The Role of Water Governance in Ensuring Water Security: A Case of Indian Cities

Siddh Doshi and Rutool Sharma

1 Introduction

Water is an unequally distributed, transient, highly variable yet renewable natural resource. While water is an inherent part of the natural environment, its use is essential to all economic and social activities [1]. Urban water has been both a catalyst of development, through the engineered approaches of pipe networks, and impetus for catastrophes [2]. Urban water has always gained social and political attention, primarily due to infrastructure financing, control, and governance mechanisms. Urban water resources are under serious threat due to the rapid rates of urbanization. Such threats lay further stress on developing and promoting adaptive and accommodative governance regimes to manage water resources. This gap has encouraged researchers and advocacy agencies to develop alternative conceptual tools and frameworks to address urban water nexus issues. These frameworks intend to study the issue of urban water from entry points like scarcity [1], equity [3], or decision-making, management, and use [4]. Apart from the recent discourses on developing improved frameworks, the contemporary commentary on urban water has evolved from a simple demand lead system design to a holistic approach considering microclimate and the overall ecosystem [5]. Similarly, the recent discussions over water security also aim to harness the productive prospects and reduce the destructive potentials of urban water systems [6].

While several attempts to develop an adaptive fit-to-purpose framework of urban water management have been made in the recent past, little progress has been measured on the ground. Each of these concepts of urban water management,

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like Green Infrastructure (GI), Integrated Water Resource Management (IWRM), Sustainable Urban Drainage Systems (SUDS), etc., have ventured towards the path of holistic development of urban water resources. Yet, most of these concepts have been limited to context-specific practices. Nevertheless, on close observation, one can find several overlaps amongst most urban water management concepts—one of the universal tools in almost all these concepts is water governance.

Interestingly, several theoretical literature and advocacy documents have equally empathized over the past few decades on water governance as a tool to address the contemporary issues of water crisis [1]. The term "water governance" has gained prominence in global literature quite quickly. The growing dominance of the term water governance can be seen in reviewing the term's use on various international platforms and research documents. For example, Google Scholar in the 1990s recorded 47 references (excluding citations) of "water governance" in comparison to 1270 for "environmental governance". While in 2020, there are 4110 references to "water governance" and 6580 for "environmental governance".

This article presents a brief overview of water governance's evolution and documents its perceived perspectives in literature. The research lists various definitions of the term water governance. The section concludes that while the perceived definition of water governance may be fuzzy and inconsistent, most recognized definitions have some common essential elements. The authors use these essential elements to develop a working definition of water governance for cities in developing countries. In the later section, the paper continues this discussion of water governance in developing countries' cities and explores the legal and regulatory framework existing in water governance, and suggests a way forward, taking India as a case study.

2 Evolution of Water Governance

Conference on Human Environment in 1972 brought a new paradigm to review issues related to the environment and natural resources on the international platform. This was the first time the world accepted that there is growing evidence of human-made harm leading to dangerous levels of pollution in water. The conference ended with an official declaration, commonly known as the Stockholm Declaration of 1972, which identified 26 principles concerning human impact on the environment. Principle 2 of the declaration mentions, "The natural resources of the earth, including the air, water, land, flora and fauna and especially representative samples of natural ecosystems, must be safeguarded for the benefit of present and future generations careful planning or management, as appropriate". Thus, water was put on the global agenda for the first time, not from the governance perspective but from pollution. Since then, the UN has convened several conferences that advocated the need to pay attention to natural resources and the environment. However, these conferences brought the term water governance into international policy documents in a much ad-hoc manner [7]. Notable ones in the next three decades include Mar del Plata Conference of 1977, Water and Sanitation Decade of the 1980s, UN Conference on Environment and

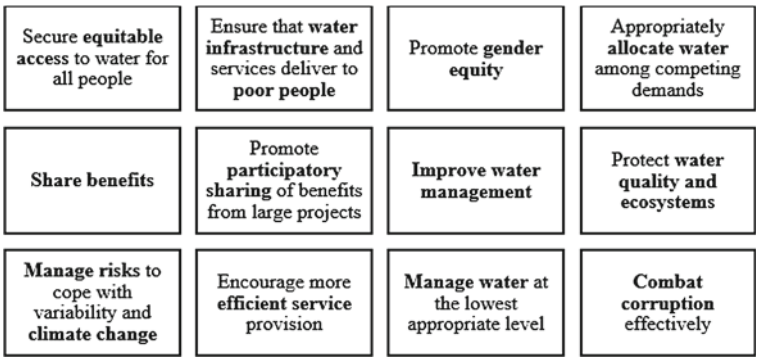

Fig. 1 Initial Actions for Water Governance based on Bonn Conference 2001 (Adapted from UN World Water Development Report (526), by UNESCO [12])

Development of 1992, Dublin Conference on Water and the Environment of 1992, World Water Forum since 1997, and the Millennium Development Goals 2000; all elaborated on the issues around water resources [8].

Amongst all the above conferences, the 1992 Dublin Conference's targets can be directly related to water governance's current notion. The outcome of this conference "The Dublin Statement on Water and Sustainable Development" recognized the increasing scarcity of water due to the different conflicting uses and overuses of water and laid down recommendations for action at the local, national, and international level through four major guiding principles. Principle 2 discussed involving a participatory approach in water development and management, while principle 3 discussed women's central role in the provision, management, and safeguarding of water. Thus, these two principles laid down preliminary aspects related to water governance, though indirectly. Accordingly, it can be marked as the threshold platform that initiated the discussion on urban water governance [9]. The concept of governing water was formally discussed in the 2000 Hague World Water Forum, where water governance was identified, and the discussions then claimed "water crises as a governance issue"[10]. This statement advocated that water systems and supplies' failures are not necessarily the result of water scarcity or lack of technical possibilities but due to inefficient water governance. Policy advocacy quickly took up this concern. In 2001 at the International Conference on Freshwater (held at Bonn), it drew the attention of the international audience on the importance of water governance. The Boon conference ranked water governance as one of the three priority action areas (besides capacity building and knowledge sharing, and financial mobility of resources) [11]. However, the Bonn conference led to over 27 recommended actions without a set timeline to achieve its targets. These included 12 recommendations for water governance [12], which help trace water governance's initial intent as a concept.

It can be observed from the list above (Fig. 1) that, from its inception, the term "water governance" was addressing a diverse range of challenges. The nomenclature rose to the limelight almost spontaneously in several international organizations with the flourishing dialogue and international water movement. Soon the term operationalized in global policy documents and advocacy. The first definition was expressed in 2002 by such a leading international water organization Global Water Partnership (GWP)[1] and later modified and adopted by the UN. The definition states:

> The governance of water, in particular, can be said to be made up of the range of political, social, economic and administrative systems that are in place, which diretly or indirectly affect the use, development, and management of water resources and the delivery of water services at different levels of society. Governance systems determine who gets what water, when, and how and decide who has the right to water and related services and benefits. [1, 11, 13]

Almost during the same time, there was another definition by UNDP about water governance that is noteworthy:

> The political, economic, and social processes and institutions by which governments, civil society, and the private sector make decisions about how best to use, develop, and manage water resources. [14]

While these initial attempts of defining water governance are associated with a larger notion of governance, it also considered the nuances of the sector-specific concepts like service delivery. The recognition of water governance by such prominent agencies leads to the recognition of water governance in academic circles. Attempts to define water governance could be observed in academic literature as well. Most of these attempts were driven by exploring the future trajectories of this naïve term. One such noticeable definition is as follows:

> The development and implementation of norms, principles, rules, incentives, informative tools, and infrastructure to promote a change in the behaviour of actors at the global level in the area of water governance. [8]

More recently, the Organization of Economic Corporation and Development (OECD), which is actively working on urban water systems, defines water governance as follows:

> The range of political, institutional and administrative rules, practices and processes (formal and informal) through which decisions are taken and implemented, stakeholders can articulate their interests and have their concerns considered, and decision-makers are held accountable for water management. [15]

Apart from these definitions, even the Sustainable Development Goals (SDGs), through their goals, 6.5.1 and 6.5.2, have laid substantial emphasis on concepts

[1] Established in 1996, by the World Bank, United Nations Development Programme (UNDP) and Swedish International Development Cooperation Agency (SIDA), the Global Water Partnership, encompasses international government agencies, donor organizations, and public and private institutes actively engaged in the water sector. Currently, GWP has about 3,000 Partner organizations in 179 countries.

that use water governance as a tool for implementation. Furthermore, it has been envisaged that appropriate water governance implementation shall place a crucial role in achieving the SGD goals [16].

Each definition and interpretation brings its own set of specific concepts and motives. Such commentary could lead to fragmentation of the term into newer ideas and would do little good to the larger picture. These complexities and multiple challenges have helped water governance attain the title of a wicked problem [17].

Despite the fuzziness, the evolution of the term "water governance" seems to have some standard essentials. The paradigm notion of water governance includes designing institutional frameworks and public policies that can mobilize resources to support their functions independently and are socially accepted. The Central argument of water governance discourses goes beyond water as a utility to water as a resource. While incorporating this, water governance also addresses the concerns of water policy and its formulation. Thus, holistically approaching this term, overlaps with economic and technical aspects are found along with indications on solving or exploring administrative and political elements [9]. Inferring from here, one can conclude the water governance is concerned with the relationship of social, political, and economic organizations and institutions that are important for the management and development of water resources.

This lack of uniformity in defining the term water governance calls for a need to develop a clearer and fit-to-purpose definition. This is crucial, particularly in developing countries, where there are limited information and clarity of these overlaps and interplays. This calls for a need to establish a consultative and participatory approach while forming water governance systems. Water resources are not confined to urban limits and boundaries. The consideration of hydro-geographical boundaries while developing the water governance framework is another challenge.

Furthermore, despite all the claims for holistic considerations, these definitions fail when applied differently. Thus, implying the importance of adaptivity in the water sector while defining water governance. The development of newer, often overlapping, water management concepts and their interpretation of water governance structures also require careful attention. The situation further blurs in developing counties like India, where several agencies in the urban water nexus overlay.

3 Water Governance in Developing Countries—A Case of India

Universally dialogues on access to water services, lack of institutional capacities, and infrastructural provisioning in developing countries have been discussed in academic literature [18]. The same has been advocated by development agencies who emphasize transforming the existing water resource infrastructure to achieve sustainable development and resilience targets in developing countries [19]. Such interventions help achieve the desired global goals and targets and enhance ownership amongst the

community members and strengthen their bargaining capacity with the government for water services [20]. It can also address issues such as the need for bottom-up water approaches for the global south countries. As most developing countries have an incomplete network of existing infrastructure services, integrated network approaches, propagated as a larger part of water governance, could be implemented with relative ease. It can cover, theoretically, a large aspect of water governance, India.

Yet, the challenge of connecting proclaimed theories and concepts to the practicalities of implementation remains uncontested. Also, it is to note that majority of these definitions of water governance are conceptualized in the global north, i.e., in the context of developed nations, making their replication in the global south (the developing countries) would demand a closer understanding and engagement alongside local idiosyncrasies. If such considerations are neglected, the envisaged benefits, as per the extended definition, may not be possible, leading to contradictory consequences and limited progress economically, socially, and environmentally in public health. Hence, while considering the implementation of water governance elements in cities of the global south, right collaborations between local and international experts, through the support of authorities and advocacy organizations, become quintessential.

The water governance inequalities in the global south have varied origins. Simultaneously, some scholars suggest it to be due to the historical legacies; others denote this with the usage of arbitrary water categories that privilege certain forms of water collection over the others. Hence water governance in the global south can be considered "many overlapping conflicts" that find roots in colonial policy segregation, discriminatory land policies, and associated complications for upgrading contemporary urban settlements [21]. Also, most of these situations require a context-specific consideration, and thus, no umbrella framework could be derived. For this study, we shall consider the contemporary water governance framework of India. This section would critically analyse the legal and regulatory framework existing in the Indian context and suggest a way forward.

India is a signatory to numerous international treaties and frameworks aimed at tackling issues on the water. The SDG 6 of UN's Sustainable Development Goals aspires to provide clean water and sanitation to all; the Sendai Framework on Disaster Risk Reduction aims at achieving disaster resilience of signatory nations, with clear targets to manage disaster risk effectively. The country has also signed water-sharing treaties with neighbouring countries. These, along with other factors, play an essential role in deciding its national and state water policies.

Water is a State subject, as per India's Constitution, implying that water governance is decentralized at the state level. Water management and governance within a state is the responsibility of the numerous municipal and district level bodies in urban areas and the different tiers of Panchayats in rural areas [22]. With 16% of the global population, the country must meet its water demands with merely 4% of the global freshwater resources [23]. With more than 75 million people unable to access clean drinking water, India fares worst in Asia in terms of the percentage population without access to safe, potable water [22].

The rapid pace of urbanization, poverty, the encroachment of watersheds, and unsustainable water resource use have increased Indian cities' vulnerability to water risks. The looming water crisis became apparent when various cities, including Bengaluru, Shimla, and Chennai, reached the brink of "day-zero"—exhausting their freshwater supply. Floods have become common in major Indian cities, with nearly all metropolitan and secondary cities reporting urban flooding instances during monsoons. The civic authorities struggle to address such issues, owing mainly to water governance challenges.

India's water governance issues include an intricate decision-making system, inter-state conflicts over water rights, insufficient technical and financial capacity, inadequate water-related expertise amongst decision-makers, especially at the local level [22]. Despite the launch of a gamut of initiatives, the country struggles to improve its water resource management. These issues can be attributed to the incomplete decentralization, inadequate monitoring of project implementation, and an obsolete approach to urban planning.

4 Conceptualizing Water Governance in India

The political and institutional complexities are one of the primary reasons for the failure of these integrated water resource models [24]. The implementation of water governance, as discussed above, heavily emphasize planning, developing, and managing at basin scale the resources. This can seldom be possible; for instance, the National Water Policy (NWP) 2012 of India has suggested practising basin plans, yet no such plans exist [25]. Thus, despite policy rhetoric advocating these concepts, governments worldwide focus on structural, regulatory, and efficiency mechanisms, and there has been limited impact on the systems [26]. This shows an apparent "policy failure". The need for understanding this disconnect between implementation and policy needs to be analysed. While there is elaborate literature on this phenomenon regarding environmental policy, little exploration to address a similar gap in urban water management is seen [27].

So, it is necessary to identify the critical elements of the term "water governance", based on its interpretation in several context-specific water management concepts, policy, and advocacy documents to undermine its multisectoral and multidisciplinary scope. This identification of essentials could then be considered a checklist for defining the term (Fig. 2). Such an exhaustive list could further be used to evaluate any future definition or interpretation of the term water governance.

While the elements listed (Fig. 2) are not represented in any hierarchical form, the grading and preferences will completely depend contextually. Moreover, the premise of fit-to-purpose definitions emphasize on the need for accommodative context-specific flexibility. Acknowledging the same, the authors of this paper advocate these five elements (Fig. 2) as the fundamental elements for the definition and implementation of water governance for any developing country. Based on the above-identified essential elements of the term water governance, this research advocates that:

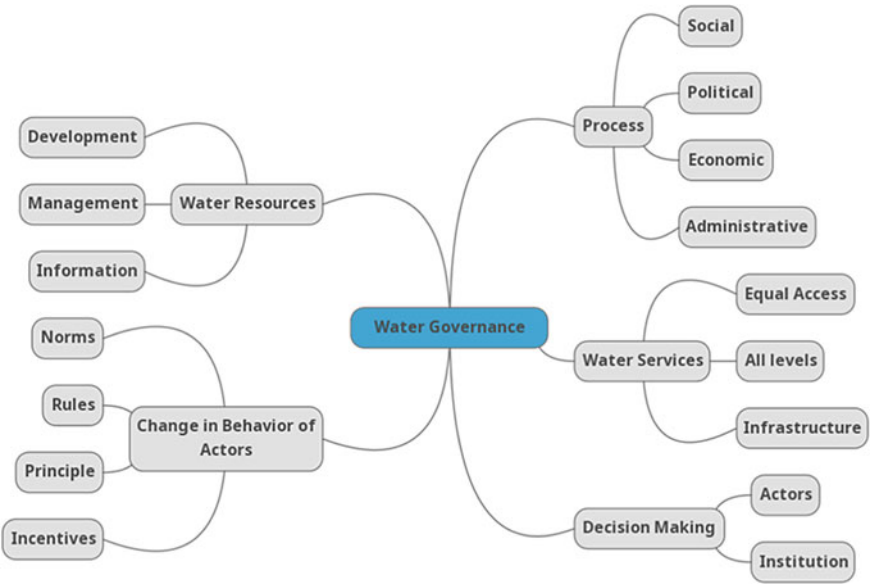

Fig. 2 List of critical elements in defining the term "water governance" derived from documented literature (*Source* Authors)

> Water governance facilitates (for actors and institutions) the decision-making process (in terms of Social, Economical, Political and Administrative) for protection/conservation, development, management, and documentation of water resources with the desire to change the behaviour of actors and institutes (through norms, rules, principles, policies, and incentives) in lines with the contemporary discourses on sustainability and resilience.

5 Discussions and Way Forward

Water governance is a key to achieving the targeted SDGs, particularly SDG6, and would be necessary for sustainable use and management of urban water systems. While there is no one agreed-upon definition of water governance in literature, there are several interpretations of the term. The research presents a brief evolution of water governance and attempts to identify a generic definition for the Indian context. However, while defining the definition, the authors of this research have tried to keep the definition as adaptive as possible to make it a fit-to-purpose definition for developing countries at large. The study also discusses the dilemmas that developing countries, specifically India, possess in terms of policy and legislation while addressing the concept of water governance.

While defining the concept of water governance, the study subtly opens up several questions on developing a fit-to-purpose framework for water governance. The contemporary commentaries on water-sensitive cities also have identified water

governance as a promising concept towards achieving water sensitivity. Such studies could also be used as a foundation to develop an integrated water governance framework for water-sensitive cities. The study further nudges to investigate linkages amongst the various identified water governance parameters contextually to derive context-specific implications. Thus, the research authors also consider this research an entry point into the more extensive discussions of adaptive and participatory water management resources.

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References

1. Woodhouse P, Muller M (2017) Water governance—an historical perspective on current debates. World Dev 225–241
2. Bell S (2014) Renegotiating urban water. Process in Planning
3. Zwarteveen M, Kemerink-Seyoum JS, Kooy M, Evers J, Guerrero TA, Batubara B, Wesselink A, et al (2017) Engaging with the politics of water goverance. WIREs Water 1–9
4. Wilson NJ, Harris LM, Nelson J, Shah SH (2019) Re-theorizing politics inwater governance. Water Gov Retheorizing Polit 1–13
5. Fletcher TD, Shuster W, Hunt WF, Ashley R, Butler D, Arthur S, Viklander M, et al (2015) SUDS, LID, BMPs, WSUD and more—the evolution and application of terminology surrounding urban drainage. Urban Water J 525–542
6. Grey D, Sadoff CW (2007) Sink or Swim? Water security for growth and development. Water Policy 545–571
7. Gupta J, Akhmouch A, Cosgrove W, Hurwitz Z, Maestu J, Ünver O (2013) Policymakers' reflections on water governance issues. Ecol Soc 35
8. Pahl-Wostl C, Gupta J, Petry D (2008) Governance and the global water system: a theoretical exploration. Global Gov Water Trends Processes Ideas Fut 419–435
9. Rogers P, Hall AW (2003) Effective water governance. Global Water Partnership Technical Committee (TEC), Sweden
10. GWP (2000) Towards water security: a framework for action. GWP, Stockholm
11. Sehring J (2009) The politics of water institutional reform in neopatrimonial states: a comparative analysis of Kyrgyzstan and Tajikistan. VS Verlag für Sozialwissenschaften, Wiesbaden
12. UNESCO (2003) Water for people, water for life. United Nations Educational, Scientific and Cultural Orgnaisation (UNESCO) and Berghahn Books, Barcelona
13. Lautze J, de Silva S, Giordano M, Sanford L (2011) Putting the cart before the horse:water governance and IWRM. Nat Res Forum 1–8
14. UNDP (2004) Water governance for poverty reduction. United Nations Development Programme, New York
15. OECD (2015) OECD principles on water governance. Adopted by the OECD Regional Development Policy Committee

16. FAO (2019) Land and water governance to achieve the SDGs in fragile systems. Food and Agriculture Organisation of the United Nations, Rome
17. Head B (2010) Wicked problems in water governance: paradigm changes to promote water sustainability and address planning uncertainty. The urban water security research alliance technical report no 38
18. Bichai F, Flamini AC (2018) The water-sensitive city: implications of an urban water management paradigm and its globalization. Wiley Interdisc Rev Water 1–9
19. Poustie MS, Deletic A (2014) Modeling integrated urban water systems in developing countries: case study of Port Vila, Vanuatu. AMBIO 1093–1111
20. Adams EA, Zulu L, Ouellette-Kray Q (2020) Community water governance for urban water security in the Global South: status, lessons, and prospects. WIREs Water
21. Lu F, Ocampo-Raeder C, Crow B (2014) Equitable water governance: future directions in the understanding and analysis of water inequities in the global South. Water Int 129–142
22. Ahmed M, Araral E (2019) Water governance in India: evidence on water law, policy, and administration from eight indian states. Water
23. NITI Aayog (2020) India voluntary national review 2020, Decade of action—taking SDGs from global to local. NITI Aayog, Government of India, New Delhi
24. Pandit C, Biswas AK (2019) India's national water policy: 'feel good' document, nothing more. Int J Water Resource Dev 1015–1028
25. Biswas AK, Rangachari R, Tortajada C (2009) Water resources of the Indian subcontinent (pp 400). Oxford University Press, New Delhi
26. Farrelly M, Brown R (2011) Rethinking urban water management: experimentation as a way forward? Global Environ Change 721–732
27. Nevill J (2007) Policy failure: Australian freshwater protected area networks. Aust J Environ Manage 35–47