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CHAPTER 7

Water scarcity as a strategic internal security threat in India

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Abstract: This chapter analyses how water scarcity in India impacts the country's internal security, extending beyond environmental concerns to affect agricultural productivity, population stability and inter-state relations. Applying political ecology theory and the concept of water security, the analysis demonstrates that persistent water stress, further strengthened by population growth, climate change and governance inefficiencies, has intensified vulnerabilities within India. Based on a qualitative approach and relevant case studies, the chapter highlights the structural challenges of India's decentralised water governance model and the knowledge-governance gap that hinders effective management. Future prospects are concerning, as many underlying problems are expected to persist. Nevertheless, strategic shifts in governance paradigms, targeted investments in sustainable water management and comprehensive legislative reforms could significantly mitigate the risks. Recognising water scarcity as a strategic internal security issue will be essential for enhancing India's resilience and stability in the coming decades.

Keywords: Water, India, water governance, water security, environmental security, internal security.

INTRODUCTION

Water, as a fundamental natural resource for human health and well-being, has become increasingly important in recent decades. Constantly growing water consumption, caused by rapid population growth in certain

areas of the world such as South Asia, where population has grown by 200 million people over the last decade (World Bank, 2025a), as well as climate change and overexploitation of water resources have led experts worldwide to raise serious concerns about water security and its shortages in the future. These problems can have significant implications for certain countries, whose water resources are subject to particularly intense stress caused by ongoing trends affecting water security worldwide (Omolere, 2024).

This chapter addresses the following questions: how does water scarcity influence internal security in India? What are the most important trends impacting India's water security? How does the decentralised water governance structure affect the country's capacity to address its growing challenges in terms of water security? How does agricultural use of groundwater impact water security in India? How does water pollution interact with water scarcity in India, and what implications does this have for internal security and effective water governance? To analyse these questions, two main analytical frameworks are applied: political ecology theory and the concept of water security. Political ecology theory analyses the interconnected political, economic and social factors and their impact on the availability of natural resources, including water. Application of this approach helps explain how the scarcity, governance and distribution of water resources affect internal security situation in India, intensifying internal economic disputes and deepening socio-economic disparities between different regions within India. At the same time, the water security concept, which refers to ability of a population to ensure sustainable access to sufficient amounts of clean water, highlights how certain environmental issues and resource stress can undermine internal stability and governance within a state. Together, these two approaches underline the importance of analysing the issue of water scarcity beyond development and environmental perspectives, exploring its implications as a strategically important concern for India's internal security and state resilience. The text will strive to prove the author's hypothesis that the existing problems of water scarcity and the unavailability of clean water,

if not properly addressed, will lead to future internal instability in the country in social, governance and environmental aspects.

The methodology applied in this chapter is a qualitative, interpretative approach drawing on a diverse range of secondary sources and statistical data – scholarly articles, policy briefs, research papers, official government reports and data from sources such as the World Bank and Statista. The analysis, being grounded in a case-oriented approach, offers a synthesis of currently available data and literature review which allows the study to show, based on a selected set of examples, how the phenomenon of water scarcity has affected the internal security dynamics in India. The study focuses on synthesising already existing knowledge to assess the relationship between environmental issues and socio-political stability of a state.

WATER SCARCITY AND MANAGEMENT IN INDIA – BACKGROUND AND TRENDS

India is a prime example of a country struggling with water scarcity. It has the largest population in the world – 1.44 billion people (World Bank, 2025a) – which translates to 18% of the world's population, yet its water resource potential of 1999.2 billion cubic metres (BCM) is just a little over 4% of the total river water in the world, and only 1139 BCM of that has been classified as total utilisable water by the latest Indian Central Water Commission Annual Report (2024, p. 12). Asthana and Shukla (2014, p. 27) indicated over 10 years ago that India's utilisable water resources, although sufficient at the time, will become increasingly stressed by the continuous growth of country's population, urbanisation, industrialisation and agriculture. Qadir (2024, Table 3.1) highlights both recent and projected declines in annual renewable water resources per capita in South Asian countries, with India projected to experience a decrease of 13.2% between 2015 and 2030, and 21.6% between 2015 and 2050. These trends seem to have continued over the last decade, and as pointed

out by Fernando (2024) the challenges of water scarcity in India persist due to insufficient policy direction, disputes between the central government and provincial administrations, as well as internal and external security issues highlighted by Asthana and Shukla.

Certain regions of the India are significantly more affected than others. Based on a 2019 report Complex Water Management Index, by the Indian government's public policy think tank, NITI Aayog, 16 out of 27 Indian states and Union Territories assessed in the report have been classified as low performing in water resource management. Most of those territories are in the northern part of the country, and only one of the northeastern and Himalayan states has not been classified as low performing according to the report. The report indicates that the 16 low-performing states account for almost 50% of the country's population, 40% of its agriculture and 35% of its economic output (NITI Aayog, 2019, pp. 61–62). Another commentary by World Resources Institute classifies 54% of the country (mostly its east coast and northeast part) as facing high to extremely high water stress (Shiao et al., 2015). Water stress is a problem which occurs when "the demand for water exceeds the available amount during a certain period or when poor quality restricts its use" (European Environment Agency, 1999, p. 155).

Although the 2019 NITI Aayog report notes improvements in water resource management across most Indian states, the pace of progress remains inadequate. India is facing what is described as its worst water crisis in history, with over half a billion people – mainly in the north, northwest and along the east coast – experiencing high to extreme water stress, and an estimated 200,000 annual deaths linked to unsafe water access due to scarcity and contamination resulting from poor management and unsustainable practices (Shiao et al., 2015; Chaudhary, 2024). It is worth noting that in recent years the issue of water security has been one of the country's priorities, but it seems that we are yet to see any significant improvements resulting from that shift in focus.

A fundamental legal limitation affecting India's ability to manage water resources strategically is the absence of a unified national water

framework law. While the Indian Constitution assigns responsibility for water primarily to individual states (Indian Constitution, art. 243ZC), inter-state rivers and related disputes fall under the central government's jurisdiction (Indian Constitution, art. 262). However, this division has created a fragmented regulatory landscape, with states pursuing divergent policies and lacking incentives for coordination. Furthermore, corruption and the lack of enforceable national standards on groundwater use, pollution control and water allocation exacerbates inequalities and hinders effective long-term planning. Scholars and policy experts have long argued that without a national framework law to guide coherent, integrated water governance – one that sets minimum standards while respecting federal autonomy – India's legal architecture will remain insufficient for tackling the growing pressures on its water system (Khambete, 2023).

FROM SCARCITY TO VITAL SECURITY THREAT

There are several important trends that significantly affect India's water security problems: groundwater overexploitation, internal disputes over the resource, climate change, industrialisation, water contamination by municipal waste, demographic pressure and the private sector's resistance to potential change in the water resource development approach (Chaudhary, 2024; Ghosh & Ghosh, 2024; Indian Infrastructure, 2024; Adeel & Böer, 2024, pp. 15–17). Water security is a crucial issue for the country's stability and internal security considering how important it is for population's overall health (Cushing et al., 2023) and agricultural production, which constitute 16% of India's GPD (World Bank, 2025b).

One of the major factors impacting India's water scarcity is the overexploitation of groundwater, stemming primarily from intensive agricultural production in certain regions of the country, such as Punjab in northwestern India (Katyaini et al., 2021, pp. 11–13). Irrigation in these areas predominantly relies on groundwater, with approximately 60% of irrigated land depending on groundwater supplies (Katyaini & Barua,

2017). Given that India has the fifth highest percentage of irrigated agricultural land in the world (World Bank, 2022), this creates significant pressure on the country's groundwater resources. Another crucial factor is the strong seasonal variability of water availability. India's monsoon climate causes over 70% of annual precipitation to occur within just three to four months, concentrating most of the river flows within this brief period. As a result, heightened water stress persists for the remaining part of the year, contributing to a wide range of problems such as drought and floods, both severely affecting the country's water and internal security (Jain, 2019, pp. 569–570). This also shows the connection between economic and ecological factors, which both affect India's water security challenges, especially when considered jointly.

The intensification of crop production is a major driver of groundwater depletion, a problem further exacerbated by policies providing free or subsidised power to farmers in certain rural areas. This problem can be evident in the 98% of cultivable area irrigation dependent on groundwater and in the 12-fold increase in the number of tube wells between 1970 and 2010 (Katyaini et al., 2021, pp. 11–12). While such subsidies may offer short-term relief for agricultural productivity, they leave the underlying issue of groundwater depletion unaddressed, creating serious long-term risks. Change in rainfall variability is also a significant factor for the Indian agriculture sector. The already scarce water resources in India, combined with ongoing trends that further impact water quality and availability, continue to reduce crop yields and agricultural output among Indian farmers. (Aryal et al., 2020, p. 5048 & Table 2). Applying political ecology theory demonstrates how these unsustainable land cultivation practices can translate into a further weakening of the country's water security as a self-propelling problem.

The various threats and challenges discussed in this chapter are connected to water governance in India, which is fundamentally decentralised. According to the Constitution of India, states are responsible for the planning, development and management of water resources within their territories, except for inter-state rivers and disputes, which

fall under the competence of the central government (Katyaini et al., 2021, pp. 4–5, Indian Constitution, art. 243ZC, art. 262). This governance structure has not proven particularly effective, as a significant gap persists between water-related knowledge and actual governance practices. The issue is often addressed only superficially, with water needs viewed mainly through the lens of economic sustainability. This overlooks the crucial role of water governance for rural livelihood security, and broader social, economic and environmental sustainability (Katyaini & Barua, 2015, pp. 11–13).

It is important to note the role played by the local authorities and central government in water resource management in India. Water governance in India is decentralised and shaped by a reductionist approach rooted in the country's federal structure. Most river basins are managed at the state level, with the central government having limited authority to resolve disputes, while the private sector plays a significant role in governance. (Ghosh & Ghosh, 2024). These factors can be considered among the most important reasons for numerous conflicts over the jurisdiction of water bodies and river basins in India, which happen both between states and between local and central governments (Modak et al., 2021). In addition to public stakeholders, there is also the issue of the private sector, which is primarily focused on short-term economic gains neglecting long-term implications of unsustainable approaches to water management (Ghosh & Ghosh, 2024). This problem is further exacerbated by the issue of corruption (SIWI, 2018), where relevant government authorities or judges can be easily controlled using money coming from private entities who benefit from the current unsustainable governance structure. Applying the study's main theoretical framework indicates that this political factor – unsustainable and decentralised water governance – is a big contributor to the country's inability to address its resource shortage issues.

Another important challenge for India's internal security that stems from water scarcity is the internal dispute over water governance. With 25 major river basins and 103 sub-basins scattered across the country,

most of them lying in the territories of multiple states, India has had a longstanding problem with inter-state river water disputes (Salve, 2016, p. 502). One of the most well-known examples of such conflicts is the dispute over the Cauvery River basin between the states of Karnataka and Tamil Nadu in the south of India. After more than three decades of competence disputes and unsuccessful attempts of the judiciary and the government to resolve them, the final agreement came into force in February 2013. The result of this dispute was later upheld by the Supreme Court, which also declared the river a national resource and directed the government to formalise the Cauvery Management Scheme (Sharma et al., 2020, pp. 5–7; Thapliyal, 2023). Under this scheme, the two bodies, the Cauvery Water Regulation Committee (CWRC) and the Cauvery Water Management Authority (CWMA), were created and are now responsible for water management in the Cauvery River basin (Ramakrishnan, 2023).

Inter-state disputes over water claims are likely to persist. Historically, such disputes have endured for decades, despite a number of effective central government interventions. Existing mechanisms – such as court rulings and tribunal decisions – often address conflicts reactively, without tackling their root causes. The recurrence of those disputes has been linked to judicial bodies struggling to address emerging environmental concerns and adapt to changes in state boundaries, which complicates water-sharing claims (Salve, 2016, p. 520). By looking at this issue through the scope of political ecology theory, we can easily notice how these political and structural factors negatively affect India's capacity to address its water security challenges.

Other factors linked to water scarcity are population growth, urbanisation and industrialisation. India has recently become the most populous country in the world, and although the rate of its population growth has been steadily slowing down over the past two decades, the population is still growing, while the water supply in the country is not improving due to numerous ongoing unfavourable trends mentioned earlier (MacroTrends, 2025). India's urbanisation has also been increasing – its urban population has been growing significantly faster in recent years

compared to its rural population. According to data from 2018–2022, India's urban population grew by 42.5 million, representing a 9.2% increase compared to 2018, while its rural population increased by only 5.67 million, equating to a 0.55% increase over the same period (Statista, 2024). The country's economic and industrial growth has been a major factor attracting people to the cities, but it also places additional strain on India's water security. The primary issue associated with the factors described above is the deterioration of water quality in municipal water bodies, resulting from the large amounts of wastewater and pollution being discharged by the growing population and expanding industry (Asthana & Shukla, 2014, pp. 93–95, 119–120). A study from 2022 found that in 118 cities across India, wastewater is either indirectly discharged into water bodies or, like in other 41 cities, directly into rivers. The study also highlighted that 38,791 million litres of untreated sewage are being released into water bodies on a daily basis, amounting to 62% of total sewage across the country (Jadeja et al., 2022, p. 2).

The water contamination briefly described here is the second underlying issue of India's water security. The central government is struggling to address this issue properly, which can be seen as yet another governance related issue. It is a social and political problem, and by applying the theoretical framework of political ecology it is clearly visible how this problem affects the availability of water as a resource and in turn the country's water security. Due to the scope of this chapter, the issue is only considered as a factor interacting with water scarcity, as discussing it thoroughly would require a separate chapter.

IMPLICATIONS FOR GOVERNANCE AND STABILITY

The lack of proper adjustments in the management of water resources risks deepening existing problems, particularly as the current legal framework and governance system have been largely ineffective in controlling the overexploitation of groundwater by Indian farmers. This

ineffectiveness is also evident in how inter-state disputes are resolved. Although constitutional mechanisms for resolving inter-state water disputes – such as the establishment of tribunals – are a valuable legal framework for addressing India's rising water security threats, their outcomes have been mixed. Some tribunals and central government actions have been effective, such as the Bhargava Tribunal's resolution of the Narmada water dispute. However, in many cases, tribunals have failed to resolve conflicts conclusively, as state governments are often reluctant to compromise on their claims to water resources (Salve, 2016, pp. 519–520). This reflects deeper structural issues within the country's water governance model and its focus on the states' role in managing this crucial resource.

Nonetheless, some recent improvements have been made, though they remain inadequate. In 2019, the Indian government established the Ministry of Water Resources, tasked with managing various programmes focused mainly on river rejuvenation. These initiatives aim to restore the uninterrupted and clean flow of major rivers, such as the Ganga, by promoting inter-sectoral cooperation to increase water availability and ensure a more equitable distribution of this resource (Jadeja et al., 2022, pp. 3–4).

Aside from water scarcity, India's water security is also negatively impacted by the contamination of water. It is an underlying issue that interacts heavily with water scarcity, as together they constitute the two main challenges for the country in terms of providing its population with a sufficient amount of safe water. Addressing this issue should also be a crucial concern for India's decisionmakers.

The current prospects for addressing water scarcity in India appear rather pessimistic, as ongoing trends such as population growth, climate change, unsustainable governance practices and intensification of agricultural production are expected to persist. Significant efforts will be required to mitigate their effects. While some water-related challenges are being addressed – particularly at the central government level – the pace and scale of worsening problems mean current interventions may not

suffice. India's present water governance system is increasingly unsustainable, based on a paradigm that prioritises the short-term gains of private entities, while a persistent knowledge-governance gap in many highly water-stressed states continues to hinder major improvements in water management (Ghosh & Ghosh, 2024; Katyaini & Barua, 2015, pp. 11–13).

Finally, the problem of water pollution raises serious concerns for the future. Urbanisation in India shows no sign of slowing down, and growing population centres will require collaborative efforts to manage rising demands for safe drinking water and effective sewage treatment. Without significant improvements in municipal water governance, the pressure on urban water systems is likely to intensify, exacerbating both health and security risks (Jadeja et al., 2022, p. 4).

Although water scarcity is likely to persist and worsen, there are viable measures that can mitigate both current and future problems. Firstly, it is crucial to implement and promote measures that enhance water sustainability across all types of water sources, including groundwater, lakes, reservoirs, rainwater and river basins. This should involve a wide range of actions, some of which are already being implemented, such as rainwater harvesting, agricultural drainage water recycling and the prevention of water loss (Qadir, 2024, pp. 66–70). In addition, appropriate legislation is needed to prevent the overexploitation of groundwater, promote the sustainable intensification of agriculture and encourage the diversification of production areas – actions that will require joint decision-making at multiple levels of governance (Katyaini et al., 2021, p. 17). Other important steps include investment in desalination facilities in coastal areas and efforts to increase productivity in particularly water-stressed regions to reduce overall water usage (Qadir, 2024, pp. 71–72). Proper preparations in the field of crisis and disaster response management are also crucial, given that a significant proportion of India's population remains at risk of becoming climate refugees due to floods, drought and climate change (Fernando, 2024).

However, many necessary improvements in water security may not be achievable without a thorough re-evaluation of the current water

governance paradigm. A shift from state-centric structural intervention to a more holistic, integrated model is essential (Ghosh & Ghosh, 2024), likely supported by a new legal framework for water resource administration. Such a reform should aim to bridge the persistent knowledge-governance gap in water management aptly highlighted by Katyaini and Barua (2015, pp. 11–12), thereby enhancing India's capacity to address the environmental, social and security challenges linked to water scarcity.

CONCLUSION

This chapter has explored the multilayered impact of water scarcity on India's internal security, demonstrating that the issue extends beyond environmental and developmental concerns to constitute a systemic threat to the country's social, economic and political stability. Drawing on the frameworks of political ecology theory and water security, the analysis has shown how decentralised governance, agricultural overuse of groundwater, demographic pressures and pollution converge to erode the resilience of institutions and communities alike.

While not examined in depth, the study also highlighted the important role of water pollution in weakening India's water security. Its interaction with scarcity – particularly by reducing the volume of safe, usable water – underscores the need for further research. Understanding this dynamic is crucial for designing integrated solutions that address both quantity and quality dimensions of water access.

The findings indicate that rural populations dependent on groundwater irrigation are both disproportionately affected by and key contributors to resource depletion. Weak regulatory frameworks and subsidy-driven overextraction have led to unsustainable practices that exacerbate inequality and heighten the risk of displacement and rural distress. Simultaneously, water pollution – from untreated sewage, industrial waste and agricultural runoff – has sharply reduced urban water availability, intensifying stress and widening disparities.

India's decentralised and fragmented water governance system has proven inadequate in addressing these compound threats. Although recent reforms have shown some promise, they remain insufficient. Jurisdictional conflicts, implementation gaps and political inertia continue to obstruct long-term planning and integrated management.

The chapter supports the hypothesis that, without significant reform, India is likely to face growing internal instability across social, governance and environmental dimensions. Reframing water scarcity as a strategic national security concern is essential. Key priorities should include integrated, multi-level governance; stronger regulation of groundwater use; investment in pollution control; and a decisive shift toward long-term sustainability.

Ultimately, recognising water as both a fundamental right and a strategic resource will be vital to preserving India's internal stability in the face of mounting environmental and demographic pressures.

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