THE RIVER MHADEI: THE SCIENCE AND POLITICS OF DIVERSION

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The Science and Politics of Diversion

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Goa 1556 1220

2025

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First edition published in 2025 by

Goa 1556

Goa,1556, Saligão 403511 Goa, India.
http://goa1556.in
goa1556books@gmail.com +91-9822122436.

This edition was printed and bound in India by SAP Print Solutions Pvt Ltd, Mumbai 400013 sapprinters@gmail.com, www.sapprints.com
Cover design by Gasper D'Souza
ISBN (Print) 978-93-95795-68-5
ISBN (Ebook) 978-93-95795-67-8
Price in Goa: Rs 900

To

the people

of the Mhadei

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2. The Many Pasts and Contested Present of the Mhadei

Lakshmi Subramanian

Abstract: *This chapter looks at the history of infrastructure on the Mhadei river to make a case for the river as a co-constitutive agent of change. It argues that the geography created by the river lent itself to a distinct mode of agrarian infrastructure while simultaneously fostering a defensive infrastructure project in order to secure trade and commercial benefits for the dominant political regime. When both categories of projects fell into disuse or were transformed, the fate of the river changed and in turn spurred a new articulation of environmental concerns amidst a radically altered political situation after the 1980s. The underlying rationale behind the chapter is to argue for a historical perspective in understanding the recent controversy around river water sharing emanating out of the infrastructural imperatives of post-independent India.*

Introduction

RIVERS have always been central to India's cultural geography and history. From the Sapta Sindhu to the Panch-ab (the five rivers making up the Punjab), from the mighty Ganga to the modest Kaveri, and the smaller but nourishing Mahadayi, legends abound about rivers communicating the intimate interaction between natural elements (water in this case) and human agency. Rivers are invoked in legends of love, in songs of the boatmen, in devotional poetry, acquiring ontological and mystical meanings in the process. From the *bhatiali* songs celebrating the rivers of East Bengal to the music of the Punjab, rivers have had an inherent language (Kapuria and Kumar 2022), something that is captured effectively by the framework of hydro-poetics. On the flip side as Lahiri Dutt (2000) reminds us, the discursive act of imagining the river generates confusion

about what a river is and what it should be notwithstanding the fact that rivers exist physically and can be seen and felt and traced on a map.

Curiously, however, the 'history' of rivers has remained largely untold, barring some exceptions, notably that of the Ganga by Sudipto Sen (2019) whose work holds out significant directions for researching the geological, socioeconomic, and political histories of rivers and aligning this research with the pressing issues of climate change and environmental degradation that we face today. We also have the benefit of fine scholarship on environmental history (Gadgil and Guha 2012; Rohan D'Souza 2016) that helps us think through the bewildering mosaic of riverine resources in India and the challenges that govern their access. More recently, rivers have featured in popular writing, travelogues and films (Albina 2008) that reveal the extraordinary layers that make up rivers and the alluvial settlements they give rise to. These layers persuade us to engage with the complex history of rivers in geological, historical, and political or contemporary time.

I take my cue from these writings to present a brief excursus of the Mhadei, its myriad pasts and contested present, to think with the river in order to unravel the distinctness of Goa's historical experience, mediated in this particular case through the axis of infrastructure involving built spaces on the river. Thus, while the rationale for looking at the Mhadei is undoubtedly informed by the political controversy that has erupted over the building of dams and their potential repercussions for the states of Goa, Karnataka and Maharashtra, there is an equally pressing concern to analyse the changing scenario of infrastructure projects and their stakeholders in order to understand the transformation of the river from a "commons" to a site of contestation for competing developmental projects, buttressed by a new discourse on imagining rivers that emphasize their extractive potential. The focus on documenting a typology of built spaces on the river is also intended to help look at the Mhadei as a co-constitutive agent of change rather than treat it as a silent and invisible referent in the background. The distinct geography created by the river lends itself to a mode of agrarian infrastructure-building that facilitates both cultivation and pisciculture. Successive political regimes have responded to this geography by adopting a dominantly riparian orientation in the infrastructures they have built, maintained, and dismantled. The chapter will contrast two kinds of infrastructure projects—one related to military and civilian projects on and around the river and the other to agrarian management—both of which imagined the river quite distinctly. When these projects fell into disuse or were transformed, the fate of the river changed and in turn, spurred a new articulation of environmental concerns

that gestured to a radically altered political situation after the 1980s.

The River and its Geography

Originating from an elevation of 600 metres in the Khanapur taluka of Belgaum district, located on the western fringe of the Karnataka plateau above the Keli Ghat, the Mahadayi ("Great Mother") initially meanders in a northeast direction for five kilometers before it turns westward for about 20 kilometers, reaching a point of junction with the Khandepar river at Bicholim when it assumes the name Mandovi. By this time, the river has in its upper reaches already gathered waters from tributaries such as the Kotrachi nadi, Surla nadi, and Ragda nadi. It enters the coastal plains of Goa where the river channel bifurcates and reconverges around the Diwar Island. Then it is joined by the Mapusa River (which has two tributaries namely, the Asnode River and the Moida River) and the Sinquerim River on the coastal plains before discharging into the Arabian Sea off Panjim. The trajectory of its flow and meanderings finds dramatic expression in the form of famous waterfalls (Dudhsagar being the best known) and in the formation of the large Mandovi basin, which along with the Zuari basin constitutes Goa's major alluvial embayment. It is tidal in its lower reaches, draining all of northern and central Goa, approximately 43 percent of its land area, and as the largest river in the state, it serves as its lifeline, providing it with unique estuarine formations and a network of canals, channels, and bays. The dynamic interaction between hill, river, and sea is evident in the constitution of Goa's physiography, which is dominated by the Sahyadri range in the east, intermediate low broad valleys alternating with highlands jutting into the sea, and western coastal plains that are fed and drained by a network of swift-flowing rain-fed rivers in the west. The river basins, especially of the Mandovi and Zuari, are made up of silt deposits. They link the coastal plains with the central physiographic section and make up islands, like Chorao, Tiswadi and Divar, thereby giving Goa a distinct geography of estuaries, creeks and embayments and a variety of estuarine, riverine, and marine islands.

Goa in History from the Fourth Century: Agrarian Settlement, Trade and Politics

While the early history of Goa is shrouded in obscurity and it subsequently features as a tributary state to one or other of the larger kingdoms (Maurya, 321–181 BCE; Satavahana, 100 BCE–300 CE; Bhoja, 400–600 CE) there seems to be general agreement that the management of Goa's unique landscape was a running preoccupation with people and rulers. Origin stories

about early human settlement in Goa revolve around the Parashurama myth of land reclamation from the sea and its settlement by 96 Brahmin families to supplant Kshatriya lineages.[1] Brahmin settlements were part of an ongoing process that saw the formation of the regions of Tiswadi (30 villages) Bardes (12 units) and Salcete (66 villages) that contoured the region of Goa. The association of agrarian settlement and grants of land to Brahmin pioneers of cultivation was not exceptional to Goa and was part of a larger all-India phenomenon. What is striking about Goa is the emerging experiments in water and land management in which local and probably preexisting communities like the Gavdas participated. The peculiarities of Goa's physiography and its river basins in which saline and fresh water mingled continuously necessitated the development of innovative water management infrastructure in order to sustain agricultural activity. This found expression in the formation of *khajjana* or *khazan* lands (derived from the Sanskrit *ksharajanaka* or salt-producing areas), mentioned in the Bandora copper plate inscription of Prithvimallavarman (fifth–sixth century CE) mentioned by Bhat and Rao (2013). Under the Bhojas (400–600 CE), there was a great deal of support for cultivation of marshy lands.

Khazans, according to Nandkumar Kamat, "were low-lying mangrove fringed coastal saline lands drained by tidal estuaries" (Kamat 2004, 1) organized by local communities (*gaunkars*) to guarantee sustainable agro-ecological systems. The *khazan* ecosystem was an interlinked series of small dikes, floodgates, furrows and channels that transformed swamps for irrigation, fish farming, and flood control. It used a system of *bandhs* and sluice gates to regulate salinity for paddy and manage tidal rhythms to retain salt waters for fish. Balancing the flows from the sea with freshwater supplies from rains and aquifers was vital to the preservation of *khazan* land and its cultivation. It was an exemplary model of early infrastructure that sustained both cultivation and pisciculture along the river and its estuarine basins. According to Sonak, the *khazan* as a community-based system of land and water resource management evolved over a period of two thousand years. (Sonak 2014, 34) Comparable to the ancient water and marshland management systems of Egypt and Mesopotamia, *khazans* embodied productive adaptation of local society to riverine flows, making

[1] According to legend, Goa's origins are associated with Parashurama, the sixth avatar of Vishnu who came to liberate the region from Kshatriya tyranny. After multiple campaigns, he shot an arrow or an axe in search of clean land to perform the fire sacrifice. It fell on the peaks of the Sahyadri and resulted in the reclamation of land from the sea, thus creating a new area called Parashurama Kshetra. The legend is retold in the Sahyadrikhanda of the Skandapurana and is associated with the settlement of Saraswat Brahmins in the region and the agrarian colonization that they spearheaded (Rodrigues 2019).

the best use of the environment to sustain agriculture.

We have extensive references to *khazan* lands in land grants from the fifth and sixth centuries that refer to their management by Brahmin families and by professional managers called Kamats who were entrusted by village communities to look after the arrangements. These communities, known as *gaonkars* and subsequently as *comunidades* were dominated by powerful Brahmin and Maratha caste settlers who displaced the original inhabitants—tribal groups, who were compelled to cultivate the lands now belonging to the "usurpers" or new settlers (Robinson 1993, 71) The *gaunkari* system that emerged owned land in common among its members with lower castes serving their ritual and material needs and receiving as payment shares in the harvest and occasionally plots of less fertile land as well. *Gaunkaris*, later formalized by the Portuguese as *comunidades* were essentially larger cooperatives entrusted with the responsibility of looking after their members, protecting *khazans*, and maintaining infrastructure. They appointed voluntary bodies called *bous* for specific tasks related to the maintenance of *khazan*. The bunds had to be periodically strengthened with fresh mud and straw so that breaches could be avoided.

Khazans embodied the marvels of indigenous management systems in response to geographical imperatives, giving the inhabitants of the region a guaranteed supply of rice and fish. These systems were not, however, exemplary embodiments of a timeless and unchanging rural landscape but evolved and accommodated modifications in the wake of political change and transformation, especially in the twentieth century. Changes related to the composition and functioning of the *comunidade* impacted not just livelihoods on the river but also ran contrary to long-term ideas of sustainability and community life. Additionally, rivers like the Mandovi and Zuari bestowed a maritime dimension to the region. Goa's ports did not typically operate as exporting centres but were trans-shipment centres absorbing goods from along the coast as well as from inland. By the beginning of the second millennium CE, the port of Gopakapattanam on the Zuari emerged as a major centre under Kadamba rule. There was also the port of Ela (later to become Portuguese Goa) on the banks of the Mandovi that initially functioned as a satellite to Gopakapattanam but later supplanted it altogether. Trade continued to prosper under the rule of the Deccan kingdoms—the Bahmanis and Vijayanagara (1378) and their feudatories.

At an ideational level, the importance of the river and its interaction with the landscape translated into myth and folklore wherein rivers, especially the Mandovi, assumed a central place transcending ritual invocation and

revealing a special sensitivity to the natural environment. The river was worshipped as goddess and savior. As Pratima Kamat (2008) shows in her work, the river was simultaneously imagined as a boat and water goddess, the Tarini or Mahishasuramardini. Kamat tracks early references to sculptural representation of the deity in the Kadamba period (tenth–fourteenth centuries) when there were associated sculptural representations of female deities seated on a fish or a boat, all of whom were worshipped in locations in and around the Mhadei. This was part of a larger coastal tradition where Tarini or Tara was worshipped as the benign patron of the sailors and men of the sea, with the important distinction that in the Sattari taluka, the image incorporated local artistic styles and imagery. Tarini like the river had many avatars and names as a symbol of fertility, a savior of seafarers and lost sailors tossed about during a shipwreck, and as the great nourisher. Evidently this cluster of imagery and meanings held vital clues about the vitality of the river as a conduit of trade in ancient times, feeding the maritime trade of Goa with both the east coast of India and the western Indian Ocean. The rural and urban dimensions of Goa were closely linked, and it was in the estuaries and islands constituted by the Mandovi and Zuari that cultivation was managed and trade flourished, bringing men of capital to its roadsteads. Predictably, the river became a site of power and contestation, a conduit for transportation of goods and ideas, deities and pilgrims.

The river assumed particular importance with newly emerging centralized state systems in the fourteenth century and their growing requirements of transportation, especially of horses and military stores. The rise of the Bahmani Sultanate in its various phases (1347–1492) and its chief rival, the Hindu kingdom of Vijayanagara (1336–1646), was accompanied by extended agriculture and trade. Goa became a bone of contention between the two states, changing hands on several occasions. With a view to enhancing Goa's commercial potential, the rulers encouraged foreign merchants to settle in Goa whose locational advantages were apparent. We do not know whether the river itself engaged the attention of rulers, persuading them to invest in securing it as the Portuguese would subsequently. What is evident is that with the rule of the Bahmanis, especially under its *wazir* Mahmud of Gawan, the western littoral of India was integrated with the Persianate world largely through trade whose protection involved systematic military campaigns. The capture of Goa in 1472 by Gawan from Vijayanagar was part of this strategy. Goa made an impression on Gawan who is supposed to have commented on its virtues thus: "The envy of the islands and the ports of India and famed for its fine climate, its coconuts and betel nuts as well as

for its springs and canals, and plenty of sugar cane and betel leaf and owing to an abundance of trees and springs, like a mirror of the grove of Genji and a copy of the cistern of plenty" (Kamat 1999, 22). For the Portuguese who supplanted the Deccan rulers in the sixteenth century, Goa and its rivers seemed like an enchanted landscape with its fine river, prosperous merchants, and fertile hinterland. As Duarte Barbosa put it, "Further along the coast, there is a very fine river which sends out two branches to the sea. Between these two is an island on which stands the city of Goa." He also mentioned Goa's affluent merchants and their extensive trade with west Asia (Barbosa 1918, vol. 1, 173–74).

How did Goa come to enjoy its status as an eminent commercial centre? What specific role did our protagonist, the river, play in this development? Like all port cities, Goa too had the benefits of a navigable river system that not merely gave access to freshwater but provided a cheap and efficient way of transporting goods. Further, the proximity of the port of Ela (which was on the Mandovi) to the timber yielding regions of Ponda must have helped with shipbuilding. Goan ships commanded a good reputation; Tome Pires (1944, vol. 1, 58) referred to both the quality of "Goanese" ships as well as sailors who could labor hard. It seems, therefore, that even before the Portuguese takeover and the integration of Goa into a larger world economy, the centre of commercial gravity in the littoral had already shifted to Goa. The process was completed by the first wave of Portuguese conquests around 1511 when the city of Goa emerged as a major hub in the network of commodity circulation in the Indian Ocean, with both official and private trade contributing to its maritime profile (Fernandes 1987, 284; Prakash 1998, 49–50).

The impact of Portuguese rule—which lasted for more than four centuries—on the Goan landscape was profound. Not only was the establishment of the Estado da India responsible for integrating Goa into a larger world system dominated by Europe, it was also crucial in reconfiguring social and spatial arrangements in the rural hinterland and in urban spaces. The Mhadei river too played its part in this saga of change, emerging as a major site of monumental architecture first and briefly under the rule of the Adil Shahis and subsequently under the Estado. Impressive riverfront forts communicated military authority, and churches, vice-regal palaces, and elite houses along its banks augmented its social value, contributing to Panjim's distinct urbanism. At the same time, the river resisted wholesale policing and assumed an agentic role when in the wake of religious changes, notably the Portuguese conversion of local Hindu populations, it facilitated "the flight of the deities," involving the relocation of Hindu artefacts and idols in the

districts of Ponda and Bicholim. This in turn resulted in the relocation and revitalization of temples across the river and encouraged converts to continue with their practices, aiding the revitalization of the Hindu faith and a vernacularization of Catholic practices (Kamat 1993, 65) Thus, the workings of infrastructure—both physical and social—gave the river and its environs a new set of features, making it a political entity. It became at once a conduit for secret transportation and in the process accumulated sacral dimensions. It was both witness and actor—a testimony to change over time.

Portuguese Rule and its Ramifications

Although a small river compared to the mighty Ganges, the Mhadei or the Mandovi was witness to a rich tapestry of historical experience that accommodated political projects of state-building as well as ecological and economic arrangements spearheaded by local populations of tillers and fishers and overseen by the political establishment. In the wake of Portuguese rule, the river also accommodated European influences that were especially manifest in urban and military architecture. The early modern European project in Asia was, for the most part, predominantly maritime. The Portuguese Estado was a seaborne empire constituted by control of specific strategic maritime and commercial outposts that secured monopoly of shipping and the carrying trade in the Indian Ocean. This meant that control of waterways—rivers and seas, littorals and maritime hinterlands—was crucial. In contrast to Asian polities, the Portuguese and their North European successors defined their strength and claims in terms of exclusive maritime jurisdiction, buttressed by infrastructure in the form of fortifications and navies and shipyards. Whether it was the building of a shipyard—the Ribeiro Grande—or forts on the river Mandavi, or the augmentation of the armada that policed the Indian Ocean, the new stakeholders clearly appreciated the strategic value of rivers and waterways greatly.

For the Portuguese, whose rule in Goa assumed formal contours by 1543 after the first round of conquests (Bardez, Tiswadi and Salcete), the river was key to securing trade and patrolling commercial operations as well as to laying out an urban settlement. The nature of the investment, however, changed over time. The strength of the Estado da India in the sixteenth and seventeenth centuries stemmed largely from control of trade and extraction of customs while the bureaucratic apparatus was supported by allowing Portuguese officials and servants of the crown and the royal trading company to participate in private trade (Pearson 1976). Subsequently, with the overall decline of the Estado as a trading power, the territorial and land revenue arrangements enjoyed priority with the administration, which in turn was

reflected in the reorganization of agrarian society after the second round of conquests in the eighteenth century with the incorporation of the territories of Sanguem, Quepem, and Canacona into Portuguese Goa.

Infrastructure was key to the success of the Estado both as an instrument of control as well as an embodiment of monumental imperial power and projection of authority. The river became the site of an ambitious building program of secular and religious architecture. To project the impression that that Portuguese rule was decidedly Christian was as important as the need to fortify their settlements. Right from the outset, the Portuguese were keenly aware of the importance of the Mandovi river for their new settlement in Ilhas or Goa, both as a source of freshwater and as a major point of access that needed to be secured. Forts were therefore a major preoccupation with the regime. Taking a cue from their predecessors, the Adil Shahi rulers who had developed an important fort at the narrowest part of the river on the southern side of the Bardez taluka, the Portuguese built two major forts. The first of these was the Reis Magos fort, whose construction began in 1550. Situated in the southeastern extremity of the tableland on the right bank of the Mandovi, it became pivotal to a defensive system intended to facilitate Portuguese control over shipping on the river and to prevent enemy ships from crossing its waters. The strategic efficacy of the Reis Magos fort was demonstrated time and again. By 1595, when the Portuguese were challenged by Dutch incursions, they built yet another fort, the Aguada fort (1609–1612), this time on the opposite bank of the river at the mouth of the Zuari and the Mandovi. A massive structure that made it onto the list of impressive fortifications compiled by Jose Nicolau de Fonseca (1878, 40–41), it skirted the seashore with a breathtaking ascent to the summit of the bare and rocky headland called Aguada Point. It featured a citadel, a lighthouse, two powder rooms, two magazines, four barracks, and a chapel, exhibiting the sheer dominance and ideology of the Estado. The Aguada fort had the spectacular effect of contouring the Mandovi as a Portuguese sphere of dominance. This sphere was, however, subject to severe challenges and assaults from the seventeenth century when Portuguese Goa went into a spiral of decline. In fact, construction of riverine forts, big and small, characterized the political initiatives of neighboring coastal rulers such as the Desais of Sawantwadi, the Angrias, and the Marathas and their subsidiaries like the Hingnikar Bhonsles, who established their strongholds along the coast. In the innumerable campaigns and skirmishes that followed among these entities, Goa was often threatened and attacked. It was only the forts of Aguada and Reis Magos that functioned as strong bulwarks.

Portuguese naval security infrastructure along the river accommodated a series of impressive buildings in addition to the forts to which we have referred. Coming by sea to old Goa, one would have encountered a large royal shipyard and arsenal, the quay of Saint Catherine, and the landing site for the fishing fleet and galley yard on the southern shore of the Mandovi estuary. Once ships disembarked at the quays of the Viceroys, the central fort area came into view with an archetypal cluster of buildings including custom houses, churches and vice-regal palaces like any other European city settlement (Heitzman, 2008, 89). The workings of the settlement fostered a riverine aspect to urban experience, although it was not entirely new, given the location of the older Bijapuri palace in the area. However, the river became a prized site for settlement where elites, both Portuguese and local, built their opulent mansions. The Ribander palace comes to mind in this connection; the eighteenth century dwelling of Jose Bernardo da Colaco, a prominent member of the Estado administration who was appointed chairman of the municipality of Ilhas (1832). He nearly drowned to death on a trip between Goa and Diu until perchance he found a statue of the Virgin Mary floating by. Clinging to it, he sailed to safety, brought the statue home, and installed it in his mansion. Construction on the eastern wing of this mansion was started in 1730 and finished in 1745 and it was intended to serve as a transit house between old Goa and the Colaco family residence in Piedade, an island village, and Ribander (Mergulhao 2022).

Securing the river became even more urgent from the end of the seventeenth century with the rise of the Marathas and the slow decline of the Mughal state. The Marathas pressed their campaigns against Goa and Bassein and there was sporadic conflict between Goa and the ruler of Sawantwadi and Maratha chiefs notably the Bhonsles whose operations tended to focus on strategic points near the river. In 1705, the Khem Sawant attacked the fort of Amona situated to the east of the Mandovi river (Mhamai 2018, 15). Indeed, the river was subject to periodic blockades by the Khem Sawant but ultimately the superiority of the Portuguese naval forces prevailed. In December 1705, the Portuguese forces were ordered to march on to Dicholi fort, another stronghold of the Bhonsles, which was built on the bank of a small tributary of the Mandovi (Staněk and Wanner 2019). Fierce fighting resulted in the occupation of this fort as well. In 1706, the Portuguese troops concentrated their efforts in attacking the islands of Kharjuvem and Paneli, which had been captured by Khem Sawant, thereby compromising the security of Goa. The island of Kharjuvem lay to the southeast of the village of Aldona in Bardez separated from it by the Mapusa river which ultimately joined the

Mandovi. The campaign was a success, thereby enabling the Portuguese to retain their control.

Subsequent decades saw the Marathas and the Sawantwadi rulers resume their attacks against the Portuguese. It was only in the 1740s under the new viceroy Louis de Menezes that the Portuguese were able to decisively reconquer Bardez, the island of Kharjuvem, and Kolvale. By 1746–47, they had effectively contained the power of the Bhonsles and taken the strongholds of the Sawantwadi rulers. The Portuguese did not show the slightest inclination to follow this up by taking over any territory that did not fit in their explicit commercial agenda. Viceroy Dom Pedro D'Almeida pointed out that any incursions into territories that did not have seaboards was irrelevant and "useless" and that his interest was only to safeguard Alorna because it was "accessible by means of a winding river," i.e., the Chapora river.

Forts like Tivim and Colvale were but one albeit a critical component of infrastructure. Expanding waterways via canals featured as major priorities like the Cumbarjua canal that connected the Mandovi and Zuari rivers. Walter Rossa (2022, 144, 146–47) makes an important point about Portuguese initiatives in hydraulic engineering being inspired largely by traditional *khazan* practices which, as observed before, underscored the ecological profile of the river. The river featured centrally in the urban expansion of Panjim from the very beginning whether in supporting bridges to connect districts of Panjim with Ribander or as a prized waterfront for houses. Fonseca (1878) refers to the Pont de Limhares, a 3.2 km causeway connecting Ribander to Panjim and running along the flood plains of the Mandovi. Fonseca's observations also emphasize the personal interest taken by viceroys and administrators in building and maintaining infrastructure although these were in a state of disarray when he wrote his work. By the eighteenth century, as Panjim urbanized rapidly and emerged as the capital, plans emphasized the laying out of an orthogonal grid to connect the two arms of the river. The riverbank gave the capital settlement its distinct profile although urban planning was quite ad hoc and the growth of Panjim was concentrated within the area of Fontainhas and further west towards the Mandovi where major state service departments like customs were located (Faria 2007).

The centrality of the river in structuring the spatial organization of Panjim and its environs is brought out eloquently by Fonseca, highlighting the river-centric imagination of the Portuguese project:

> The view from the entrance of the harbour is at once picturesque and imposing. To the left stands the stately fortress of Agoada,*

> with a series of batteries commanding the sea-coast, and with a castle and a lighthouse on the brow of a rock rising to an elevation of 260 feet above the level of the sea. In the centre of the harbour is seen the Cabo, with a beautiful palace, the summer residence of the Governors of Goa. To the right appears the fortress of Mormugao, which by its elevated position and massive structure rivals that of Agoada. Proceeding through the harbour up to the mouth of the Mandovi, we see two other forts almost confronting each other from the opposite banks of the river, and known as the forts of Reis Magos and Gaspar Dias. Further up the river lies Pangim, the modern capital of Goa, five miles distant from the harbour, and next to it the pretty little village of Ribandar, connected with Pangim by a long causeway which forms the main road over a salt marsh from the new to the old capital. The entire margin of the river from Ribandar to the ancient city was in former times flanked with a row of elegant buildings, which, together with the distant turrets and cupolas in the city and its suburbs, presented an exceedingly charming sight, of which several travellers have left graphic descriptions.
>
> At present these buildings, turrets, and cupolas have almost all crumbled to dust, but still the natural scenery which bursts on the view from all sides as we advance up the river is at once picturesque and interesting. A mere glance, says a celebrated Orientalist, at a sketch of this river will suffice to convince one that it washes an enchanted land (Fonseca 1878, 113).

Imagining the river as a site of built space for securing control over trade and for initiating an urban program stood in sharp contrast to its agrarian profile, which was however, not insignificant. The difference derived from the fact that infrastructure projects related to town planning and security demonstrated an explicit adherence to immediate imperatives of military threat, demographic pressure, and the maintenance of political power and presence, while projects related to agrarian practices and livelihoods followed a more unhurried rhythm and had different stakeholders whose understanding of the riverscape was more in line with notions of collective responsibility. This is not to suggest that the agrarian infrastructure represented by *khazans* was timeless and unchanging but rather to make the point that change in this arena occurred more slowly until the middle of the twentieth century.

The River as Ecological Entity: Social and Agrarian Experiments

Historically the Mandovi river and its saline tidal flats provided a rich and productive agrarian landscape that encouraged experiments in land-water management and regulation of fresh and saltwater flows. As we have pointed out earlier, the eco-aquatic systems known as *khazans* were designed by settlers in the fifth and sixth centuries to make use of a fragile interconnected system of water channels and reclaim lands to sustain both agriculture and fishing. The river was a daily presence in the life of the people who inhabited its banks where they fished and farmed and drew salt. Ingenious methods of salinity regulation and water management through sluice gates and dikes guaranteed regular supplies of fish and water for paddy cultivation. The village cooperatives or the *gaunkari* assumed charge of maintaining embankments and dikes and of protecting lands that were not privately owned. As self-governing cooperatives, the *gaunkari* owned all common village lands and leased out cultivable lands by auction. The proceeds earned from the auction of rights to cultivate land were used for the protection and maintenance of the *khazan* ecosystem. In the pre-Portuguese period, the *gaunkari* paid a fixed tax to the local ruler for security. The Portuguese quickly realised the importance of the *gaunkari* system as a means of tax collection and for the provision of useful social allies and set about codifying rules that formalized the system. These arrangements enabled the rulers to adapt the system in order to ensure rents for their own use and to enlist the support of prominent *gaunkars* as collaborators. Renaming the *gaunkari* as *comunidade*, the Portuguese state intervened in the management of their internal affairs even though it left the basic community organization intact.

The *Foral* of 1526 by Afonso Mexia codified customary rights and practices and obligated village communities to pay taxes even as an apparatus of control was put together to oversee affairs of the *comunidade*. Successive decrees in the eighteenth and nineteenth centuries made the functioning of the *comunidade* accountable to the state. Through a slew of subsequent legislation, the state gained control over *comunidade* administration in matters related to expenditure, debt and recovery, deficit, sales and mortgages, records and registration, etc. Of direct relevance to the management of the *khazan* system and the health of the river was the maintenance of the b*ouco*/*bous* system (Dias 2016). According to Dias, it is not clear when this association emerged but it is apparent that that the *comunidades* faced pressure to bring additional lands under cultivation, which in turn necessitated additional supervision of the infrastructure of bunds and dikes along the river. (Dias 2016, 176). The *bous* were in charge of repairs (Sonak 2014, 68) and violation of

these responsibilities was considered a serious offence under the Code of *Comunidades* (1882). Interfering in the flow of saline waters was an offence; so was the retention of saline water for breeding fish.

At the same time, participation in the *bous* became compulsory for all tillers of *khazan* land—anyone taking *khazans* on lease became its members automatically. Simultaneously the regulations expanded the authority of the state (Sonak 2014, 68) by overhauling the procedures related to expenditure, debt and recovery, records and registration. By this time, the rationale behind the *comunidade* system came under scrutiny, with public debates arguing for and against the institution (Dias 2016, 13–14). Some argued that the assets of the *comunidade* had to be redistributed for the revival of Goa's agrarian economy. These arguments were partly reflected in the modifications and amendments that the Portuguese state introduced from 1904 onwards as a result of which non-*gaonkars* became part of the village council. In 1961, the *bous* was abolished and new tenants were made responsible for infrastructure maintenance with disastrous consequences in the form of poorly maintained embankments and falling fertility in *khazan* lands (Sail and Priya 2020, 140).

A new lobby of tenants and bund contractors (Kamat 2004, 8) emerged whose understanding of the system did not prioritize ecological sustainability or working in tandem with the river rather than forcibly bending it to their aims. The workings of the new bureaucracy after Liberation in 1961 led to a long-term decline of the old system of *khazan* management and the articulation of new priorities that no longer saw value in balancing paddy cultivation and pisciculture. Sonak (2014, 87) mentions how under new tenancy arrangements, the state was the ultimate authority for issuing sanctions and the Mamlatdar, the adjudicating officer, was not obliged to work within a designated time frame. At the same time, there were growing illegalities over the execution of contracts. Kamat (2004) points out how tenant associations siphoned off funds by taking over contracts for bund repair and auctions for sluice gate fishing rights. In his words, there was "since 1963, systematic plundering of khazans" with "active political support," resulting in illegal pisciculture and long-term damage of *khazan* lands (Kamat 2004, 8).

Can we hear in this an inverted reverberation of an older echo of decline that accompanied regime change? Fonseca in the 1870s recalled comments made by the Prince of Wales during his tour in the 1870s about how the city of Panjim was in utter ruin and how the river washed crumbling masonry, arsenal, palaces, quays and churches, which were in a state of utter disre-

pair. More than a century later, we have a situation where excessive building threatens to subvert the physical environs dictated by new property arrangements and new conceptions of development that are decided by a political regime that is not sensitive to local realities. In both cases, it is infrastructure that holds our attention, either by its overwhelming presence or by willful neglect and irresponsible stewardship of resource management.

It is in this context that we turn to the study of the Mhadei controversy, which emerged at a time when agriculture was no longer a running concern for most farmers and the idea of the river as a "commons" to be safeguarded no longer enjoyed traction. While the middle of the twentieth century saw the unprecedented expansion of infrastructure projects (the Mandovi bridge and the Selaulim dam) and new modalities of land organization and tenancy reform, there were new stakeholders both in the administration as well as in the community who saw the river and *khazan* land management very differently from older *comunidade* members. Given the steady decline of paddy cultivation, there was no interest in defending an older system or in applying brakes to the expanding illegal pisciculture that successive post-Liberation governments promoted at the expense of a fragile and unique ecosystem.

These changes at the local level in Goa intersected with larger all-India developments related to infrastructure building for consumptive and non-consumptive water use, triggering a major dispute over water sharing of the Mhadei-Mandovi among the states of Maharashtra, Karnataka and Goa. At the heart of the dispute was the rights of riparian states to water use amidst a complex legal landscape that had evolved haphazardly over a period of colonial rule and a pressing political milieu in which the states concerned had very different realities and needs to grapple with.

Contestations over Water: The Mhadei Controversy

The Mhadei dispute first surfaced in 1985 in the backdrop of escalating pressure for water resources in Karnataka, particularly in the drought-prone areas of Belgavi, Dharwad and Gadag whose farmers hankered for the potential of new irrigation projects put forward by the state government. Even before this, irrigation held out prospects of material improvement for farmers who had in the 1970s switched from their traditional one crop a year to commercial cultivation of cotton. However, their hopes were belied when cotton prices crashed, and poor-quality seeds aggravated the situation. Around this time, the Karnataka state government stepped up their irrigation projects and also decided to impose a betterment levy on farmers for funding the Malaprabha Reservoir. Technical defects compromised the working of the

reservoir leading to uneven water distribution as a result of which farmers agitated against the levy. The farmers of Nargund led the way; protests turned violent leading to the death of farmers and police personnel on 21 July 1980. From this point onwards, water became a critical issue in farmers' protests in the region merging into the dispute over the sharing of the Mhadei. The government of Karnataka was cornered into pushing forward irrigation projects to solve the problems of water supply and power, something that neighboring states could not countenance (Ranjan 2018).

In 1985, the Karnataka government investigated the possibility of a 35-megawatt hydroelectricity project to divert half the waters of the Mhadei. The state was interested in access to water for both drinking water and irrigation within the Mahadayi river basin (Mahadayi Water Disputes Tribunal 2018, vol. I) and the development of the hydroelectric project, involving non-consumptive use of water. Goa protested against the scheme and the issue was shelved but not resolved. In 2002, the issue resurfaced when the Karnataka Government received the clearance of the Union Government to proceed with the Kalasa-Banduri nala project, which would improve water supply to Belgavi, Gadag and Dharwad by diverting 7.56 TMC of water from the Mahadayi tributaries Kalasa and Banduri to the Malaprabha river. Once more, Goa protested and in July 2002 requested the Government of India to constitute a tribunal to evaluate the dispute and assess available water resources and their allocation to the concerned states. In 2010, the Mahadayi Water Disputes Tribunal was set up, which reviewed the matter for nearly eight years and came out with a decision on 14 August 2018. The tribunal allowed Goa to use 24 TMC water from the river for its municipal, irrigation and industrial water needs, Karnataka to use 13.4 TMC water for power generation and drinking purposes and Maharashtra a smaller share of 1.33 TMC water.

Between 2010 and 2018, the states were asked to provide detailed statements of their claims and rationale as well as rebuttals of rival positions in order to facilitate the settlement of the dispute. Each state was given clear terms of reference to back their pleadings, including accurate scientific information about assessment of water availability, hydro-meteorological and hydrological data, the basis of deciding on equitable shares of co-basin states, information about water for consumptive and non-consumptive use, and finally guidance about the required authority for construction and sanction of projects of upper riparian states. The tribunal tried to reconcile the requirements of all parties but the Award of 2018 was resisted and the matter remains pending at the Supreme Court as of December 2024.

What do we make of the dispute in terms of both the discourse that governments and the tribunal have produced as well as of the conflicting priorities of states in independent India? Do we simply understand the conflict as an expression of confusing water federalism in the post-liberalization period? Or do we look at it as the inevitable fallout of the logic of developmental projects and inter-state competition over them? Evidently neither of these explanations is complete in itself and it may be useful here to draw insights from a historical perspective on water disputes and the effects of colonial legislation that augmented regional variations and structural anomalies. It is useful to remember that the Portuguese colonial state did not entirely displace all notions of water as a common property even while it steadily extended control over the *comunidade* that assumed responsibility for sustainable *khazan* management. The rationale for both Portuguese policy as well as British policy in the rest of India was revenue maximization, the pursuit of which saw major changes in landed society, perceptions of resource management, and the allotment of government power over development projects. Irrigation projects, for instance, were a major concern in British India and were initially designated as a central subject, irrespective of political boundaries with princely states like Mysore. The guiding principle was optimum utilization of river waters and most disputes between provinces relied on mutual consensus agreements with the final sanction coming from the Secretary of State. Under the Dyarchy Act of 1919, water became a provincial but reserved subject. In 1935 with the passing of the Government of India Act, irrigation and irrigation-related water management became a provincial subject, falling within what was termed as the "legislative competence" of the province. While each provincial government was given the authority to manage waters that flowed in its area including inter-state rivers, the central government still retained the right to adjudicate disputes and to institute a committee with experts if the situation so demanded (Chokkakula, Kapur and Singh 2021).

These provisions did not always make for easy execution on the ground. For instance, Radha D'Souza shows in her work on the Tungabhadra dispute how colonial rule introduced "conflicting trajectories of economic development, different political structures and different mixes of traditional and modern technology" and how those differences came to be formalized within a legal framework that gave the disjuncture its structure (D'Souza 2004, 312–314). She cites the Act of 1892 that came into existence in the wake of a dispute between princely Mysore and the British-ruled Madras Presidency and how it introduced new ways of conceptualizing irrigation works. It was

not based on any statute or international agreement and in fact "alienated irrigation works from their embedded places in agriculture by the manner in which such works were defined in the agreement" (D'Souza 2004, 317). The agreement defined new irrigation works and new repairs and further stipulated that none of these works could be undertaken without permission from Madras. The agreement also assigned to the state disproportionate power over waterworks and to grant or withhold permission as it saw fit. De Souza suggests that these principles have been carried forward in post-colonial India as well (D'Souza 2004, 345).

A similar formulation is suggested by Leela Fernandes who provides empirical information to explain the regional variations in river-water sharing disputes and their resolution. Contrasting the Kaveri river waters dispute between Karnataka and Tamil Nadu with that of the Telugu-Ganga waters between Tamil Nadu and Andhra Pradesh, she raises historical antecedents of disputes that were either amicably resolved with negotiations or that involved more hostility and demonstrates how the competition over mega irrigation projects has converted rivers into competing and conflict-ridden spaces (Fernandes 2018). We also have an important argument put forward by Srinivas Chokkakula that riparian relations were inherently asymmetrical, favoring the interests of the upper riparian state, but that legal principles have historically favored lower riparian states. He also argues for a deeper political understanding of disputes, which could deepen democracy, force more transparency in the dissemination of information and encourage greater inter-state cooperation (Chokkakula 2014).

In post-Independence India, water policy development has occurred over a range of levels—state, central and local—and the rationale for the policy is almost entirely informed by developmental considerations, overlooking ecological requirements for the most part. State governments enjoyed power over intra-state rivals and water bodies but were obligated not to prejudice other states' rights, none of whom had proprietary rights over any volume of water. However, in practice, states have shown a tendency to overstretch their competence, just as there has been an overreach on the part of the centraal government and subsequently the judiciary. The impact of judicial decisions has resulted in what has been referred to as tribunalization of water justice, with tribunals determining the volume of water availability and utilization for competing states. Added to this has been a chronic absence of reliable data on the basis of which negotiations could be carried out.

All these factors have surfaced time and again in the Mhadei dispute, which has been subject to the playing out of historical precedents regarding wa-

ter sharing and the rights of riparian states (Marathe 2024) and of narrow political interests that have complicated the dispute with very little understanding of the history of the river and its basin, of its ecological value and reach and of its deep political and cultural history. Even worse has been a colossal indifference to redressing old structural anomalies in the relations between states in a federal structure and to the consolidation of expertise in charting out viable courses of action. The overriding impulse to step up infrastructure has meant that anomalies of policy and the importance of environmental protection are given short shrift, resulting in the invocation of an empty rhetoric that has no real engagement with the river and its enduring importance for the region and its peoples.

Concluding Observations

This chapter has ventured a brief excursus into the history of the Mhadei river during the period of Portuguese rule and the decades after Liberation through the lens of physical and social infrastructure, which had long term implications for Goa in terms of perception and usufructuary rights. These added to the profile of the river as a complex yet unitary and interconnected system that sustained agrarian, urban and imaginative life in the past and stands for a new set of serious concerns about environmental sustainability in the present. Understanding its complex history is important as it reveals its dynamism as a complex political, social and ecological entity whose representation cannot be surrendered to claimants with extractive political and financial agendas. Through a history of infrastructure, this chapter has attempted to identify the ways in which the state in Goa (Portuguese as well as the Indian state after Liberation) has viewed and valued the river and what lessons we can draw from the past in shaping public understanding of the river and its importance. We have seen how the Portuguese were driven by some obvious considerations—military, transportation and revenue management—that resulted in the articulation of a particular kind of architectural visibility around strategic sites on the river. On the flip side, the rank disinterest in maintaining infrastructure related to *khazans* during the final decades of Portuguese rule had damaging consequences for paddy cultivation, leading to the rampant expansion of pisciculture that altered the older balance between species and the environment.

With the independent state government of Goa, there was yet another new coalition of interests and a new kind of infrastructural activity on the river, in the form of bridges (in the 1970s and 1990s) and jetties, which have impacted the physiography of the river. Additionally, there are casinos that dot the

riverfront as part of a new tourism drive that stands for a particular mode of development. These gesture to a rapidly transforming socio-political milieu that look at the river as resource to be extracted rather than conserved. It is only if we take a long-term view in terms of looking both at the past and into the future that we can consider the contentious question of who can speak for the river and for its responsible stewardship.

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Sujata Noronha is an educator specializing in early literacy and enjoys working with children and books. She is deeply interested in the power of the printed word and the pathways to access and growth emerging from it. In Goa, she works out of her organization called Bookworm, that provides resources and facilitates libraries and reading within the community of Panjim and in schools around the state. She consults with the Tata Trusts within the education portfolio.

Maya de Souza has an inter-disciplinary background with over twenty years' experience in public policy and the law. She graduated from Oxford University in Philosophy, Politics and Economics before studying and practising law. After an L.L.M. (London), graduating with distinction, she joined the Department for the Environment, Food and Rural Affairs in the UK Government Legal Services and later moved to policymaking. She headed various teams on better institutional structures for flood risk and integrated water management where she led a project on holistic approaches to water management in the climate risk context. She has also headed the Business Environment Council Hong Kong's Policy and Research Team, leading projects on climate resilience; and served on the BITC–UK Circular Economy team as Co-Director, Environment. Maya has been an elected Green Party councillor in London, playing an active role in town and country planning and scrutiny of the environment among other policy areas. Currently, Maya lives and works in Goa, and is a co-director of Act for Goa, co-founder of Materia Verde (a new biomaterials industry accelerator powered by Quicksand). She was previously with Bangalore-based think tank, CSTEP. She also works with various consultancies on future-proofing and strategic insight.