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Mainstreaming Disaster Risk Reduction into Sector-Level Policy and Corporate HSE Systems: An Alignment with NEMA's National Push

[1] Victoria O Emelu, [2] Godspower Imiete, [3] Sunny O Asomaku, [4] Abiye Tomquin, [5] Geoffrey Ebe, [6] Perri Tamuno-Owunari

[1] Department of Geography and Environmental Management, University of Port Harcourt, Nigeria
[2, 4, 5, 6] Department of Environmental Management, Rivers State University, Port Harcourt, Nigeria
[3] Centre for Disaster Risk Management and Development Studies, University of Port Harcourt, Nigeria

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Corresponding Author: **Sunny O Asomaku**

Abstract
Nigeria has spent most of its disaster history reacting. The 2022 floods, which NEMA's Director-General later put at 662 deaths and more than 2.4 million displaced people, showed how costly that habit has become, and the launch of the National Disaster Risk Reduction Strategy (2025–2030) and the NEMA Strategic Plan (2025–2029) signals a deliberate move toward prevention. Yet a national strategy only changes risk on the ground when ministries, regulators and companies rewrite what they do every day. This paper asks how disaster risk reduction (DRR) can be mainstreamed into sector-level policy and into corporate health, safety and environment (HSE) management systems in a way that aligns with NEMA's push. Using a qualitative documentary analysis and framework synthesis, the study maps the four Sendai Framework priorities against the clause structure of ISO 45001, ISO 14001 and ISO 22301, and against the institutional mandates of six policy sectors. The analysis suggests that corporate HSE systems are strongest where they meet Sendai Priority 4 (preparedness and response) and weakest where they touch Priority 1 (understanding systemic risk) and Priority 3 (investment in resilience). At sector level, the entry points for DRR exist but are rarely written as enforceable expectations. The paper proposes a three-layer mainstreaming framework, an alignment matrix, a set of indicators, and a phased roadmap that gives NEMA, sector regulators and operators a common vocabulary. The argument is conceptual and policy-analytic; the ratings reported are the author's documentary judgements intended for later validation by expert panel, not survey findings.

Keywords: Disaster Risk Reduction, Mainstreaming, Corporate HSE Systems, NEMA, Sendai Framework, ISO 45001, Nigeria, Policy Alignment

Highlights

- Nigeria's 2025–2030 DRR Strategy creates a national reference point that sector policies and company HSE systems can be aligned to.
- Corporate HSE systems are strong on emergency response but thin on hazard-informed investment and systemic risk analysis.
- The NEMA Act 1999 gives the agency no power to compel other bodies to integrate DRR, so mainstreaming must be pursued through sector regulators, procurement and management-system standards.
- A three-layer framework, alignment matrix, indicator set and phased roadmap are proposed for validation.

1. Introduction

Anyone who has worked in Nigeria's oil and gas fields or on a construction site in the rainy season knows the gap between a plan on paper and a plan that holds when the river rises. Emergency response procedures exist, drills are logged, and yet the same access roads flood, the same jetties are cut off, and the same communities absorb the worst of it. The distance between formal preparedness and real resilience is the problem this paper addresses.

The national picture makes the point sharply. The 2022 flood season was the most damaging Nigeria had seen in a decade.

NEMA's Director-General reported 662 deaths, 3,174 injuries and 2,430,445 displaced people (Daily Trust, 2023) [4], while the federal government's Global Rapid Post-Disaster Damage Estimation (GRADE) analysis put direct economic damage at a median of US$6.68 billion, within a range of US$3.79 to US$9.12 billion (ThisDay, 2023) [18]. Every state and the Federal Capital Territory were affected. Losses on that scale are not only a humanitarian matter. They interrupt supply chains, damage assets, close roads to work sites and reshape the operating environment of every sector.

Nigeria's institutions have responded, at least on paper. The National Emergency Management Agency (NEMA) published the National Disaster Risk Management Policy (NEMA, 2018) [14], and in 2025 the Office of the Vice President and NEMA, with UNDP support, produced the National Strategy for Disaster Risk Reduction (2025–2030) with a short- and medium-term action plan (Office of the Vice President & NEMA, 2025) [16]. NEMA's leadership has framed the shift as one from reactive to proactive, preventive and resilient management, and has discussed innovative financing such as catastrophe bonds, insurance pools and blended finance (International Fire and Safety Journal, 2025; Voice of Nigeria, 2025) [8, 23]. Nigeria's statement to the ninth Africa Regional Platform likewise reported DRR units in federal ministries, departments and agencies (MDAs) and national and sub-national platforms (NEMA, 2024) [15].

But a strategy is not a mechanism. NEMA is a coordinating agency, and an earlier critical appraisal of the NEMA Act found that the law focuses on setting up the agency rather than on preventing risk, and does not empower NEMA to compel other public or private bodies to integrate DRR into their operations (Mashi *et al*., 2019) [13]. If integration cannot be ordered from the centre, it has to be pulled through the systems that organisations already obey: sector policies, regulatory expectations, procurement rules, and the management systems that companies audit themselves against every year. That is what mainstreaming means in practice, and it is why this paper concentrates on sector-level policy and corporate HSE systems.

The study therefore asks three questions. First, what does NEMA's national push actually require of sectors and companies? Second, how far do typical corporate HSE systems already deliver those requirements? Third, what would a credible, phased route to alignment look like? The contribution is a structured alignment analysis and a framework that practitioners can test, rather than new field data.

2. Background and Literature

2.1 Mainstreaming DRR and the Sendai Framework

Mainstreaming DRR means building risk considerations into the routine decisions of development and business rather than treating disasters as a separate, occasional concern. Guidance for development organisations describes it as a process of embedding DRR into policies, planning, programmes and budgets so that it becomes part of how organisations normally work (Benson & Twigg, 2007) [1]. The Sendai Framework for Disaster Risk Reduction 2015–2030 organises this ambition into four priorities: understanding disaster risk; strengthening disaster risk governance; investing in DRR for resilience; and enhancing preparedness for effective response and "build back better" in recovery (United Nations Office for Disaster Risk Reduction [UNISDR], 2015) [22]. Its emphasis on prevention, on shared responsibility across public and private actors, and on national and local strategies is what NEMA's 2025–2030 Strategy is designed to implement domestically.

The literature is clear that mainstreaming is easier to announce than to achieve. Thomalla *et al*. (2006) [19] showed that disaster risk reduction, climate adaptation, environmental management and poverty reduction communities have worked largely in isolation, limiting their combined effect on vulnerability. Kelman *et al*. (2015) [12] similarly argue for placing DRR within a wider development and sustainability frame rather than leaving it as a specialist silo. For a corporate reader, the lesson is practical: DRR will not take hold if it is bolted onto HSE as another compliance layer. It has to enter the systems that already drive decisions.

2.2 Nigeria's legal and institutional architecture

Modern disaster management in Nigeria dates to the 1976 National Emergency Relief Agency, replaced in 1999 by NEMA (Mashi *et al*., 2019) [13]. Successive documents added structure: the National Disaster Management Framework, the 2018 policy, and state and local emergency management agencies (SEMAs and LEMAs). Recent commentary observes that the policy landscape is now comparatively well developed and that the priority is implementation, accountability, and sustainable financing for sub-national agencies (PreventionWeb, 2026) [17]. Scholars have been blunter about coherence. Danhassan *et al*. (2023) [5] found no single national flood policy, weak synergy among the institutions that share flood responsibilities, and weak monitoring and reporting, while noting that state and local governments carry much of the burden with limited capital. Echendu (2022) [7] attributes much Nigerian flooding to anthropogenic drivers and argues that partnerships and risk-management strategies can reduce the harm, which is directly relevant to the role of companies and regulators.

Two features of this architecture shape the mainstreaming problem. The first is dispersal: hazard forecasting, environmental regulation, water resources, works, health and petroleum regulation all sit in different institutions. The second is the limit of NEMA's legal reach noted above. Together they imply that alignment has to be built horizontally, through sector policy and regulatory practice, not only vertically from Abuja.

2.3 Corporate HSE systems and disaster risk

Corporate HSE management is normally organised around international management-system standards. ISO 45001 sets requirements for occupational health and safety management, including hazard identification, risk assessment and emergency preparedness (International Organization for Standardization [ISO], 2018) [10]. ISO 14001 covers environmental management systems (ISO, 2015) [9], and ISO 22301 addresses business continuity (ISO, 2019) [11]. These standards share a plan-do-check-act logic and are widely audited in the Nigerian oil, gas and construction sectors. Their strength is discipline and evidence. Their limitation, from a DRR standpoint, is scope: they were written around the organisation's own activities and boundary, not around cascading, territorial and climate-

driven risk.

The oil and gas literature makes the vulnerability explicit. Cruz and Krausmann (2013) [3] concluded that climate change and extreme weather pose a real physical threat to the sector, particularly in low-lying coastal areas, and that operators need to assess their own vulnerability and act on it, with the potential for Natech (natural-hazard-triggered technological) accidents forming part of that concern. For a Niger Delta operator, flood-driven access loss, tank and pipeline exposure, and community disruption are not remote scenarios; they are seasonal realities. Yet routine HSE risk registers seldom treat hydro-meteorological hazard, upstream catchment behaviour or community vulnerability as first-order inputs.

2.4 The gap this paper addresses

Existing Nigerian studies have examined flood causes, the NEMA Act, governance coherence and sectoral impacts. What appears to be missing is an explicit bridge between the national DRR agenda and the management systems that companies actually operate. This paper builds that bridge by aligning Sendai priorities and NEMA's strategy with the structure of corporate HSE systems and with sector policy mandates.

3. Conceptual Framework

The framework in Fig 1 treats mainstreaming as movement across three layers. The national layer sets direction: the Sendai Framework, the NEMA Act and 2018 policy, and the 2025 strategy documents. The sector-policy layer translates that direction into regulator expectations, sector plans and indicators in energy and petroleum, environment, water, works, health and finance. The corporate layer converts those expectations into hazard-informed HIRA (hazard identification and risk assessment), asset integrity, contractor control, emergency preparedness and audit routines. A set of enablers cuts across all three: legal mandate and reporting duty, DRR focal points, shared hazard data, financing and insurance, competence, and community engagement. The intended outcome is reduced exposure, reduced vulnerability and shorter downtime.

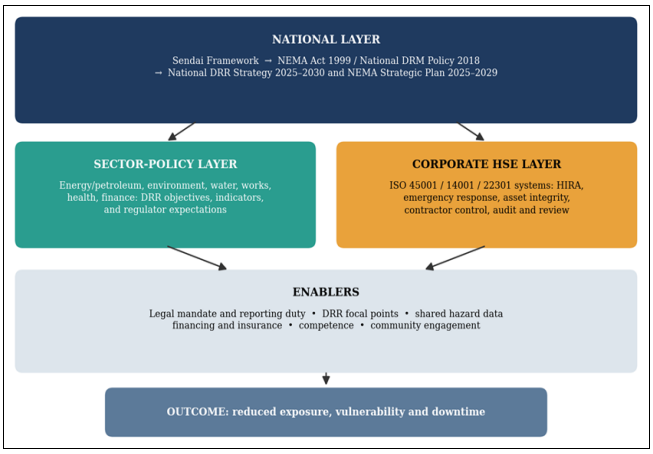

Fig 1: Three-layer framework for mainstreaming DRR from national strategy into sector policy and corporate HSE systems (author's synthesis)

4. Methodology

The study is a qualitative documentary analysis followed by framework synthesis. It does not report primary survey or interview data. Three sets of documents were analysed: (a) national DRR instruments and official statements, namely the NEMA Act as discussed in the literature, the 2018 National Disaster Risk Management Policy, the 2025–2030 Strategy, NEMA's 2024 statement to the Africa Regional Platform, and public reporting of NEMA's 2025 strategy launch; (b) international frameworks and standards, namely the Sendai Framework and ISO 45001, 14001 and 22301; and (c) peer-reviewed and official literature on Nigerian flood governance and on oil and gas vulnerability. Official flood statistics were taken from NEMA and federal-government sources as reported in the press, and where sources differ the differences are stated.

The analytic procedure had four steps. Requirements were first extracted from the national instruments and grouped under the four Sendai priorities. The main clause families of a generic ISO-based HSE system were then listed: context and risk assessment, leadership and policy, planning, support and competence, operational control, emergency preparedness and response, performance evaluation, and improvement. Each intersection was rated on a five-point documentary scale (Table 1). Finally, sector mandates were reviewed to identify where a DRR expectation could be written into existing policy or regulatory practice.

Table 1: Rating rubric used for the alignment matrix

Score	Interpretation
0	No relevant requirement or practice in the standard's typical implementation
1	Incidental: DRR relevance exists only indirectly
2	Partial: relevant activity exists but is not framed around hazard-driven or systemic risk
3	Substantial: requirement clearly supports the Sendai priority and is normally implemented
4	Explicit and embedded: the priority is directly addressed and routinely audited

Two cautions apply. The ratings are the author's professional reading of typical, ISO-based systems as commonly documented, and are not an audit of any particular company; no employer or client data were used. And because a single analyst produced them, they are hypotheses to be tested by expert panel (for example a Delphi exercise) rather than measurements.

5. Analysis and Findings

5.1 The risk context that makes alignment urgent

Fig 2 locates the six states that the GRADE assessment identified as worst affected in 2022: Jigawa, Rivers, Taraba, Cross River, Delta and Bayelsa (Tribune, 2023) [20]. Four of the six lie in or beside the Niger Delta, where much of Nigeria's upstream petroleum activity takes place. The overlap between flood exposure and oil and gas infrastructure is precisely why the sector is a natural first mover for corporate DRR mainstreaming. The map is schematic and is drawn for orientation, not for cartographic measurement.

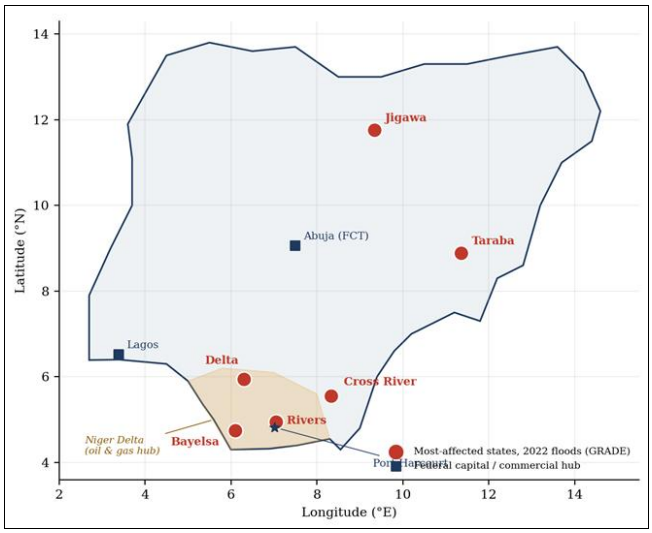

Fig 2: Schematic map of Nigeria showing the six states identified as worst affected by the 2022 floods (Tribune, 2023) [20] and the Niger Delta petroleum region. Outline and positions are approximate

Table 2 and Fig 3 compare the two largest recent flood events. Reported figures vary by source and date, so they should be read as official orders of magnitude. The 2012 figures are those cited by a federal humanitarian ministry statement in the press (CNN, 2022) [2], and the 2022 figures are NEMA's. Other sources give different 2012 displacement totals, which is a reminder that Nigeria still lacks a single authoritative disaster loss database.

Table 2: Selected reported impacts of the 2012 and 2022 floods

Indicator	2012	2022	Source
Deaths	363	662	CNN (2022) [2]; Daily Trust (2023) [4]
Displaced persons	≈600,000	2,430,445	CNN (2022) [2]; Daily Trust (2023) [4]
Injuries	Not compared	3,174	Daily Trust (2023) [4]
Direct economic damage	Not compared here	US$6.68 bn (range 3.79–9.12)	ThisDay (2023) [18]
Jurisdictions affected	Widespread	All 36 states and FCT	ThisDay (2023) [18]

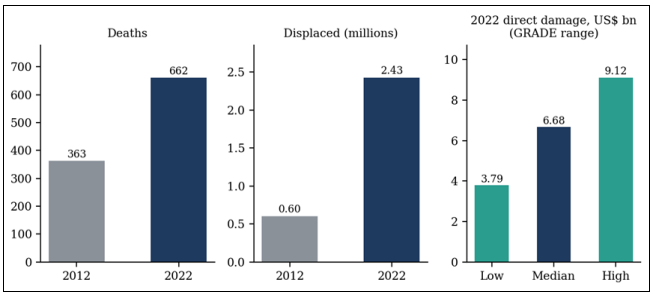

Fig 3: Reported deaths and displacement in the 2012 and 2022 floods, and the GRADE range for 2022 direct damage. Sources as in Table 2

5.2 National policy instruments and what they ask of sectors

Fig 4 sets the main instruments on a timeline and Table 3 lists their relevance to sector and corporate actors. Two points stand out. The 2025 strategy documents explicitly aim to embed DRR and climate adaptation in development planning (UNDP, 2025) [21], and NEMA's public messaging emphasises private-sector involvement and cross-sector coordination as well as innovative financing (International Fire and Safety Journal, 2025) [8]. At the same time, the older legal foundation contains no compulsion. That combination means the 2025 push is, for now, an invitation backed by moral and political authority. Regulators and companies that move early will shape what the eventual expectations look like.

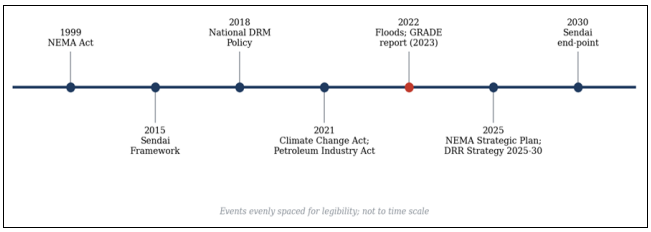

Fig 4: Timeline of key national and international instruments relevant to DRR mainstreaming in Nigeria (events evenly spaced; not to time scale)

Table 3: Selected instruments and their relevance for sector and corporate mainstreaming

Instrument	Year	Relevance for sectors and companies
NEMA Act	1999	Establishes NEMA; focuses on agency functions and gives no power to compel DRR integration by other bodies (Mashi *et al*., 2019) [13]
Sendai Framework	2015	Four priorities and shared-responsibility principle; the global reference for national strategies (UNISDR, 2015) [22]
National Disaster Risk Management Policy	2018	Roles for NEMA, SEMAs and local authorities; policy basis for mainstreaming (NEMA, 2018; PreventionWeb, 2026) [14, 17]
DRR units and platforms in MDAs	Reported 2024	DRR units in national MDAs; national and sub-national platforms; MDAs supported to protect critical infrastructure and basic services (NEMA, 2024) [15]
National DRR Strategy and Action Plan	2025–2030	Short- and medium-term implementation aimed at embedding DRR and adaptation in development planning (Office of the Vice President & NEMA, 2025; UNDP, 2025) [16, 21]
NEMA Strategic Plan	2025–2029	Emphasis on risk-informed development, early warning and institutional coordination (International Fire and Safety Journal, 2025) [8]

5.3 Alignment of corporate HSE systems with the Sendai priorities

Fig 5 reports the alignment matrix. Emergency preparedness and response scores highest against Priority 4 (score 4), which is unsurprising: ISO 45001 asks organisations to plan for emergency situations, and drills and response plans are among the most visibly audited elements of any HSE system. Leadership and policy also scores comparatively well against Priority 2 on governance (score 3). Almost everything else sits at 1 or 2. Context and risk assessment reaches only 2 against Priority 1 because standard HIRA is organised around task and site hazards rather than catchment-scale flooding, cascading failure or community vulnerability. Operational control and planning score 2 against Priority 3 because capital and asset-integrity

decisions are rarely screened for hazard exposure over the asset's life.

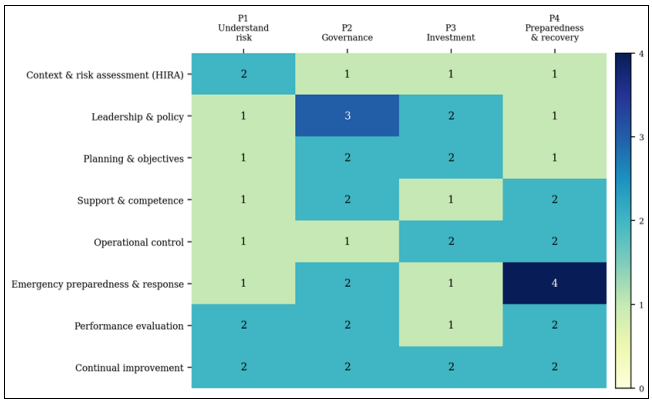

Fig 5: Alignment matrix: indicative documentary ratings (0–4) of ISO-based HSE system elements against the four Sendai priorities (author's assessment; see Table 1 for the rubric)

The pattern is consistent with the wider critique of mainstreaming. Organisations invest in what is auditable and visible, and response is both. Hazard-informed investment and systemic risk analysis are harder to audit and slower to pay back, so they get less attention unless a regulator or a client asks for them.

5.4 Sector-level entry points

Table 4 sets out where DRR expectations could be written into sector policy. The institutional names are those in the sources cited or widely established in Nigeria's public administration; the entry points are proposals for discussion, not descriptions of existing rules. In upstream oil and gas, for example, petroleum regulators and the oil-spill response agency already oversee facility integrity and spill preparedness, so hazard-informed design and contingency requirements can be framed as extensions of duties they already exercise. In water and environment, the agencies responsible for hydrological and meteorological services are natural providers of the shared hazard data on which corporate risk assessment depends. Danhassan *et al.* (2023) [5] note that forecasting and monitoring in Nigeria have been carried out in stand-alone mode by several agencies, so a data-sharing protocol would be a genuine gain.

Table 4: Proposed DRR entry points in sector policy and matching corporate HSE hooks

Sector	Lead institutions (examples)	Proposed DRR entry point in sector policy	Corporate HSE hook
Petroleum / energy	Petroleum regulators; NOSDRA; NEMA	Hazard and climate screening in facility design, integrity and contingency-plan approvals; reporting of Natech near-misses	HIRA and asset-integrity reviews (ISO 45001 clause 6, 8); contingency plans; supplier flood-access plans
Environment and water	Federal Ministry of Environment; NIHSA; NiMet	Standardised hazard data-sharing and early-warning feeds to operators and SEMAs	Use of official forecasts as triggers in emergency procedures and work-permit stop-work criteria
Works and housing	Federal and state works ministries; planning authorities	Flood-sensitive drainage and development control on corridors serving industry	Access-route risk mapping; contractor site selection and camp siting
Health	Federal Ministry of Health; NCDC	Flood-linked disease surveillance and surge planning with employers	Occupational health surge plans; welfare and evacuation provisions
Finance and insurance	Finance ministry; insurance regulator	Risk-transfer instruments and incentives, aligned with NEMA's financing discussions	Business-continuity funding and insurance reviews (ISO 22301)
Local government and community	SEMAs; LEMAs; community structures	Local risk profiles and community early-warning links	Host-community engagement and joint drills

5.5 The maturity gap

Fig 6 contrasts an indicative assessment of where a typical, certified system stands with a target position consistent with the national strategy. The largest gaps are in data sharing with public agencies, community and supply-chain linkage, and board-level DRR accountability. These are all areas that require external relationships or leadership decisions rather than technical fixes, which helps explain why they lag.

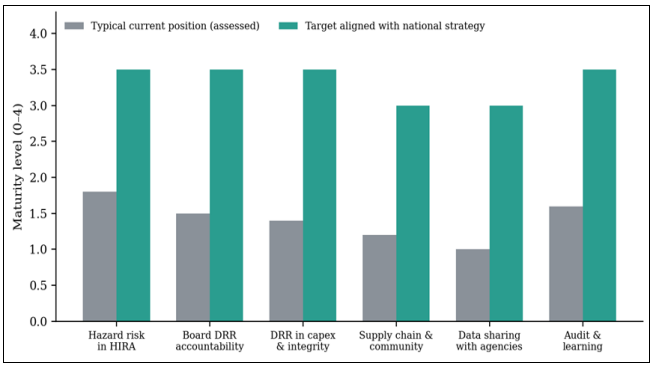

Fig 6: Indicative maturity gap between a typical certified HSE system and a position aligned with the national DRR strategy (author's assessment on a 0–4 scale; for validation)

6. Discussion

The findings point to a straightforward but uncomfortable conclusion: the corporate systems that Nigeria's heavy industries already run are excellent at responding and modest at preventing. That is not a criticism of HSE professionals. It reflects what the standards reward and what regulators check. When the auditor asks for the emergency response plan and the last drill report, both can be produced. When nobody asks for a catchment-level flood scenario or a hazard-adjusted asset life, nobody produces one.

The second point concerns leverage. Because the NEMA Act does not empower the agency to compel integration (Mashi *et al.*, 2019) [13], the practical levers are indirect: sector regulators writing DRR into their approval and inspection routines, clients writing it into contracts, insurers pricing it, and companies choosing to lead. This is a more optimistic reading than it might first appear. Mainstreaming through management systems can move faster than legislative reform, and it lands where operational decisions are made. It also fits Thomalla *et al.*'s (2006) [19] call for collaboration across communities: HSE, environmental management, business continuity and DRR practitioners already share the plan-do-check-act structure and can share an agenda.

Third, climate and disaster risk should be treated as one conversation. The oil and gas vulnerability literature (Cruz & Krausmann, 2013) [3] and the Nigerian flood literature (Echendu, 2020, 2022; Danhassan *et al*., 2023) [6, 7, 5] point in the same direction: much loss is shaped by human decisions about land, drainage, infrastructure and coordination, not only by rainfall. A company that treats flood risk as a design and siting question, not merely a response question, is contributing to the national objective and protecting its own continuity.

Finally, credibility depends on honest measurement. Nigeria's reported disaster statistics vary across sources, as Table 2 shows. Corporate DRR indicators should therefore be defined in ways a company can measure itself, for example downtime avoided, share of critical assets screened for hazard exposure, or number of joint drills with SEMA, rather than relying on national data that may be revised.

7. Recommendations and Phased Roadmap

Table 5 proposes a phased route. The timing is indicative and is designed to run alongside the 2025–2030 strategy period. Each action is written so that it can be adopted voluntarily by a company or sector body now, and later converted into an expectation if regulators choose.

Table 5: Phased roadmap for aligning sector policy and corporate HSE systems with the national DRR push

Phase	Timeframe	Key actions	Illustrative indicator
1. Foundation	Year 1	Add hydro-meteorological, flood and community-vulnerability hazards to the HIRA method; name a DRR focal person; open a data channel with SEMA, NiMet and NIHSA	Hazard register updated; focal person appointed; data protocol signed
2. Integration	Years 2–3	Screen critical assets and access routes for hazard exposure; add hazard triggers to permit-to-work and emergency procedures; include DRR clauses in contractor prequalification	Percentage of critical assets screened; triggers in procedures; contractor DRR compliance
3. Investment	Years 3–4	Link capital projects to hazard-adjusted design; review insurance and business-continuity funding; engage host communities on joint early warning	Capex projects with hazard review; continuity plan tested; joint drills held
4. Assurance	Years 4–5	Add DRR to internal audit and management review; report annually against national strategy targets; share lessons with sector peers and NEMA	DRR in audit scope; annual public report; peer learning sessions

For public bodies, three recommendations follow from the analysis. NEMA and sector regulators could jointly publish short DRR expectations for regulated sectors, starting with petroleum, and could specify a common template for reporting hazard-related near-misses and losses. Federal hydrological and meteorological agencies could establish a standard data-sharing arrangement for operators and SEMAs. And the standards community in Nigeria could produce guidance on applying ISO 45001, 14001 and 22301 in a DRR-informed way. For companies, the practical message is to begin with the first two phases, since they require little capital and produce the evidence a regulator or client will later ask for.

8. Limitations and Future Research

The study has clear limits. It is documentary and conceptual; it does not test the framework with practitioners, and the alignment ratings and maturity assessments are indicative judgements from one analyst. Some source documents, including parts of the NEMA strategy text, were accessed through summaries, press reports and official web pages rather than as complete texts, and press-reported figures may be revised. The map is schematic. The sector matrix proposes entry points without assessing legal feasibility. Future work should validate the ratings through a Delphi study with regulators, HSE managers, NEMA and SEMA officials, and test the roadmap through action research in one or more operating companies, ideally with data on avoided downtime and losses. Comparative work with other African oil-producing countries would also help establish which parts of the approach generalise.

9. Conclusion

NEMA's national push, expressed in the 2025–2030 DRR Strategy and the 2025–2029 Strategic Plan, points Nigeria toward prevention. Whether it succeeds will depend on what ministries, regulators and companies do in their own systems. This paper has argued that mainstreaming is best pursued through the sector policies and HSE management systems that already shape behaviour, and has offered a three-layer framework, an alignment matrix, sector entry points, and a phased roadmap to guide that work. The central finding is a familiar one, stated in a new setting: response is well built and prevention is not. Closing that gap does not require inventing new institutions. It requires writing hazard-informed expectations into documents and audits that people already take seriously, and sharing the data that makes them workable.

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