INTERNATIONAL JOURNAL OF HUMAN RIGHTS LAW REVIEW
An International Open Access Double Blind Peer Reviewed, Referred Journal

Volume 5 | Issue 6 | 2026 Art. 18

Canals as Corridors: Alien Species and the Legal Blind Spot in India's National River Linking Project

Sandra Prasad
Law Student,
4th Year, BBA.LL.B.,
Symbiosis Law School, Hyderabad

Recommended Citation
Sandra Prasad, *Canals as Corridors: Alien Species and the Legal Blind Spot in India's National River Linking Project*, 5 IJHRLR 206-217 (2026).
Available at www.ijhrlr.in/current-issues/.

This Article is brought to you for free and open access by the International Journal of Human Rights Law Review by an authorized Lex Assisto & Co. administrator.
For more information,
please contact submission.ijhrlr@gmail.com

Canals as Corridors: Alien Species and the Legal Blind Spot in India's National River Linking Project

ABSTRACT

A species from the Ganga is an invader in a stream in the Western Ghats, but Indian law does not consider it an invader. The National River Linking Project (NRLP) is a plan to create thirty links between basins that have been separated by evolution for thousands of years. This article examines the question of whether Indian law applies to biological invasion in the context of the State creating the pathway, based on a 2026 basin-level modelling study of fifteen freshwater invasive alien species (IAS). Using a doctrinal and analytical method supplemented by secondary empirical data, it applies a four-question pathway framework such as is the risk identified, captured by law, assigned to an institution, and remediable to the Wild Life (Protection) Act, 1972, as amended in 2022, the EIA Notification, 2006, the Supreme Court's river-linking and precautionary-principle jurisprudence, and comparative practice under the Convention on Biological Diversity and EU Regulation 1143/2014. It concludes that about 45 per cent of the assessed basin area is at high modelled risk, corridors run from heavily invaded to less-invaded basins, import, trade and possession are regulated by Section 62A, and project-by-project appraisal does not account for the cumulative effect of sequential links, "alien" is anchored to the national border, and intra-national translocation is outside Section 2(16A). The evidence indicates risk, not proven harm, and trade and aquaculture are the main sources, so canal controls will not be enough. The article suggests that the legal trigger should be the pathway, rather than the species: programme-level risk assessment, link-specific biological invasion assessments under the EIA regime, burden on proponents to demonstrate low risk, a broader definition of IAS, and phased commissioning. Most links are still at the feasibility stage, and clearance can still be the moment when biosecurity is achieved.

KEYWORDS

Biotic Homogenisation; Environmental Impact Assessment; Invasive Alien Species; National River Linking Project; Wildlife (Protection) Act.

1. INTRODUCTION

Rivers seldom feature in public debate as biological boundaries, yet

India's river basins are ancient, topographically isolated evolutionary units whose separation has produced high endemism. The NRLP would dissolve that separation. The institutional form of India's river linking idea dates to the National Perspective Plan of August 1980, under which the National Water Development Agency (NWDA) has identified thirty links, sixteen in the Peninsular and fourteen in the Himalayan component, for feasibility reports.[1] The Union Government Informed Parliament that securing "*all requisite statutory clearances*" and reaching an agreement among the relevant State are prerequisites for implementation. The first link being built is the Ken-Betwa Link Project, which will cost Rs. 44, 605 Crore and have a foundation stone placed on December 25, 2024.[2]

A less discussed issue has drawn attention by a recent press article titled "*India's river interlinks may carry invasive species to more areas*".[3] It relies on a 2026 study in *Scientific Reports,* which models fifteen naturalized freshwater IAS and finds that the proposed links would act as corridors between previously isolated basins.[4] The species in question did not happen to show up. They were brought in for food, the pet trade, and biocontrol, and now they "*wreak havoc in the invaded areas*".[5] The issue is not incidental. According to the 2023 IPBES assessment, there are more than 37,000 established alien species in the world, including more than 3,500 dangerous invasive species, and they cost the economy more than $423 billion annually in 2019.[6] The Kunming-Montreal Global Biodiversity Framework's sixth target requires parties to control introduction pathways and lower the rates of invasive species

[1] Ministry of Jal Shakti, Press Information Bureau, "National River Linking Project", 2 December 2021, available at: https://www.pib.gov.in/Pressreleaseshare.aspx?PRID=1777259&reg=48&lang=2 (Last visited on 7 October 2026).
[2] Press Information Bureau, "Ken-Betwa Link Project", available at: https://static.pib.gov.in/WriteReadData/specificdocs/documents/2026/aug/doc2026821966401.pdf (Last visited on 7 October 2026).
[3] "India's river interlinks may carry invasive species to more areas", The Hindu, available at: https://www.thehindu.com/sci-tech/energy-and-environment/india-river-interlink-project-spread-invasive-species-ecologically-sensitive-basins/article71516506.ece (Last visited on 07 October 2026).
[4] Aravind Neelavar Ananthram and others, "River interlinking and biodiversity risks in Indian freshwater ecosystems", (2026) 16 Scientific Reports 17552, available at: https://doi.org/10.1038/s41598-026-46640-5 (Last visited on 7 October 2026).
[5] "Interlinking of rivers could flood India's freshwater with invasive fish", Mongabay India, December 2023, available at: https://india.mongabay.com/2023/12/interlinking-of-rivers-could-flood-indias-freshwater-with-invasive-fish/ (Last visited on 8 October 2026).
[6] IPBES Secretariat, "Media Release: IPBES Invasive Alien Species Assessment", 4 September 2023, available at: https://ipbes.net/zh/node/59066 (Last visited on 7 October 2026).

established and introduction by at least 50% by 2030.[7]

An inter-basin canal is an introduction pathway; hence the legal importance is obvious. However, federalism, hydrology, and displacement predominate in discusses about the NRLP: and statutory instruments are rarely examined in the ecological literature. The article addresses this gap. Its objectives are: (i) summarize the NRLP's published findings on invasion risk; (ii) assess current Indian law against that risk; (iii) compare India practice with international norms; and (iv) suggest workable reforms.

2. LITERATURE REVIEW

1. The research paper "*Opening the floodgates for invasion – modelling the distribution dynamics of invasion alien fishes in India*" by M. Nobinraja, N.A. Aravind and G. Ravikanth examines twelve alien fish species in India from an ecological and geographical perspective. According to the study, which maps climatic suitability using species distribution models, around 31% of India's land has suitable habitat and the Pennar, Kaveri, Godavari, Krishna, and Mahanadi basins are extremely susceptible.[8] However, the study doesn't look at the legal tools that could be used to govern such a pathway; instead it is limited to fish and climatic appropriateness.[9]

2. The research paper "*River interlinking and biodiversity risks in Indian freshwater ecosystems*" by Aravind Neelavar Ananthram, Gokulapriya Raja, M. Nobinraja and G. Ravikanth offers a geographically detailed, basin level analuysis of fifteen freshwater IAS in India's river basins. The study highlights the underrepresentation of invasions in Indian EIAs, finds a positive association between IAS richness and freshwater biodiversity, and calls for early discovery and quick action. Neverthless, the study offers no legal framework to carry out its proposals and doesn't

[7] Convention on Biological Diversity, Decision 15/4, Kunming-Montreal Global Biodiversity Framework, UNEP/CBD/COP/DEC/15/4, 19 December 2022, Target 6, available at: https://www.cbd.int/gbf/targets/6 (Last visited on 7 October 2026).
[8] M. Nobinraja, N.A. Aravind and G. Ravikanth, "Opening the floodgates for invasion—modelling the distribution dynamics of invasive alien fishes in India", (2023) 195 Environmental Monitoring and Assessment 1411.
[9] Max Martin, "Interlinking of rivers could flood India's freshwater with invasive fish", Mongabay India, December 2023, available at: https://india.mongabay.com/2023/12/interlinking-of-rivers-could-flood-indias-freshwater-with-invasive-fish/ (Last visited on 7 October 2026).

analyze the wording of the EIA Notification, the Wild Life (Protection) Act, or any other document.[10]

3. The research paper "*Inter-basin water transfers and the expansion of aquatic invasive species*" by B. Gallardo and D.C. Aldridge offers a modelling-based analysis of the overlap between the ranges of invasive and native mussels as well as how the Severn-Thames transfer may propagate invasive species, most notably the quagga mussel. The study highlights the EU's legislative reaction and indicates inter-basin transfers as a significant freshwater invasion mechanism. It doesn't, however, provide advise on the Indian regulatory framework or on transfers between India's biogeographically varied basins; instead, it concentrates on Great Britain.[11]

When considered collectively, the ecological research identifies the risk but doesn't go into legal analysis where the NRLP is tested against India's invasive-species and impact-assessment law. This article addresses that gap.

3. RESEARCH METHODOLOGY:

Research design: The study is doctorinal and analytical, supplemented by secondary empirical data.

Sources: Primary sources comprises the Wild Life (Protection) Act, 1972, the EIA Notification, 2006, a Supreme Court judgement, parliamentary replies released by the Press Information Bureau, and the decisions of the Convention on Biological Diversity.

Scope: The article concerns freshwater IAS and inter-basin links proposed under the NRLP, the Union-level law

Limitations: There are no primary field data. The ecological findings are model-based; their authors acknowledge that climate-only models may over-predict and that the Andaman and Nicobar Islands were excluded. No NRLP link has yet operated long enough to show actual invasion, and the author could not locate a notification under section 62A addressing inter-basin transfer.

Analystical framework: A pathway approach, consistent with Target 6, asks four questions: is the risk identified, is it captured by law, is an

[10] Aravind et al., supra note 4.

[11] B. Gallardo and D.C. Aldridge, "Inter-basin water transfers and the expansion of aquatic invasive species", (2018) 143 *Water Research* 282.

institution responsible, and is there a remedy?

4. DISCUSSION AND ANALYSIS

4.1.The Empirical Case

The *Scientific Reports* study describes the NRLP consists of thirty linkages connecting 37 rivers, with over 3,000 reservoirs and around 15,000 km of canals. Its goal is to generate 34,000 MW and redistribute approximately 174 billion cubic meters of waters.[12] Each of the fifteen-model species was purposefully added for aquaculture, biocontrol, ornamentation, or pets. The Brahmaputra, Ganga, and Lower Ganga sub-basins, as well as the Krishna, have the highest modeled invasion richness (13-15 species). According to the author's calculations, 1,533,481 km² (or around 45%) of the 3,430,337 km² of designated basin area are high-risk, 1,286,406 km² are intermediate, and 610,447 km² are low risk. With 1,533 freshwater species, 318 threatened species, and 11 modeled IAS, the Southern-Western Ghats rank highest on the study's weighted index (664.2), while the Mahanadi, which is home to` 69 threatened species, would receive propagules from the heavily invaded lower Ganga through the Ganga-Damodar-Subernarekha-Mahanadi chain.

Table 1: Modelled IAS richness along selected peninsular corridors.

Source Basin	Recipient Basin	IAS richness (source too receipient)
Krishna	Kaveri-Krishna	13-15 to 10-12
Krishna	Godaveri	13-15 to 10-12
Krishna	Lower Kaveri	13-15 to 7-9

The stakes go beyond lists of species. Although freshwater ecosystems make up only 2.4% of the planet's surface, they are home to nearly 10% of all known species. According to the study, species like Oreochromis mossambicus and Salvinia molesta disrupt habitats and reduce native fish abundance, which has an impact on the livelihoods of inland fisheries. It also warns people to the spread of pathogens.[13]There are two things to be aware of. The study found a moderate ($R^2 = 0.475$) and weaker for the threatened species ($R^2 = 0.181$). Still, each corridor in Table 1 runs from an invaded to a less invaded basin, which is exactly the gradient that makes the transfer a concern.

[12] Aravind et al., supra note 4.
[13] Aravind et al., supra note 4.

4.2.The statutory framework:

The Wild Life (Protection) Amendment Act, 2022 is India's first statutory treatment of IAS. According to Section 2(16A), an invasive alien species is any animal or plant that is "*not native to India*" and whose introduction or spread could endanger wildlife or its habitat.[14] Section 62A permits the Central Government to regulate or forbid the "*import, trade, possession or proliferation*" of such species and to authorize their seizure and destruction through notification. Freshwater taxa are covered by the Act since fish and aquatic plants are considered "*wild life*" under section 2(37).[15]

There are three restrictions. First, although a link transports species between Indian basins, alienness is anchored to be national border. On a literal reading, a species that is native to the Ganga but absent from the streams in the Western Ghats is alien to the receiving basin, not to India, and so doesn't fall under section 62A; the author has not identified any judicial interpretation of the definition. Second, the operative verbs describe holding and commerce rather than the regulated flow of water; it is debatable but unproven whether "*proliferation*" reached a canal. Third, the authority is species-specific and subject to judgement. A project proponent is not required to stop transfer. Article 8(h)[16] of the Convention on Biological Diversity, to which India is a signatory, mandates that parties take all reasonable steps to prevent, control, or remove alien species that pose a harm to ecosystem, habitats, or species.

4.3.The EIA framework:

River valley and irrigation projects fall under item 1(c)[17] of the Schedule to the EIA Notification, 2006, as amended. The Jethala Balancing Reservoir Lift Irrigation Project which is a component of the improved Parbati-kalisindh-Chambal connection, was evaluated as a Category A project under item 1(c).[18] Biological connection is not av factor in classification is not a factor in classification under that item; instead, it depends on factors like command area, submergence, and inter-state nature. The Indian EIAs primarily assess` hydrological characteristics

[14] Wild Life (Protection) Act, 1972, ss. 2(16A) and 62A, inserted by the Wild Life (Protection) Amendment Act, 2022.
[15] Wild Life (Protection) Act, 1972, s. 2(37).
[16] Convention on Biological Diversity, 1992, art. 8(h).
[17] Environment Impact Assessment Notification, 2006, S.O. 1533(E), dated 14 September 2006, Schedule, item 1(c).
[18] Ministry of Environment, Forest and Climate Change, Minutes of the 53rd Meeting of the Expert Appraisal Committee (River Valley and Hydroelectric Projects), Agenda Item 1, available at: https://parivesh.nic.in/utildoc/1226853020_1778155785133.pdf (Last visited on 7 October 2026).

while ignoring biodiversity, and that sequential links can promote biotic mixing even in situations where a single canal has little effect, which project-by-project appraisal is unable to capture which is by the authors of the *Scientific Report*.[19]

4.4.Judicial and administrative developments:

The Supreme Court considered interlinking as a national program in *In Re Networking of Rivers*[20], and ordered the Center to establish a Special Committee for Inter-lining of Rivers to set deadlines for feasibility and other reports so that projects are finished on time and within budget. As stated, the goal of the decision is to overcome the delay; the author has not discovered any evidence that the decision was influenced by the threat of invasion.

The similar emphasis can be seen in the one link examined from an ecological perspective. With regard to the tiger and gharial, a Central Empowered Committee formed by the Supreme Court questioned the wildlife clearance for the Ken-Betwa Link Project, Phase I.[21] A study of the Ken and Betwa reveals great fish diversity and vulnerable fishes in the Betwa, designating the region as a priority for aquatic evaluation. Examining terrestrial and flagship species is essential but insufficient.[22]

4.5.International and comparative practice:

The route is acknowledged abroad. Instances has been described in the *Scientific Reports*[23] where the Orange-Great Fish River link increased the range of the African catfish Clarias gariepinus, China's South-to-North diversion allowed three aquatic plants to spread northward, and the Severn-Thames link enabled quagga mussel invasion. Regulation (EU) No. 1143/2014 of the European Union increases the obligation of water managers to prevent the spread of invasive species.[24] Operators aren't

[19] Aravind et al., supra note 4.
[20] *In Re: Networking of Rivers*, (2012) 4 SCC 51.
[21] Mongabay India, "Ken-Betwa river linking project may be economically unviable, says Supreme Court's committee", September 2019, available at: https://india.mongabay.com/2019/09/ken-betwa-river-linking-project-may-be-economically-unviable-says-supreme-courts-committee/ (Last visited on 7 October 2026).
[22] W.S. Lakra and others, "River inter linking in India: status, issues, prospects and implications on aquatic ecosystems and freshwater fish diversity", (2011) 21 *Reviews in Fish Biology and Fisheries* 463, abstract available at: https://krishi.icar.gov.in/jspui/handle/123456789/4930 (Last visited on 7 October 2026).
[23] Aravind et al., supra note 4.
[24] Regulation (EU) No 1143/2014 of the European Parliament and of the Council of 22 October 2014 on the prevention and management of the introduction and spread of invasive alien species, as discussed in Gallardo and Aldridge, supra note 9.

subject to a similar obligation under Indian law.

4.6.Policy Developments:

States may reach agreements prior to the establishment of ecological protections. This is made worse by transboundary links: Nepal or Bhutan are involved in a number of Himalayan links, including Kosi-Ghaghra and Manas-Sankosh-Tista-Ganga.[25] There is no transboundary biosecurity agreement in the program's public record, and invasive organisms disregard national boundaries.

There is yet time for reform. As of December 2021, comprehensive `project reports had been finished for a few of links, such as Ken-Betwa, Par-Tapi-Narmada, and Damanganga-Pinjal. The majority of other links were at the feasibility or pre-feasibility stage, while one Himalayan link was marked as discontinued.[26]

4.7.Critical Evaluation:

Five requirements make the case for reform stronger rather than weaker. Canals are not the main vector, to start. Links represent a secondary dispersal channel because all fifteen of the modeled species entered through ornamental, biocontrol, pet, and acquaculture trade. The author found no notification utilizing the trade-and-possession powers of section 62A[27] against freshwater species, and a rule focused solely on canals would not address the primary source. As a result, source controls and corridor controls must be coupled.

Second, the evidence is not a verdict but rather a warning of danger. According to the scientists, the models may overpredict, map climatic suitability rather than actual invasion, and have a limited correlation with vulnerable species. They also ignore hydrological and human causes. Since Indian philosophy views scientific uncertinity as a justification for evaluation rather than inaction, these limitations argue against both utilizing the study to veto linkages and disregarding it.

Third, Indian doctorine already gives the standard. *Vellore Citizens' Welfare Forum* holds the precautionary principle to be part of Indian evironmnetal law, founded on Article 21, 47, 48A and 51A(g) and *A.P. Pollution Control Board* v. *M.V. Nayudu* placed on those who would alter the status quo the duty of showing the absence of injurious effect[28]. In

[25] Press Information Bureau, supra note 1, Annexure.

[26] Press Information Bureau, supra note 1, Annexure. Status is as stated on 2 December 2021 and may since have changed.

[27]

[28] *Vellore Citizens' Welfare Forum v. Union of India*, (1996) 5 SCC 647; *A.P. Pollution*

Narmada Bachao Andolan, however, the Court confined that responsibility to projects where the extent of anticipated damage is not known and rejected to apply it to a big dam, whose consequences were considered well understood.[29] Invasion by canal is reverse case: the damage is unpredictable, potentially irreversible and unassessed. Yet the same ruling demonstrates deference to policy decisions and a rigorous view of delay, so litigation is an unreliable protection and a statutory requirement is the sounder path.

Fourth, the constitutional structure hampers enforcement. Water is a State topic, subject to Union power over inter-state rivers, but conservation of wild animals and birds is a concurrent subject.[30] Because the program progresses by inter-state consensus, those agreements are the natural location to bind the States to biosecurity duties before the Union's regulatory authorities are employed.

Fifth, the human-rights dimension is under-argued. Invasion affects inland-fisheries livelihoods and engages the right to life under Article 21[31], although nothing in the approved framework necessitates interaction with fishing communities. Prevention is also the cheaper course: CBD advice records that preventing introduction is more cost-effective than eliminating an established species.[32]

5. FINDINGS

- Although the data indicates danger rather than harm, modeled evidence shows that suggested links flow from more-invaded to less-invaded basins and that basins rich in native and vulnerable species are also at high risk.

- Corridor-only management would be insufficient because canals are a secondary vector and trade and aquaculture are the main sources.

- Intra-national translocation is not adequately covered by the statutory definition of IAS.

- According to the author's search, Section 62A has not been used for inter-basin transmission, is not framed around it, and doesn't impose any obligations on operators.

Control Board v. M.V. Nayudu, (1999) 2 SCC 718.

[29] *Narmada Bachao Andolan v. Union of India*, (2000) 10 SCC 664.

[30] Constitution of India, Seventh Schedule, List II, entry 17; List I, entry 56; List III, entry 17B.

[31]

[32] Convention on Biological Diversity, supra note 6.

- The cumulative effects of sequential links cannot be captured by project-by-project appraisal, and the EIA scheme categorizes projects based on characteristics unrelated to biological connectedness.

- Although judicial deference renders litigation an unreliable safeguard, the precautionary theory in *Vellore* and *Nayudu* supports requiring proponents to establish low invasion danger, but it has not been applied to this risk.

- Comparable states offer responsibilities to water management that India doesn't, and the consensus concept excludes biosecurity from interstate and transboundary agreement.

6. CONCLUSION AND RECOMMENDATIONS

Instead of viewing rivers as living systems with unique biotas, the NRLP views them as volumes of water. The 2022 amendment demonstrates that although Parliament now considers invasive species to be a legislative issue, it has not linked that worry to the infrastructure that is most likely to disseminate them. The goal is to make clearance dependent on proven biosecurity rather than to stop the initiative. It would be less expensive and more efficient to take-action prior to the construction of the main connections.

Drawing on the gaps identified above, the following recommendations are offered.

Firstly, the Ministry of Environment, Forest and Climate Change should commission a programme-level invasion-risk assessment of full network before further detailed project reports are approved, and amend item 1(c) of the EIA notification, or lay down standard terms of reference, to require a Biological Invasion Risk Assessment for each link. This would include cumulative effects and consultation with inland-fishing.

Secondly, rules or clearance conditions should require the proponent to demonstrate low invasion risk and file a biosecurity plan as a precondition to clearance thereby codifying the *Nayudu* burden for this class of project.

Thirdly, the definition under Section 2(16A) should be amended, or supplemented by rules, to cover species translocated beyond their native basins within India. Additionally, the Central Government should notify interim-basin transfer as a regulated pathway and restrict possession, stocking and trade priority species in corridor basins, with licensing of aquaculture and ornamental-fish trade as the source control.

Fourthly, the National Biodiversity Authority should keep a freshwater IAS register, inter-basin transfers should be audited as natural experiments and links should be commissioned gradually, starting with lowest-risk corridors, with monitoring data guiding subsequent permits.