understanding the relational coexistence between water, giant vegetation, communal interaction, and vernacular spatial culture in Umbul Pengging. Through this synthesis, the study positions communal spring environments not merely as ecological resources or tourism infrastructures, but as lived relational spaces continuously produced through ecological interaction, historical continuity, and collective occupation.

3. RESULT

3.1. Mapping the Scholarly Landscape of Hydro-Arboreal and Communal Spring Studies

The results of this study are organized into three interconnected dimensions consisting of bibliometric mapping, visual observation, and philological interpretation. These dimensions were combined to examine Umbul Pengging not merely as a spring environment, but as a relational communal space shaped through ecological interaction, historical continuity, and everyday social occupation. To position Umbul Pengging within broader interdisciplinary discussions concerning communal water environments, bibliometric mapping was conducted using VOSviewer based on Scopus-indexed publications.

The bibliometric visualization generated through VOSviewer reveals a dense and interdisciplinary scholarly landscape surrounding communal water spaces, sacred springs, and public spatiality. The dataset was compiled from indexed publications in Scopus using several interconnected keywords, including “umbul,” “sendang,” “petirtaan,” “hydro-arboreal,” “commons economy,” “sacred spring,” “collective space,” “water-based sociality,” and “Javanese bathing culture.” The resulting network demonstrates that studies concerning water-based communal environments are no longer isolated within environmental management discourse, but have expanded into discussions of public space, social participation, spatial memory, cultural value, and collective practices.

The visualization identifies several dominant thematic clusters. The first cluster, represented by green nodes, is centered around terms such as “spring,” “sacred spring,” “management,” “area,” “resource,” “value,” and “data.” This cluster indicates that springs are commonly studied as ecological resources requiring management, conservation, and sustainable utilization. However, the presence of terms such as “value,” “impact,” and “family” suggests that these spaces are simultaneously interpreted as socio-cultural environments embedded within everyday communal life.

A second cluster, represented in blue, revolves around concepts such as “public space,” “urban space,” “city,” “architecture,” “building,” and “appropriation.” This grouping demonstrates that the discourse surrounding water spaces increasingly intersects with urban studies and spatial humanities. Water sites are therefore not merely viewed as natural resources, but as socially negotiated environments shaped through human interaction, spatial occupation, and collective use.

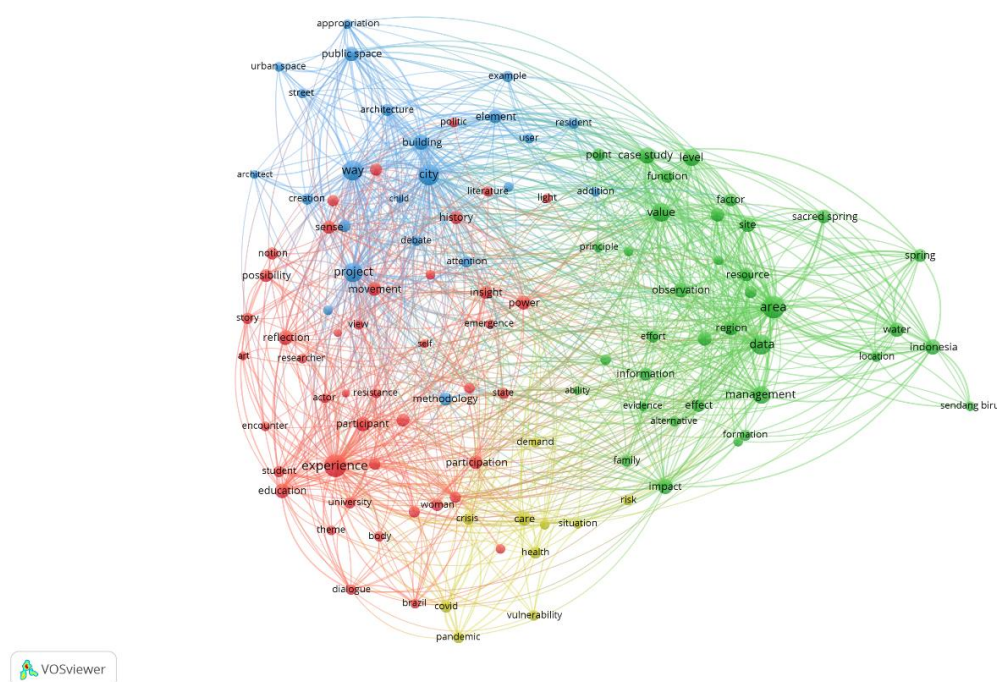


Figure 1. Bibliometric visualization of hydro-arboreal, sacred spring, and communal space studies generated using VOSviewer from Scopus-indexed publications.

The third cluster, represented in red, highlights concepts related to “experience,” “reflection,” “movement,” “participant,” “dialogue,” and “methodology.” This cluster indicates the growing use of interpretive and ethnographic approaches in examining communal spaces. Human experience, emotional attachment, and participatory engagement emerge as important analytical dimensions within studies of public environments and collective spatial practices.

Meanwhile, the smaller yellow cluster connects themes such as “health,” “care,” “risk,” “vulnerability,” and “pandemic.” The emergence of this cluster reflects recent scholarly attention toward communal environments as spaces connected to well-being, resilience, and public health, especially following global pandemic conditions.

Within the bibliometric network, the term “spring” occupies a strategically connected position linking ecological, spatial, social, and cultural clusters. This indicates that spring-based environments possess multidimensional significance beyond hydrological functionality alone. The network further demonstrates that scholarly discussions concerning communal water spaces have increasingly shifted toward relational and interdisciplinary perspectives.

3.2. Visual Observation of Umbul Pengging

Field observation further revealed the importance of arboreal presence within the communal spatial ecology of Umbul Pengging.



Figure 2. Gigantic banyan tree adjacent to Umbul Pengging, Banyudono, Central Java. The tree functions as a spatial anchor, shaded gathering environment, and symbolic marker within the communal spring landscape.

Field observations at Umbul Pengging reveal a spatial environment where hydro-social interaction continues to operate dynamically within everyday communal life. One of the most visually dominant elements is the presence of a gigantic banyan tree situated adjacent to the bathing complex. The tree functions not only as vegetation, but also as a central spatial anchor that organizes social gathering, shade production, and symbolic orientation within the site. The spatial positioning of the banyan tree adjacent to circulation pathways and resting areas indicates that vegetation functions not only ecologically, but also socially by organizing patterns of gathering and prolonged occupation within the spring environment.

The banyan tree is wrapped with black-and-white patterned cloth, commonly associated in Javanese and Balinese traditions with sacrality and spiritual protection. This visual marker indicates that the tree remains culturally respected despite the highly public nature of the surrounding environment. The coexistence between sacred symbolism and informal public activity suggests that spiritual meaning has not disappeared from the site, but rather persists alongside recreational and social functions. In addition to ecological elements, the spring environment also demonstrates active patterns of communal occupation and everyday social interaction.

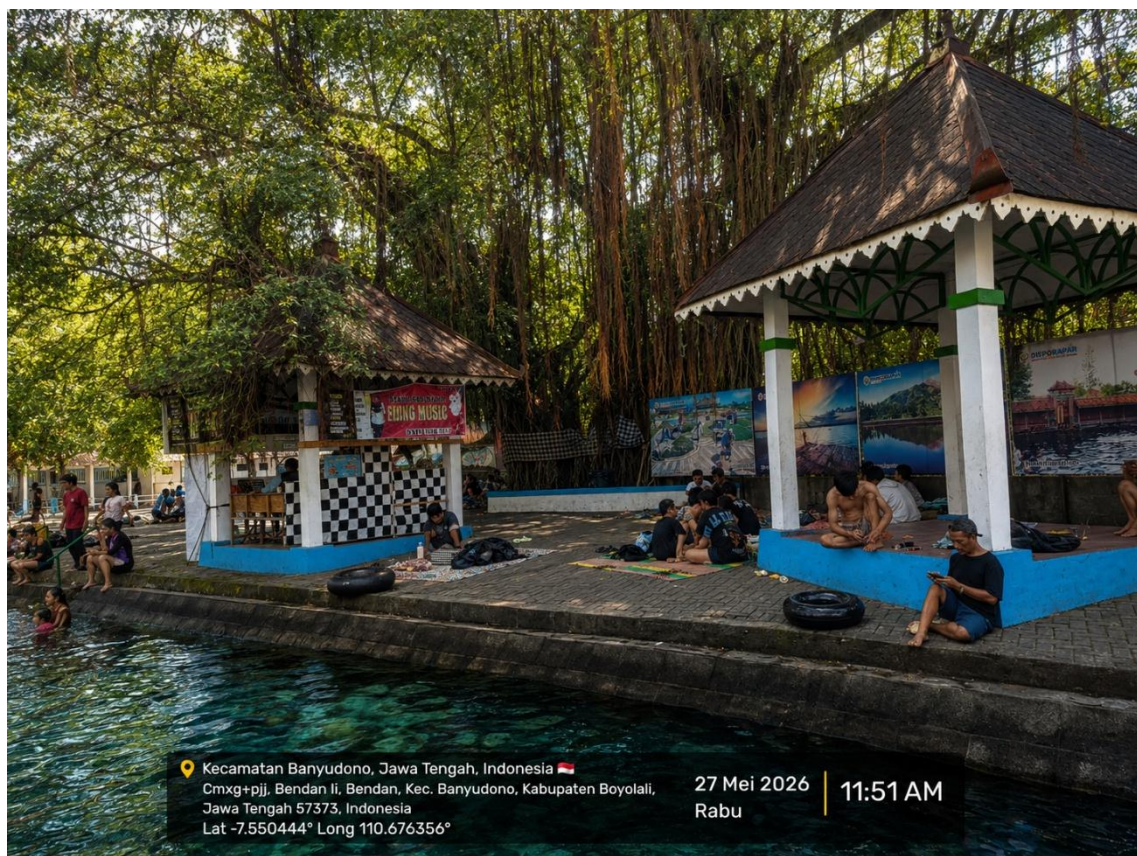


Figure 3. Communal activities surrounding the Umbul Pengging bathing area. The spring functions as a collective environment for recreation, gathering, resting, and informal social interaction.

Observation of the bathing area further demonstrates that Umbul Pengging operates as an active communal environment. Visitors occupy the pavilions, gather collectively near the water, rest beneath shaded areas, converse casually, and engage in recreational bathing activities. The spatial arrangement encourages prolonged social interaction rather than brief utilitarian usage. The presence of open sitting spaces, shared bathing zones, and communal circulation paths reinforces the role of the spring as a lived collective environment. The arrangement of pavilions, shaded resting zones, and open communal circulation paths encourages collective interaction and reinforces the non-exclusive character of the spring environment.

The visual relationship between water, giant vegetation, and public gathering spaces forms what may be described as a hydro-arboreal commons. In this configuration, water and trees jointly shape social cohesion by producing thermal comfort, spatial attraction, symbolic continuity, and communal accessibility. The site therefore operates simultaneously as ecological infrastructure, social environment, and cultural memory space.

4. Philological Traces of Umbul Pengging

Philological sources further confirm the long-standing communal significance of Umbul Pengging. According to *Bauwarna*, Umbul Pengging was connected to the Surakarta Palace during the reign of Pakubuwono III, when its water was channeled into the royal complex and categorized as a restricted royal water source.

Meanwhile, *Narpa Wandawa* describes Umbul Pengging as a public bathing environment widely used for recreational and communal bathing activities. The text also mentions the establishment of a dedicated management body responsible for overseeing the bathing complex. This indicates that communal management and organized public utilization had already emerged historically within the site. The phrase “*dipun angge padusan umum*” recorded in *Narpa Wandawa* explicitly indicates that Umbul Pengging had historically functioned as a public bathing environment shared collectively by the community.

Another historical source, *Pahargyan Surakarta*, records the existence of a small royal residence near Umbul Pengging and explains that water from the spring was distributed toward the Surakarta Palace alongside the Kali Pepe water system. These records demonstrate that Umbul Pengging historically functioned not merely as a natural spring, but as an integrated socio-political and spatial infrastructure connected to royal authority, public bathing culture, and collective water circulation systems. Taken together, the visual observations, bibliometric mapping,

and philological evidence reveal that Umbul Pengging possesses layered functions extending across ecological, communal, symbolic, and historical dimensions.

5. DISCUSSION

5.1. From Water Resource to Living Commons

The findings reveal that Umbul Pengging cannot be understood merely as a hydrological resource, recreational bathing site, or tourism infrastructure. Instead, the site represents a living commons in which ecological, social, symbolic, and historical dimensions continuously interact and reproduce one another. The bibliometric mapping generated through VOSviewer demonstrates that contemporary scholarship increasingly places springs and communal water environments within interdisciplinary discussions concerning public space, participation, environmental governance, social value, and collective spatial practices. However, the case of Umbul Pengging introduces an additional dimension that remains relatively underexplored within existing literature, namely the intimate relationality between water, giant vegetation, historical memory, and everyday communal sociality.

Commons theory has long argued that commons should not be reduced to shared material resources alone, but must instead be understood as socially reproduced relations maintained through collective practice and negotiated accessibility (Ostrom, 1990; Harvey, 2012). Within Umbul Pengging, the communal dimension emerges not primarily through formal ownership structures, but through everyday patterns of inhabitation. Visitors gather collectively beneath shaded spaces, occupy shared bathing zones, converse informally, rest collectively near the water, and participate in a continuously reproduced atmosphere of togetherness. In this sense, the commons is not simply administered institutionally, but lived spatially through repeated social interaction.

The historical records contained in Javanese philological texts further reinforce this interpretation. *Narpa Wandawa* explicitly describes Umbul Pengging as a public bathing environment widely used for communal recreation and public bathing activities, while simultaneously mentioning the existence of a management body responsible for maintaining the site. Such evidence demonstrates that collective usage and negotiated management had already become integral characteristics of the spring environment long before the emergence of modern tourism governance. Likewise, *Bauwarna* and *Pahargyan Surakarta* indicate that Umbul Pengging historically maintained direct relations with royal infrastructure and water circulation systems connected to the Surakarta Palace. The spring therefore historically operated across multiple domains simultaneously, functioning as ecological infrastructure, royal resource, public bathing space, and communal gathering environment.

This continuity between historical and contemporary communal functions is particularly significant. Despite changing political structures and modern urban transformations, Umbul Pengging continues to function as a collectively inhabited environment. People still come not solely to access water, but to experience social interaction, shared atmosphere, thermal comfort, leisure, and collective presence. Such continuity suggests that the communal logic of the site survives not because of formal preservation policies alone, but because the spring remains embedded within everyday cultural practice.

5.2. Hydro-Sociality and Relational Water Space

The findings also demonstrate that water within Umbul Pengging should be approached relationally rather than instrumentally. Conventional environmental perspectives frequently position springs as utilitarian resources requiring conservation, extraction management, or tourism optimization. However, hydro-social approaches emphasize that water cannot be separated from the social, cultural, and spatial relations through which it is experienced and organized (Swyngedouw, 2009; Linton & Budds, 2014). Water is therefore not merely a natural substance, but a socially produced and culturally inhabited medium.

Within Umbul Pengging, water functions as a catalyst for communal interaction. The spring generates gathering, movement, conversation, recreation, and prolonged social occupation. Visitors do not interact solely with water itself, but with the entire relational environment surrounding the spring, including shade, resting areas, communal circulation paths, vegetation, and social presence. The spring consequently becomes what may be understood as a hydro-social environment, where ecological and social processes become inseparable.

Importantly, the visual observations reveal that communal interaction surrounding the spring remains highly informal and fluid. Social boundaries appear relatively permeable, allowing visitors from different backgrounds and age groups to occupy the same environment collectively. Such conditions resonate with Lefebvre's (1991) understanding of lived space, in which spatial meaning emerges through everyday practice, embodied experience, and repeated social occupation rather than solely through planned architectural design.

The role of atmosphere also becomes important within this configuration. The cooling thermal environment generated by water and giant vegetation encourages prolonged occupancy and social lingering. Umbul Pengging therefore functions not merely through its physical infrastructure, but through its capacity to produce

environmental comfort and collective atmosphere. The spring environment actively shapes the rhythm of social interaction occurring within the site.

5.3. *Hydro-Arboreal Configuration and Arboreal Presence*

One of the most distinctive findings emerging from the observations is the inseparable relationship between water and giant vegetation. The gigantic banyan tree located adjacent to the bathing complex functions not simply as decorative vegetation, but as an active spatial component shaping social orientation and communal cohesion within the environment.

Anthropological approaches to landscape increasingly argue that non-human elements participate actively within lived environments rather than functioning merely as passive objects (Ingold, 2000; Tsing, 2015). In Umbul Pengging, the banyan tree produces shade, thermal protection, visual centrality, and spatial orientation. At the same time, its monumental physical presence contributes to an atmosphere of permanence and collective memory. The tree operates as what may be described as an arboreal anchor stabilizing the communal ecology of the spring environment.

The coexistence between water and giant vegetation forms a hydro-arboreal configuration in which ecological and social functions become deeply intertwined. Such a relationship appears repeatedly within Javanese spatial traditions associated with umbul, sendang, tuk, and petirtaan environments. Water sources in Java frequently coexist with giant trees that simultaneously provide ecological protection, symbolic meaning, and communal gathering space. The tree and spring therefore operate not as separate entities, but as mutually reinforcing components of a shared spatial ecology.

The wrapping of the banyan tree with black-and-white patterned cloth further indicates that the tree remains culturally respected and symbolically protected within local cosmological understanding. Yet importantly, this sacred dimension does not produce exclusionary spatial boundaries. Instead, sacredness coexists alongside informal recreation, public accessibility, and everyday communal activity. Such coexistence challenges modern dichotomies separating sacred space from public space.

Rather than functioning as an isolated ritual enclosure, the sacred dimension of Umbul Pengging appears integrated within everyday life. This condition reflects what may be described as vernacular sacrality, where spiritual respect becomes embedded within ordinary social environments rather than separated from them institutionally. In this sense, sacrality contributes not to spatial restriction, but to ethical coexistence and cultural continuity.

5.4. *Umbul Pengging as Javanese Common Space*

Umbul Pengging may ultimately be interpreted as a specifically Javanese form of common space shaped through ecological proximity, historical continuity, and shared cultural practice. In many modern urban traditions, public space is commonly associated with formal planning systems, civic accessibility, and state-regulated environments (Massey, 2005; Amin, 2008). However, the communal character of Umbul Pengging emerges through a different spatial logic rooted in vernacular interaction between water, vegetation, atmosphere, ritual memory, and everyday collective occupation. The spring environment is not organized primarily through monumental architecture or bureaucratic regulation, but through lived ecological relations continuously reproduced within communal practice.

The findings reveal that the communal atmosphere of Umbul Pengging is sustained through the interaction between several interconnected spatial elements, including spring water, giant banyan trees, bathing activities, shaded gathering areas, and informal social circulation. Such a configuration demonstrates that communal space in the Javanese context often develops organically around ecological infrastructures rather than through rigid urban planning systems. The spring functions not only as a water source, but also as a social condenser generating interaction, gathering, leisure, and shared environmental experience. At the same time, giant vegetation surrounding the spring provides thermal comfort, spatial orientation, and symbolic continuity that encourage prolonged communal occupation. This condition reflects Lefebvre's (1991) argument that social space is continuously produced through lived practice and everyday interaction rather than existing merely as physical infrastructure.

Importantly, the communal character of Umbul Pengging persists because the site remains actively inhabited rather than transformed into a static heritage object. Visitors continue to gather collectively, occupy shared bathing spaces, rest beneath shaded areas, and engage in informal social interaction within the spring environment. Such conditions indicate that the communal logic of the site survives through repeated spatial occupation embedded within ordinary daily life. In this sense, Umbul Pengging functions as a lived commons in which social relations are reproduced continuously through shared environmental use (Harvey, 2012; Ostrom, 1990). The commons therefore emerges not solely through institutional regulation, but through collective presence, mutual accessibility, and repeated patterns of communal inhabitation.

The coexistence between sacrality and public accessibility further strengthens the distinctiveness of Umbul Pengging as a vernacular communal environment. The gigantic banyan tree wrapped in black-and-white patterned cloth indicates the persistence of symbolic respect and sacred protection within the spring landscape. Nevertheless, sacrality does not generate exclusionary boundaries separating ritual space from public activity. Instead, sacred symbolism coexists alongside recreation, relaxation, bathing activities, and everyday communal interaction. Such coexistence challenges modern dichotomies separating sacred space from public space, since spirituality within Umbul Pengging remains embedded within ordinary social life rather than isolated institutionally. This condition may be understood as a form of vernacular sacrality in which ecological respect and communal accessibility reinforce one another simultaneously.

The historical evidence contained within **Bauwarna**, **Narpa Wandawa**, and **Pahargyan Surakarta** further demonstrates that Umbul Pengging has historically functioned as both communal and socio-political infrastructure. The spring was connected to royal water circulation systems, public bathing practices, and organized communal management. Such continuity suggests that the communal role of Umbul Pengging is not a recent phenomenon emerging through tourism development, but part of a long-standing Javanese hydro-social tradition. Water environments within Java have historically operated as spaces where ecological resources, collective interaction, symbolic values, and everyday life intersect continuously.

From this perspective, Umbul Pengging represents more than a recreational spring environment. The site reveals an alternative spatial imagination in which nature and communal life remain inseparable within a shared relational ecology. Water, giant trees, thermal atmosphere, collective occupation, memory, and spirituality coexist dynamically within the same environmental configuration. Such findings contribute to broader discussions concerning commons, hydro-sociality, environmental humanities, and relational ecological space by demonstrating that vernacular communal environments may sustain ecological continuity precisely because social attachment and environmental interaction remain deeply interconnected (Ingold, 2000; Tsing, 2015).

5.5. Beyond Tourism and Conservation

Many contemporary studies concerning springs and heritage water environments tend to frame them primarily through tourism development or environmental conservation perspectives. Although such approaches remain important, the case of Umbul Pengging demonstrates that these frameworks alone are insufficient to explain the complexity of lived communal environments.

The significance of Umbul Pengging lies not merely in its economic potential or ecological value, but in its capacity to sustain communal sociality. The spring enables informal gathering, intergenerational interaction, collective leisure, and the reproduction of shared atmosphere. Such functions cannot be adequately measured solely through tourism indicators or managerial frameworks.

Moreover, the coexistence between sacrality, recreation, ecology, and collective occupation suggests that vernacular communal spaces possess flexible social structures capable of accommodating multiple layers of meaning simultaneously. Umbul Pengging therefore represents not a singular-function environment, but a relational assemblage connecting water, memory, vegetation, embodiment, and social practice.

From this perspective, the spring environment offers an alternative spatial imagination in which nature and communal life are not separated into distinct domains. Water, giant trees, humans, shade, leisure, spirituality, and historical memory coexist within a shared relational ecology. Such a configuration contributes important insights to broader discussions concerning commons, environmental humanities, hydro-sociality, and culturally embedded ecological space. Taken together, the bibliometric mapping, visual observations, and philological evidence demonstrate that Umbul Pengging possesses layered ecological, communal, historical, and symbolic functions. The spring environment therefore operates not merely as a physical water source, but as a lived relational space continuously produced through interaction between water, vegetation, memory, and collective occupation.

6. CONCLUSION

This study demonstrates that Umbul Pengging should not be understood merely as a bathing site, tourism destination, or hydrological resource. Instead, the spring environment represents a living hydro-arboreal commons in which water, giant vegetation, communal interaction, and historical memory continuously intersect within everyday social life. The bibliometric mapping reveals that contemporary scholarship concerning springs and communal water environments increasingly emphasizes relational perspectives connecting ecology, spatiality, participation, and social value. However, the case of Umbul Pengging shows that Javanese spring environments possess additional dimensions rooted in vernacular spatial culture, particularly the coexistence between water, arboreal presence, sacrality, and collective occupation.

The findings further indicate that Umbul Pengging operates as a specifically Javanese form of common space. Unlike modern public spaces that are often structured through formal planning and institutional regulation, the communal character of Umbul Pengging emerges organically through shared cultural practice and ecological

proximity. The interaction between spring water, giant banyan trees, communal bathing traditions, ritual memory, and informal gathering activities produces a continuously inhabited spatial ecology. In this environment, sacrality does not exclude public accessibility, but instead coexists with recreation, relaxation, and everyday social interaction. Such conditions reveal the persistence of vernacular hydro-sociality in which ecological and communal relations remain deeply intertwined.

This study also contributes theoretically to discussions concerning commons, environmental humanities, and hydro-social studies by proposing the concept of hydro-arboreal commons as an interpretive framework for understanding communal spring environments in Java. The concept emphasizes that water and giant vegetation function not merely as natural resources, but as relational infrastructures that sustain social cohesion, spatial comfort, symbolic continuity, and collective memory. Ecological sustainability within such environments therefore cannot be separated from lived cultural attachment and everyday communal practice.

Finally, the case of Umbul Pengging suggests that vernacular spring environments should be approached not only as objects of tourism development or environmental conservation, but as living communal infrastructures that continue to sustain collective sociality within contemporary society. Similar hydro-arboreal environments found across Java, including umbul, sendang, tuk, and petirtaan sites, may therefore offer important insights for future studies concerning culturally embedded ecological space, relational heritage, and sustainable commons-based environments.

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