

## Article

# Ending India's Water Stress: The Road Ahead

Heena Samant

### Abstract

*India is facing water distress in both quality and quantity. This is expected to worsen if urgent all-round remedial measures being taken prove to be inadequate. Water shortages, pollution, overuse and significant wastage, low to no water pricing, floods in monsoon when water is abundant, among others, characterise the prevailing situation in parts of the country. Several factors, such as exponential population growth, rapid urbanisation, industrialisation, antiquated infrastructure, and inadequate water governance, can be credited for this plight. There are major reforms and changes underway that raise hopes for a more secure future. The Government has made 'water governance' one of the main priorities in its policies and decisions, and significant advances in overcoming water related challenges are being made. Despite these measures, a crisis could still be inevitable due to the challenges posed by climate change. India needs to make its people conscious of the finite nature of water and the utmost need to avoid waste and overuse. They need to learn to nurture, conserve, reuse, and recycle this invaluable resource of nature.*

**L**arge parts of India face water related distress in the dry summer months or in the monsoons when floods wreak destruction.<sup>1</sup> The National Institute of Transforming India, also known as NITI Aayog, the premier policy think tank of the Government of

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India chaired by the Prime Minister, in its pioneering reports in 2018 and 2019 surveyed the water situation across the country. They revealed that India was facing the worst water crisis in its history impacting millions of lives and livelihood.<sup>2</sup> The report emphasized the shortage of water in both urban and rural India, deteriorating water quality, over-extraction and contamination of groundwater, inter-state disagreements on water-related issues, and lack of water data as some of the key issues the country was grappling with. It further stressed that this situation is likely to worsen due to the rising demand for water in the coming years. The distress can be partly attributed to the fact that India is home to 18 percent of the world population but has only 4 percent of global freshwater resources for its use.<sup>3</sup> Besides this, the report observed, there are other reasons for the rapidly deteriorating water situation in India, such as rapid urbanisation, industrialisation, weak water governance and poor water management systems.

The NITI Aayog report was deeply disturbing and has galvanised the government to step up all round systemic reforms and initiate a slew of ambitious schemes in both urban and rural India. The water governance and management systems began to be reformed and modernised with some urgency by the government from 2014 onwards. Several major steps have been taken since then by the Modi government to make India water secure. In fact, the surveys and studies leading to the publication of the NITI Aayog Report in two parts in 2018 and 2019, were themselves part of the effort to understand the scope of the crisis so that necessary corrective measures could be taken. The government of India has introduced significant programs and schemes to address the issue. The year 2019 was a watershed in this regard as the government launched several flagship programmes, such as the Jal Jeevan Mission, Atal Bhujal Yojana, and Jal Shakti Abhiyan, to name a few, to deal with the water crisis. Visible progress has been made since then.

Yet, despite the significant measures being taken by the government, a crisis is far from being eliminated. This paper argues that India's water crisis may still become inevitable due to a far more pressing challenge confronting the world-- climate change. The present policies and programmes have the capacity to limit the intensity of the crisis but may not be able to eliminate it as climate change continues to become a "threat multiplier".

## NITI Aayog Findings

NITI Aayog in 2018 published a 'Composite Water Management Index' report, a first-of-its-kind, comprehensive scorecard for identifying, targeting, and solving problems in the water sector across the country.<sup>4</sup> This was followed by a second edition of the Index report in 2019, which establishes a clear baseline and benchmark for state-level performance on key water indicators. The report uncovers and explains how states have progressed on water issues over time and identifies high-performers and under-performing States in terms of water management.<sup>5</sup> The idea was to instil a sense of competition among States for improving their water governance and management systems.<sup>6</sup>

As per the 2018 report based on 2017 data, some 75 percent of the households did not have piped drinking water on their premises.<sup>7</sup> Additionally, 84 percent of rural households did not have direct piped water supply. Only half of the rural population in India had access to safely managed water, resulting in one of the highest water borne disease burdens in the developing world. Although 93 percent of India's urban population had access to 'basic water', supply gaps in the cities were causing the citizens to depend on privately extracted groundwater, thus bringing down local water tables. The quality of water in the country was categorised as 'poor'. It was estimated that around 70 percent of the water in the country was contaminated. In fact, due to the bad water quality, India witnessed nearly 200,000 deaths each year. The groundwater reserves of the country were over-exploited and also contaminated. The report revealed that critical groundwater resources of the country, which account for 40 percent of water supply, were being depleted at unsustainable rates. In 54 percent of India's wells the level was declining because extraction rates exceed recharge rates. The groundwater crisis was most acute in the Indian agricultural sector, as it provides 63 percent of all irrigation water.<sup>8</sup>

Some other concerns highlighted in the report were that droughts were becoming more frequent, creating severe problems for India's farmers as approximately 53 percent of agriculture in India is rainfed.<sup>9</sup> Inter-state disagreements were on the rise, with seven major disputes currently raging, pointing to the weak institutional framework of national water governance. The populous northern states of India, which account for approximately 20-30 percent of India's agricultural output, face high to extreme water

stress, posing a significant food security and livelihood security risk for the country. The report emphasised that apart from rural drinking water, critical subjects such as augmentation of groundwater resources and sustainable on-farm water use practices were areas that needed urgent attention.<sup>10</sup>

The 2019 NITI Aayog report clearly stated that India's water challenges were not only a result of limited availability of water resources but also of mismanagement.<sup>11</sup> It highlighted the critical impacts of India's water situation on the social, political, economic, and environmental spheres. Focusing on the urban areas, the report mentioned that the urban hubs are likely to witness severe water shortages in the future, lowering urban growth and the quality of life of the urban citizens. There could be a risk of energy shortages as well in the country due to water stress. It estimated that 70 percent of India's thermal power plants were likely to face high water stress by 2030, severely hampering India's energy production and economic activity. The report also acknowledged that the country's rich biodiversity faced serious threats from human activities undertaken in pursuit of creating additional water sources.<sup>12</sup>

The 2018 report predicted that India's water demand would rise by a factor of two by 2030.<sup>13</sup> Some 40 percent of the population may not have access to drinking water by 2030, and 6 percent of GDP will be lost by 2050 due to water crisis if nothing changes in policies, institutions and governance.<sup>13</sup> It identified the lack of water data in the country as one of the key challenges driving this crisis. It argued that data systems related to water in the country were limited in their coverage, robustness, and efficiency. Unchecked extraction of groundwater by farmers is one of the major reasons driving the groundwater depletion in the country, as per the report.<sup>15</sup> This unchecked extraction is largely driven by two factors:

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- i. The current legal framework for groundwater allows farmers to extract water from underneath their land without any limit.
- ii. Low electricity prices for farmers to boost irrigation have created an unsustainable situation.

Additionally, population growth, inadequate water infrastructure, industrialisation,

lack of formal water pricing system, inefficient water use, and poor water governance are the reasons driving this water crisis in the country. These reports strongly asserted that India was facing a water crisis, which could worsen if nothing changes and fast.

However, a series of positive developments have taken place in the water sector in the country and water management started receiving increased policy attention from 2014 onwards.<sup>16</sup> India formulated the National Water Policies to manage, distribute, and regulate water resources since 1987, however, it is only from 2014 onwards that Prime Minister Modi's government has persistently stressed the importance of water and has made water governance a priority in its policies and decisions.<sup>17</sup> The next section looks into these policies and decisions made by the present government.

### Water Governance and Management

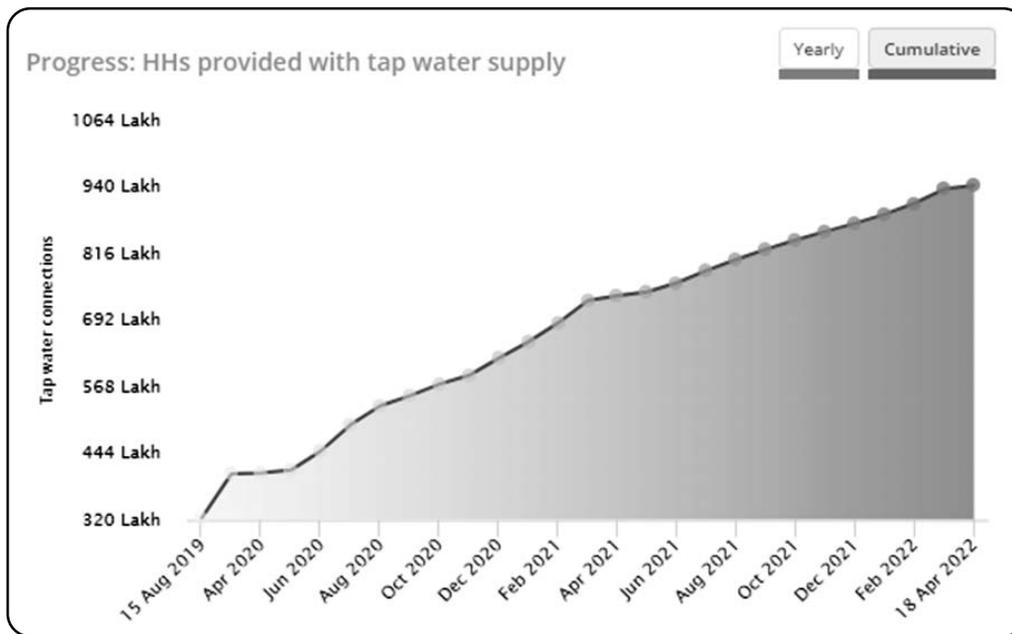
The Modi government since its inception has been committed to provide water security to all in the country.<sup>18</sup> Its focus has been to not only change the present water situation but also find solutions for the future.<sup>19</sup> As a result, there has been a growing focus on water conservation, including rainwater harvesting and groundwater conservation, adequate water availability, de-pollution of water, and efficient water use across the country. In 2014, the government launched a 'Namami Gange Mission' whose main objective was the reduction of pollution, conservation and rejuvenation of the National River Ganga.<sup>20</sup> In 2015, the government formulated the Pradhan Mantri Krishi Sinchayee Yojana (PMKSY), a landmark scheme for high irrigation efficiency.<sup>21</sup> This programme endorses two important components such as 'Per drop-more Crop', which means the adoption of precision irrigation and other water-saving technologies, and 'Har Khet Ko Pani' (Water for all farms), which is aimed at enhancing the physical access to water and expand cultivable area under assured irrigation.<sup>22</sup> The programme also seeks to improve on-farm water use efficiency, reduce wastage of water, and sustainable water conservation.<sup>23</sup>

**The Modi government has been committed to provide water security to all in the country.**

Since 2019 onwards, the developments in the water sector have climbed another step as a series of flagship programmes and schemes were introduced by the government. This came in the wake of the reports published by NITI Aayog in 2018 and 2019. Starting with the Jal Jeevan Mission (Har Ghar Jal) which was launched on 15<sup>th</sup> August

2019 with the aim to provide safe and adequate drinking water through tap connections by 2024 to all households in rural India.<sup>24</sup> At present, more than 60 million rural households have been provided with tap water connections under the mission (Figure 1).<sup>25</sup>

Figure 1



The graph shows the progress of the Jal Jeevan Mission till 18<sup>th</sup> of April 2022.<sup>27</sup>

\*(HHs = Households; 10 lakh = 1 million)

Six States and Union Territories -- Goa, Telangana, Andaman & Nicobar Islands, Puducherry, Dadra & Nagar Haveli, and Haryana -- have already achieved a 100 percent target of providing tap water connections to households.<sup>26</sup>

In line with the above mission, the union budget of 2021-22 announced the Jal Jeevan Mission (Urban) designed to provide universal tap water supply coverage to all households in all 4,378 statutory Indian towns, in accordance with Sustainable Development Goal-6 (SDG-6).<sup>28</sup> Two other significant programmes launched by the government are the Jal Shakti Abhiyan and Atal Bhujal Yojana in 2019. The former is a time-bound water conservation campaign to make water conservation a people's movement (Jan Andolan) through asset creation and extensive communication.<sup>29</sup> The main intervention areas of the campaign are water conservation and rainwater

harvesting, renovation of traditional and other water bodies/tanks, reuse and recharge structures, watershed development, and intensive afforestation.<sup>30</sup> The latter—the Atal Bhujal Yojana-- was launched to improve the management of groundwater resources in water- stressed areas of states such as Gujarat, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan and Uttar Pradesh through community participation.<sup>31</sup>

Additionally, the Model Groundwater Sustainable Bill of 2017 focuses on three important aspects of the water sector -- recognition of the unitary nature of water, the need for decentralised control over groundwater, and the necessity to protect it at the aquifer level.<sup>32</sup> Inter-linking of rivers is also an important mission of the government, and its foundation were laid with the implementation of the Ken-Betwa interlinking project in 2021. The project will provide an annual irrigation of 1.062 million ha, drinking water supply to a population of about 6.2 million and generate 103 MW of hydropower and 27 MW solar power.<sup>33</sup>

The Jal Jeevan Mission encourages the role of women in water governance. Water testing is an important characteristic of the mission and at least five women in every village are being trained to test water.<sup>34</sup> Additionally, the 'Nal Se Jal' (Water from Tap) scheme encourages the villagers to decide for themselves as to how much they should pay for the water they are consuming.<sup>35</sup> This highlights the government's approach towards making India's water governance system a community-driven system where women who have suffered for water the most are the leaders. These measures have gained support from the experts who consider these to be a positive development in India's water governance system. For instance, these developments have been described as 'a silent revolution that has been ushered in multiple fronts in the water sector over the last few years' by Anand Mishra and Rajesh Mehta.<sup>36</sup> These measures are also in line with the targets set for achieving SDG-6, which are to ensure access to water and sanitation for all.<sup>37</sup> According to S. K. Sarkar and Girija K. Bharat, there

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are several studies which have highlighted the fact that India has made considerable progress in SDG-6.<sup>38</sup> The annual *Economic Survey* prepared by the NITI Aayog and presented to the Lok Sabha by the Finance Minister on 31<sup>st</sup> January this year shows that India has improved its score to 66 on NITI Aayog's SDG India Index (1-100) in 2020-21.<sup>39</sup> This was up from 60 in 2019-20 and 57 in 2018-19. The number of front

runners (scoring 65-99) increased to 22 States and Union Territories (UTs), out of 36, in 2020-21 from 10 in 2019-20. The SDG scores range between 0 and 100 with a higher score indicating that a State is closer to achieving the targets. “Despite 2020-21 being a pandemic year, India performed well on eight of the 15 SDGs measured by the NITI Aayog SDG India Index. These included – Goal 3 (good health and well-being), and Goal 6 (clean water and sanitation),” the *Survey* observed. The country has also made significant advances in achieving Goal 15 (life on land) by adding on an average of 2,66,000 ha of additional forest area every year since 2010. The increase in total forest cover has been attributed to an increase in very dense forest—all lands with tree canopy density of 70 percent and above—which rose by 19.54 per cent between 2011 and 2021.<sup>40</sup> This has direct relevance for recharging ground water, improving environmental conditions and biodiversity.

With a view to rejuvenate water bodies, Prime Minister Modi launched a new initiative named Amrit Sarovar on 24<sup>th</sup> April this year. It is aimed at developing and rejuvenating 75 water bodies in each of the 773 districts of the country as a part of the celebration of 75 years of India’s independence. The 75 Sarovars (ponds and lakes) will come up in every district by 15 August in 2023 and will be surrounded by trees named after martyrs and freedom fighters.

Water supply and distribution in India is a State (provincial) subject under the federal scheme, which means that the responsibility of water resources development and management rests with the individual States.<sup>41</sup> As per the 2019 NITI Aayog report, the States are displaying progress in water management, but the overall performance remains well-below what is required to adequately tackle India’s water challenges.<sup>43</sup>

Figure 2 shows the relative ranks of different States in terms of water management. Gujarat has been persistently the highest-ranking State in terms of water resource management.<sup>44</sup> It is estimated that Gujarat has provided 100 percent of its rural habitations with piped water and sharply reduced water quality issues.<sup>45</sup> Besides, 100 percent of its urban population also has access to piped water, and 87 percent of households are being charged for water.<sup>46</sup>

It is quite clear that the intent of the Modi government is to move India away from a crisis. Its focus is to encourage community participation, especially of women, to boost the effectiveness of the measures introduced. It does seem that the country is well on

track in terms of implementation of various schemes to augment water resources, manage it efficiently, and provide access to all households, industry and agriculture. A lot has also been said about under treatment or lack of extensive sewage treatment in India. This too seems to be changing. Under the Namami Gange Programme, for example, so far 160 sewerage infrastructure projects have been taken up, out of which 78 projects have been completed.<sup>47</sup> A large number of such projects in urban India are now underway.

Figure 2



Gujarat ranks 1<sup>st</sup> in water resource management for the third consecutive year as per the 2019 NITI Aayog Report.<sup>42</sup>

### Areas that Need Further Attention

*"When the well is dry, we know the worth of water"*

*-Benjamin Franklin*

However, there are some other areas in the water sector that still require immediate and adequate attention, such as that of bringing down the consumption and wastage at the individual house-hold level. Most people still believe that freshwater is unlimited. Traditionally, India used to have, what is called, '5Rs' in its water management system.<sup>48</sup> Those are as follows:

- Respect for water;

- Reduced use of water;
- Reuse of water;
- Recycle of water; and
- Restoration of water.

Unfortunately, what we see today is the absence of these elements. When one acknowledges that water is finite, one just doesn't only become water resilient but also innovative in dealing with crisis. This is exactly what happened with Mridula Ramesh, founder of the Sundaram Climate Institute and author of the critically acclaimed books: *'The Climate Solution: India's Climate Change Crisis and What We Can Do About It'* and *'Watershed: How We Destroyed India's Water and How We Can Save It'*. She recounts the experience of her family in Madurai in 2013 and how they dealt with the water crisis. Her success in dealing with it is very similar to the approach taken by the citizens of Cape Town when they were confronted with the worst water crisis in 2018. These include measuring water usage at home, reducing pressure in taps, reuse of water, taking short showers, fixing leaks, etc. The measures enabled Ramesh and her family to bring down their consumption significantly.

However, when Chennai, a city with a population of 11.5 million people was faced with a similar situation in 2019, neither the people of the city nor the authorities were adequately prepared to deal with the crisis.<sup>49</sup> Why was Cape Town able to handle the crisis better than Chennai? The answer lies in the fact that Chennai lacked an effective communication strategy. 'Effective communication' by the government with the people needs to be given a high priority. In places where this strategy has worked, the authorities were able to keep it simple by telling the people how much water they really have. The city authorities of Cape Town introduced a campaign to encourage water conserving behaviour among its citizens. They introduced a simple public information website called *Think Water* which provided information on the water levels in the dams of the city and about water-saving techniques. Additionally, the city flashed the dam levels on electronic billboards across highways and within the city to let the people know where their city stood in terms of water.

It is said that Cape Town borrowed this idea from Australia, which faced one of the worst droughts in its history from 1997 to 2009.<sup>50</sup> Water levels in Melbourne dropped

to a very low capacity of almost 26 percent, which led the city authorities to use electronic billboards to flash available water levels to all citizens across the city.<sup>51</sup> This, in turn, led the people to take responsibility for themselves and by the end of the drought, there was a sense of urgency and a sense of community.<sup>52</sup>

Keeping these examples in view, India needs to:

- a) Introduce a city-wise, dedicated website like *Think Water* to provide its residents with all the information regarding water. This information should include the sources of water for the city, with a weekly update on the amount of water the city has so that next time the city faces shortage of water the citizens are better prepared. Although India has introduced a platform such as INDIA-WRIS which allows anyone to access information on rainfall, soil moisture and groundwater levels, this portal provides information at the district level.<sup>53</sup> What India needs at present is a more granular information on available water.<sup>54</sup> Additionally, posters and billboards are effective ways of communication that India needs to effectively use in its water distressed cities.
- b) Prioritise education of the masses to adhere to India's traditional '5Rs' water management system. Every citizen of this country needs to become water resilient by restraining their water consumption, reusing water, storing water during monsoon, eating less meat and dairy products that demand large quantities of water, and minimizing food waste.<sup>55</sup>

### Impact of Climate Change on India's Water Resources

The first and foremost thing to bear in mind is that we are living in an era of climate change which is impacting our daily lives by making droughts and other extreme events more frequent and severe. It is argued that global warming and climate change have the potential to put the water security of India at risk.<sup>56</sup> Rising temperatures will have severe implications for the water security of the country. Firstly this would mean increased evaporation from water bodies. Sunita Narain, director-general of Centre for Science and Environment, says that evaporation losses were happening in the past too, but the rate of evaporation is likely to increase with soaring

**Global warming and climate change have the potential to put the water security of India at risk.**

temperatures. It is also argued that the demand for water will increase, be it for drinking and irrigation purposes, or for fighting forest fires or fires in markets and buildings due to extreme heat.<sup>57</sup> Climate change is also impacting the rainfall patterns of India. It is important to note that India receives 118 cm of rainfall on an average in a year, which is quite less.<sup>58</sup> A warming climate makes the rainy days of India fewer and leads to extreme events or heavy downpours such as the Chennai floods in 2015.<sup>59</sup> These incidences are expected to increase in the future.

As per the recent Intergovernmental Panel on Climate Change (IPCC) report published in March 2022, global warming will affect India's coasts, plains, forests, rivers, groundwaters and mountain systems.<sup>60</sup> The report also adds that more than 40 percent of the country's population will face water scarcity by 2050, even as the country's coastal areas such as Mumbai face sea level rise.<sup>61</sup> Additionally, the Ganga and Brahmaputra river basins are expected to witness increased flooding as a result of climate change.<sup>62</sup> Hence, climate change is an important factor that will have a huge impact on India's water resources.

In terms of policies, schemes, and programmes introduced by the government to cover this aspect, a National Water Mission under the National Action Plan on Climate Change (NAPCC) has been established with the aim to "conserve, minimisation of wastage and ensuring its equitable distribution both across and within states through integrated water resources development and management."<sup>63</sup> The National Water Policy 2012 had also acknowledged the importance of the impact of climate change on water resources.<sup>64</sup>

However, climate change remains the most pertinent issue of our time. The key to minimize its effects is to maintain the rise in global temperature within 1.5 degrees Celsius. Although the global community has made progress, it is nowhere close to reaching the desired target. The more the rise in global temperature the greater is the impact on natural resources, especially on water. India is one of the most vulnerable countries when it comes to the impacts of climate change. The present policies and programmes introduced by the government of India cover a wide range of areas, as discussed above, and acknowledge that freshwater is limited. These measures have the capacity to significantly mitigate the intensity of the crisis. However, India's water crisis will not be completely eliminated until and unless the climate change negotiations and collective measures succeed to maintain the global temperatures within the limits set by the Paris Accord. India, therefore, needs to be prepared to face water scarcity

and extreme floods in the future resulting from climate change.

## Conclusion

The world is facing freshwater scarcity to the point where in many parts of the world, there is no water. As many as seventeen countries are assessed to be critically water-stressed, India being one of them. India is the second-most populous country, and the implication of water scarcity will be enormous. The fact that the government has made water governance one of its main priorities in its policies and decisions indicates that there has been an acknowledgement of the fact that freshwater is not unlimited. This is a positive step towards drawing the country out of its water crisis. But the responsibility to conserve and manage water must not lie with the government alone. Given today's circumstances, the citizens who have access to clean flowing water should be equally responsible to save it and bring consumption down. India needs to move forward in this regard. Some of the measures introduced by the government to address the crisis involve engaging the rural community, especially women, which underlines its intention to promote a powerful people-centric water governance system. The cities of India also need similar attention. The citizens of the growing urban centres also should become aware and participate actively in this drive to preserve this limited resource. The water stress is here to stay till the global temperatures are rising.

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