OXFORD JOURNAL
OF STUDENT
SCHOLARSHIP

Climate Change and Livelihood Vulnerability in India's Coastal Fishing Communities: A Narrative Review with a Focus on Island and Coastal Union Territories

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ABSTRACT

The present narrative review brings together 25 peer-reviewed journal articles published in the last ten years (2016–2026) to understand the impact of climate change on fishing communities' livelihood vulnerability in the coastal states and UTs of India. The review shows that there are three striking convergent themes: that the determinant of the fate of fisher livelihoods is not just climate hazards but their interaction with the socio-economic vulnerabilities and low adaptive capacities that already existed; that many of the studies rely on index-based vulnerability assessment, specifically on the Livelihood Vulnerability Index or other composite vulnerability indices; and that gendered and occupational exposure is a minority but recurring finding. Underlying this convergence are unanswered questions about the best way to measure vulnerability, either quantitatively or qualitatively, through participatory processes, and a clear geographical imbalance, with the deltaic communities of the mainland studied much more intensely than the communities of the Lakshadweep, Andaman and Nicobar, and Puducherry. Four gaps emerged from the research: firstly, the absence or rarity of longitudinal designs; secondly, limited attention to Andaman and Nicobar fisheries; thirdly, the lack of integration between ecological and household-level vulnerability measures; and fourthly, gendered differentiation is not extended to the island UTs. The review suggests that similar validated vulnerability indices should be used for the island Union Territories together with the qualitative governance work already undertaken, and synthesis of the data across the regions, which is currently missing in the review.

INTRODUCTION

India's coast is over 7500 km long, and more than 4 million people are directly dependent on marine and estuarine fisheries activities, most of which are small and artisanal fisheries found in coastal states and island Union Territories (UTs) (Krishnan et al., 2018; Salim et al., 2018). The impacts of high SST, cyclone intensity, sea-level rise, and changing monsoon patterns on fish catch have been documented, while other impacts include damage to coastal infrastructure and the socio-economic base of the coastal communities (Makwana & Patnaik, 2025; Debnath et al., 2024). This literature has shifted from initial case studies of single sites to comparative studies based on indices to more recent participatory as well as

gendered approaches to the experience of vulnerability and its uneven distribution across fishing households (Natarajan et al., 2025; Paira & Ao, 2026).

This growth is not geographically even across the country. While India's island UTs of Lakshadweep and Andaman and Nicobar and the coastal UT of Puducherry, islands most vulnerable to climate change and most dependent on livelihoods, are comparatively under-studied, the deltaic and mainland areas, such as Sagar Island in the Sundarban delta of West Bengal, are the focus of much of the empirical literature (Jaini et al., 2017; Bera et al., 2022). The starting point of the present review is the asymmetry described above such that, instead of reading the literature as a monolithic set of evidence, this review asks: Where does the evidence converge? Where is it in tension? Where are the real gaps? And where does the evidence from the well-studied sites on mainland India lend credence to the extension of results to the island UTs that are the focal point of this review?

When reading this review, look for answers to the following questions: RQ1: What are the common findings from literature that span the period from 2016 to 2026 on how climate change can lead to livelihood vulnerability of coastal fishing communities in India? RQ2: What are the differences in the literature in terms of conceptualization and measurement of that vulnerability? RQ3: What are the gaps in the field for using this to guide policy for the island and coastal Union Territories? This literature review brings together 25 peer-reviewed articles covering a range of states in India (Kerala, Odisha, Tamil Nadu, Gujarat, Maharashtra, West Bengal, and the island UTs of Lakshadweep and Andaman and Nicobar) that share a common theme on the main drivers of vulnerability, while having varying methods, scales, and geographic foci. The main thrust of the review in the island and coastal UTs is not limited to the UTs but is carried out deliberately by making comparisons with the mainland states that were studied along with the UTs.

THEORETICAL FRAMEWORK

Most of the literature reviewed is contained within two complementary traditions. The vulnerability framework of Adger (2006) and the Intergovernmental Panel on Climate Change (IPCC) assessments categorize vulnerability as a combination of exposure, sensitivity, and adaptive capacity. This is reflected in most of the quantitative studies reviewed here, which create a composite vulnerability index, incorporating hazard-exposure indicators (cyclone frequency, sea-level rise, and shoreline change), socio-economic sensitivity indicators (income diversification, asset ownership, and education), and adaptive-capacity indicators (access to credit, social networks, and institutional support) (Bera et al., 2022; Mukherjee et al., 2019; Sahana et al., 2019).

The second tradition is the Sustainable Livelihoods Framework of Chambers and Conway (1992) and Allison and Ellis (2001) that views livelihood vulnerability as a process and a product of household asset building using natural, physical, financial, human, and social capital in the face of external shocks. This is more evident in the qualitative and participatory studies included below, especially on the Lakshadweep islands, where the study has focused on how the ability of customary fisheries management, the

traditional ecological knowledge, and market access influence a community's ability to respond to climate stress, instead of focusing on an index score (Khot et al., 2024; Abraham et al., 2025; Jaini et al., 2017).

A third, less prominent strand focuses on the gendered livelihoods analysis, which posits that in the field of fishery vulnerability, women are also not equally vulnerable; however, they are often involved in post-harvest and shore-based or subsistence activities that are vulnerable to climate change circumstances in different ways compared to the offshore fishing that is usually analyzed in aggregate measures (Natarajan et al., 2025; Paira & Ao, 2026). None of the three traditions alone accounts for the pattern that can be found throughout the literature: broadly, the convergence around the exposure-sensitivity-adaptive capacity logic, which coexisted with a lesser degree of tension between a quantitative and a qualitative approach to operationalizing the logic, and the gendered differentiation, which remained a minority issue compared to the number of household- or village-level index studies.

METHODS

Review Type and Reporting Approach

This represents a structured narrative review — a review conducted with a search strategy across multiple databases that is structured and reproducible and is open about the search process using an adapted PRISMA-style flow diagram, but that does not follow a pre-registered systematic-review protocol, and no dual independent screening or formal meta-analysis was performed. The same terminology is used throughout, and the review is not an exhaustive list of the literature.

Search strategy

A literature search was conducted across four databases that were selected for their breadth, ability to be searched in bulk, ability to find citations in their context, and open-access and grey literature content: Dimensions (fielded, exportable bulk search), Semantic Scholar (citation-context and AI-assisted discovery), OpenAlex, and CORE (open-access and grey literature aggregation). The same Boolean search strategy was used for all four searches: (“climate change” OR “climate variability” OR “sea level rise” OR cyclone*) AND (fisher* OR “fishing community*” OR “small-scale fisheries” OR aquaculture) AND (livelihood* OR vulnerability* OR resilience OR “adaptive capacity”) AND (India OR “Andaman and Nicobar” OR Lakshadweep OR Puducherry OR “coastal Union Territory*”). The searches were done in August 2026, and the publication-date filter was set to 2016–2026 in all databases.

Concept	Search Terms	Rationale
Climate exposure	"climate change" OR "climate variability" OR "sea level rise" OR cyclone*	Captures the range of physical hazards documented as drivers of fisheries impact
Fisheries / livelihood base	fisher* OR "fishing community*" OR "small-scale fisheries" OR aquaculture	Restricts results to the fisheries-dependent population rather than agriculture generally
Vulnerability outcome	livelihood* OR vulnerability* OR resilience OR "adaptive capacity"	Broad outcome terminology avoiding exclusion of studies framing the dependent variable differently
Geography	India OR "Andaman and Nicobar" OR Lakshadweep OR Puducherry OR "coastal Union Territory*"	Narrows results to the review's specific national and sub-national scope

Table 1. Search Term MatrixNote. Boolean OR in concepts / AND across concepts. Date filter: 2016–2026. English only. Only peer-reviewed journal articles are accepted at the screening stage.

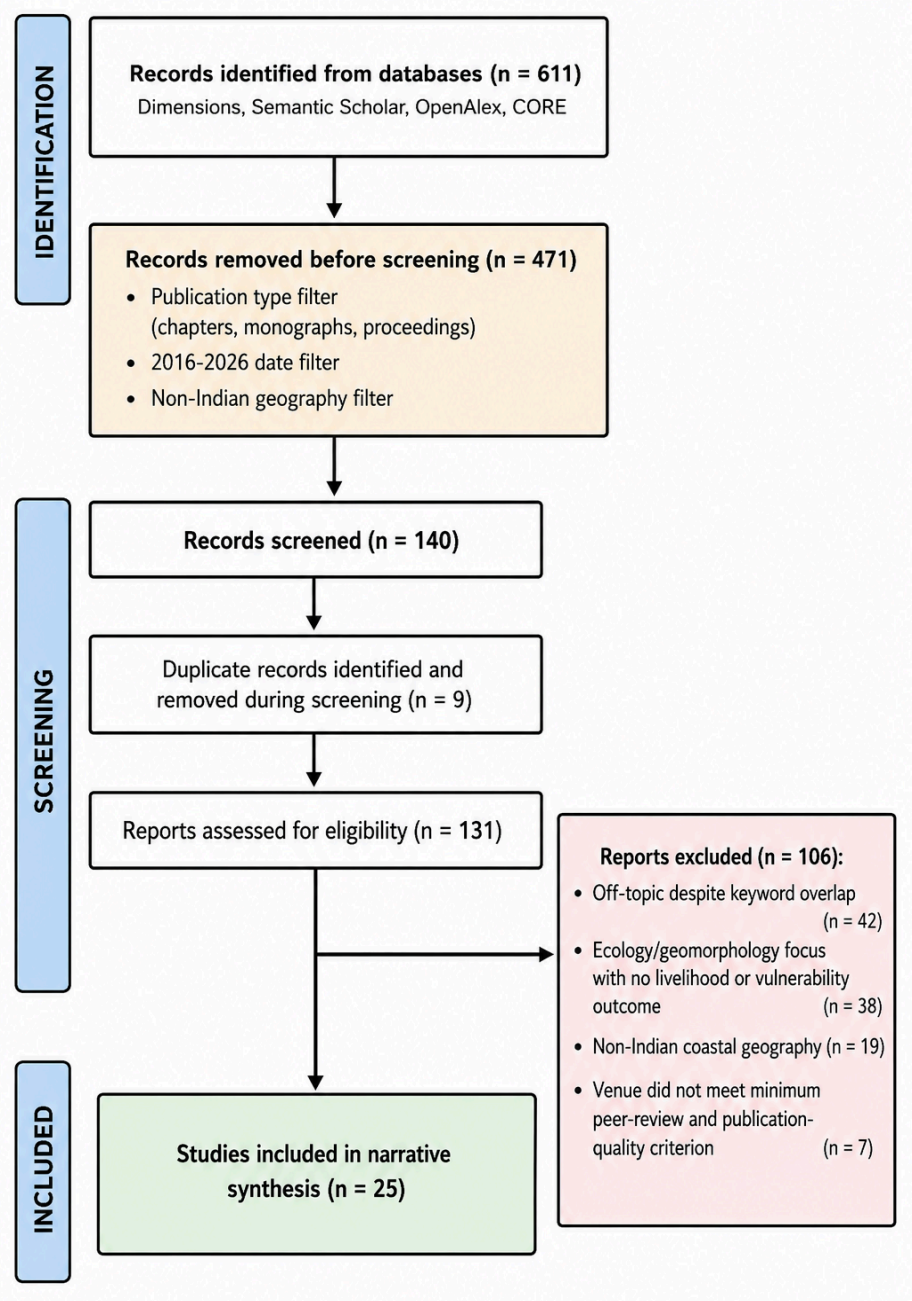
Inclusion and Exclusion criteria

Only studies that fulfilled all of the following criteria were included: 1) published in a peer-reviewed academic journal; 2) published in English between 2016 and 2026 and focused on exposure, livelihood vulnerability, adaptation, or resilience related to climate change in a coastal or fisheries-dependent population, either as an outcome of the study or as a physical hazard-exposure component of the outcome; and 3) located within an Indian coastal state or Union Territory. A number of studies measured either sensitivity or adaptive capacity rather than physical exposure specifically, and these were assessed against the exposure–sensitivity–adaptive capacity framework in Section 2 (see Table 2 for affected studies). Although there was topical overlap in some cases, not every study was included as a physical-exposure study, since it could not be considered as the exposure component of livelihood vulnerability within the framework; one study on coastal agriculture adaptation was excluded during screening (Section 3.4, Figure 1) despite the topical overlap. Studies conducted outside India, but similar in methods to those conducted in South/Southeast Asian and Pacific Island countries, were not included in the main synthesis, even where methodologically similar, but are instead described separately in Section 4.4 as an external comparative source. At this stage, journal venue and peer-review status were applied as an eligibility criterion, and sources were excluded where the venue did not meet a minimum peer-review/publishing-quality criterion, judged from the information available about the journal rather than determined mechanically (Section 3.4, Figure 1).

Screening, Selection and Quality appraisal

In summary, the flow: Of the 611 records initially identified in the four databases, 471 were removed prior to screening, with publication-type, date-range and non-Indian-geography filters, and 140 records were screened for title/abstract. During this screening step, 9 duplicate records were removed, resulting in 131 records being assessed for full-text eligibility. Of these, 106 were removed due to one or more of the following reasons: an ecology/geomorphology focus with no livelihood or vulnerability outcome, a venue that did not meet the minimum criterion of peer-review and publication quality, an off-topic study despite keywords, or a non-Indian coastal geography (see Figure 1 below).

Figure 1. Adapted PRISMA-style flow diagram of the literature search and selection process across four databases.



This review has not been pre-registered and does not follow any pre-registered systematic-review protocol, consistent with the structured narrative review scope declared in Section 3.1; the flow diagram below is included to ensure transparency of the search. Deduplication was manual: the 140 records shown

below were screened for additional duplicates, 9 of which were identified and removed during this step; a small number of further duplicates could not be completely ruled out (Section 6).

The non-Indian-geography exclusion (n = 19) comprises one study on fisheries of Southeast Asia/Pacific Island origin that was judged sufficiently topical to merit discussion, but which was not admitted as an included study and is instead treated as an external comparative source, discussed separately in Section 4.4. One study on agriculture adaptation (Panja et al., 2024) was included in a previous draft but was removed on revision, since it does not refer to a fisheries-dependent population and was reclassified as off-topic.

Quality Appraisal

Publication venue and peer-review status were considered as an eligibility criterion at screening (Section 3.3; Figure 1), and methodological quality was appraised separately after inclusion; the two are not conflated here. The 25 included studies were each assessed on four criteria, with each criterion rated Low, Moderate, or High, and scores applied qualitatively rather than as a scored checklist, because the designs in the sample (quantitative, qualitative, and geospatial/modeling) were too varied to score consistently on a single numeric scale. These criteria were informed by the Mixed Methods Appraisal Tool (MMAT) (Hong et al., 2018): clarity of research objective, appropriateness of sample and geographic scope, validity of the vulnerability measure or qualitative method, and transparency of limitations.

A study was considered High if the following four criteria were clearly and transparently met: an explicit and well-justified research objective, a sample and geographic scope well matched to the claims made, a vulnerability or a qualitative measure, a clear methodological or theoretical basis for this measure, and explicit discussion of the study's own limitations. A Moderate rating meant that the majority of the criteria were clearly met, but with a weakness in one area (most frequently a less inclusive description of the limitations or a less broad rationale for the vulnerability assessment applied). Low–Moderate or Low ratings meant that two or fewer criteria were clearly met, often because the study was poorly focused, the geographic claims were not appropriate to the sample, or the study lacked an adequate discussion of the validity of the measure or the limitations of the study. No study was excluded at this stage of study inclusion because of quality concerns; study ratings are provided in Table 2.

Table 2. Included Studies by Geography, Method, and Relationship to Livelihood Vulnerability (n = 25)

Author(s) & Year	Geography	Method	Vulnerability Framing	Relevance	Quality
Jayarajan et al. (2019a)	Lakshadweep	Ethnographic interviews	Perception-based, qualitative	Direct	Moderate
Jayarajan et al. (2019b)	Lakshadweep	Participatory assessment	Perception-based, qualitative	Direct	Moderate
Khot et al. (2024)	Lakshadweep	Practitioner case study	Governance-induced vulnerability	Direct	High
Abraham et al. (2025)	Lakshadweep (Minicoy)	Qualitative case study	Institutional/customary management	Direct	High
Jaini et al. (2017)	Andaman & Nicobar, Lakshadweep	Comparative case study	Market/infrastructure access	Indirect (comparative sensitivity, not A&N-specific)	High
Natarajan et al. (2025)	Kerala	Household survey, LVI	Gendered index-based	Direct	High
Salim et al. (2018)	Kerala	Household survey, LVI	Index-based	Direct	High
Salim et al. (2019)	Kerala	Household survey	Livelihood options analysis	Direct	Moderate
Banerjee & Mohapatra (2023)	Odisha	Stakeholder survey	Perception-based	Direct	Moderate
Priyadarshi et al. (2019)	Odisha	Household survey	Index-based	Direct	Moderate
Radhika et al. (2023)	Tamil Nadu	Household survey	Economic vulnerability	Direct	Low–Moderate
Koya et al. (2017)	Gujarat	Household survey	Index-based	Direct	Moderate

Krishnan et al. (2018)	Maharashtra	Spatial/statistical index	Composite vulnerability index (CVI)	Direct	High
Jeevamani et al. (2021)	Maharashtra	Integrated index	Vulnerability–sustainability linkage	Direct	High
Ramachandran et al. (2017)	Tamil Nadu, Puducherry	Modeling (SimCLIM)	Hazard-exposure projection	Indirect (exposure component)	High
Makwana & Patnaik (2025)	Bay of Bengal / West Bengal	Statistical regression	Catch–climate relationship	Indirect (exposure component)	High
Bera et al. (2022)	Sagar Island, WB	Geospatial index	Composite vulnerability index	Direct	High
Mukherjee et al. (2019)	Sagar Island, WB	Household survey	Index-based	Direct	High
Paul et al. (2024)	Sagar Island, WB	Geospatial modeling	Shoreline/overwash vulnerability	Indirect (exposure component)	High
Das et al. (2025)	Sagar Island, WB	GIS/AHP	Flood vulnerability zoning	Indirect (exposure component)	Moderate
Paira & Ao (2026)	Sagar Island, WB	Qualitative case study	Gendered/occupational vulnerability	Direct	High
Saha & Munian (2025)	Indian Sundarbans	Epidemiological review	Health-livelihood linkage	Indirect (health-exposure pathway, asserted)	Moderate
Sahana et al. (2019)	Sundarban Biosphere Reserve	Household survey	Socio-economic vulnerability	Direct	High
Debnath et al. (2024)	Multi-state coastal India	Indicator-based assessment	Ecosystem–livelihood vulnerability	Direct	High

Chauhan et al. (2026)	India (national)	Systematic literature review	Community-based adaptation synthesis	Direct	High

Note. "Direct" = assesses vulnerability, sensitivity, or adaptive capacity at the household/community level. "Indirect" studies fall into three subtypes: (1) exposure component — physical hazard exposure is measured, but sensitivity and adaptive capacity are not; (2) comparative sensitivity — market-access sensitivity is compared between two island UTs, but no household-level sensitivity or adaptive-capacity measure is produced for either; (3) asserted health-exposure pathway — Saha and Munian (2025) document a health-exposure burden that this review interprets as an adaptive-capacity pathway, a linkage the review asserts rather than one the source study tests empirically; this is not a quantified Andaman and Nicobar assessment (see Section 4.3). Radhika et al. (2023) is framed around "coastal households" broadly, but the source identifies the surveyed district as fisheries- and fish-trade-dependent, satisfying the fisheries-population criterion on that basis.

This table does not include Cappa et al. (2024); since the study is not geographically qualified to be included in India (it focuses in Southeast Asia and the Pacific Islands, not on India), it is not included in the 25-study count in Section 3.3 but is used as a relevant external comparative source in Section 4.4, not as an included India-focused study.

RESULTS: THEMATIC ANALYSIS

Convergence: Vulnerability as an Interaction, Not a Direct Effect

In most of the 25 studies included, across geographies and approaches, one overarching finding emerges: hazard exposure alone does not explain the outcomes of fisher livelihoods; it interacts with pre-existing socio-economic sensitivity to produce vulnerability. This claim is most directly tested in the studies rated "Direct" in Table 2; the four studies rated "Indirect (exposure component)" (Ramachandran et al., 2017; Makwana & Patnaik, 2025; Paul et al., 2024; Das et al., 2025) contribute only the exposure side of this interaction. In the context of villages vulnerable to coastal hazards in Sindhudurg, Maharashtra, Krishnan et al. (2018) explicitly decompose vulnerability into exposure, socio-economic sensitivity, and adaptive-capacity sub-indices, and show that villages with comparable physical exposure can vary significantly in outcome due to their socio-economic sensitivity and adaptive capacity. Using different sets of indicators, Bera et al. (2022) and Mukherjee et al. (2019) independently reach the same structural conclusion: households that are poorer and less diversified in their livelihoods have higher vulnerability scores than their wealthier counterparts, even when both groups are exposed to similar levels of cyclone and flood risk. The same pattern is evident in the qualitative literature: Khot et al. (2024), studying the pole-and-line tuna fishery in Lakshadweep, find that a socio-economic sensitivity factor (market access and infrastructure) is as responsible for this difference in outcome as any climatic factor, with the islands experiencing a degree of vulnerability far greater than is generally recognized.

Household-level studies show a recurring reliance on the Livelihood Vulnerability Index (LVI) or similar composite measures. Studying LVI-style composites in Kerala, Gujarat, and the Sundarbans respectively, Natarajan et al. (2025), Salim et al. (2018), Koya et al. (2017), and Sahana et al. (2019) arrive at similar dominant sensitivity indicators, namely income diversification, dependency ratio, and access to institutional credit. This convergence across independently designed studies in different states increases confidence that these findings are valid and generalizable, although the qualitative, geospatial, and modeling studies elsewhere in Table 2 do not follow this approach.

The third convergent finding relates to differentiation based on gender and occupation. Both Natarajan et al. (2025), for Kerala, and Paira and Ao (2026), for the Sagar Island region, show that women in fishing households occupy roles, such as post-harvest processing, vending, and shore-based subsistence work, that are climate-sensitive in different ways than the offshore fishing typically captured in vulnerability assessments reliant on catch data. Both independently find that household-level indices understate women's vulnerability because of how they aggregate data at the household level.

Tension: Quantitative Indices vs. Qualitative, Participatory Accounts

Underlying this convergence is a methodological impasse. Many studies, particularly those focused on the wider set of coastal states or on Sagar Island, operationalize vulnerability using composite indices built from survey or spatial data (Bera et al., 2022; Krishnan et al., 2018; Mukherjee et al., 2019; Sahana et al., 2019). These allow some comparability between villages and regions but reduce lived experience to a single numeric measure, and none report whether the index's weighting scheme was tested against communities' own priorities for their livelihoods.

By contrast, the literature available on Lakshadweep is mostly qualitative and participatory. Jayarajan et al. (2019a, 2019b), Khot et al. (2024), and Abraham et al. (2025) use ethnographic interviews, focus groups, and long-term practitioner engagement, explicitly rejecting index-based reduction in favor of documenting how customary governance and traditional knowledge shape climate response. This produces findings that are richer and more contextually grounded, but that cannot be directly compared with the index-based Sagar Island or Kerala literature, since no comparable index has been applied to Lakshadweep, nor has a qualitative account been validated against the Sundarbans-style findings. Jaini et al. (2017) is a partial exception, comparing the vulnerability status of Andaman and Nicobar with that of Lakshadweep without producing index values for either.

A second tension concerns the object of measurement. Ramachandran et al. (2017) and Paul et al. (2024) measure vulnerability primarily through physical exposure, with limited engagement with household-level data, while Natarajan et al. (2025) and Radhika et al. (2023) focus almost exclusively on economic and social indicators at the household level, with little engagement with hazard data. Only a handful of studies, such as Debnath et al. (2024), attempt to integrate the two, and this remains the exception rather than the norm.

Geographic Imbalance: Sagar Island as a Disproportionately Represented Case

A third theme, more structural than methodological, is the striking geographic concentration of the literature. Only five studies focus specifically on Sagar Island in the Sundarban delta of West Bengal, which is not itself a Union Territory (Bera et al., 2022; Mukherjee et al., 2019; Paul et al., 2024; Das et al., 2025; Paira & Ao, 2026). Two further studies (Saha & Munian, 2025; Sahana et al., 2019) do not focus on Sagar Island specifically but address the wider Sundarbans/Sundarban Biosphere Reserve region, confirming the same deltaic, mainland-adjacent concentration. By contrast, the evidence base for the island and coastal UTs is thin and fragmented: four studies give a household-level livelihood-vulnerability finding for Lakshadweep specifically (Jayarajan et al., 2019a, 2019b; Khot et al., 2024; Abraham et al., 2025); Jaini et al. (2017) provides a comparative case study spanning both Lakshadweep and Andaman and Nicobar, but without a matching household-level vulnerability measure for the latter; and Ramachandran et al. (2017) contributes hazard-exposure evidence for Puducherry specifically, without a matching household-level vulnerability study for that UT. Taken together, this means Andaman and Nicobar has only comparative, non-quantified coverage, and Puducherry has only exposure-side coverage, while Lakshadweep is the only UT with a directly comparable body of livelihood-vulnerability evidence. Andaman and Nicobar's climate exposure is otherwise documented in a separate ecological/disaster-focused literature that was excluded here for lacking a livelihood outcome, and the two literatures remain unconnected. For this reason, despite differing from the island UTs in governance, population density, and fisheries type (artisanal reef and lagoon fisheries versus estuarine and brackish-water fisheries), Sagar Island findings are disproportionately represented in the Indian literature on island and coastal vulnerability, and the findings of this review can be extended to the UTs of primary interest only cautiously.

A National Framing Study and an External Comparative Anchor

Chauhan et al. (2026), the only study operating at a national level among the 25 analyzed, serves as a synthesis anchor for the Indian fisheries sector rather than as primary household-level evidence. It independently confirms both the reliance on index-based measurement and the skew toward mainland deltaic sites documented here, strengthening confidence in both findings.

Cappa et al. (2024) was not included in the 25 studies listed because it does not meet the India-specific geographic eligibility criterion set out in Section 3.3; it is used instead as an external comparative source, not as an included India-focused study. Operating at the level of Southeast Asia/Pacific Islands, it demonstrates that the food-security dimension of climate-fisheries vulnerability, barely addressed in the India-specific literature reviewed here, has received sustained regional attention, suggesting this dimension remains comparatively underdeveloped in the Indian literature.

DISCUSSION

An Integrative Reading of Convergence, Tension, and Gaps

The pattern that emerges across Sections 4.1–4.4 does not neatly fit into either the index-based vulnerability tradition or the qualitative sustainable-livelihoods tradition outlined in Section 2. Both arrive at the same underlying claim, that vulnerability results from the interaction of exposure and socio-economic sensitivity, but operationalize it incompatibly, and are applied to different, non-overlapping geographies. The mainland and Sagar Island literature is relatively well-established and largely quantitative, using index-based comparisons, while the Lakshadweep literature offers rich qualitative evidence for the UTs of primary interest here, but in a form not yet quantitatively comparable to, or benchmarked against, the mainland literature.

This suggests that further single-site studies in either tradition are unlikely to be the field's next contribution, as both are already well represented; rather, the opportunity lies in studies that connect them — integrating ecological and household-based vulnerability indicators, as Debnath et al. (2024) began to do for coastal wetlands generally, applied specifically to sites in Andaman and Nicobar and Lakshadweep.

Research Gaps

Four gaps recur throughout the reviewed literature. First, the included empirical studies are largely cross-sectional, and no study offers a longitudinal evaluation of livelihood vulnerability at the same site over several years from which to draw conclusions about long-term trends. Second, Andaman and Nicobar fisheries livelihoods are almost entirely absent here; the region's exposure is documented in a separate ecological/disaster literature disconnected from the fisheries-livelihoods literature. Third, integration of hazard-exposure and household-level metrics remains limited, with Debnath et al. (2024) an exception rather than the norm. Fourth, the gendered differentiation documented by Natarajan et al. (2025) and Paira and Ao (2026) has not been extended to the island UTs, where labor patterns may differ from the mainland deltaic context on which this finding currently rests.

LIMITATIONS

This review has four limitations. First, it is restricted to English-language, peer-reviewed journal publications, which excludes grey literature and government technical reports (e.g., CMFRI, National Centre for Sustainable Coastal Management) that may contain UT-specific data not yet in indexed journals. Second, deduplication was not automated, so some duplicates beyond those identified could not be completely ruled out. Third, Jayarajan et al. (2019a, 2019b) share overlapping authorship; both were retained as they report data from different island samples, but their combined weight in Section 4 should be treated with caution. Fourth, the review's within-India scope excludes potentially relevant comparative evidence from other small-island and deltaic South/Southeast Asian contexts that are structurally similar.

CONCLUSION

Twenty-five peer-reviewed journal articles on climate change and the vulnerability of coastal fisheries livelihoods in the Indian context were identified and synthesized from literature available across Dimensions, Semantic Scholar, OpenAlex, and CORE, alongside one comparative source from outside the review's geographic scope. While the existing literature agrees that vulnerability arises from the interaction between climate exposure and socio-economic sensitivity, there is a lack of methodological connection between the relatively well-established, index-based tradition focused on the mainland and Sagar Island, and the qualitative, governance-based tradition focused on Lakshadweep. Although the island UTs, particularly Andaman and Nicobar, are widely acknowledged as climate exposed, they remain the least evidenced part of this literature. Clearly, the most promising avenue for researchers is the use of validated, comparable vulnerability indicators on the island UTs, alongside the qualitative governance analysis already being conducted in Lakshadweep, as well as the extension of the gendered and longitudinal analysis currently limited to the mainland to those same island contexts. This research is needed to help policymakers make decisions about the islands based on evidence as strong as that which already exists for the mainland.

REFERENCES

Abraham, A. J., Deepak, D., Khot, I., & Namboothri, N. (2025). Traditional systems and contemporary transitions on an oceanic island: Insights for participatory fisheries management from Minicoy Island, India. Maritime Studies, 24(1). https://doi.org/10.1007/s40152-024-00397-7

Adger, W. N. (2006). Vulnerability. Global Environmental Change, 16(3), 268–281. https://doi.org/10.1016/j.gloenvcha.2006.02.006

Allison, E. H., & Ellis, F. (2001). The livelihoods approach and management of small-scale fisheries. Marine Policy, 25(5), 377–388. https://doi.org/10.1016/S0308-597X(01)00023-9

Banerjee, S., & Mohapatra, D. (2023). Climate change and marine fisheries: Stakeholders' perspective from coastal district of Odisha, India. Asian Journal of Agricultural Extension, Economics & Sociology, 41(9), 19–27.

Bera, A., Meraj, G., Kanga, S., Farooq, M., Singh, S. K., Sahu, N., & Kumar, P. (2022). Vulnerability and risk assessment to climate change in Sagar Island, India. Water, 14(5), 823. https://doi.org/10.3390/w14050823

Cappa, P., Andreoli, V., La, C., Palacios-Abrantes, J., Reygondeau, G., Cheung, W. W. L., & Zeller, D. (2024). Climate change undermines seafood micronutrient supply from wild-capture fisheries in Southeast Asia and Pacific Island countries. Science of the Total Environment, 955, Article 177024. https://doi.org/10.1016/j.scitotenv.2024.177024

Chambers, R., & Conway, G. (1992). Sustainable rural livelihoods: Practical concepts for the 21st century (IDS Discussion Paper 296). Institute of Development Studies.

Chauhan, S., Chauhan, J. K., Upadhyay, A. D., Chandegara, A. K., Kumar, P., & Tanjay, T. (2026). Community-based adaptation and mitigation in Indian fisheries under climate change: A systematic literature review (SLR). Indian Research Journal of Extension Education, 26(2), 141–150.

Das, S., Roy, K., Mallick, B., & Ghosh, T. (2025). Delineation of flood vulnerable zones using AHP and GIS techniques in climatically vulnerable Sagar Island, Indian Sundarban Delta. Discover Geoscience, 3, Article 232. https://doi.org/10.1007/s44288-025-00348-7

Debnath, S., Sarkar, U. K., Kumari, S., Karnatak, G., Puthiyottil, M., Das, B. K., Das, A., Ghosh, B. D., & Roy, A. (2024). Exploring the vulnerability of the coastal wetlands of India to the changing climate and their adaptation strategies. International Journal of Biometeorology, 68(4), 749–760. https://doi.org/10.1007/s00484-024-02620-w

Hong, Q. N., Fàbregues, S., Bartlett, G., Boardman, F., Cargo, M., Dagenais, P., Gagnon, M.-P., Griffiths, F., Nicolau, B., O'Cathain, A., Rousseau, M.-C., Vedel, I., & Pluye, P. (2018). The Mixed Methods Appraisal Tool (MMAT) version 2018. Education for Information, 34(4), 285–291.

Jaini, M., Advani, S., Shanker, K., Oommen, M. A., & Namboothri, N. (2017). History, culture, infrastructure and export markets shape fisheries and reef accessibility in India's contrasting oceanic islands. Environmental Conservation, 45(2), 137–146. https://doi.org/10.1017/S037689291700042X

Jayarajan, K., Sreelusreepadi, Lakshmi, K., & Amirsha, A. (2019a). Climate variability and fisher adaptation in Lakshadweep: A qualitative study of coastal observations. Journal of Survey in Fisheries Sciences.

Jayarajan, K., Lakshmi, K., SreeluSreepadi, & Amirsha, A. (2019b). Voices from the atolls: A participatory assessment of climate change awareness among small-scale fishermen in Lakshadweep Islands. Journal of Survey in Fisheries Sciences.

Jeevamani, J. J., Priya, P., Infantina, J. A., Abhilash, K. R., Behera, D. P., Samuel, V. D., Soundararajan, R., Purvaja, R., & Ramesh, R. (2021). An integrated approach to assess coastal vulnerability versus fisheries livelihood sustainability: Strategies for climate change adaptation in Sindhudurg, west coast of India. Environment, Development and Sustainability, 23(3), 4011–4042.

Khot, I., Khan, M., Raj, A., & Namboothri, N. (2024). Operationalizing participatory governance in small-scale fisheries: Researcher-practitioner reflections from the Lakshadweep Islands, India. Maritime Studies, 23(4). https://doi.org/10.1007/s40152-024-00386-w

Koya, M., Dash, G., Kumari, S., Sreenath, K. R., Dash, S. S., Ambrose, T. V., Shyam, S. S., Kripa, V., & Zacharia, P. U. (2017). Vulnerability of coastal fisher households to climate change: A case study from

Gujarat, India. Turkish Journal of Fisheries and Aquatic Sciences, 17(1), 193–203. https://doi.org/10.4194/1303-2712-v17_1_21

Krishnan, P., Ananthan, P. S., Purvaja, R., Joyson Joe Jeevamani, J., Amali Infantina, J., Srinivasa Rao, C., Anand, A., Mahendra, R. S., Sekar, I., Kareemulla, K., Biswas, A., Kalpana Sastry, R., & Ramesh, R. (2018). Framework for mapping the drivers of coastal vulnerability and spatial decision making for climate-change adaptation: A case study from Maharashtra, India. Ambio, 48(2), 192–212. https://doi.org/10.1007/s13280-018-1061-8

Makwana, M., & Patnaik, U. (2025). Seasonal effects of extreme climate events and sea surface temperature indicators on the vulnerability of marine pelagic fisheries in the Bay of Bengal region. Marine Environmental Research, 205, 107009. https://doi.org/10.1016/j.marenvres.2025.107009

Mukherjee, N., Siddique, G., Basak, A., Roy, A., & Mandal, M. H. (2019). Climate change and livelihood vulnerability of the local population on Sagar Island, India. Chinese Geographical Science, 29(3), 417–436.

Natarajan, A., Zacharia, P. U., Salim, S. S., Athira, N. R., & Sunil, P. V. (2025). Livelihood vulnerability of small-scale fisher households to climatic hazards: A gendered analysis in the South West Coast of India. International Journal of Bio-resource and Stress Management, 16(4), 1–13.

Paira, K., & Ao, M. (2026). Occupational challenges and coping strategies of women amid climatic hazards: A case study of Sagar Island, India. International Journal of Population Studies, 12(3), 025210097. https://doi.org/10.36922/IJPS025210097

Paul, S., Mishra, M., Pati, S., Acharyya, T., Santos, C. A. G., da Silva, R. M., Guria, R., & Laksono, F. A. T. (2024). Evaluation of overwash vulnerability and shoreline dynamics in cyclone-prone Sagar Island, Sundarbans (India). Science of the Total Environment, 907, Article 167933. https://doi.org/10.1016/j.scitotenv.2023.167933

Priyadarshi, S., Ojha, S. N., & Sharma, A. (2019). An assessment of vulnerability of fishers' livelihood to climate change in coastal Odisha, India. Current World Environment, 14(1), 60. https://doi.org/10.12944/CWE.14.1.08

Radhika, D., Priyanka, D., & Cisma, F. (2023). Economic vulnerability of coastal households in Southern Tamilnadu. Tuijin Jishu/Journal of Propulsion Technology, 44(4).

Ramachandran, A., Saleem Khan, A., Palanivelu, K., Prasannavenkatesh, R., & Jayanthi, N. (2017). Projection of climate change-induced sea-level rise for the coasts of Tamil Nadu and Puducherry, India using SimCLIM: A first step towards planning adaptation policies. Journal of Coastal Conservation, 21(6), 731–742. https://doi.org/10.1007/s11852-017-0532-6

Saha, S., & Munian, D. (2025). Impact of climate change on prevalence of waterborne Vibrio sp. in fisherfolk health of the Indian Sundarbans. Uttar Pradesh Journal of Zoology, 46(18).

Sahana, M., Rehman, S., Paul, A., & Sajjad, H. (2019). Assessing socio-economic vulnerability to climate change-induced disasters: Evidence from Sundarban Biosphere Reserve, India. Geology, Ecology, and Landscapes, 4(3), 159–170.

Salim, S. S., Narayanakumar, R., Remya, R., Safeena, P., Rahman, M. R., & James, H. (2018). Climate change impacts on livelihood vulnerability assessment-adaptation and mitigation options in marine hot spots in Kerala, India. International Journal of Environment and Climate Change, 8(3), 218–231.

Salim, S. S., Joseph, L., James, H., Shinu, A., Athira, N., & Smitha, R. (2019). Assessing the alternative livelihood options for climate change vulnerable coastal fishing villages in Kerala, India. International Journal of Environment and Climate Change, 9(8), 495–503.