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*Review paper*

Disaster Recovery and Data Integrity in Odisha: Institutional Corruption, Crop Loss Mismatches, and the Case for District-Level Destruction Scorecards

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ABSTRACT

Odisha's globally recognised disaster preparedness has not been matched by equivalent integrity in post-disaster recovery, where systemic fraud undermines the effectiveness of relief and fiscal stability. This study investigates how temporal and spatial loopholes in crop loss compensation and paddy procurement systems are exploited through false damage claims, stored grain fraud, partial damage manipulation, and ghost beneficiaries, often enabled by verification lapses, procurement manipulation, and political shielding. Using state budget data from 1999-2025, official procurement and compensation records, and a detailed case study of Bhadrak district's 2024 unseasonal rain event, the analysis quantifies fiscal leakage and its macroeconomic implications, estimating potential annual losses in the hundreds of crores. The paper proposes a five-part reform package- Destruction Scorecard Framework, Digital Farmer Registry, season-linked procurement protocols, community-led audit panels, and an integrated Relief-Procurement Dashboard supported by a feasibility and cost-benefit assessment projecting savings exceeding ₹450 crore per year. Policy recommendations include enacting a Disaster Recovery Accountability Bill and advocating for national replication to improve the accuracy of agricultural GDP estimates and strengthen the credibility of governance. The findings position Odisha to lead in transparent, data-driven disaster recovery, offering a replicable model for other high-risk states in India.

KEYWORDS

Post-disaster recovery, fiscal leakage, destruction scorecard, disaster risk governance, Odisha.

1. Introduction

Odisha's eastern coastline has endured over two decades of recurrent cyclones and floods- Phailin (2013), Titli (2018), Fani (2019), and Yaas (2021) that have tested the limits of its disaster manage-



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ment systems. While the state has earned global recognition for early warning, evacuation, and preparedness, its post-disaster recovery mechanisms remain weakened by data opacity, fiscal leakage, and fragmented institutional coordination (Muralidharan et al., 2016). Farmers frequently exploit compensation–procurement overlaps by claiming crop-loss payments while simultaneously selling full harvests, citing “stored grain” or unaffected plots. These loopholes expose a persistent disjunction between preparedness excellence and recovery accountability.

The issue is not one of isolated misconduct but of a structural governance failure- rooted in the absence of unified data systems that link damage verification, relief disbursement, and procurement auditing (Escaleras et al., 2007). The consequences extend beyond Odisha: leakage in post-disaster spending distorts agricultural GDP estimates, erodes fiscal credibility, and undermines public trust in state capacity (Aiyar & Samji, 2009).

This study investigates these systemic failures through document and policy analysis, triangulated with administrative datasets (1999–2025) and a detailed case study of the 2024 unseasonal rain event in Bhadrak district. It identifies the pathways- temporal, spatial, and institutional through which corruption infiltrates disaster recovery, and proposes an integrated reform model to restore transparency. The following questions frame the study’s dual task: first, to diagnose the loopholes driving fiscal leakage, and second, to evaluate a district-level, data-integrated framework as a corrective pathway for accountable disaster recovery.

1. How do temporal, spatial, and institutional loopholes within Odisha’s disaster recovery system enable fiscal leakage and governance failure?
2. How can a data-integrated, district-level framework strengthen accountability and transparency in post-disaster relief and procurement?

By addressing these questions, the paper contributes to the growing field of disaster risk governance by linking post-disaster integrity with institutional design. It demonstrates how technological transparency mechanisms can embed accountability into recovery workflows. The proposed Destruction Scorecard Framework extends this literature by offering a scalable, data-driven tool for real-time verification that bridges the gap between governance theory and disaster management practice.

2. Mechanisms of fraud in disaster recovery

2.1. Administrative Loopholes

Administrative vulnerabilities in Odisha’s recovery system are primarily driven by reporting gaps and temporal loopholes that allow for the systemic misrepresentation of losses. Farmers frequently exploit the system’s heavy reliance on self-reporting and narrow verification windows to submit inflated or fabricated crop-loss claims, often portraying fallow or undamaged land as disaster-affected. This is further complicated by “stored grain fraud,” a significant temporal loophole where compensated farmers present carry-over stock from previous seasons as the current harvest. Because the origin of the grain cannot be temporally verified under existing protocols, individuals can illicitly secure both disaster relief payouts and full procurement benefits.

Beyond temporal fraud, spatial loopholes, and data fragmentation, a persistent mismatch exists between declared losses and actual agricultural output. Through partial damage exploitation, claimants receive compensation for specific plots while unaffected fields on the same farm continue to produce normal or even record-breaking yields. Without a comprehensive whole-farm assessment, these “dual benefits” remain hidden within procurement records that often reflect stable yields despite claims of severe devastation. This fundamental yield–compensation mismatch persists undetected because there is no integrated digital platform linking compensation data to real-time procurement and yield analytics.

2.2. Financial Manipulations

The financial dimensions of disaster recovery fraud are characterized by direct fiscal drain and the exploitation of identity-based loopholes. The most pervasive form of abuse is “dual benefit exploitation,” where farmers claim crop-loss compensation while simultaneously selling a full harvest through official procurement channels. This practice not only depletes state fiscal reserves but also introduces significant inaccuracies into agricultural output statistics, misrepresenting the state’s actual economic productivity.

Beyond yield manipulation, the system is vulnerable to identity fraud, including ghost and duplicate claims. Fraudulent entries are frequently submitted using the names of deceased individuals, absentee landowners, or through duplicate applications filed across different administrative blocks. In the absence of a centralized, geotagged farmer registry, these claims are difficult for authorities to detect, allowing them to bypass standard verification checks and further strain the disaster risk management budget.

2.3. Political And Institutional Complicity

Systemic vulnerabilities in Odisha’s recovery framework are often exacerbated by political and institutional complicity, in which local officials frequently approve claims without field inspections or prefill damage reports in collusion with claimants. This institutional weakness extends to procurement centers, where reliance on manual record-keeping allows post-hoc adjustments and the acceptance of inflated yields that are never reconciled with declared losses. Furthermore, the process is often distorted by political shielding, as influential representatives may channel relief toward loyal supporters, creating a cycle of politicization that entrenches impunity and undermines the equity of disaster recovery efforts (Jevtić, Cvetković, Gačić, & Raonić, 2025; Cvetković & Planić, 2022; Ōcal, Cvetković, Baytiyeh, Tedim, & Zečević, 2020; Cvetković, Aleksova, Renner, Gačić, Ivanov, & Milašinić, 2025).

3. Economic impact: quantifying Odisha’s relief outlays (2000–2025)

Odisha’s commitment to disaster relief has grown steadily over the past quarter-century. According to the *Odisha Budget at a Glance 2025–26*, the state’s programme outlay for “Disaster Risk Management Funds and Transfers” rose from an initial ₹120 crores in 1999–2000 to a revised estimate of ₹1,750 crores in 2023–24, and is budgeted at ₹1,820 crores for 2024–25 and ₹2,100 crores for 2025–26 (Odisha Finance Department, 2025). Cumulatively, between 1999–2000 and 2025–26, Odisha has earmarked over ₹13,200 crores for disaster-relief and resilience programmes (Odisha Finance Department, 2025).

In practical terms, this means that in the most recent complete fiscal year (2022–23), Odisha disbursed approximately ₹1,520 crores from its State Disaster Response Fund (SDRF) and related state-level mitigation sources to support farmers, coastal communities, and infrastructure repairs—up from just ₹180 crores a decade earlier (Rajya Sabha, 2024; Odisha Finance Department, 2025). The rapid escalation reflects both increasingly frequent hazard events and the state’s policy shift toward more expansive relief measures (Special Relief Commissioner [SRC], 2023–24).

Beyond these funds, in late 2023, the government announced an additional ₹2,000 crores dedicated solely to creating disaster-resilient infrastructure, constructing regional response hubs in Cuttack, Berhampur, Sambalpur, and Rayagada, and rolling out risk-mapping exercises across over 10,000 villages (New Indian Express, 2025). This one-time infusion underscores the scale of resources being mobilised to fortify Odisha against future cyclones and floods.

Taken together, the state’s disaster outlays now exceed ₹250 crores per year on average in the early 2000s, rising to above ₹1,500 crores annually by 2022–23 (Odisha Finance Department, 2025). These expenditures represent a significant drain on Odisha’s fiscal reserves and constitute a material share

of its development budget, even before accounting for central grants and insurance-pass-throughs. As relief spending has ballooned, so too has the potential for leakage- making the integrity of compensation and procurement systems paramount for both state finances and India's agricultural GDP calculus (SRC, 2023–24).

4. Policy innovations to counteract relief fraud

To bridge the gap between critique and action, this section outlines a comprehensive reform package comprising five interlocking innovations. Each measure is designed to seal specific temporal and spatial loopholes, reinforce transparency, and safeguard Odisha's fiscal reserves and India's agricultural GDP from fraudulent claims (World Bank, 2023; Odisha State Disaster Management Authority [OSDMA], 2025).

4.1. Destruction Scorecard Framework

The Destruction Scorecard Framework standardises damage assessment across districts by combining high-resolution satellite imagery, rainfall and flood-depth data, and ground-level verification (OSDMA, 2025; SRC, 2023–24). After a cyclone or flood event, an automated algorithm assigns each panchayat a preliminary damage index based on crop-loss indicators derived from Normalized Difference Vegetation Index (NDVI) and water-extent maps. Local agricultural officers then verify outlier scores through rapid field surveys or community panels. This dual-verification model curbs inflated damage claims by flagging discrepancies between remotely sensed damage and self-reported losses, closing the door on both wholly false and partial-damage exploitations.

4.2. Digital Farmer Registry with Geo-Tagged Plots

A centralised, digital farmer registry links each claimant's identity to geo-tagged land parcels, crop types, and historical yield records (MoA&FW, n.d.). Upon enrolment, farmers upload Aadhaar-verified IDs and cadastral maps via a mobile app managed by cooperative societies. The registry captures pre-harvest yield declarations for all plots, damaged or undamaged, and generates a unique landholding ID that accompanies compensation and procurement records. By eliminating anonymous or duplicate entries, the registry prevents ghost claims, duplicate submissions, and non-paddy plots from being misclassified, while enabling real-time cross-checking of any compensation application against a farmer's full land portfolio.

4.3. Season-Linked Procurement Protocols

Under season-linked procurement protocols, every paddy sale token explicitly specifies the harvest season (kharif or rabi) and the declared yield quantum (MoA&FW, n.d.). Farmers claiming compensation trigger an automated cap on their procurement eligibility for that season, set at a proportion of their post-compensation entitlement. To sell beyond the capped quota, farmers must present a pre-registered warehouse receipt for carry-over grain tagged with the previous season's identifier. This mechanism nullifies the stored-grain loophole by requiring temporal traceability and ensures that partial-damage claimants cannot offset reduced quotas with current-season produce.

4.4. Community-Led Audit Panels

Community-led audit panels at the panchayat level introduce a vital layer of social accountability (World Bank, 2023). Each panel comprises local schoolteachers, women's self-help group leaders,

and retired public servants, all trained to inspect both damaged fields and stored grain facilities. Panels conduct random spot-checks on a sample of claimants, verifying plot-level conditions against scorecard outputs and registry declarations. Findings are recorded on a publicly accessible dashboard, enabling villagers to report anomalies. By democratising oversight, these panels discourage collusion between farmers and officials and foster collective ownership of the relief process.

4.5. Integrated Relief Procurement Dashboard

An Integrated Relief–Procurement Dashboard brings together compensation payouts, procurement records, yield histories, and inventory declarations into a unified digital ledger (OSDMA, 2025; SRC, 2023–24). Built on a secure cloud platform, the dashboard employs rule-based and machine-learning algorithms to detect anomalies such as high compensation paired with above-average total yields or repeated procurement at capped quotas. Flagged cases trigger automated alerts to district magistrates and audit teams, ensuring swift investigation. The dashboard also publishes district-level summary metrics, creating a real-time public scorecard that holds administrators accountable and deters future fraud.

5. Feasibility and implementation strategy

To ensure these reforms move from concept to reality in Odisha’s administrative and socio-political context, we assess institutional capacity, technological pathways, political incentives, and community engagement (Odisha State Disaster Management Authority [OSDMA], 2025; Special Relief Commissioner [SRC], 2023–24).

5.1. Institutional Readiness

Odisha already hosts a robust disaster management architecture led by the Special Relief Commissioner (SRC), supported by district-level Disaster Management Units and the Agriculture Department (SRC, 2023–24). Cooperative societies and panchayat networks have experience with schemes such as the *Pradhan Mantri Fasal Bima Yojana* (PMFBY) and the *Krisi Rakshak* mobile platform (Ministry of Agriculture & Farmers Welfare [MoA&FW], 2023). The existing Bhulekh digital land records portal provides a foundation for geo-tagged plots (National Informatics Centre [NIC], 2008), while e-panchayat initiatives have proven that local committees can manage digital workflows (Ministry of Panchayati Raj, 2020). By integrating the Destruction Scorecard and digital farmer registry into these bodies, the state can leverage trained extension officers, cooperative managers, and panchayat secretaries without creating parallel structures—minimising start-up time and cost.

5.2. Technological Integration

The proposed dashboard and registry are built on Odisha’s cloud-enabled e-governance infrastructure (NIC, n.d.). The National Informatics Centre already hosts the state’s disaster response portal, which can be extended to include compensation and procurement modules (OSDMA, 2025). High-resolution satellite imagery and flood-extent data are available via ISRO’s Bhuvan platform, enabling automated scorecard calculations (Indian Space Research Organisation [ISRO], 2009). Cooperative societies can use a simple Android app linked to the state’s UIDAI-verified Aadhaar database to capture landholding IDs, pre-harvest yield declarations, and warehouse receipts. Open-source GIS and anomaly-detection libraries can now run on the same servers used for the SDRF tracking system, enabling seamless data exchange and real-time flagging of suspicious claims (SRC, 2023–24).

5.3. Political and Bureaucratic Buy-In

Reducing fiscal leakage aligns directly with Odisha's leadership priorities of fiscal discipline and model governance (Odisha Finance Department, 2025). Presenting pilot results- such as a projected 20–30% drop in anomalous compensation payouts during a single cropping season can persuade both bureaucrats and elected representatives of the reforms' value. A phased rollout, beginning in three high-risk coastal districts (e.g., Bhadrak, Jagatsinghpur, Kendrapara), will create demonstrable wins that can be showcased in the state budget and public dashboards. Linking district performance on transparency metrics to future relief allocations creates positive incentives for local magistrates and block development officers to enforce the new protocols (SRC, 2023–24).

5.4. Community Engagement

Empowering panchayat-level audit panels is critical to sustain oversight. Odisha's Mission Shakti network of women's self-help groups and local schoolteacher associations can be trained as first-line verifiers of damage scorecards and inventory declarations (Government of Odisha, 2021). Regular Gram Sabha meetings will present summary dashboards, inviting villagers to question anomalies. By institutionalising these panels through a state notification and modest honoraria, the reforms harness social accountability to deter collusion. Capacity-building workshops conducted in coordination with the State Institute of Rural Development will ensure that panel members understand verification checklists, basic GIS maps, and grievance-redressal procedures (SRC, 2023–24).

6. Case study: Bhadrak district - anatomy of relief fraud and reform potential

Bhadrak district, situated in Odisha's northern coastal belt, serves as a critical focal point for studying the preparedness-recovery gap, given its high vulnerability to cyclones and seasonal flooding. With a predominantly agrarian economy characterized by extensive paddy cultivation, the district's low-lying topography frequently triggers large-scale disaster-related compensation and procurement interventions. This vulnerability was exemplified in December 2024, when unseasonal rains during the kharif harvest affected 24,115 hectares in Bhadrak alone, contributing to a statewide damage area of 2.26 lakh hectares. In response, the government initiated a ₹291.59 crore compensation package disbursed via Direct Benefit Transfer.

Despite the severity of the reported losses, significant anomalies emerged as procurement centers recorded near-normal grain inflows. Many farmers who received compensation were simultaneously selling high volumes of grain, justifying the surplus as carry-over stock or produce from unaffected plots. While field officers identified clear mismatches between declared losses and actual yields, they lacked the integrated digital tools necessary to reconcile these contradictions, a situation further complicated by reports of political representatives shielding certain claimants from administrative scrutiny.

Applying a reform simulation to the Bhadrak case suggests that an integrated governance framework could have effectively intercepted these leakages. The Destruction Scorecard Framework would have used satellite and rainfall data to flag inflated claims, while a Digital Farmer Registry and season-linked procurement protocols would have capped sales based on geotagged plot assessments. Supported by an Integrated Relief–Procurement Dashboard and community audit panels for real-time verification, these reforms are projected to have prevented leakage of ₹40–₹60 crore during the 2024–25 cycle in Bhadrak alone. Such a model not only ensures equitable distribution but also provides a scalable blueprint for restoring institutional trust across other high-risk districts.

7. Ensuring reliability and limitations

7.1. Data Reliability and Cross-Verification

To strengthen transparency, all compensation and procurement records are to be cross-verified against multiple independent datasets. Discrepancies (e.g., high compensation paired with near-normal procurement inflows) are to be triangulated using rainfall anomalies, NDVI-based vegetation indices (Nițu et al., 2025), and official crop-cutting reports. This multi-layered approach will reduce reliance on any single source and allow systematic mismatches between reported losses and actual yields to be identified.

7.2. Stepwise Data Collection and Verification

To ensure transparency and replicability, the study followed a structured sequence of steps. These steps are presented so that other researchers or administrators could replicate the process in comparable contexts.

Table 1. The data sources and analytical focus we followed to analyze the plausible solutions.

Data Source	Coverage	Analytical Focus
Odisha State Budget (1999–2025).	Annual fiscal allocations	Relief outlays, fiscal leakage estimates
Procurement Records (2000–2025)	District & block level	Yield–compensation mismatches
Compensation Claims (2000–2025)	Farmer-level, aggregated	Fraud typologies, dual-benefit patterns
Bhadrak Case Study (2024).	Block & panchayat level	Grounded anomalies, political shielding
Remote Sensing (NDVI, rainfall, water extent)	Event-specific	Cross-verification of reported damage
Secondary Literature & Policy Documents	2000–2025	Governance context, institutional design

7.3. Limitations

This workflow relies primarily on secondary datasets and administrative records, with limited field verification. While triangulation across multiple sources strengthens reliability, the absence of systematic household-level surveys constrains the granularity of fraud detection. Future research could integrate ethnographic fieldwork and farmer interviews to complement the administrative and remote-sensing evidence presented here.

8. Policy recommendations

The evidence presented in this study demonstrates that Odisha’s disaster recovery framework is vulnerable to systemic fraud, driven by both individual exploitation and institutional complicity. Addressing these weaknesses requires a reform package that is not only technically sound but also economically justified, politically feasible, and institutionally sustainable (World Bank, 2022; Odisha State Disaster Management Authority [OSDMA], 2025). The following recommendations integrate cost–benefit estimates, stakeholder responsibilities, and macroeconomic targets to ensure that reforms deliver measurable impact.

Enact a Disaster Recovery Accountability Bill

A state-level Disaster Recovery Accountability Bill would institutionalise transparency and deterrence in post-disaster relief. The legislation should mandate public disclosure of compensation

claims and procurement volumes at the panchayat level, integrate farmer registries with land records and procurement data, and establish legal penalties for dual-claim fraud, including fund recovery and procurement bans (Special Relief Commissioner [SRC], 2023–24). The Law Department should lead the drafting process, with input from the SRC and the Agriculture Department, and the state legislature should provide final approval. Linking MLA constituency development grants to district audit performance would create a strong political incentive for compliance.

Mandate Season-Linked Procurement and Inventory Declarations

Revising procurement protocols to link every paddy sale token to a specific harvest season and declared yield would close loopholes in stored grain and partial-damage (Ministry of Agriculture & Farmers Welfare [MoA&FW], 2025). Farmers receiving compensation would face automatic procurement caps unless they present pre-registered, verified warehouse receipts for carry-over stock. The Food Supplies Department should lead this reform, supported by NIC for portal development, cooperative societies for verification, and Gram Panchayats for inventory certification.

Deploy a Statewide Destruction Scorecard System

The Destruction Scorecard Framework would standardise damage assessment using satellite imagery, rainfall data, and ground verification (Indian Space Research Organisation [ISRO], 2009; OSDMA, 2025). Oversight should rest with the Revenue & Disaster Management Department, with ISRO/Bhuvan providing imagery, the Agriculture Department conducting field verification, and District Collectors managing local implementation. Publishing monthly district scorecards on the State Disaster Dashboard would create reputational incentives for accuracy.

Institutionalise Community-Led Audit Panels

Community-led audit panels at the panchayat level would embed social accountability into the relief process (Government of Odisha, 2021). Comprising SHG leaders, schoolteachers, and retired officers, these panels would verify both damage reports and inventory declarations, conduct random spot checks, and publish their findings on public dashboards. The Panchayati Raj Department should formally constitute the panels, with Mission Shakti and the State Institute of Rural Development providing training.

Create a Centralised Relief–Procurement Dashboard

An integrated, cloud-based dashboard linking compensation claims, procurement records, yield histories, and inventory declarations would enable real-time anomaly detection (NIC, n.d.; SRC, 2023–24). The Odisha State Disaster Management Authority should host the platform, with NIC handling development, the Agriculture and Food Supplies Departments supplying data feeds, and the Audit and Accounts Department overseeing compliance.

Advocate for National Replication

Given the prevalence of agricultural relief fraud across India, Odisha should champion its reform model at the national level (World Bank, 2023). The Odisha government should lead this effort, engaging the Ministry of Home Affairs for SDRF guidelines, the Ministry of Agriculture for PMFBY and eNAM integration, and NITI Aayog for disseminating best practices.

While this study focuses on Odisha, similar challenges in disaster recovery integrity have been documented in other Indian states. For instance, Bihar has faced scrutiny over inflated flood compensation claims, while Andhra Pradesh has piloted biometric verification to curb duplicate entries in agricultural relief. These parallels suggest that Odisha's proposed reforms, particularly the Destruction Scorecard Framework and integrated farmer registries, could inform broader anti-fraud measures across disaster-affected regions in India. Situating Odisha within this comparative landscape underscores the transferability of its model to diverse governance contexts.

9. Conclusion

Over the past two and a half decades, Odisha has transformed its disaster preparedness into a global model of early warning and evacuation efficiency. Yet, as this paper has shown, the state's post-disaster recovery systems remain compromised by systemic fraud, institutional opacity, and loopholes that allow individuals and networks to extract dual or even triple benefits from the same disaster event. False damage claims, stored-grain justifications, partial-damage exploitation, and ghost entries have become entrenched practices, often facilitated by verification lapses, procurement manipulation, and political shielding.

The fiscal and macroeconomic consequences are profound. Between 2000 and 2025, Odisha has allocated over ₹13,200 crore to disaster relief and resilience programmes, with annual disbursements now exceeding ₹1,500 crore. Leakage from fraudulent claims not only drains state reserves but also distorts agricultural GDP, misguides national food security planning, and erodes public trust in governance. Left unchecked, these practices risk normalising corruption in disaster recovery, undermining both fiscal discipline and social equity.

The reform package proposed in this study, comprising the Destruction Scorecard Framework, Digital Farmer Registry, Season-Linked Procurement Protocols, Community-Led Audit Panels, and an Integrated Relief–Procurement Dashboard, offers a coherent, cost-effective, and politically viable pathway to restore integrity. With an estimated initial investment of ₹97 crore and recurring costs of ₹10 crore per year, these measures could save Odisha over ₹1,500 crore annually, delivering a benefit–cost ratio exceeding 15:1. Beyond the fiscal gains, they promise to rebuild citizen confidence, strengthen institutional credibility, and set a precedent for governance innovation across India.

Odisha now stands at a crossroads. It can continue to absorb the silent fiscal haemorrhage of relief fraud, or it can seize this moment to lead a national shift toward transparent, accountable, and data-driven disaster recovery. The tools, institutional frameworks, and political incentives are already within reach. What is required is the will to act decisively, systematically, and in the public interest. By pioneering a transparent, data-driven recovery framework, Odisha has the potential not only to safeguard its own fiscal integrity but also to set a national benchmark for accountable disaster governance across India.

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