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Developments in legislating dam safety in India: a tale of ifs and buts?

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Given the many dams worldwide, safety is critical as a dam failure can negatively impact human health, property and the environment. India has a substantial stock of dams, ranking third after the US and China. However, about 80 percent of its large dams are over 25 years old, and nearly 227 dams are over 100 years. These 'geriatric' dams continue to function but raise serious safety concerns, with a classic example being the 127-year-old Mullaperiyar Dam. Although India's track record of dam safety is more or less satisfactory, there has been poor maintenance and several failures. Even though 'water' under India's Constitution is a matter that India's States determine, India recently enacted the Dam Safety Act, 2021 at the national level. Many have expressed criticism of this statute for being 'anti-federal'. This article evaluates the law on dam safety in India by highlighting the salience of India's Dam Safety Act. The core argument is that given legislative laxity on the part of States in adopting dam safety measures, and the limitations on a State to legislate beyond its borders, the Union did need to intervene via the Dam Safety Act. By enacting this statute, the Union has not usurped the States' powers. Instead, it has fortified cooperative federalism by creating institutional structures at the central and State levels to ensure that dam safety is not compromised and that people do not have to lose their lives unnecessarily.

Keywords: *dam safety, water security, Mullaperiyar dam, World Bank, federalism, instrumentation, hydrology, centre-state relations, international water law*

1 INTRODUCTION

Over the past several years, there has been overwhelming scientific evidence that global warming will cause substantial glacier retreat and thinning in the Himalayas, contributing to new glacial lakes and the enlargement of existing ones.[1] These glacial lakes are fundamentally unstable and are often insecurely held back by ice or moraines and risk giving way. It has been warned that in the event of a glacial lake outburst, a massive torrent of water could result in floods and dam collapses, endangering the lives of millions.[2] However, India has consistently ignored these warnings and pursued an

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1. Intergovernmental Panel on Climate Change (IPCC), 'IPCC Special Report on the Ocean and Cryosphere in a Changing Climate' (Hans-Otto Pörtner, Debra C Roberts, Valérie Masson-Delmotte, Panmao Zhai, Melinda Tignor, Elvira Poloczanska, Katja Mintenbeck, Andrés Alegría, Maike Nicolai, Andrew Okem, Jan Petzold, Bardhyl Rama, Nora M Weyer (eds), 2019) <www.ipcc.ch/site/assets/uploads/sites/3/2019/12/SROCC_FullReport_FINAL.pdf> accessed 12 October 2022.
2. Ibid, 161.

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intensive policy of damming rivers and setting up hydro-power projects along the high Himalayas in ecologically fragile areas prone to landslides and flooding. These dire predictions almost came true when, on 7 February 2021, a chunk of the Nanda Devi glacier broke off.[3] It led to the release of a massive sheath of water trapped behind the ice causing a high-velocity surge down the *Dhauli Ganga*, *Rishi Ganga* and *Alaknanda* Rivers – all tributaries of the Ganges, unleashing havoc in Uttarakhand State's *Chamoli* district.[4] The sudden flood swept away the *Rishiganga* Hydroelectric Project situated in its path and damaged the under-construction *Tapovan-Vishnugarh* Hydel Project. Nearly 200 people lost their lives, and infrastructure worth millions was laid to waste.[5] This incident again triggered severe concerns over the safety of India's dams and brought the issue of dam safety to the forefront of public consciousness.

Dam breaks are not new in India. Due to overtopping by floodwaters, the *Kaddam* Project dam in Adilabad failed in 1958.[6] A year later, the energy dissipation devices failed for the Kalia dam in Gujarat at first, and subsequently, the dam collapsed due to a weak foundation bed.[7] In 1977, the *Kodaganar* Dam in Tamil Nadu gave way with huge property losses in downstream areas.[8] Two years later, the *Machhu* 2 dam in Gujarat broke, leaving 2,000 people dead and causing severe devastation to the *Morvi* town and nearby villages.[9] In 2005, the Nand Gavan dam in Maharashtra and the *Pratapura* dam in Gujarat failed, causing severe flooding in downstream areas.[10] The breaking of India's barrage over the *Kosi* river in Nepal and the ensuing destruction demonstrated why this river is called 'Bihar's sorrow'.[11] In July 2019, a breach in the *Tiware* dam in Maharashtra State cost 23 people their lives.[12] Even though the dam was only 14 years old, structural cracks were brought to the authorities' notice, who failed to act because of a jurisdictional dispute.[13] As if this was not shocking enough, the then Maharashtra Water Conservation Minister preposterously

3. Special Correspondent, 'Nanda Devi glacier burst updates: Seven bodies recovered so far, Dhauliganga water level rises again' *The Hindu* (7 February 2021, upd. 10 March 2021) <www.thehindu.com/news/national/high-alert-in-up-after-part-of-nandadevi-glacier-breaks-off-in-uttarakhand/article62124756.ece> accessed 10 October 2022.
4. Ibid.
5. Ibid.
6. BS Thandaveswara, *41.2 History of Dam Failures*, online: Hydraulics: Indian Institute of Technology Madras <www.yumpu.com/en/document/read/18818295/331-introduction-nptel-indian-institute-of-technology-madras> accessed 12 October 2022.
7. Ibid.
8. Centre for Inter-disciplinary Studies of Mountain & Hill Environment (CISMHE), *11 Dam Break Analysis and Disaster Management Plan*, online: <http://apspcb.org.in/pdf/lshep/EMP%20Report/Ch11_Disaster%20Management%20Plan2.pdf> at 151 accessed 11 October 2022.
9. Ibid.
10. Ibid.
11. Banjot Kaur, 'Why does Kosi river cause devastating floods so often? Answer lies in massive siltation: study' *Down to Earth* (22 March 2018) <www.downtoearth.org.in/news/water/why-does-kosi-river-cause-devastating-floods-so-often-answer-lies-in-massive-siltation-study-60014#:~:text> accessed on 12 October 2022.
12. PTI, '23 feared dead after breach in Maharashtra dam' *The Hindu* (Mumbai, 3 July 2019) <www.thehindu.com/news/national/other-states/tiware-dam-breaches-in-maharashtras-ratnagiri-district-several-killed-many-missing/article28268976.ece?homepage=true> accessed 12 October 2022.
13. Ibid.

claimed that the structure gave way due to the damage caused by crabs living in and around the dam.[14] More recently, in November 2021, the failure of the *Annamayya* dam in Andhra Pradesh led to 20 deaths.[15] Collectively, these dam failures have led to thousands of deaths and economic losses of mammoth proportions.

India's Central Water Commission reports that there have been 36 dam failures.[16] The maximum failures occurred in the State of Rajasthan (11), followed by Madhya Pradesh (ten). Out of 36 failures, 30 have been in respect of earthen dams.[17] The most common cause of dam failure in India is breaching, accounting for about 44 percent of cases. Over-topping follows next (about 25 percent).[18] Apart from dam breaks, there have also been umpteen instances of improper dam management resulting in the sudden release of floodwaters' aggravating impacts. A case in point was the 2018 flood of 'biblical' proportions that affected the South Indian State of Kerala, which led to the loss of 433 lives, affecting 5.4 million people and displacing another 1.4 million.[19]

Several countries like Australia,[20] Canada,[21] South Africa[22] and the United States[23] have dam safety laws. Each legislative model is unique and contains features

14. PTI, 'Maharashtra minister blames crabs for Tiware dam breach' *The Economic Times* (Mumbai, 5 July 2019) <https://economictimes.indiatimes.com/news/politics-and-nation/maharashtra-minister-blames-crabs-for-tiware-dam-breach-report/articleshow/70086314.cms> accessed on 12 October 2022.
15. Staff Reporter, '8 washed away as Annamayya project breaches' *The Hindu* (19 November 2021) <www.thehindu.com/news/national/andhra-pradesh/8-washed-away-as-annamayya-project-breaches/article37586263.ece> accessed 12 October 2022.
16. Central Water Commission, Dam Failure in India <www.cwc.gov.in/damsafety/dam_fail_india> accessed 29 July 2022.
17. Central Water Commission, Dam Failure Type and Cause <www.cwc.gov.in/damsafety/dam_faulure_type_cause> accessed 29 July 2022.
18. Ibid.
19. 'Kerala: Post Disaster Needs Assessment, Floods and Landslides – August 2018', UNDP (October 2018) 13, <www.undp.org/publications/post-disaster-needs-assessment-kerala> accessed 12 October 2022.
20. Dam safety regulation in federal Australia falls to its States and Territories. For instance, in the State of Victoria, dam safety is regulated *via* the Water Act 1989 and the Water Industry Act 1994. The State of Victoria Department of Environment and Primary Industries, 'Strategic Framework for Dam Safety Regulation 2014' 2. In New South Wales, the Dams Safety Regulation 2019 provides the legal mandate. NSW Government, *NSW Legislation (Dam Safety Regulation 2019)* <https://legislation.nsw.gov.au/view/whole/html/inforce/current/sl-2019-0506> accessed 11 October 2022.
21. In federal Canada, dam safety is essentially a matter determined by its Provinces. Accordingly, there is no federal regulatory agency or over-arching program on dam safety. Some of the provinces have their own legal framework. For instance, the Province of British Columbia enacted the Water Sustainability Act, 2014 and under that law brought out the Dam Safety Regulation, which regulates more than 1,800 dams. See *Water Sustainability Act, Dam Safety Regulation*, B.C. Reg. 40/2016 <www.bclaws.gov.bc.ca/civix/document/id/crbc/crbc /40_2016> accessed 11 February 2023.
22. Unitary South Africa has enacted *Regulations Regarding the Safety of Dams, 2012 in terms of Section 123(1) of the National Water Act, 1998*, GN No R. 139, 24 February 2012, GG 35062. The *National Water Act 36 of 1998*, Ch 12: Safety of Dams, provides the broad legal framework to secure dam safety in the country. <www.gov.za/sites/default/files/gcis_document/201409/35062rg9689 gon139.pdf>.
23. In federal US also, the States have their statutes and regulations on dam safety. Association of State Dam Safety Officials, 'Summary of State Laws and Regulations on Dam Safety' (2020); At the federal level, there is a National Dam Safety Program which is a partnership of

that set them apart vis-à-vis others in their prescriptions, allowing them to create a positive example in certain areas even if they lack in others.[24] As a developing country with one of the largest stocks of aging dams, two factors stand out in India's experience with legislating for dam safety. First, India's Dam Safety Act is comparatively recent, reflecting current thinking. Second, unlike most federations where dam safety-related legislation emanates at the Provincial/State level, India's Dam Safety statute flows from its Union, providing a uniform template applicable to the entire country. Therefore, India's experience in legislating dam safety may be relevant and instructive to other countries seeking to create or update their normative frameworks on dam safety.

This article provides an overview of the law on dam safety in India and analyses its federal implications. To this end, the article is organized as follows. Section 2 explains the concept of dam safety and highlights factors that propel the need for a dam safety culture. Section 3 provides an overview of the controversy surrounding the safety aspects of the 127-year-old Mullaperiyar dam. In several respects, the Mullaperiyar is symbolic of the struggles and challenges in securing dam safety in a complex federal country like India, especially when a dam involves two or more States' interests. Section 4 explains the legal framework for dam safety. It begins by setting out the constitutional and federal dimensions of water and dam safety, and thereafter, it offers an overview of the salience of India's Dam Safety Act, 2021. The study concludes in Section 5 by discussing the salient points emerging from the previous parts to underscore the message that dam safety is a non-negotiable value based on adaptive management and uniform regulatory principles, standards and practices. An argument will be made to underscore that the Dam Safety Act, 2021 despite certain drawbacks, is imperative for India and is long overdue.

2 THE CONCEPT OF DAM SAFETY AND THE NEED FOR A DAM SAFETY CULTURE

2.1 The need for dam safety

A dam is an artificial barrier with ancillary structures built across rivers or tributaries to impound, store, retain and redirect the water.[25] At its core, it is a rainwater harvesting structure that captures and stores surface runoff for productive applications. Rather than allow rivers to wander at the whim of nature, dams help keep the rivers in their channels to manage them. In times of scarcity, this stored water is released *via* canals, which helps convey the water across long distances, ensuring reasonable and dependable supplies, and thereby preventing desertification. By damming water, dams help rectify spatial and temporal variations in water availability and related inequities to a large extent. It also performs multi-purpose functions (cleaner and cheaper power,

States, federal agencies and other stakeholders to secure dam safety. One of the primary pathways envisaged to operationalise this program is to provide financial assistance to the State to strengthen their dam safety programs. FEMA, *National Dam Safety Program* <www.fema.gov/emergency-managers/risk-management/dam-safety> accessed 11 February 2023.

24. Daniel D Bradlow, Alessandro Palmieri and Salman MA Salman, 'Regulatory Frameworks for Dam Safety: A Comparative Study', *The World Bank* (31 October 2002) <https://openknowledge.worldbank.org/bitstream/handle/10986/13826/multi0page.pdf?sequence=1&isAllowed=y> accessed 12 October 2022.

25. World Commission on Dams, 'Dams and Development: A New Framework for Decision-Making' (Earthscan Publications Ltd, 2000) 11.

drinking water and industrial supply, recreational use, flood control and habitat enhancement) and is crucial in facilitating integrated water resources development and management.[26] A dam is thus a harbinger of economic progress and social welfare and is a vital pathway to secure sustainable growth.[27]

Even though dams are inaugurated with fanfare and gaiety, none knows what might happen to them in their later years, with much depending on their levels of upkeep and maintenance. A dam break is a failure in the structure or the operation of a dam that leads to an uncontrolled release of impounded water resulting in the flooding of downstream areas and destroying life and property.[28] The International Commission on Large Dams (ICOLD) defines dam failure as the 'collapse or movement of part of a dam or its foundation so that the dam cannot retain water'.[29] Typically, such failure may be caused by age, construction deficiencies, inadequate maintenance, extreme weather or seismic events, and faulty operation. An unhealthy dam can pose significant threats to human life, crops, houses, buildings, roads, the environment and the economy. Therefore, dam safety is a matter of utmost and universal importance.[30]

In essence, dam safety management is a broad and holistic term that emphasizes the safe operation of dams and their appurtenant structures from the cradle to their grave, managing the risks associated with public safety, infrastructure and the environment. The principles of dam safety apply at all stages of a dam's life cycle (design, construction, operation, maintenance, alteration and decommissioning). It begins with investigations, then moves on to the design stage, the construction stage (for example, the quality of the construction materials used), the operational phase (requirements for dam safety) and, finally, decommissioning.[31] Throughout these stages, the objective is to decrease the dams' potential to negatively impact human life, health, property and the environment. Dam safety is a notion that extends beyond immediate measures to prevent a dam failure, and it encompasses a broad range of procedures to ensure that dams operate safely. This includes limiting the release of damaging discharges downstream of the dam, reducing the likelihood of events that could result in a loss of control over the stored volume, the spillway and other releases, and mitigating the consequences of such circumstances if they occur through on-site accident management and emergency planning. Dam safety objectives include achieving safe reservoir management and ensuring that the downstream communities are fully informed.

2.2 Dams in India

Dams are a critical component of India's economic infrastructure, an essential cog in its endeavour to secure sustainable development. This is because India's 12 major and 46 medium rivers hold nearly 92 percent of its water, and these river systems carry

26. Tony George Puthucherril and Mary Sabina Peters, 'Dam-Related Displacement and Sustainable Development Goal 6' in Walter Leal Filho, Anabela Marisa Azul, Luciana Brandli, Amanda Lange Salvia and Tony Wall (eds), *Clean Water and Sanitation* (Springer Cham, 2020).
27. Ibid.
28. Dam Safety Act, 2021 s 4(f).
29. World Commission on Dams (n 25) 63.
30. Duminda Perera, Vladimir Smakhtin, Spencer Williams, Taylor North and Allen Curry, 'Ageing Water Storage Infrastructure: An Emerging Global Risk' (United Nations University – Institute for Water, Environment and Health, 2021) 6.
31. Bradlow et al (n 24) 80.

almost 80 percent of the flow during four to five monsoon months of the year.[32] Consequently, dam storage is essential. Since the 1950s, agriculture has been the single largest sector in the national economy and the primary determinant of rural incomes, especially for the poor. Successive development plans have emphasized developing agriculture and raising foodgrain production. Irrigation, in particular, has been central to this strategy, and India has invested considerable resources to impound its rivers to support agriculture. Dams were to play such a critical role in India's march towards economic development and self-reliance in food grains production that Jawahar Lal Nehru, India's first prime minister (in office from 1950–64), termed them the 'temples of modern India'.[33] Presently, India houses more than 18 percent of the world's population, nearly one-sixth of the human race. However, this country has only four percent of the world's renewable water resources distributed unevenly over time and space.[34] In addition, frequent floods and droughts in one or the other part of the country present a formidable challenge in trying to meet the water demands. Urbanization and environmental degradation, including water pollution, compound this issue. In such a scenario, dams have emerged as the most effective mechanism for managing and controlling freshwater resources to cater to the colossal water requirements.

Accordingly, India has emerged as an aggressive dam builder; presently, this country has a large stock of dams. It ranks third after the United States and China regarding the many large dams constructed.[35] There are nearly 5,334 large dams in operation in India, and almost 411 large dams are under construction.[36] In addition to this, there are thousands of medium and small dams. However, out of the 5,344 large dams in operation, around 293 are more than 100 years old, and 1,041 are 50 to 100 years old.[37] Apart from aging, another worrying factor is the quality of the construction which has always been suspect. For a long time, an 'unholy nexus' of bureaucrats, politicians and contractors has been India's bane, often sabotaging ambitious infrastructural projects. Such unscrupulous elements have even pocketed public money for infrastructure, often never built. Way back in 1991, in a scathing attack, the World Bank, in the context of poorly constructed dams in India, remarked that '[w]hile there are some examples of good quality construction … [shoddy] work is more common. Construction quality has deteriorated sharply and … is … deficient for [several] dams, posing a serious potential risk to downstream populations unless rectified'.[38] Ineffective maintenance, damaged structures, inadequate instrumentation and monitoring, deficient reservoir operation practices and insufficient regulatory and operational safety measures have compromised dams' ability to provide their critical functions optimally. Therefore, it is essential that the enormous investments made in developing dam infrastructure to ensure water security be protected. These dams also require a high level of monitoring and remedial activity to ensure their continued safety.

32. Ministry of Water Resources, 'National Water Policy' (2012).
33. 'Temples of Modern India' *Financial Express* (16 August 2003).
34. Ministry of Water Resources (n 32).
35. Central Water Commission, 'Dam Safety Organization' <www.cwc.gov.in/damsafety/home> accessed 11 October 2022.
36. Dam Safety Monitoring Directorate, 'National Register of Large Dams' (Government of India, 2019) 33–5.
37. Ministry of Jal Shankti, 'Construction of Dams' (Press Information Bureau, 12 February 2021).
38. Report No 9518-IN India Irrigation Sector Review - Volume l: Main Report (20 December 1991) 40–41.

In India, the State governments[39] and their water and irrigation ministries own most dams and are primarily responsible for their upkeep. Many of these dams have structural deficiencies and shortcomings in operation and monitoring, while a few do not meet modern structural and hydrological design standards. The overall approach in the States to secure dam safety has, to say the least, been dismal. In 2017, the Comptroller and Auditor of General of India found that out of the 17 States it audited, only two states, Tamil Nadu and West Bengal, conducted pre- and post-monsoon safety audits of their dams.[40] Given the overall high density of population per square kilometre and the increasing human population and settlements close to dams, a failure can be particularly disastrous.

Numerous dams have been built on interstate rivers to cater to the water needs of multiple States. Ninety-two percent of India's large dams have been built on these inter-state rivers. India also has dams in neighbouring Nepal and Bhutan.[41] Even though there are procedures for notification of co-basin states and countries in the event of accidents or emergencies, a dam's hazard potential may not be confinable to the State or the country where it is located. There is the possibility that the negative repercussions will spill over to other States and even other countries. A failure to pay adequate attention to dam safety may lead a country to violate its international obligations not to cause transboundary harm.[42]

As explained earlier, the attendant impacts of climate change also highlight the importance of dam safety. Water is the primary medium through which climate change impacts will be perceived. With precipitation patterns becoming increasingly unpredictable, there must be proper water planning and efforts to conserve every drop, enhancing the need for structurally safe dams and implementing safety protocols and sound management practices. Under its nationally determined contributions, India has pledged to lower the emissions intensity of its GDP by 45 percent compared to 2005 levels by 2030.[43] In securing this goal, India also looks to hydropower, particularly to small hydel projects, as a clean, renewable and environmentally friendly energy source that can significantly reduce greenhouse gas (GHG) emissions and mitigate global warming.[44] Moreover, with river interlinking

39. Presently, India is organised into 28 States, namely, Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Chhattisgarh, Goa, Gujarat, Haryana, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Mizoram, Nagaland, Odisha, Punjab, Rajasthan, Sikkim, Tamil Nadu, Telangana, Tripura, Uttarakhand, Uttar Pradesh, and West Bengal. There are also eight Union Territories.

40. Union Government Ministry of Water Resources, River Development and Ganga Rejuvenation, 'Report of the Comptroller and Auditor General of India on Schemes for Flood Control and Flood Forecasting' (2017) vii–viii.

41. 'Water Beyond Borders' <http://waterbeyondborders.net/> accessed 29 July 2022.

42. *Trail Smelter arbitration* (United States, Canada) (1938 and 1941) 3 RIAA 1905; *Declaration of the United Nations Conference on the Human Environment* (Stockholm Declaration, 1972) Principle 21; *Rio Declaration* of the United Nations Conference on Environment and Development (1992) Principle 19.

43. Government of India, India's Updated First Nationally Determined Contribution Under Paris Agreement (2021-2030) Submission to UNFCCC, <https://unfccc.int/sites/default/files/NDC/2022-08/India%20Updated%20First %20Nationally%20Determined%20Contrib.pdf> accessed 19 January 2023.

44. Government of India, Prime Minister's Council on Climate Change, National Action Plan on Climate Change, 40, 42 <www.nicra-icar.in/nicrarevised/images/Mission%20Documents/National-Action-Plan-on-Climate-Change.pdf> accessed 19 January 2023.

emerging as a genuine prospect that necessarily involves more damming of rivers, dam safety is a national imperative.[45]

2.3 Discussion

Dams serve multiple purposes and all possible measures must be adopted to ensure they are safe, since their soundness has significant implications for human life, the environment, infrastructure and overall well-being. This requires the development of a sustainable dam safety culture that addresses technical and non-technical issues. Technical aspects include the impact of tensile stresses, structural adequacy of the dam and its appurtenant structures, dam auscultation and the like. Those with the technical expertise decide these issues best. The 'non-technical' issues include matters like how dam safety's environmental and social impacts are to be addressed.[46] While all of these depend primarily on the decision-maker's judgement, it is necessary to have in place a regulatory framework to ensure accountability, transparency and stakeholder participation. The framework must provide an appropriate environment for developing a dam safety culture where decision-makers can decide both the technical and non-technical aspects of dam safety based on the broad parameters that it contains.

3 THE 'GERIATRIC' MULLAPERIYAR DAM AT 127 YEARS: A PERENNIAL CONFLICT BETWEEN IRRIGATION AND SAFETY

3.1 The Mullaperiyar Dam

On 10 October 2022 the Mullaperiyar dam, the lifeline of the people living in the central districts of Tamil Nadu, completed 127 years. This region's greenery, human habitations and prosperity are directly attributable to the Mullaperiyar waters. While the people in these areas celebrated the anniversary with joy and remembered with gratitude the enigmatic Colonel John Pennycuick CSI, the dam's primary architect; across the border on the other side of the Western Ghats, in Kerala, there was a pall of gloom. If the Mullaperiyar gave way, Kerala's three districts would be washed away.

The Vaigai River, which rises in the Western Ghats and flows eastwards through the central districts of Tamil Nadu, is this region's primary surface water source. Even in years of good rainfall, the Vaigai did not have much water.[47] Consequently, in the seventeenth and eighteenth centuries, the region was frequented by famines, and people began to migrate.[48] At the same time, in sharp contrast, greenery and water were abundant on the Travancore side of the Western Ghats, which caught the British officers' attention. They came up with the idea that if the waters of the west-flowing Periyar river could be dammed and channelled eastwards into the Vaigai, a large extent of the land could be cultivated.

45. *In Re: Networking of Rivers* (2012) Supreme Court of India, <https://indiankanoon.org/doc/41857247/> accessed 19 January 2023.
46. International Atomic Energy Agency, 'Non-technical factors impacting on the decision-making processes in environmental remediation: Influences on the decision-making process such as cost, planned land use and public perception' (2002).
47. Empowered Committee (Mullaiperiyar Dam), 'Report of the Empowered Committee' (New Delhi, 2012) 6.
48. Ibid.

Nearly 3,000 workers toiled incessantly for eight years braving the cold weather, constant rain, frequent wash-out, wild animals and diseases to build an engineering marvel, one of the earliest successful inter-basin water transfers.[49] The Mullaperiyar is a masonry dam in a remote region encircled by the Cardamom Hills in the Western Ghats' verdant forests in the Thekkady area of Kerala State. A gravity dam, the Mullaperiyar includes the main dam, a baby dam and ancillary structures. The main dam's length is 1200 feet (ft) (365.76 metres (m)), and the dam stands tall at 155 ft (47.24 m). The dam's Full Reservoir Level (FRL.) is 152 ft (46.33 m). The length of the baby dam is 240 ft (73.15 m). The original spillway capacity of the dam was ten vents of 36' × 16' (10.97 m × 4.88 m).[50] The dam essentially diverts the waters of the west-flowing Periyar river to the east across the ridge, where through a tunnel, it merges with the eastward flowing Suruliar river. After that, further downstream, it flows into the Vaigai river, augmenting its flow, extending irrigation to the Vaigai basin and providing water to cities and towns in central Tamil Nadu to ultimately join the Bay of Bengal.[51]

Even though the dam is situated in Kerala State, it is owned and operated by Tamil Nadu. A series of historical factors contributed to this unique legal arrangement. The Mullaperiyar dam stands over the Periyar river under the 'Periyar Lake Lease Agreement' (PLLA) of 29 October 1886 entered into between the Maharaja of Travancore and the Secretary of State for India in Council by which 8,100 acres were granted on lease to Madras for 999 years effective from 1 January 1886.[52] Further, the lease indenture also gave Madras the full right, power, and liberty to construct the irrigation works of the project. The project was completed in 1895 and filled to its total capacity of 152 feet.

With independence in 1947 and the States Reorganisation Act in 1956, the State of Travancore-Cochin (Part-B, State) was formed. Kerala is the successor in Travancore-Cochin's interest, while Tamil Nadu is the successor-in-interest of the Governor in Council, Secretary of State for India. In May 1970, Kerala and Tamil Nadu entered into two supplemental agreements.[53] These agreements did not alter the fundamental character of the 1886 Lease Agreement. Under the terms of the first supplemental Agreement, Tamil Nadu surrendered the reservoir's fishing rights to Kerala and agreed to an upward revision of the leased land's rent. The second supplemental Agreement conferred on Tamil Nadu the right to use the Mullaperiyar waters for power generation and construct the necessary facilities. Kerala also leased to Tamil Nadu another 43 acres, and Tamil Nadu was to pay Kerala an annual sum as specified in the Agreement.[54]

49. Deepa Kandaswamy, 'John Pennycuick: The man who built the Mullaiperiyar dam' *Live Mint* (28 August 2016).
50. *Mullaperiyar Environmental Protection Forum v Union of India and Others* (2006) 3 SCC 643, [4].
51. V Venkatraman, Er P Selvan and S Chandran, 'Land Use and Land Cover Change Detection of Periyar Main Canal Command through Remote Sensing Using Multi-Temporal Satellite Data' (2014) 3 *International Journal of Engineering Research and Technology* 404.
52. Tony George Puthucherril, 'The Mullaperiyar Inter-Basin Water Transfer, Water Conflicts, and Dam Safety' in P Ishwara Bhat (ed), *Law Governing Inter-State and International Water Disputes* (Eastern Book Company, 2012); SG Sreejith, 'Dam Jurisprudence of the Supreme Court of India: Situating the Case of Mullaperiyar Dam Dispute' (2022) 45 *Hastings International and Comparative Law Review* 129.
53. Puthucherril, 'The Mullaperiyar Inter-Basin Water Transfer, Water Conflicts, and Dam Safety' (ibid).
54. *State of Tamil Nadu v State of Kerala and another* (2014) 12 SCC 696, [17].

The safety of the Mullaperiyar dam became a predominant concern in 1979 when a leak was detected in the dam's gallery. The Government of Kerala requested Tamil Nadu to strengthen the dam and, in the interregnum, to bring down its water level to 136 feet. Simultaneously, Kerala asked the Central Government to depute a Central Water Commission (CWC) team to examine the dam and recommend strengthening measures. Accordingly, the CWC inspected the dam and suggested measures at three levels, namely, (i) emergency, (ii) medium and (iii) long-term, to reinforce the dam. Only upon the completion of the emergency and medium-term strengthening measures could the reservoir's water level be raised to 145 ft (44.2 m), and until then, the water level was to be at 136 ft (41.45 m). It was suggested that the water could be raised to the full reservoir level of 152 ft only after implementing the long-term measures.[55]

Upon the conclusion of the more immediate suggested measures, Tamil Nadu sought to raise the water level to 142 ft. However, consensus eluded between the two State Governments. Kerala began to argue that the dam's lifespan was only 50 years. Having lasted more than 100 years, it had served its useful life. Therefore, raising the water level above 136 feet could have potentially devastating implications. The dam was built when design and building methods were in their infancy. There was no facility to test the construction materials accurately. Stress was noticed after filling the dam, which remained despite corrective attempts. There were also frequent vibrations, and an earthquake's consequences could be catastrophic. Kerala claimed that the CWC report was prepared without considering Kerala's viewpoints. On the other hand, Tamil Nadu accepted the CWC report and argued that Kerala's fears were imaginary. The CWC inspected the dam in detail and determined Kerala's complaints to be unfounded; hence, there was no cause to worry.

Kerala continued to resist raising water levels in the reservoir beyond 136 ft. This led to several writ petitions in the Kerala and Madras High Courts, which were transferred to the Supreme Court. The primary issue in *Mullaperiyar Environmental Protection Forum v Union of India*[56] related to the dam's safety if the water level was raised to 142 ft. At the beginning of the hearing, the Supreme Court directed the Union Minister of Water Resources to convene a meeting of the Chief Ministers of both States to resolve the issue amicably. Even though no consensus could be reached, the Union Ministers constituted an Expert Committee to consider whether Tamil Nadu complied with the CWC recommendations and to advise regarding raising the water level above 136 ft. The Expert Committee concluded that the water level in the Mullaperiyar could be raised to 142 ft, and there was no endangerment to the dam. The Committee also recommended that when more measures like installing instrumentation were completed, the water level could be raised to the Full Reservoir Level of 152 ft.[57]

3.2 The dam and litigation

Before the Supreme Court, the legal question related to the reservoir's environmental and safety impacts. Kerala objected to the raising as it would submerge a large area, claiming it an infraction of the Wild Life (Protection) Act, 1972 and the Forest (Conservation) Act, 1980. Specifically, section 26A of the Wildlife (Protection) Act states that the borders of a sanctuary can be changed only with the National Wildlife

55. *Mullaperiyar Environmental Protection Forum* (n 50), [122].
56. Ibid, [8].
57. Ibid, [32].

Board's approval. The Court dismissed this claim since raising the water level would not change the sanctuary's limits.[58] Kerala also argued that strengthening an existing dam in the forest is not a non-forestry activity that requires the Union's prior consent under Section 2 of the Forest (Conservation) Act, 1980. The Court rejected this prong of the argument too. Up to 1979, the water level was 152 ft and the reduction happened only after that.[59] Consequently, increasing the water level would have minimal effect on the flora and the animals; instead, it would improve the environment. The Court stated that 'the fauna, particularly elephant herds and tigers, will be happier when the water level [progressively] rises to touch the forest line. In nature, all birds and animals love water and show [their delight] when heavy rains [fill] the reservoir, resulting in a lot of greenery and [a healthy environment]'.[60] Accordingly, the Court concluded that Kerala's fears of a negative influence on the environment and ecosystem were unwarranted.

Various reports regarding the dam's safety were examined. They helped the Supreme Court to determine Kerala's charges as unfounded and 'obstructionist'.[61] Tamil Nadu had completed the numerous CWC-recommended strengthening measures and had given the dam reinforced concrete construction support. Except for a 20 mt. length on the main dam that could not be completed due to the denial of permission by Kerala; all other measures were completed.[62] In the worst-case scenario, the Idukki dam, with 70.500 TMC lying directly adjacent to the Mullaperiyar dam, could accommodate the Mullaperiyar waters. Even when there was ample rain, the Idukki reservoir would be filled only up to 57.365 TMC; the Idukki dam had room to hold an additional 11 TMC of water.[63] As a result, the Court concluded that raising the water level to 142 ft. would not compromise Mullaperiyar's safety. Consequently, the Court permitted the water level in the Mullaperiyar dam to be raised to 142 ft. Regarding increasing the water level to 152 ft., once the strengthening works were completed to the CWC's satisfaction, independent experts were to examine the safety aspects before deciding.

The judgment in the *Mullaperiyar Environmental Protection Forum* was pronounced on 27 February 2006. Within three weeks, that is, on 15 March 2006, the Kerala State legislature met in a special session to hastily amend the Kerala Irrigation and Water Conservation Act, 2003 (KIA). The KIA, 2003, as amended, provides for a Dam Safety Authority to ensure the safety and security of all dams within Kerala. The amendment fundamentally re-cast section 62, which now began with a non-obstante clause empowering the Dam Safety Authority to exercise its functions notwithstanding anything contained in any judgment, decree or order of any Court. Some of the more pertinent functions of the Dam Safety Authority relating to the controversy at hand include (1) evaluating the safety and security of all dams in the State, considering factors like the structure's age, and (2) directing the custodian to suspend or restrict the functioning of any dam or to decommission it if there was a threat to public safety, human life or property.[64]

Furthermore, the amendment added two new clauses. These essentially prohibit governments, custodians or other agencies from increasing, augmenting, adding to or

58. Ibid, [29].
59. Ibid, [28].
60. *Mullaperiyar Environmental Protection Forum* (n 50), [29].
61. Ibid, [30].
62. Ibid.
63. Ibid.
64. *State of Tamil Nadu* (n 54), [14].

expanding the FRL as fixed and set out in the Second Schedule to the Act or its storage capacity unless there was the Dam Safety Authority's prior consent.[65] In the Second Schedule, at item No. 1, the FRL for the Mullaperiyar Dam owned and maintained by Tamil Nadu was fixed at 136 ft.

Tamil Nadu immediately moved to the Supreme Court, challenging the amendment as an attempt to nullify the Supreme Court's *Mullaperiyar* judgment. In *State of Tamil Nadu v the State of Kerala*,[66] the primary question related to the vires of the 2006 Amendment. At the outset, the Court appointed an Empowered Committee (EC) under the Chairmanship of Dr AS Anand, a former Chief Justice of India, to examine all aspects of the Mullaperiyar dam. Former judges of the Supreme Court, Justice KT Thomas (Kerala's nominee) and Justice Dr AR Lakshmanan (Tamil Nadu's nominee), and Dr CD Thatte and Dr DK Mehta (technical experts) were the other members. The EC submitted its report in April 2012.[67] Even though the Supreme Court judgment details several legal and constitutional issues, the focus in the succeeding paragraphs will primarily be on safety.

Before the Supreme Court, the core question related to the *vires* of the Kerala law, that is, whether it violated the separation of powers doctrine.[68] Kerala's core argument was that the legislation was enacted as a precautionary measure to protect its citizenry. However, the Supreme Court disagreed. It held that the law's real purpose was only to nullify its prior judgment. When a constitutional court adjudicates a dispute between two States, and if anyone of them unilaterally enacts a law to overturn the judgment, it infringes the separation of powers and the rule of law. By enacting the Kerala Irrigation and Water Conservation (Amendment) Act, 2006, Kerala usurped the judicial power; therefore, the law was held to be unconstitutional in its application to the Mullaperiyar dam.

Dam safety is dynamic and can change from time to time in varied circumstances. Therefore, it is always open to the parties to approach the Court and apply for reassessing a categorical finding on safety rendered by the Court in an earlier judgment. However, absent any change in circumstances, the factual determination in an earlier proceeding will continue to bind the parties and operate as *res judicata* to a subsequent suit. Accordingly, the next question before the Supreme Court was whether any change in circumstances necessitated overruling its earlier finding that the Mullaperiyar was safe.[69]

In arguing that circumstances had changed, Kerala submitted that the danger to the Mullaperiyar emanated from three factors. These were the impacts from (1) probable maximum flood (PMF); (2) the maximum considered earthquake (MCE); and (3) structural degeneration. In the 2006 case, Kerala argued that the Supreme Court wrongly endorsed 2.12 lakh cusecs as the PMF estimated by the CWC in 1986. Even in 1943, the observed flood at Mullaperiyar dam was 2.98 lakh cusecs. Regarding the impact of MCE, Kerala relied on the study conducted by two experts, who concluded that the main dam and the baby dam were likely to fail under static plus earthquake conditions. As far as structural degeneration was concerned, Kerala submitted that the inner core of the dam, which constitutes about 62 percent of its total volume, consists of lime *surkhi* concrete. During 1930 and 1960, the dam suffered heavy lime loss, forcing Tamil Nadu to grout 542 MT of cement. Kerala also highlighted that the density of the materials

65. Ibid.
66. Ibid, [18].
67. Ibid [36].
68. *State of Tamil Nadu* (n 54), [35], [121].
69. Ibid, [35].

used in the dam gradually went down from 150 lbs/cft in 1895 to 135 lbs/cft in 1986, reflecting structural degradation.[70]

Given these submissions' technical nature, the Supreme Court relied upon the EC report, which, after rummaging through various studies, investigations and site visits, concluded that the Mullaperiyar dam was hydrologically, structurally and seismically safe. As far as the issue of the PMF was concerned, the EC held that Kerala's 1943 determination was unreliable. The EC also examined Kerala's concerns regarding seepage and loss of free lime. It concluded that in 116 years of the dam's existence, the total lime leaching was about 3.66 percent, much less than the permissible upper limit of 15–20 percent. Therefore, there was no cause for concern regarding Mullaperiyar's strength. Finally, the dam was also seismically safe for FRL 152 ft. Additionally, the reserve strength of cable anchors made the dam safer. It also ruled out the existence of a geological fault in the Baby Dam's foundation.

In a final attempt, Kerala sought to assail the EC report on the ground that in coming to its conclusions, the EC did not follow natural justice principles. However, these arguments also failed to cut ice with the Supreme Court.[71] In sum, the Court concluded that there was no change in the circumstances, much less any drastic change or emergency warranting the reopening of the safety aspect of Mullaperiyar dam as determined by the 2006 judgment, which operated as *res judicata*.[72]

Nevertheless, to assuage Kerala's (unfounded) fears, the Supreme Court directed the appointment of a three-Member Supervisory Committee. It was to have representatives from the Central Water Commission (Chairman), Tamil Nadu and Kerala to look into Mullaperiyar's safety when its water level was restored to 142 ft. The Committee was to inspect the dam periodically before and during the monsoons and recommend measures. In an emergency, the Committee could take appropriate measures and issue necessary directions to both States, which they were to obey.[73]

Until 2018, the primary concern before the Supreme Court was the dam's structural safety and integrity. In a public interest litigation before the Supreme Court, the focus shifted to disaster management and related preparedness. At the heart of the dispute in *Russel Joy v Union of India*,[74] was the fear that had gripped the minds of the residents living in and around and in the downstream areas of the dam regarding the possibility of its failure. Stressing that while the State must dispel any fears that citizens may harbour over the Mullaperiyar's safety, the Supreme Court adopting a precautionary approach, directed the Central Government to constitute a sub-committee under the Disaster Management Act 2005 to ensure preparedness in the event the Mullaperiyar were to fail. Kerala and Tamil Nadu were also directed to constitute separate sub-committees to work in tandem with the Central Committee. Both States were also to create 'separate dispensations' under their State Disaster Management Plans.

Soon floods of 'biblical' proportions hit Kerala, and the entire State was practically under water. Despite the grim situation, there was a complete lack of coordination between Kerala and Tamil Nadu over the Mullaperiyar. Kerala even alleged that one reason for the deluge was the sudden release of waters by Tamil Nadu from the Mullaperiyar. Given this lack of coordination, the Supreme Court again had to

70. Ibid, [183].
71. Ibid, [196], [197].
72. *State of Tamil Nadu* (n 54), [170].
73. Ibid, [223].
74. *Russel Joy vs Union of India (UOI) and Ors.* MANU/SC/0050/2018.

focus on disaster management.[75] This time, the Supreme Court issued several directions, including one which called upon Kerala and Tamil Nadu to coordinate with the National Crisis Management Committee to provide immediate relief to the affected.

3.3 Discussion

Due to the rehabilitation and strengthening measures, the waters in the Mullaperiyar dam now often touch 142 ft. Because of this, Tamil Nadu has brought more land under the plough, generated more power and has supplies to cater to even more drinking water needs. As Tamil Nadu seeks to implement further strengthening measures for full operational levels, the incessant rains and floods lashing Kerala have the people living downstream of the dam in perpetual fear. Thus, the fundamental dispute between the two States over the Mullaperiyar relates to safety, a purely technical matter where the judiciary and legal doctrines have a minimal role. Unfortunately, as there is no spirit of giving and taking between the States, the Court is repeatedly pulled into the vortex of this dispute. There, it finds itself clueless to crafting an enduring and sustainable solution to a conflict that is, in essence, more technical than legal.

What renders the Mullaperiyar such a curious and intractable case is that for a long time the State of Kerala had nothing to do with this dam's management. This is when, in the event of a disaster, it will only be the people of Kerala who will be directly in the line of the fire, suffering the maximum damage. Also, it will be Kerala's Government that will be at the forefront in doing everything possible to mitigate its harmful consequences. A fundamental re-cast in this position occurred when the Supreme Court directed setting up the Supervisory Committee and related Sub-Committees, thereby ensuring Kerala's participation in decision-making regarding safety and disaster preparedness. These arrangements in no way affect Tamil Nadu's rights over the waters. They continue to own, operate and maintain the dam and derive the maximum beneficence that every drop the Mullaperiyar can offer. However, as the remit of the Supervisory Committee was limited, it was clear that this body would not be able to secure the unflinching cooperation of the two States.[76] As subsequent events testify, many of its meetings were just another venue for both States to lock horns.

Fortunately, with the enactment of the Dam Safety Act, 2021 we may now have a lasting solution to this impasse. Under this Act, in the case of certain dams like the Mullaperiyar, the National Dam Safety Authority (NDSA) is tasked with the role of the State Dam Safety Organisation (SDSO).[77] Given that the NDSA is a non-political specialist body headed by a high-ranking Central Government official, such an arrangement will ensure expeditious decision-making even though both Kerala and Tamil Nadu will have no representation. This will be a vast improvement over the Supervisory Committee, where bickering by both States led to crucial decisions being delayed.[78] Since the NDSA has a larger and more significant pool of dam safety knowledge and superior resources, there will be more effective oversight of the Mullaperiyar. The NDSA can secure the better implementation of mitigation

75. Ibid.
76. See *Dr Joe Jospeh v State of Tamil Nadu* (2022) 6 SCC 384 (reconstituting and empowering the Supervisory Committee on the lines of the NDSA to deal with the Mullaperiyar, until the NDSA became fully functional).
77. Dam Safety Act 2021, s 24.
78. Manoj Viswanathan, 'Mullaperiyar issue: Experts feel Kerala's U-turn on tree cutting against state's interest' *The New Indian Express* (8 November 2021, upd. 8 November 2021)

measures, ensure greater transparency in data gathering, and offer better coordination between both States in an emergency. All of this may also contribute to greater confidence-building between the States.

While it is practically impossible to ensure the total insulation of all dams from possible disasters, much less the 127-year-old Mullaperiyar, the silver lining in the black clouds over the Cardamom Hills is that this controversy has served to expose the underbelly of India's approach to dam safety regulation, and has helped place the spotlight on the need for a dam safety culture in India. Going by the past, we can reasonably predict that the legal wrangles over the Mullaperiyar are far from over. However, with the Dam Safety Act now in India's statute book, there is renewed hope that the safety of the Mullaperiyar and other 'geriatric' dams will receive the consideration they deserve.

4 WATER, INDIA'S CONSTITUTION AND LEGISLATING DAM SAFETY

4.1 India's constitutional arrangements and dam safety

Since each country has its own constitutional, legal and governance frameworks and traditions, a dam safety statute must be consistent with these core elements, like any other legal framework. In this context, the nature of India's polity and its impact on the Dam Safety regulatory framework needs an examination. Even though India is often referred to as a federal State, the fact is that the Union wields more power than its constituting States. Therefore, India's federal scheme is asymmetrical and more quasi-federal. This facet is mirrored even in the legislative entries on water. Entry 17 of List II secures the State's legislative power over water.[79] However, it is subject to Entry 56 of List I. This Entry deals with the Union's legislative power relating to the regulation and development of inter-State rivers and river valleys, provided that the Parliament may declare such regulation and development necessary in the public interest by law.[80] Despite this quasi-federal tone of the constitutional scheme favouring the Union, the States are not stooges of the Federal Government; they have substantial powers over water management and are supreme within their respective domains. The Centre cannot ride roughshod over the States' rights over water.[81]

Thus, under the constitutional dispensation of legislative powers in India, the States are primarily responsible for developing water resources. Resultantly, the States, that is, the State governments themselves, State-owned entities, such as State Electricity Boards and State Power Corporations, and State Irrigation Departments own the vast majority of dams. The Central Government is also a significant dam builder, particularly over inter-state rivers. For example, the National Hydro-Power Corporation is India's largest hydropower development organization. The Federal Government has also entered into joint ventures with State governments to construct large multi-purpose dams. The Tehri Hydro-Development Corporation, a joint venture between the Central Government and Uttar Pradesh State, is a prime example. It is also worth noting that the 73rd and 74th Constitutional Amendment Acts, which resulted in the eleventh and

<www.newindianexpress.com/states/kerala/2021/nov/08/mullaperiyar-issue-experts-feel-keralas-u-turn-on-tree-cutting-against-states-interests-2380718.html#:~:text> accessed 12 October 2022.

79. Constitution of India, Sch VII, Entry 17 of List II.
80. Constitution of India, Sch VII, Entry 56 of List I.
81. *S.R. Bommai v Union of India* (1994) 3 SCC 1.

twelfth schedules in the Constitution, have given *panchayats* and municipalities extensive power over water management.[82] While dams are not explicitly reflected in the two schedules, their scope is broad enough to provide local self-government entities with the power to construct and maintain modest dams.

4.2 Dam safety-related reform initiatives

Due to this unique nature of the constitutional relations on water, the State Governments had the primary responsibility to secure dam safety. The Central Government for long refrained from legislating dam safety issues, despite mounting evidence that uniform legislation establishing consistent dam safety protocols was required. Nevertheless, in 1979, the Government of India established the Dam Safety Organization (DSO) in the Central Water Commission to assist the State Governments in identifying the causes of potential distress and recommend remedial measures.[83] In 1982, the Government of India constituted a Standing Committee under the Central Water Commission to review existing practices and evolve unified procedures for dam safety.[84] The Standing Committee in 1986 recommended suitable dam safety procedures for all dams in India and stressed the need for a law on dam safety. Subsequently, in 1987, the Union Ministry of Water Resources constituted the National Committee on Dam Safety (NCDS) to oversee dam safety activities in various States and suggest improvements based on state-of-the-art safety practices.[85] Initial efforts for dam safety legislation were directed toward the States, goading them to enact appropriate legislation. In 2002, a comprehensive Draft Dam Safety Bill was prepared and circulated to the State Governments. The idea was that the States could use this Bill as a model to provide for their legislation. The State of Bihar enacted a Dam Safety Act in 2006 based on this draft Bill, but there was no response from the other States. However, some States favoured the idea of uniform central legislation on dam safety. In 2007, the Andhra Pradesh and West Bengal State Legislative Assemblies adopted Resolutions under Article 252 requesting the Union Parliament to enact Dam Safety legislation.[86] Article 252 empowers the Union Parliament to pass laws on matters in the State List if two or more States pass resolutions requesting such legislation. However, the enacted law will apply only to these States that passed the resolutions. The other States will have to move similar resolutions if they want to adopt the statute.

Based on the strength of these resolutions, the Union Ministry of Water Resources prepared the Dam Safety Bill, 2010. The idea was that it would be placed before the

82. Tony George Puthucherril, 'Water Federalism, Tribunalization of Water Justice and Hydro-Politics: India's Inter-State River Water Disputes Act at 65 Years' (2022) 35 *Columbia Journal of Asian Law* 1, 18.
83. Central Water Commission, Central Dam Safety Organization <www.cwc.gov.in/damsafety/CDSO> accessed 31 July 2022.
84. Ministry of Water Resources (Government of India), 'Report on Dam Safety Procedures' (1986).
85. Central Water Commission, National Committee on Dam Safety (NCDS) and its Sub-Committees <http://cwc.gov.in/damsafety/NCDS> accessed 31 July 2022.
86. Ajith Athrady, 'A New Round of Centre-state Acrimony over the Dam Safety Bill' *Deccan Herald* (23 December 2021, upd. 23 December 2021) <www.deccanherald.com/opinion/panorama/a-new-round-of-centre-state-acrimony-over-the-dam-safety-bill-1063698.html> accessed 12 October 2022.

Union Parliament, and once it obtained approval, there would be subsequent adoption by all the States.[87] Thus there was the realization that dam safety is a matter that falls to the States, and the 2010 Bill's Preamble expressly declared that Parliament did not have the power to enact rules for States regarding dam safety procedures.[88] However, the Bill could not be enacted into law. It was withdrawn, and the legal frame was re-cast based on the recommendations of a Parliamentary panel.[89] However, since the term of the fifteenth Lok Sabha ended, the Dam Safety Bill, 2010, lapsed. In 2014, the State of Andhra Pradesh was bifurcated into the new States of Telangana and Andhra Pradesh.[90] This cast doubts regarding the legal validity of the resolution passed by the undivided State of Andhra Pradesh. Since no other State passed any resolution calling for parliamentary action on the matter, it was clear that the route under Article 252 of the Constitution was foreclosed. In 2018, another attempt was made to introduce a new Dam Safety Bill.[91] However, this could not also be fructified because of the dissolution of the Sixteenth Lok Sabha.

Subsequently, in 2019, with the Seventeenth Lok Sabha in place, the Union Ministry of Jal Shakthi brought out a new Dam Safety Bill. The Ministry refrained from introducing the law under Article 252 since this would require the law's acceptance by a majority of States, which could be uncertain, lengthy and drawn-out. Then there was also the possibility that some States may decide not to adopt the Dam Safety Law, preferring to operate outside its remit leading to ambiguity in its overall enforcement. To avert such eventualities and ensure that this legislation is extended to the whole of India, the Union introduced the Dam Safety law under Articles 246, 248, read with Entries 56 and 97 of List I. The Lok Sabha passed the Dam Safety Bill in 2019. However, it took another two years for the Rajya Sabha to afford its sanction but with amendments. This necessitated the ratification of these amendments by the Lok Sabha. Following Presidential Assent, the Dam Safety Act, 2021 was Gazetted, and it came into force on 30 December 2021.[92]

4.3 Salient features of the new legislation

The primary objective of the Dam Safety Act, 2021 is that it provides for the 'surveillance, inspection, operation and maintenance' of specified dams and creates institutional structures to ensure their safe functioning to prevent dam failure-related disasters.[93] It seeks to accomplish this by providing uniform dam safety procedures and creating authorities at the national and State levels for dams' safety. Below is an overview of the salient features of the Dam Safety Act, 2021.

87. *See* Dam Safety Bill 2010, Bill no. 108 of 2010, Statement of Objects and Reasons.
88. Ibid, Preamble.
89. Ministry of Water Resources, 'Standing Committee on Water Resources (2010–2011)' (Fifteenth Lok Sabha, 2011).
90. Andhra Pradesh Reorganisation Act, 2014.
91. Dam Safety Bill, 2018, Bill No 149 of 2018.
92. Ministry of Jal Shakthi (Department of Water Resources), Gazette Notifications on Dam Safety Act (2021). Simultaneously, India has implemented the Dam Rehabilitation and Improvement Project with World Bank support. For more details, see Dam Rehabilitation and Improvement Project <https://damsafety.cwc.gov.in/> accessed 13 November 2022.
93. Dam Safety Act 2021, s 4(f).

4.3.1 Nature, scope and institutional mechanisms

The starting point of a regulatory scheme on dam safety must be the criteria for determining which dams fall under its regulatory ambit. The dam's size and hazard potential are the most common criteria for determining a dam safety legislation's regulatory scope. The Dam Safety Act is no exception and applies to specified dams. These are dams with heights above 15 metres or a height between ten to 15 metres and satisfy certain specified conditions, like having foundational problems or unusual designs.[94] Even though, *prima facie*, the Act applies only to specified dams, by empowering the National Dam Safety Authority and the State Governments to make regulations[95] and rules for the safety of dams other than the specified ones,[96] the coverage is rendered quite extensive.

The second important aspect is that the regulatory scheme should identify the primary players. In line with India's federal nature, the Dam Safety Act identifies regulatory bodies at the central and State levels. While the National Committee on Dam Safety (NCDS) and the National Dam Safety Authority (NDSA) operates at the Centre, the State Committee on Dam Safety (SCDS) and the State Dam Safety Organization (SDSO) functions at the State level. Finally, there are the dam owners.

Regarding the specifics, the NCDS includes representatives of the Central Government (minimum ten) holding no less than the post of Joint Secretary or equivalent and dealing with dam engineering or dam safety.[97] Additionally, the NCDS has seven representatives of the State Governments,[98] whom the Central Government nominates.[99] They hold the post for three years on a rotational basis. Three specialists in dam safety or allied fields appointed again by the Central Government are also part of the NCDS.[100] The NCDS generally meets twice a year, with one meeting before the monsoons.[101] The Chairman of the Central Water Commission chairs the NCDS.

The National Dam Safety Authority (NDSA) is headed by an officer appointed by the Central Government. This officer holds a position not less than an Additional Secretary and has qualifications and experience in dam engineering and safety management.[102] The Central Government can appoint other officers to enable the NDSA to discharge its functions.[103]

94. Ibid, s 4 (x).
95. Ibid, ss 54 (2) (s) and 53 (g).
96. Ibid, s 46.
97. The officials are the Chairman, Central Water Commission; Chairman, National Dam Safety Authority; Member (Design and Research), Central Water Commission; Member (Hydro), Central Electricity Authority; Representative of Department of Union Water Resources, River Development and Ganga Rejuvenation; Union Ministry of Power; Representative of National Disaster Management Authority; Representative of Union Ministry of Environment, Forest and Climate Change; Director General, India Meteorological Department; Director General, Geological Survey of India; Director, National Remote Sensing Centre, Department of Space; and Director, National Geophysical Research Institute. *See* Ministry of Jal Shakti, Notification S.O. 757(E) (New Delhi, 17 February 2022).
98. The 28 States have been grouped into seven groups. *See* Ministry of Jal Shakti, Notification S.O. 757(E) (New Delhi, 17 February 2022).
99. Ministry of Jal Shakti, 'Notification S.O. 757(E)' (New Delhi, 17 February 2022).
100. Dam Safety Act 2021, s 5.
101. Ibid, proviso to s 7(1).
102. Dam Safety Act 2021, s 8(2); see Ministry of Jal Shakti, 'Notification S.O. 757(E)' (New Delhi, 17 February 2022).
103. Ibid, proviso to s 10 (1).

The Act provides for the State Committee on Dam Safety (SCDS) and the State Dam Safety Organization (SDSO) in the States. It is the concerned State that constitutes the SCDS.[104] The Chief Engineer or equivalent officer from the Department for Dam Safety in the State is the Chairperson.[105] As members, the State Government appoints six technical and scientific officers holding the rank of Chief Engineer from relevant Departments.[106] In addition, if the reservoir area of a specified dam in a State extends to another State, the Chief Engineer or an equivalent level officer of such upstream States is also appointed as member.[107] Similarly, if the flood release from a specified dam in a State flows to a neighbouring downstream State, the Chief Engineer or equivalent level officer of the downstream State is also a member.[108] Others include a representative of the Central Water Commission, the Central Electricity Authority and three experts in hydrology or dam design.[109]

The State Government also constitutes the State Dam Safety Organization (SDSO) in the Department that deals with dam safety.[110] All specified dams in a State fall under its jurisdiction.[111] In States with more than 30 specified dams, the SDSO is headed by the Chief Engineer or equivalent. In all other cases, the Superintendent Engineer or equivalent heads the SDSO.[112] The State Dam Safety Organization reports to the technical head of the Department dealing with Dam Safety.[113]

The final actor is the dam owner. Since the owner is primarily responsible for dam safety and ensuing liability, the dam owner must be clearly defined. In India, the State Governments own most dams, and the definition in the Dam Safety Act accepts this reality. Accordingly, dam owners can be public sector undertakings or institutions owned or controlled by the Central or a State Government or jointly by one or more Governments. It can also be an undertaking, company, or institution owned or controlled by private entities.[114]

4.3.2 Powers, responsibilities and functions

Another element of a dam safety law is that the regulatory framework must bifurcate powers and responsibilities between the dam owner and the regulator. While the owner is generally responsible for ensuring safety in a dam's operation and maintenance, the regulator sets the overall safety standards and ensures that the dam owner complies.[115] India's Dam Safety Act follows this mould.

The NCDS discharges various functions to ensure dam safety as specified in the First Schedule.[116] These include evolving dam safety policies and standards, exchanging views on remedial measures, analyzing incidents and failures and suggesting changes, evolving comprehensive dam safety management approaches, providing strategic

104. Ibid, s 11.
105. Ibid, s 11 (1) (a).
106. Ibid, s 11 (1) (b).
107. Ibid, s 11 (1) (c).
108. Ibid, s 11 (1) (d).
109. Ibid, ss 11 (1) (e), 11 (1) (g) and 11(1) (f).
110. Ibid, s 14 (1).
111. Ibid, s 24 (1).
112. Ibid, proviso to s 14(1).
113. Ibid, s 14 (2).
114. Ibid, s 3.
115. Bradlow et al (n 24) 72.
116. Dam Safety Act 2021, s 6 (1).

supervision for dam rehabilitation programmes and exploring the possibility of insurance coverage.[117] The NCDS also makes recommendations regarding the safety of dams located outside India, rehabilitation of ageing dams, the coordinated operations of cascading dams, and any other matter referred by the Central Government.[118] It can also recommend that the NDSA make regulations.[119]

The NDSA implements the policy, guidelines, and standards evolved by the NCDS. It has 32 functions as specified in the Second Schedule. Some of these are laying down uniform criteria for vulnerability and hazard classification of specified dams, providing technical and managerial assistance to the SDSO's, maintaining a national-level database of all specified dams and major dam failures, examining the causes of dam failures and providing general education and awareness on dam safety. It can give directions on various issues, including instrumentation.

Additionally, the NDSA performs six critical functions. The first relates to resolving disputes between the SDSOs or between an SDSO and owners of specified dams.[120] The second is advisory. It can advise the Central Government to take measures to mitigate the threats (landslides or glacial moraines) to dams located outside its territory.[121] Third, the NDSA performs the role of the SDSO for certain kinds of dams like those owned by a Central Public Sector Undertaking or if a specified dam extends to over two or more states or is situated in one State, but another State owns it.[122] Fourth, it can make regulations based on the recommendations of the NCDS.[123] Interestingly, these Regulations can include measures to ensure the safety of dams other than the specified ones.[124] Fifth, it provides accreditation and can disqualify agencies entrusted with the investigation, design, construction, and alteration of specified dams.[125] Finally, the NDSA can send its authorized representative to investigate any specified dam and suggest remedial measures.[126]

Additionally, the NDSA provides secretarial assistance to the NCDS.[127] It also prepares a consolidated annual report of the dam safety activities in the country (publicly available) which is submitted to the Central Government and is laid before the Union Parliament.[128] Given the far-reaching nature of the functions it performs, the NDSA can enforce the attendance of any person and call for any information.[129] Its decisions are final and binding.[130]

The Third Schedule to the Act enumerates the State Committee on Dam Safety's functions. Its primary duty is to maintain dam safety standards and prevent dam failure – by following safety guidelines, standards and other directions issued by the NDSA.[131] In addition, it reviews the work of the SDSO, investigates and recommends appropriate

117. Ibid, First sch.
118. Ibid.
119. Ibid, ss 54, 16, 17, 18, 23, 26, 30, 31, 32, 33, 34, 35, 36, 38 and 46.
120. Ibid, s 9 (2).
121. Ibid, s 47.
122. Ibid, proviso to s 24(1).
123. Ibid, s 54.
124. Ibid, s 54 (2) (s).
125. Ibid, s 26.
126. Ibid, ss 24 (2)–(5).
127. Ibid, s 6 (2).
128. Ibid, s 45 (3).
129. Ibid, s 9 (1).
130. Ibid, s 9 (3).
131. Ibid, s 12 (1) and Third sch (Cl 1).

measures for specified dams under distress and reviews progress. It also assesses the potential implications of reservoir filling of a specified dam in upstream States and coordinates mitigation measures. The possible implication of failure of a specified dam in a downstream State also falls within their functions. To prevent cascading dam failures, it coordinates mitigation measures with downstream States.[132] In discharging its functions, the SCDS is assisted by sub-committees.[133] The SCDS generally meets twice a year, once before the monsoons.[134]

The SDSO has jurisdiction over all specified dams within the concerned State.[135] It keeps perpetual surveillance, carries out inspections and monitors the operation and maintenance of all specified dams to ensure their safety.[136] It can take measures to address safety concerns, classify dams,[137] conduct investigations and provide instructions to specified dam owners.[138] The SDSO also examines the filling criteria and the initial filling plan and certifies the dam's fitness for filling.[139]

As part of its reporting obligations, it must maintain a logbook or database for specified dams and records of significant dam incidents including dam failures.[140] It must furnish all such information to the NDSA[141] and prepare an annual report outlining its activities and the safety status of specified dams. This publicly available report is provided to the State Disaster Management Authority[142] and forwarded to the State Government, which places it before the State Legislature.[143]

4.3.3 Obligations imposed on dam owners

The Dam Safety Act imposes a series of obligations on the dam owner relating to dam construction, operation and maintenance. Every owner must comply with the SDSO's instructions and earmark funds for maintenance and repair.[144] Since States are India's largest dam builders, the construction or alteration of a specified dam is subject to investigation and design by agencies accredited by the State Government.[145] The owner must establish an operation and maintenance establishment along with a manual which must be followed at all times. Within this establishment, there must be a safety unit of competent engineers[146] who will inspect the dams: (1) before and after monsoons;[147] (2) during and after every earthquake, flood, natural or artificial calamity; and (3) when the dam shows any sign of distress or unusual behaviour.[148]

132. Ibid, Third sch.
133. Ibid, s 12 (2).
134. Ibid, proviso to s 13 (1).
135. Ibid, s 24 (1).
136. Ibid, s 16.
137. Ibid, s 17.
138. Ibid, s 20 (1).
139. Ibid, s 27.
140. Ibid, s 19 (1).
141. Ibid, ss 18, 19 (2) and 45 (2).
142. Ibid, s 45 (5).
143. Ibid, s 45 (1).
144. Ibid, ss 20 (2) and 21.
145. Ibid, s 26 (1).
146. Ibid, s 30.
147. Ibid, s 31 (2).
148. Ibid, s 31 (2).

The dam owner must install a minimum number of instrumentations at each specified dam.[149] A record of the readings of these instrumentations must be maintained, and their analysis forwarded to the SDSO.[150] The dam owner must also establish a hydro-meteorological station and network to record data. If the specified dam's height is 30 metres or more or is situated in a seismic zone, the owner will also have to establish a seismological station.[151] Additionally, the owner must provide inflow forecasting and emergency flood warning systems[152] and periodically test their functioning.[153] The owner should install new scientific and technical instruments[154] and provide information about maximum anticipated inflows and outflows, including flood warnings. It must assist the NDSA in establishing and running early warning systems to exchange real-time hydrological and meteorological data and information regarding the operation of reservoirs.

The owner must prepare and regularly update emergency action plans for new and old dams[155] in consultation with disaster management agencies and other dam owners in the immediate vicinity.[156] These plans must have procedures to protect people and property upstream or downstream.[157] They must carry out a comprehensive dam safety evaluation through an independent panel of experts to determine the specified dam's conditions.[158] The first comprehensive dam safety evaluation should be done within five years and at regular intervals.[159] The evaluation analyses the structure's design, maintenance and performance; hydrologic and hydraulic conditions; seismic safety; and other conditions that can affect the structure's integrity.[160] The comprehensive dam safety evaluation is also obligatory if there is a significant modification to the original structure or design criteria, unusual conditions at the dam, or an extreme hydrological or seismic event.[161] The evaluation results must be reported to the SDSO.[162] If there are recommendations for corrective action, the owner must carry them out on time.[163] The owner should also undertake risk assessment studies at specified regular intervals.[164]

Apart from the above, other significant provisions include the powers of the Central Government to give necessary directions to the owner of a specified dam,[165] rule-making powers available to both the Central and the State Governments[166] and offences and penalties.[167]

149. Ibid, s 32 (1).
150. Ibid, s 32 (2).
151. Ibid, s 34.
152. Ibid, s 35.
153. Ibid, s 35 (1).
154. Ibid, s 35 (1) (d).
155. Ibid, s 36 (1).
156. Ibid, s 36 (4).
157. Ibid, s 36 (2) (a).
158. Ibid, s 38 (1).
159. Ibid, s 38 (2).
160. Ibid, s 38 (2).
161. Ibid, s 39.
162. Ibid, s 40.
163. Ibid, s 40 (3).
164. Ibid, s 35 (2).
165. Ibid, s 50.
166. Ibid, ss 52 and 53.
167. Ibid, ch X.

5 INDIA'S DAM SAFETY ACT, 2021: AN ADHESIVE TO FIX THE CRACKS?

5.1 The impact of the new legislation

One of the more remarkable features of India's attempts to institutionalize and secure dam safety is that there is now in this country a dedicated statute that applies across the length and breadth of India that spells out the broad regulatory principles and measures on dam safety. The Dam Safety Act 2021 effectively puts to an end '*ad hoc*-ism' and reactionary approaches. The details and the gap-filling will happen subsequently through rules and regulations. Nevertheless, a dedicated statute on dam safety rather than one that views it only as one aspect of more general legislation dealing with water or allied matters ensures that dam safety will henceforth receive all the seriousness it demands.

The Dam Safety Act creates an institutional framework and prescribes procedures for preventing dam failure-related disasters through proper surveillance, inspection, operation and maintenance of dams. Its primary objective is to provide uniform safety procedures for all specified dams across the country. It does not deal with any aspect of water sharing or its apportionment, nor does it alter or dilute the entrenched idea of State ownership of dams or their roles in their operation and management. Its remit ensures that dams are monitored, inspected, operated and maintained according to specific safety parameters. Even though dams can be of various sizes and designs, only dams above a particular length and those that meet specific design and structural standards are brought under its regulatory purview. However, this does not mean dams not falling within these criteria are left out. Given that small dams can also threaten human well-being, particularly those who live in and around the dam, the Dam Safety Act empowers the NDSA and the State Governments to make regulations and rules necessary to ensure the safety of dams other than specified ones.

A striking feature is the institutional arrangements to ensure dam safety. In line with India's federal polity, it creates institutions at the national (NCDS and the NDSA) and State (SCDS and the SDSO) levels. Another essential feature of the dam safety law is that this regulatory framework bifurcates powers and responsibilities between the dam owner and the regulator. While the onus to secure dam safety in its operation and maintenance is placed on the owner, the regulator sets the overall safety standards and ensures that the dam owner complies. The NCDS is primarily responsible for developing unified policies and recommending dam safety standards applicable throughout the country. At the same time, the NDSA, as the primary regulatory body, ensures the implementation of the National Committee's policy, guidelines and standards. It also provides technical assistance to SDSOs and resolves disputes between SDSOs or between an SDSO and a dam owner. These two national institutions focus primarily on dam safety issues that are generic and of national importance. The concerned SCDS and the SDSO address dam safety issues specific to an individual State. Constituted by the State Governments, the SCDS and the SDSO are primarily in charge of surveillance, inspection and monitoring of the operation and maintenance of dams within their jurisdiction.

The statute lays down a comprehensive legal framework by addressing safety considerations in the different stages of the dam's life cycle – from its design, construction, first filling, operation, and alteration. It stipulates creating an emergency action plan and a comprehensive dam safety review and emphasizes the need for repair and maintenance funds. Interestingly, it imposes a series of obligations on the dam owner to secure safety. Notable commitments include earmarking sufficient and specific

funds for dam maintenance and repair, creating a dam safety unit, providing for instrumentation, creating hydro-meteorological networks and seismological stations, developing emergency action plans, and arranging for comprehensive safety evaluation. The Dam Safety Act also provides safety measures regarding dams located outside India's territory.

Another feature of this law is that it provides a possible way out in situations of conflict over dams situated in one State but are owned and operated by another State for its benefit. Several dams across India are located in one State but operated by another. For example, Tamil Nadu has ownership and operates and maintains four dams in Kerala, including the Mullaperiyar. Since all regulatory decisions are taken by the State which owns and operates the dam, the State where the dam is situated is left out of the decision-making process. This is indeed grave, particularly when there are concerns over its safety.[168] With the Dam Safety Act, such dams will continue to be owned and operated by the State where it is not situated. However, their regulatory control will be with the more independent and technically competent NDSA, which will perform the role of the SDSO. The concerned States' governments will have access to all information on the dam as available with the NDSA. In effect, to a large extent, such an arrangement can obviate the possibility of inter-state disputes over dams and help ensure adequate oversight by a more neutral body.

5.2 Shortcomings of the new legislation

There are quite a few shortcomings of the Dam Safety Act. Since a primary bone of contention relates to its anti-federal nature, this section will first examine the general criticism and then delve into the supposedly anti-federal nature of the statute.

5.2.1 Bureaucracy

One of the primary criticisms against the NCDS, the NDSA, the SCDS and the SDSO is that they are bureaucratic, technocratic and top-heavy. They include only technical experts appointed by the Central or State Governments. There is no room for the representatives of affected local authorities and communities, that is, those who matter. Moreover, since the State owns most dams, the dam owner is a part of the regulatory bodies. Accordingly, this lack of participation by the affected communities can be problematic. This aspect may also affect regulatory independence. The composition of the NCDS leaves room for improvement. As it stands, State governments have representation in the NCDS. This ensures that there is State input while formulating policies and procedures. However, only seven from 28 States can sit on the NCDS rotationally. Once a State steps down from the NCDS, it may take quite some time for the next window of opportunity to open. Thus, a State may have to remain outside the Committee for a considerable time. Under the Dam Safety Act, the NCDS can invite the representative of the owner of specified dams which it considers appropriate for the discharge of its functions. Utilizing this provision, technically, the NCDS may be able to obviate the criticism regarding non-representation and secure the presence of at least a few States that may have a significant number of specified dams. However, this may lead to allegations of favouritism. All this may not augur well for healthy Centre-State relations in

168. See, discussion in Section 3.

securing and operationalizing dam safety since it is the States who ultimately will have to implement the decisions of the NCDS on the ground.[169]

5.2.2 *Dam owner's liability*

Second, India's Dam Safety Act is silent regarding the nature of a dam owner's liability in the event of a dam failure. The Act only requires the NCDS to explore compensation using insurance coverage for those affected by dam failures.[170] Under the common-law rule of *Rylands v Fletcher* (applicable also to common law India), if a person brings on to his land and keeps anything likely to harm, and if it escapes and damages another, s/he is liable to compensate for the damage. However, this rule applies only to non-natural land use. It also does not apply to natural uses, an 'act of God,' or that of a stranger. Similarly, if there is any default by the person injured or where the thing which escapes is by the consent of the injured person or where there is a statutory authority to back up the activity, the rule is inapplicable.

Since *Rylands* evolved when science and technology were in their infancy (1866), India's Supreme Court reassessed its dicta in a case regarding the leak of Oleum gas.[171] It concluded that *Rylands* could not guide the evolution of a liability standard consistent with constitutional norms and the needs of modern industrial society. Given that hazardous or inherently dangerous industries are necessary for development, the Court developed a new liability principle. It held that an enterprise engaged in a hazardous or inherently dangerous activity owes an absolute and non-delegable duty to the community to ensure that no harm results to anyone because of its undertaken activity. The enterprise must ensure that the hazardous or inherently dangerous activity must be carried out by following the highest safety standards. Despite this, if any harm results, the enterprise is absolutely liable to compensate. It is no excuse to say that it had taken all reasonable care and that the harm occurred without negligence.[172]

Despite the silence in the Dam Safety Act, since this principle is part and parcel of India's law,[173] it can reasonably be concluded that if a dam fails, then dam owners will be absolutely and strictly liable even if there is no negligence on their part. Adopting this liability standard may incentivize owners to pay close attention to safety issues.

5.2.3 *Decommissioning*

Another critical omission in the statute is that it does not expressly deal with decommissioning, even though this is an essential cog in a dam's life cycle. There are provisions in the statute that may enable rulemaking to encompass this area subsequently. Nevertheless, being a specific statute with a pan-India application, it would have served the more significant interests of dam safety if the statute had provisions on decommissioning. As well, a dam's integrity is often affected by wanton acts of deforestation, illegal mining and quarrying. Quarrying, for instance, involves high-intensity blasts that may

169. Jayadev Galla, Member of Parliament, 'Dam Safety Bill 2019' (Speech at the Lok Sabha, New Delhi, 2 August 2019).
170. Dam Safety Act 2021, First Sch (Cl 4).
171. *M.C. Mehta and another v Union Of India* (1987) 1 SCC 395.
172. Ibid.
173. Civil Liability for Nuclear Damage Act 2010, s 4 (4); The liability of the operator of the nuclear installation shall be strict and shall be based on the principle of no-fault liability.

occur in the vicinity of a dam affecting its structural stability. As it stands, the statute fails to consider these aspects, which is a serious omission.[174]

5.2.4 Encroachment on legislative domain

The primary criticism against the Dam Safety Act is that it encroaches into the exclusive legislative domain of the States and infringes on the principle of cooperative federalism, which is part of the basic structure of the Constitution. Several states have vociferously opposed a national dam safety law, including Tamil Nadu, Karnataka, Kerala and Odisha. They argue that because water is a State matter, the Federal Government, under the pretence of securing dam safety, is, in reality, encroaching into a power reserved to the States by the founding fathers, thereby upsetting the federal balance.

S. Ramalingam, a member of India's Parliament from the *Dravida Munnetra Kazhagam* (DMK), the political party presently in power in the State of Tamil Nadu, has moved a public interest litigation before the Madras High Court. This writ seeks to impugn the constitutional validity of the Dam Safety Act, on the grounds of legislative incompetence and arbitrariness given infractions of Articles 246(3), 14, 19 and 21 and, more importantly, the federal idea.[175] Even though pending, this writ raises highly compelling arguments regarding the federal question. Some of these are analyzed below.

Entry 17 of List II reads, '[w]ater, that is to say, water supplies, irrigation and canals, drainage and embankments, water storage and water power subject to the provisions of Entry 56 of List I'. Despite being the primary entry that articulates the State's power over water, it does not expressly deal with the subject of dam safety. Other entries in List II relevant to this discourse include Entry 18, which deals with land and Entry 35, which deals with 'works, lands and buildings vested in or in possession of the State'. A combined reading of all these can suggest that the primary responsibility for dams, embankments and other kinds of water storage units and related matters falls on the States. This argument is reinforced by the factual reality that out of India's 5,745 large dams, 5,675 are operated by the States, 40 by central public sector undertakings and five by private agencies. Since most of the dams that the Dam Safety Act seeks to regulate are under the States' control, the core argument is that this statute is beyond the Union's legislative competence. Under the guise of promoting dam safety, the impugned legislation is an attempt by the Union to take over the control of the dams and to 'tinker' with water supplies.

At first brush, this argument seems highly compelling. However, it fails to consider that the objective of the Dam Safety Act is not to take over the control of dams, the embankments and the waters they hold. Its remit is limited only to creating regulatory apparatuses at the central and State level and imposing responsibilities on the States to streamline their processes to secure dam safety. The functions and responsibilities of the NCDS and the NDSA, as defined in the First and Second Schedules to the Act, do not appropriate dam owners' rights. The primary regulatory entities at the State level that the Dam Safety Act creates, namely, the SCDS and the SDSO, are constituted by the respective State Governments and primarily consist of

174. Sumalatha Ambareesh, Member of Parliament, 'Dam Safety Bill 2019' (Speech at the Lok Sabha, New Delhi, 2 August 2019).
175. See affidavit filed by S Ramalingam in the High Court of Judicature at Madras (Special Original Jurisdiction), Writ Petition 166 of 2022, *S. Ramalingam v The Union of India* (2022).

officers that States appoint.[176] The term 'dam' has also been defined in the Act to include only water-impounding structures, excluding water conveyancing and flow regulation structures. If the intention were to effect an appropriation of the State's powers over water, it would not make sense to exclude conveyancing and flow regulation devices. The Act in no way takes away a State's ownership rights over its dams, its rights over the impounded water or any of the benefits (hydropower generation or fishing rights) that may arise from the use of the waters. For instance, in most dams, the fisheries departments of State governments undertake aquaculture activities. This help generates revenue and also provides livelihood opportunities for local communities. The Dam Safety Act does not take away the fishing rights of the State. But, if, in case, the fishing activities within the dam affect its safety, then, to that extent, there could be regulatory interference to ensure that safety is not compromised. Characterizing such interferences as intrusions into the State's powers[177] is quite a stretch. This is because on examining the pith and substance or the true character of the Dam Safety Act, as evident from its objectives, scope and effect, the core focus of the statute is solely on safety; the so-called encroachments are only incidental and superficial. Merely because a piece of legislation incidentally impacts an issue that falls beyond its area of competence and authority, it does not per se render it unconstitutional.

Entry 17 of List II includes various fields: water supplies, irrigation and canals, drainage and embankments, water storage and water power. Under the law, the legislative entries should not be read in a narrow or pedantic manner. They must be given their entire meaning and extended to include all ancillary and subsidiary matters that can fairly and reasonably fall within their scope. Accordingly, dam safety can be a State legislative subject. Recognizing this reality, even though the Central Government initiated a proposal to enact a dam safety law in 1986, it waited almost 25 years before moving forward. Meantime, it continued to urge the States to enact laws on this matter. However, the States persisted with their ambivalence, and some even favoured a Union law. In this context, the Union, treating dam safety as a matter of national importance, decided to utilize its constitutional powers to provide a uniform dam safety protocol for all specified dams in the country through legal instrumentality.

As seen earlier, Entry 17 of the State List is not absolute. It is subject to Entry 56 of the Union List, whose mandate extends to inter-state river waters and valleys. Most of India's dams are on inter-state rivers. If there is a dam break, it can not only affect the State where the dam is situated, but the repercussions can span several downstream States. Furthermore, since a State's jurisdiction ends at its borders, it is definitely in the national interest that the Union, which constitutionally can 'make laws for the whole or any part of the territory of India',[178] and which has the deepest pockets and superior resources, provide for the matter. Accordingly, the Union Parliament inserted Section 2 into the Dam Safety Act, which mirrors the requirement of Entry 56, that Parliament by law declare that it is expedient in the public interest to take over the regulation and development of inter-state rivers and river valleys. In section 2 of the Dam Safety Act, this declaration takes the following form: 'it is expedient in the public interest that the Union should take under its control the regulation of uniform dam safety procedure[s] for specified dam[s]'.

176. Dam Safety Act 2021, ss 11 and 14.
177. Constitution of India, Sch VII, Entry 21 of List II.
178. Constitution of India, Art 245.

Thus, while Entry 56 provides legal support to the Dam Safety Act regarding its application to inter-state rivers and river valleys, the Union Parliament cannot ordinarily legislate on matters relating to rivers that flow wholly within a State's boundaries. Presently, there are about 212 legislative entries in the Seventh Schedule to the Constitution. However, none directly deal with dam safety. When framing the Constitution and the legislative entries, the constitutional fathers realized that it was impossible to conceive and provide for every imaginable head of legislation despite the exhaustive enumeration. Accordingly, they inserted Article 248 and Entry 97 of List I into the Constitution and secured the residuary powers of legislation to the Union Parliament. Once it is evident that a particular subject matter does not fall under any entry in Lists II or III, the Union Parliament can resort to the residuary powers to fill in the lacuna. The Union has treated 'Dam safety' as a separate field of legislation not enumerated in any of the Lists and has utilized the residuary powers of legislation to constitutionally support the Dam Safety Act.

5.2.5 Further 'anti-federal' provisions

Other supposed anti-federal provisions include section 49(1), which empowers the Central Government to amend the First, the Second and the Third Schedules by notification provided it is satisfied that it is necessary or expedient to do so. The functions of NCDS, the NDSA and the SCDS are provided in the First, Second and Third Schedules. Such legislative devices have been used by the Union previously in several statutes.[179] Therefore, the criticism that the power is enormous and unguided is misconceived. It also fails to consider that there is an in-built safety valve in that section, namely that these amendments, once notified, will have to be laid at the earliest before the Parliament.

As well, under section 8(4) of the Dam Safety Act, the NDSA must comply with the directions given to it by the Central Government from time to time. The fear is that the Central Government will utilize this power to render the NDSA redundant. Clearly, these are basket clauses written into the statute to cater to eventualities not otherwise envisaged. Dam safety is a highly dynamic and unpredictable area, and it is in the very nature of things that there has to be a certain degree of flexibility in responding to unforeseen circumstances, which is why sections like these and sections 50[180] and 56[181] find a place in the statute. It is not as if the Central Government will utilize these provisions now and then to frustrate the objectives of the Dam Safety Act and bypass the institutional framework.

5.3 Discussion

In sum, the criticisms against the Dam Safety Act are largely unfounded. India's legislative model on dam safety is set against its legal traditions and constitutional principles and caters to this country's socio-economic requirements. It is unique and shapes the conceptions and understandings of dam safety as prevalent and accepted by this country. As a whole, the Act strengthens the principle of cooperative federalism, which is a core feature of India's Constitution. Cooperative federalism envisages

179. Industrial Disputes Act 1947, s 40.
180. Dam Safety Act 2021, s 50.
181. Ibid, proviso to s 56 (1).

a flexible relationship where the federal and the State governments join forces and work together on various issues and programmes to find sustainable solutions. The Dam Safety Act provides the legal architecture for these functional dynamics to play and evolve to secure a culture of dam safety by establishing institutions at the central and State levels and conferring specific functions and responsibilities. It does not intrude into or take over the rights of the State in terms of their control, autonomy, and ownership over dams. Rather, its core focus is establishing a regulatory system to streamline processes that can help effectuate dam safety.

6 CONCLUSION

As a critical element of India's water management strategy, playing a pivotal role in fostering rapid and sustained agricultural growth and development, many dams have been built, and more are planned. Over the years, huge investments and other resources have created this infrastructure. Therefore, it is necessary to maximize the leverage from these assets. Until recently, most debates over dams in India related to land acquisition, relocation, rehabilitation, environmental assessments and clearances, and competing apportionment claims over impounded water. The idea of dam safety in India was not majorly contested. However, most of India's dams are of a bygone era and are reaching the end of their functional lives. These structures need constant upkeep and maintenance. With age, the costs of keeping them fit and running keep increasing. 'Mass ageing' of water storage infrastructure is a significant sustainable development issue that India faces, and at its root is the safety aspect. Apart from age and various structural and other flaws, many dams do not meet modern quality, quantity, hydrology and engineering standards. The uncertainties of climate change also provide new credence to dam safety.

The many States who own most of the dams lack the institutional and technical capacities to resolve safety concerns. Often minimal funds are allocated for their maintenance and repair. Left to their own devices, the States have been rather apathetic to the idea of dam safety. Furthermore, the absence of a comprehensive legal framework, attendant institutions and allocation of responsibilities only increases the risk of accidents. Consequently, securing the mandate of dam safety has always been a tale of ifs and buts, missed opportunities and close shaves.

A dam break caused either due to an 'act of God', defective engineering or sheer human negligence can lead to loss of life, environmental degradation and destruction of property. It is an unacceptable risk, an area that demands scrupulous adherence to standards that mandate absolute safety. And here, through its normative prescriptions, a dam safety law can help make the risk of failure as small as possible. However, dam safety is a dynamic, developing idea. The knowledge regarding the technical aspects of dams, and their economic, financial, environmental and social implications, is in a continual state of change. Many elements in dam design and engineering methods have indeed evolved over the years for the better. Even though we now have a deeper understanding of dam engineering, there is still an incompleteness regarding the uncertainties associated with natural and human factors, materials behaviour and construction processes and meteorological factors. Therefore, however well-built and maintained every dam risks failure. Nevertheless, dam safety legislation imbued with a cradle-to-grave precautionary and adaptive approach that prescribes uniform and acceptable standards is necessary to ensure the standardization and institutionalization of appropriate safety protocols.

While a dam safety law is essential, such a move should also not be at the expense of federalism to erode the State's powers over what is perhaps the most critical natural resource of our times – water. A few States in India's Union consider the Dam Safety Act, 2021 to be an affront to its federal framework. However, as seen from the above analysis, many of these criticisms are wholly misconceived. While this statute is not entirely free from blemish and merely having a regulatory framework does not guarantee dam safety in practice, an overarching legal framework does have several positives. The most critical is that it is foundational for creating and sustaining a dam safety culture that seeks to safeguard human life, property, and massive infrastructure investments. India, as elsewhere, needs healthy and vibrant dams whose safety is non-compromisable. Dam safety cannot be a tale of 'ifs and buts'. The rule of law assumes sanctity only when it ably defends the right of every human to live and flourish, and this is precisely what India's Dam Safety Act, 2021 seeks to accomplish.