［招待論文：研究論文］

Stakeholder Perception of Addressing Water Stress in Nagpur, India
Lessons for Enabling Participatory Governance
ナーグプルの水ストレスに対する利害関係者の認識
インドにおける参加型統治の研究

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Abstract: While the situations of ‘water stress’ are progressively on the rise, the rapid urbanization trends are also leading to urban-rural water conflicts, evident from the case of Nagpur, India. Due to the varied stakeholder groups at multiple levels, it has therefore been realized that the consideration of diverse stakeholder interests and values is essential for effective water resource management (like in Japan). In light of that, this research adopts a qualitative approach (key informant interviews) to establish a comprehensive account of stakeholder perception in Nagpur for enabling a participatory governance approach.

インドのナーグプルの実態から窺えるように、急速な都市化は都市と農村における水問題に拍車をかけている。効果的な水資源の管理には、それぞれの階層における利害関係者の多様な意向や価値を考慮することが（日本の事例のように）不可欠であるとされている。ナーグプルにおいて参加型統治を実現するために、包括的に利害関係者の認識を明らかにすべく、本研究では質的手法(重要な情報提供者に対するインタビュー調査)を用いた。

Keywords: water stress, urban-rural, participatory governance, stakeholder perception
水ストレス、都市と農村、参加型統治、利害関係者の認識

1 INTRODUCTION

Beyond the essence for human survival, water lies at the core of sustainable development and is crucial for socio-economic growth, energy and agriculture production, and healthy ecosystems (United Nations, 2021). Against the growing water demands worldwide and the finite stock of available water resources, 'water stress' (an element of water scarcity) has today become a buzz word. The situation of 'water stress' occurs when the water demands exceed the available quantity during a specific time period or when poor quality restricts its utilization (EEA, 2021). The gradual change in hydrological phenomenon is further intensifying the water stress situation worldwide, especially evident in Asian countries (like India) due to their significant demographic growth and lifestyle changes (Ray & Shaw, 2019; Singh et al., 2021).

According to the UN DESA (2019) report, the world population is projected to increase from 7.6 billion (in 2018) to 9.8 billion by 2050, wherein the proportion of urban population is projected to reach 68% (55% in 2018). In parallel with that, the freshwater demands in urban areas are projected to increase by 50% to 80% (Flörke et al., 2018; World Bank, 2018), and the demand for water intensive resources, like food and energy, are also projected to increase by over 50% (IRENA, 2015). These projections are highly concerning in the backdrop of already existing resource shortfalls, wherein 2.2 billion people worldwide lack access to safely managed drinking water services, and over half of the global population lacks safely managed sanitation services (WHO/UNICEF, 2019). Even more alarming is the fact that the urban areas predominantly meet their water demands from outside their physical boundaries (Heard et al., 2017), due to which there are increasing conflicts with the rural areas. Water reallocation from rural to urban regions has now become a common strategy (Garrick et al., 2019), and Padowski & Gorelick (2014) highlighted that one-third of world's surface water dependent cities are already facing competition with the agricultural users. Nevertheless, the conventional government led top-down strategies have progressively proved to be inadequate, and the policy mechanisms to address the water conflicts at local level remain to be underdeveloped

(Ballabh, 2008; Cullet et al., 2015).

Babcock et al. (2016) stressed that the effective management of water resources is highly complex, as it involves varied stakeholder groups (like urban-rural residents, farmers, industry, government officials, etc.) at multiple levels. The stakeholders, in general, refer to those people or groups of people who can potentially affect, or can potentially be affected, by the decisions on water-related issues, whether on a local catchment level or at the international transboundary level (Hockaday, 2020). For the sound management of water resources in alignment with the goals of efficiency, sustainability and equity, the necessity of integrated water resources management (IWRM) and stakeholder participation has therefore been recognized for a long time, yet their implementation is often hindered by the issues like that of institutional fit and interplay (Christophe & Tina, 2015). Porras et al. (2018) underlined that the stakeholder perception (i.e., the opinions and awareness that someone has) of water ecosystem services greatly affects how they are managed. An increasing number of studies (eg. Tshikolomo et al., 2012; Babcock et al., 2016; Montgomery et al., 2016; Smetanová et al., 2018; Haldar et al., 2021) have correspondingly also focused on unravelling the stakeholder perceptions in different contexts, duly acknowledging that the success of effective water governance relies upon the recognition of stakeholder interests and values. Gondo et al. (2019) also stressed that although the stakeholder perceptions vary, they form an integral part of water management.

To establish a precise understanding of these aspects at local level, this research discusses a specific case of Nagpur in Central India, which is now being recognized as one of the fastest growing cities in the world from 2019-2035 in terms of economic growth (Holt, 2018). While Nagpur is witnessing rapid urbanization paralleled by a growing demand of freshwater resources, the wider metropolitan region has recently experienced serious water stress concerns due to upstream developments and climate variations (Deshkar, 2019; Sukhwani & Shaw, 2020). By analyzing the secondary data on water utilization trends from the Pench Project (key surface water source in Nagpur), Sukhwani et al. (2020) uncovered that the declining freshwater availability is also leading to urban-rural conflicts, as the prioritized allocation to urban areas

disproportionately impacts the co-dependent sectors (agriculture, energy, etc.) and rural areas in wider region. However, there is still a limited understanding about the upstream-downstream implications of rapid urbanization and stakeholder conflicts at regional level.

In due consideration of the existing research gaps, this study aims to understand the perception of various stakeholder groups in Nagpur for establishing a comprehensive account of water stress concerns and identifying the focus areas for enabling a participatory approach to water governance. The two key objectives of this research are: 1) To study the stakeholder perception in Nagpur for the ongoing water stress situation, the current shortcomings, and the potential solutions. To achieve the same, a qualitative approach (based on key-informant interviews) has been adopted, as it has the potential to reveal the complexities of diverse subjective views (Jacobs & Buijs, 2011); 2) To establish a comprehensive account of stakeholder perception and suggest feasible directions for enabling participatory governance. Herein, the term 'participatory' mainly refers to the participation of diverse stakeholders across urban and rural areas within a defined space (like region and watershed). As the urban-rural relationships are expected to get severely constrained due to the changing climate and the limited stock of water resources, it is hoped that this research will provide a wider perspective to decision makers and pave the way for policy reforms in Nagpur and beyond.

The remaining part of this paper is structured as follows. In reference to the existing literature, Section 2 establishes a theoretical foundation for the conducted research and highlights the good practices from Japan. Section 3 provides an overview of the Nagpur case, and the corresponding urban-rural water linkages and governance structures. The research methods adopted for this study are explained in Section 4. Section 5 describes the results of the study, and Section 6 interprets the study results in reference to the existing literature. Lastly, Section 7 summarizes the derived research findings and outlines the way forward.

2　LITERATURE REVIEW

Divided into three parts, this section is mainly intended to establish a theoretical foundation for the readers to comprehend the conducted research. The first sub-section discusses the growing relevance of urban-rural linkages and emerging water conflicts. The second sub-section discusses the importance of participatory governance approach. The third and last sub-section highlights the Japanese good practices of water management. For the literature review, relevant publications from Scopus database and online grey literature were referred.

2.1　Urban-Rural Linkages and Water Conflicts

With defined administrative boundaries across space, urban and rural areas exist as independent entities, but they are closely interlinked through a variety of spatial (food, water, people, good, etc.) and sectoral (agricultural, industrial, etc.) interlinkages (Tacoli, 1998; Akkoyunlu, 2015). The rural areas have traditionally served as the center of key natural resources (like water) for their urban counterparts, while the urban areas have provided the rural populations with access to markets and specialized services like education, healthcare, etc. With the growing concentration of populations and economic activities in urban areas, the form and nature of these interlinkages is increasingly transforming today. More and more productive lands (croplands, forests, etc.) around the urban areas are being acquired for development purposes, while the urban resource demands continue to rise at a rapid pace (also discussed by Sukhwani et al., 2019a). In recognition of the changing regional dynamics and the environmental sustainability concerns, the importance of strengthening urban-rural linkages has recently been recognized at the global policy levels too, including the 2030 Agenda for Sustainable Development (mainly Sustainable Development Goal ‘SDG’ 11) and The New Urban Agenda.

Due to the changing urban-rural dynamics, the localized water conflicts are also now on the rise, alongside the interstate or international level conflicts which have for long been recognized (Moore, 2016). As urban and rural areas within a regional space rely upon a shared stock of water resources, the growing water demands in urban

areas are primarily being met through the reservoirs that were constructed for irrigation purposes. In line with that, the competing claims on the limited water resources between the diverse stakeholders across different sectors (agriculture, industry, etc.) and administrative scales are also now gradually being discussed in the scientific literature (eg. Celio et al., 2010; Flörke et al., 2018; Garrick et al., 2019).

2.2 Importance of Participatory Governance Approach

While the localized water conflicts are on the rise, the idea of participatory governance is increasingly being recognized for realizing the goal of IWRM (Palumbo, 2017). It has been embraced by major organizations around the world, including the World Bank and UN-Habitat (Fischer, 2012). Yet, little is known about the distinguishing attributes of participatory governance initiatives (both in conceptual and empirical terms). While 'participation' generally means 'the act or state of taking part in something', in the context of development planning, it mainly relates to the process of involving the stakeholders in planning and implementation of decision making programs (Heyd & Neef, 2004). Palumbo (2017) explained that 'participatory governance' refers to the democratic mechanisms which are intended to bridge the gaps between citizens and government agencies through deliberative practices, in order to increase the effectiveness and responsiveness of public policy. It entails engaging the relevant individuals and organizations outside the government to facilitate the collaborative discursive relationships.

The importance of a participatory governance approach is reflected in the fact that it takes into consideration the varied stakeholder interests and perception (refer to Fig. 1) in the management of water resources. Beyond the multi-faceted benefits it provides, the participation of diverse stakeholders in decision making also widens the scope for social consensus, and the realization of IWRM principles (Vaessen & Brentführer, 2015). The stakeholder participation can also take many forms, like consultation, interactive, functional, institutionalized, etc. (Fischer, 2012).

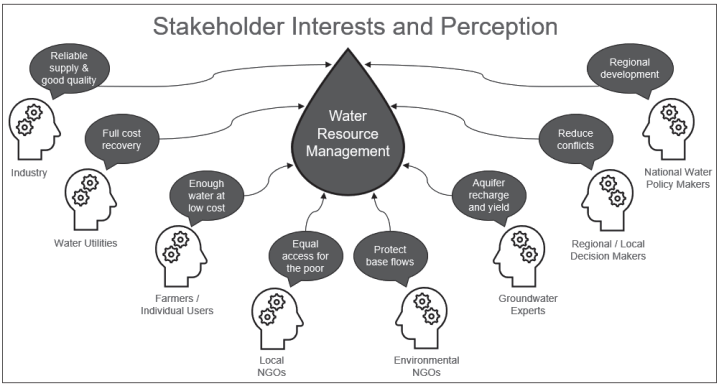

Fig. 1: Varying stakeholder interests and perceptions of water resource management (Modified from Vaessen & Brentführer, 2015, Module 7)

2.3　Good Practices of Participatory Water Governance in Japan

With nearly two-third of its lands covered by forests, Japan is recognized as a mountainous country (Population in 2018: 126.5 million; Urban population share > 90%) (Sugiura & Sonohara, 2019), wherein majority of the forest lands are privately owned. In due recognition of the importance of forest management for water-source environment conservation and watershed performance, the governments in Japan have for long been implementing diverse participatory approaches (new regulations, economic measures, etc.), in close collaboration with local citizens and other stakeholders. Sukhwani et al. (2019b) highlighted several such practices of stakeholder collaboration and urban-rural partnerships in Japan, including the case of water conservation taxes (to promote cost sharing) in Yokohama and Kanagawa Prefecture, incentivization of groundwater recharge in Kumamoto, and corporate social responsibility (CSR) programs of Honda Suigennomori and Suntory. Otsuka et al. (2009) have also described the history of water resource management in Japan, alongside the numerous examples of environment conservation taxes (intended to bridge the revenue shortages) in different Prefectures of Japan. Further, the Government of Japan also works in close cooperation with the Prefectural Governments to support the watershed management activities for disaster mitigation

and prevention (like replanting of trees and restoration of forest landscapes), wherein high emphasis is also put on enabling stakeholder engagement (like business sectors) in forestry operations, enabling citizen participation, engagement of volunteer groups, etc. (Forestry Agency, 2017).

3 CASE OF NAGPUR, INDIA

Nagpur - uniquely situated at the geographical center of India - is one of the largest urban agglomerations of the country, and the third largest city in Maharashtra State (location shown in Fig. 2). Spread over an area of 217.56 square kilometers 'sq. km', Nagpur city has a population of 2.405 million (2011 Census). While Nagpur has for long been recognized as an important commercial and political center of Central India, its strategic location and good connectivity offers high potential for economic growth. To achieve a balanced development in wider region, Nagpur Metropolitan Area (NMA) was notified by the Maharashtra State Government on 23rd July 1999, which comprises of 721 villages and 24 Census Towns across the geographic area of 3577.70 sq.km. Majority of the lands within NMA are a combination of farmlands, forests and water bodies, and the region also has rich mineral resources (NMC, 2011; NIT, 2015).

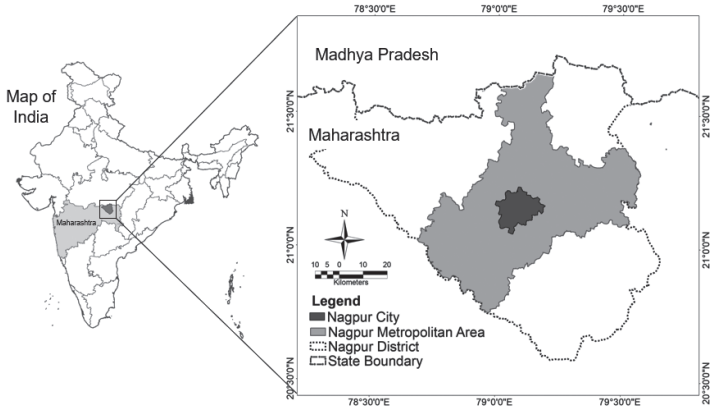

Fig. 2: Location map of Nagpur in India (Image source: the authors).

3.1　Urban-Rural Water Linkages in Nagpur

The water demands for urban areas in NMA (including Nagpur city) is mainly met through surface water sources like lakes, rivers and reservoirs, and the rural areas are predominantly reliant upon the groundwater sources (NIT, 2015). Within NMA, Pench dam located in the northern part is one of the main sources of drinking water for Nagpur city (provides nearly 520 million liters per day 'MLD' out of the 670 MLD water demand). However, as a multipurpose project, it also serves for several other purposes like irrigation, fisheries, energy production, etc. In reference to the recently declining water levels in Pench dam, Sukhwani et al. (2020) further uncovered that the priority water allocation to meet the rising water demands in Nagpur city is leading to increasing conflict with the co-dependent rural areas in upstream areas, and the allied sectors of agriculture and industry, especially during the water deficit years. Conversely, the wastewater generation from Nagpur city has also been on the rise. MPCB (2019) highlighted that the city currently generates around 505 MLD wastewater, of which nearly 130 MLD is being treated at the Bhandewadi sewage treatment plant (Roy, 2018), which is then supplied for reuse at the Koradi Thermal Power Station, in line with the joint agreement between Nagpur Municipal Corporation (NMC) and Maharashtra State Power Generation Co. Ltd. However, the bulk of residual untreated wastewater is directly released into the natural drains, which pollutes the streams and rivers (mainly Nag river) flowing towards the downstream areas.

3.2　Institutional Structure for Water Governance

In India, water is mainly a state (like prefecture in Japan) subject, wherein the state governments address all water-related issues through different ministries and departments (Pangare et al., 2004; TISS, 2015). Within Maharashtra State, there are several (administrative and technical) government agencies which look at water management activities at various levels (see Fig. 3). Within the broader Nagpur region too, a number of agencies are responsible for planning, design, and execution of water management activities at different levels (like river basin, district, block,

city, village). In Nagpur city, the water supply is managed by the NMC (an elected urban local body), under a 'Public Private Partnership' (PPP) agreement with a private agency named Orange City Water Pvt. Ltd. The annual water allocation for NMC is determined by the Vidarbha Irrigation Development Corporation (river basin agency), in accordance with the provisions set by Maharashtra Water Resources Regulatory Authority. For the rural areas, the water supply is managed by multiple agencies at different levels, including the village water and sanitation committees under village councils at the local level (NMC, 2011; NIT, 2015).

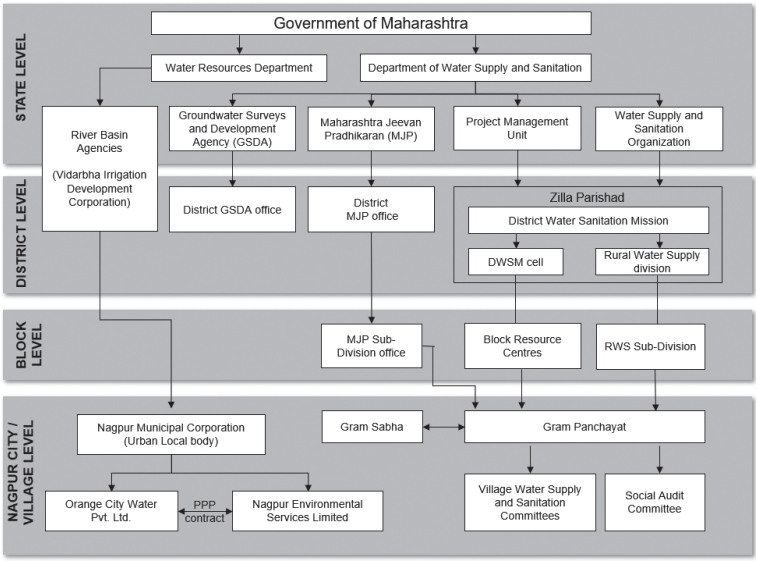

Fig. 3: Water Governance Structures in Maharashtra State, India (Modified from Sukhwani et al., 2020).

4 RESEARCH METHODS

In reference to the earlier studies (discussed in Section 1 and Section 2), this research adopts a qualitative approach, based on semi-structured interviews with identified key stakeholders in Nagpur. Through purposive sampling technique, twelve key informants are identified for this study across different stakeholder groups (as

shown in Table 1). In general, the key informants are those who have formal positions in the community, and can provide access to information which the researchers may not have on their own (Hockaday, 2020). In consideration of that, half of the key informants selected for this study are from varying government agencies, and the other key informants represent a variety of professions and interests in urban-rural context. Relying upon the prior experience and previous research findings in the case study area, diverse key informants are selected to explore a multitude of opinions, place meanings and experiences.

Table 1: Details of Key Informants

No.	Sector	Designation	Organization
1	Government Agency	Disaster Management Officer	District Disaster Management Authority, Nagpur
2	Government Agency	Sub-divisional Engineer	Irrigation Department, Hingna Branch
3	Government Agency	Cluster Coordinator	Panchayat Samiti, Parsheoni
4	Government Agency	Assistant Draftsman	Panchayat Samitti, Kamptee
5	Government Agency	Water Quality Expert	Zilla Parishad
6	Government Agency	Joint Director Town planning	Nagpur Metropolitan Region Development Authority
7	Academia & Research	Professor	Visvesvaraya National Institute of Technology
8	Academia & Research	Scientist	National Environmental Engineering Research Institute
9	Civil Society	Civil Engineer	Purti Sinchan Samruddhi Kalyankari Sanstha
10	Private Sector	Assistant General Manager	Orange City Water Pvt. Ltd.
11	Private Sector / Research	Geologist	Geo-Hydro Consultants
12	Rural Community Representative	Sarpanch (Village Head)	Nayakund Gram Panchayat

The interviews are mainly guided by four broad research topics: 1) Water stress in Nagpur region; 2) Transboundary implications in urban and rural areas; 3) Shortcomings in current water governance approach; 4) Key areas of intervention. To initiate the discussions with the key informants along these lines, four open-ended questions are framed as follows: 1) Can you please share your perspective on the ongoing water stress in Nagpur region? 2) In what ways do you think the water stress situation is impacting the Nagpur city and surrounding region? 3) In your opinion, are there any shortcomings of the current water management policies? 4) In your opinion, what are the key areas of interventions to enable a participatory approach to water governance? Herein, the interviews are deliberately less structured to provide more flexibility for the respondents to provide in-depth information on the subject. A

list of subsequent questions (e.g. 'Could you elaborate a little on this?' or 'What do you think are the key reasons for that?') are also designed to encourage detailed responses from the interviewees.

All the interviews were performed one-on-one, during August-September 2019, starting with an introductory explanation about the purpose of the interview, and followed by the basic questions designed to tap into place meanings. In general, the interviews lasted between 30 to 75 minutes, and the average duration for all interviews was 60 minutes. While most of the interviews were tape recorded (except for few government stakeholders), all the interview discussions were manually transcribed into Word documents, and loaded into QDA (Qualitative Data Analysis) Miner software to identify common themes and patterns for thematic analysis.

5 RESULTS

5.1 Stakeholder Perception of Water Stress in Nagpur region

The key-informants consistently pointed out that the climate variability in recent years (like extreme rainfall and heatwaves) and upstream developments (construction of Chaurai dam) in the Madhya Pradesh State have affected the water storage in the Pench Project (key water source). At the same time, the groundwater levels in wider Nagpur region are also reported to be declining, which is being attributed to the declining surface water availability. Beyond that, three other reasons are identified for the ongoing water stress situation:

1. Urbanization and Industrialization: The key informants from 'Academia and Research' domain explained that the current situation is due to the accumulated stressors over a period of time. While the growing influx of rural populations to Nagpur city has led to increased water demands, the industrialization trends have also been enhancing pressure on groundwater resources.
2. Destruction of natural watersheds: The key informants from 'Civil Society' and 'Private Sector' domain underlined that the urbanization and industrialization trends are also associated with the decline in green cover

and environmental degradation, which influence the earth temperature and rainfall. The expanding city boundaries in that manner are encroaching the natural watersheds while affecting the groundwater recharge.

3. Poor Water Management: The key informants from 'Government agencies' particularly highlighted the concerns of ageing infrastructure and non-revenue water losses in Nagpur city, and the water-intensive (flow) irrigation technique in rural areas. A common water management problem highlighted through all the interviews is the lack of community awareness.

5.2 Stakeholder Perception of Transboundary Implications in Urban and Rural Areas

Although the urban and rural areas in Nagpur are varyingly reliant upon surface and groundwater sources, three specific transboundary implications are identified as follows:

1. The recently declining water levels in Pench project has led to an acute water shortage in both urban and rural areas of Nagpur. While the drinking water demands in urban areas are met on priority, the co-dependent sectors like agriculture, industries, etc. are disproportionately affected.
2. As the urban water demands are constantly rising, the key informants collectively highlighted that a proportionately increasing amount of wastewater is also being discharged towards downstream rural areas, leading to water insecurity concerns in upstream and downstream areas.
3. While the agricultural production (rabi crops) and the rural livelihoods (animal husbandry, fisheries, etc.) are affected, the current trends are also associated with the decline in organic products in rural areas (like cow dung), and the increased use of chemical fertilizers.

5.3 Stakeholder Perception of Shortcomings in Current Water Governance Approach

According to the statements of the key informants from 'Government Agencies',

proactive measures are being taken for effective water management, and several government projects are being implemented in the form of infrastructure development, training programs, hackathons, etc. However, the lack of community awareness and limited funding remain to be a major challenge. On the other hand, the key informants from other domains highlighted that limited awareness not just at the community level, but also at the governance level hinders the judicious use of water resources. The informants from 'Academia and Research' emphasized that there is currently a lack of innovation as no new ideas are being implemented at governance scale, and a need-based approach is followed discretely within different administrative boundaries. The informants from 'Civil Society' further stressed that there is also a lack of responsibility sharing amongst different stakeholders within a watershed. The informants from 'Private sector' also brought to the core several policy constraints at various governance scales, as the regional planning continues to be dominated by real-estate (economic growth) perspectives. Despite the declining groundwater levels, the 'rural community representative' highlighted that the focus in rural areas remains to be on operation and maintenance of water supply systems, rather than water planning.

5.4 Stakeholder Perception of Key Areas of Intervention

Over the identified reasons for water stress and shortcomings of governance approaches, several different areas of interventions have been highlighted, among which the four common themes are:

1. Watershed Management: While the key informants from 'Government Agencies' recognized the need for technology-based solutions (like to curb water losses), the key informants from 'Civil Society' and 'Private Sector' stressed on the need for rainwater harvesting through micro-watershed management. In line with the ridge to valley planning concept, emphasis needs to be put on conserving every drop of rainwater starting at the ridge of watersheds.
2. Innovative financing: The key informants from 'Academia and Research',

'Private sector' and 'Civil Society' domain pointed out that several different compensation forms could be tapped to bridge the funding gaps in water management, like through water pricing, corporate social responsibility, provision of subsidies to rural areas, private sector engagement, etc.

3. Community Engagement: All the key informants emphasized enhancing community awareness (through education, training, etc.) about the genuine need for water harvesting, and citizen engagement for long-term sustainability. Empowering the village water committees could effectively serve the purpose in rural areas.
4. Urban-Rural Policy coordination: As urban and rural areas are closely interlinked, all the key informants recognized that urban-rural policy coordination is integral for regional development, and the scope of regional agencies (like Nagpur Metropolitan Region Development Authority 'NMRDA') need to be enhanced to minimize the cross-sectoral and transboundary impacts.

6 DISCUSSION: ENABLING PARTICIPATORY GOVERNANCE

Through the responses of key-informant interviews (Section 5), different stakeholder groups are found to have varying levels of awareness on the ongoing water stress situation in Nagpur. While, the key informants from government agencies provided detailed insights into statutory water management practices and issues, other key-informants conversely highlighted several shortcomings of current governance approaches, though a broader consensus was evident on certain aspects, like the rising implications of climate change. While the complete elaboration of these results falls beyond the scope of this study, three broad lessons (explained in following sub-sections) could be derived through the study results for enabling participatory governance.

6.1 Community Awareness for Effective Water Use

All the stakeholder groups consistently highlighted the need for raising community awareness, in light of the growing water stress concerns in Nagpur. As the rainfall patterns are reported to be progressively changing (in Section 5.1), a genuine need has been recognized for stimulating a change in behaviors of water users towards more sustainable practices, like water harvesting (in Section 5.4). GWP (2017) emphasized that the key to encourage IWRM and collective action lies in the creation of shared values and a common understanding of water issues. Further, through the Japanese good practices (Section 2.3), it is revealed that the active citizen engagement in water management initiatives (like as part of committee members, training programs, campaigns, etc.) plays a key role in fostering social change. Although water pricing interventions (like in Japan) are widely recognized to be effective in altering the consumption patterns, the behavioral approaches (like persuasive messages and water use comparisons) are also now gaining high currency in enhancing water use efficiency (eg. case of Bogota; World Bank, 2015).

6.2 Watershed Management to Enhance Water Conservation

While the haphazard and rapid infrastructure development over the years has led to accumulation of various stressors (Section 5.1), the growing water demand in Nagpur city is also leading to increasing water use conflicts with the co-dependent rural areas, raising concerns for long-term sustainability. To address these issues, the importance of enhancing water conservation through watershed management approach has been recognized through the key-informant interviews (in Section 5.4). As Heyd & Neef (2004) underlined, a watershed (or drainage basin or catchment areas) mainly refers to a land area that drains into a stream, and watershed management refers to the use, management, and investment in a number of inter-dependent resources (water, forests, and other land uses) within watersheds. Herein, the ridge to valley approach (emphasized in Section 5.4) mainly seeks to detain, divert, store, and maximize the available water for the range of water users within a watershed. The importance of watershed management for conserving water source

environment is also evident through the Japanese good practices (Section 2.3). Elaborating on the case of Kanagawa Prefecture (Japan), Sukhwani et al. (2020) explained how the citizen water taxes can be utilized for comprehensive projects focused on the conservation and restoration of water source environment, like forestry conservation and groundwater protection.

6.3 Institutionalizing Stakeholder Participation to Enhance Policy Coordination

For the context of Nagpur, the key-informants (except those from government agencies) highlighted a core need for policy reforms and innovative governance approaches to address the emerging water stress concerns (in Section 5.3). The importance of urban-rural policy coordination has particularly been recognized in the backdrop of transforming urban-rural dynamics and growing water conflicts (Section 5.4). While the diverse stakeholder groups within the watershed boundaries have in general varying interests and perceptions (as also explained in Section 2.2), institutionalizing the stakeholder participation can not only initiate policy level dialogue towards conflict resolution, but can also uncover several avenues for innovative financing, like through private sector engagement. To achieve the same, there is a need for inclusive governance structures or multi-stakeholder platforms in place. As the contemporary water governance structures in Nagpur do not fully conform to the watershed boundaries (evident through Fig. 3), the presence of any boundary organization or committee can not only serve for enhancing policy coherence (like between urban and rural areas, water and agriculture department, etc.), but also minimize the transboundary implications in urban and rural areas. As observed in the case of Japanese good practices (Section 2.3), urban-rural partnerships also demonstrate high potential for realizing participatory governance.

7 CONCLUSIONS

Through key-informant interviews with identified representatives of different stakeholder groups, this study establishes a wider understanding about the stakeholder

perceptions in Nagpur. While different stakeholder groups are observed to have varying perceptions on the ongoing water stress situation, current shortcomings in governance, and the potential solutions, the decision makers should essentially consider the diverse views, to stimulate a participatory approach of governance for effective water management. The study acknowledges that, although the concept of participatory governance is still evolving, emphasis needs to be put on raising community awareness, adopting watershed approach, and institutionalizing stakeholder participation, to promote any policy level dialogue between diverse stakeholder groups and enable stakeholder participation in water-management decisions. The cross-validation and confirmation of these study results through other corroborating evidence (like through questionnaire surveys and secondary data analysis) can further help enhance their authenticity and usefulness.

Towards the end, the authors acknowledge that this research is subjected to certain limitations. Firstly, this research is based on a limited number of key-informant interviews, which warrants further investigation with a larger sample size. Secondly, although the selected key-informants in this study represent a wide range of perspectives, majority of them are government stakeholders, who are typically involved from a regulatory standpoint, and tend to be impartial towards competing water uses. The future research scope therefore includes a systematic analysis of stakeholder perception, while ensuring equal and diverse stakeholder participation. The authors also acknowledge that the interviews were conducted before the ongoing COVID-19 pandemic. However the study results are still very significant as they open up future directions of research in the areas of rainwater harvesting and watershed management, which are generally overlooked.

AUTHOR CONTRIBUTIONS

Both authors were involved in conceptualization, investigation, visualization, methodology, and writing—review and editing; formal analysis, software, and writing—original draft preparation, V.S.; validation, resources, supervision, project administration, and funding acquisition, R.S. Both authors have read and agreed to

the published version of the manuscript.

ACKNOWLEDGEMENTS

Both authors sincerely acknowledge the valuable support and cooperation received from the key informants (from Nagpur region) in conducting this study. The first author (V.S.) is also thankful to the Ministry of Education, Culture, Sports, Science and Technology (MEXT), Japan, for the provided scholarship.

CONFLICTS OF INTEREST

There are no potential conflicts of interest related to this study.

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〔受付日　2021. 6. 17〕