

Nature Under Pressure

Unlocking Natural Capital for Resilience in Nigeria's Conflict-Affected Borderlands



1 The Opportunity

Northern Nigeria's conflict-affected landscapes are typically viewed through the lens of what has been lost: degraded soils, shrinking forests, declining water, displaced communities. But the evidence from Katsina State tells a more nuanced story. Despite significant ecological pressure, meaningful natural capital persists — and communities are ready to protect it, if given the right incentives.

Research conducted under the SPRiNG programme across three Local Government Areas — Jibia, Dan Musa, and Batsari — combined satellite remote sensing, bioacoustic monitoring, camera trap deployment, and participatory community research to build the first comprehensive natural capital baseline for these landscapes. The findings reveal that certification-based conservation is ecologically viable, that communities are willing to engage, and that context-specific models can bridge the gap between ecological protection and livelihood improvement.

This summary presents the central findings and sets out the case for investing in nature-based resilience pathways that work with communities, not around them.

2 Three Landscapes, Three Stories

Each study area presents a distinct socio-ecological profile, shaped by its position in the wider border economy, its exposure to conflict, and the condition of its natural assets. Understanding these differences is essential to designing certification models that fit.

2.1 Jibia: Transitional Stress Zone

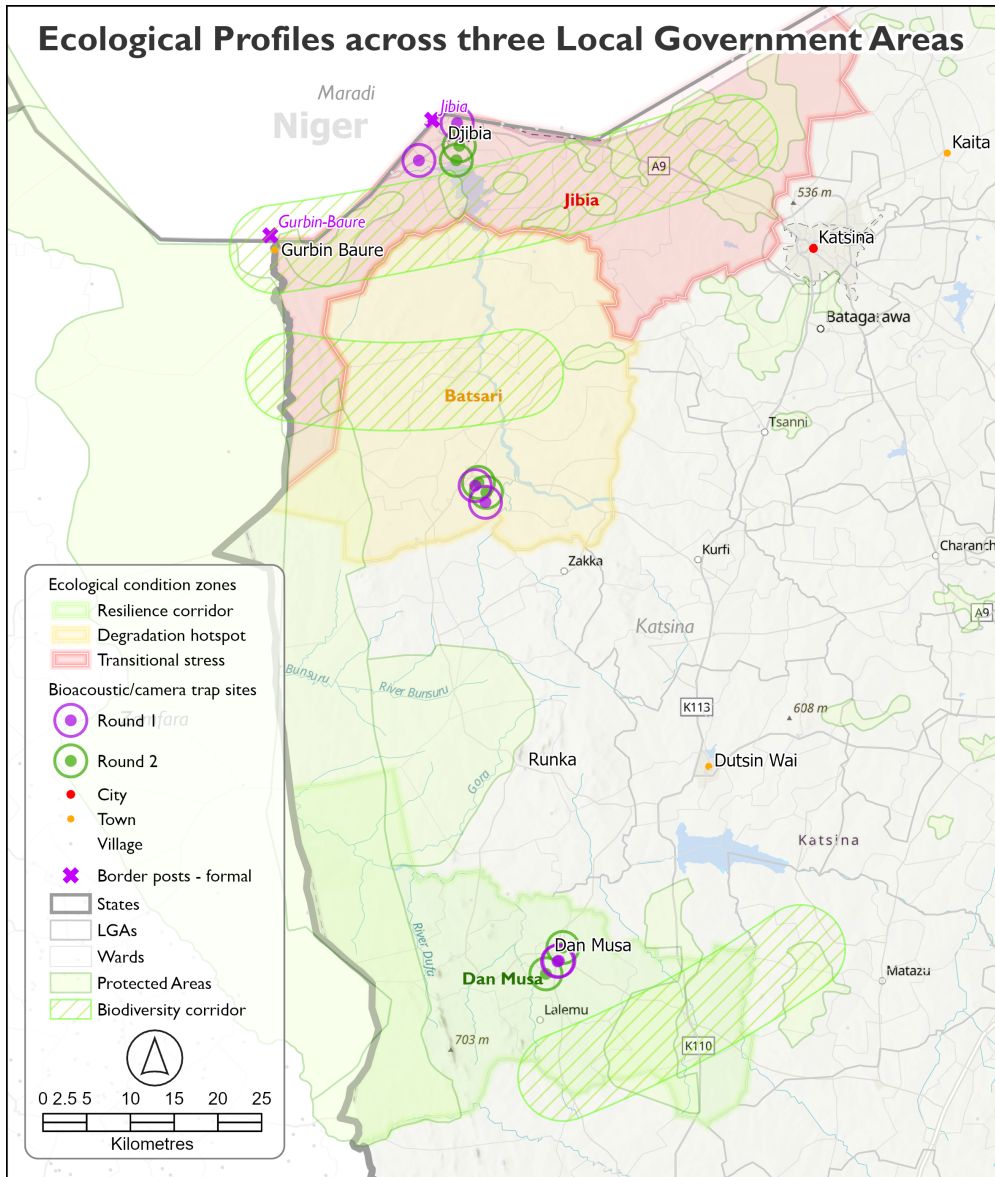
Jibia sits on the Nigeria–Niger border, a cross-border trade zone under acute ecological and security pressure. NDVI analysis shows vegetation decline of approximately 0.18 per decade, with severe degradation hotspots along the Jibia–Dan Abdallah axis. Yet residual wetland systems and riparian corridors persist, serving as critical refugia for biodiversity. Bioacoustic monitoring detected 394 biodiversity events across two sites, including the Greater Painted Snipe — a nationally significant wetland species — and multiple owl species indicating functional nocturnal predation. The landscape is heavily modified but not ecologically dead.

2.2 Batsari: Degradation Hotspot

Batsari is the most conflict-affected of the three sites and exhibits the most severe ecological stress. NDVI decline reaches 0.25 per decade, the fragmentation index is highest at 0.68, and the socio-economic sensitivity index of 0.82 reflects compounded vulnerability. Bioacoustic monitoring registered the lowest detections of all LGAs — 184 total calls — confirming a biologically stressed landscape. Yet protected rangeland segments showed surprising biodiversity resilience, with the highest bird diversity at monitored sites. Batsari demonstrates that even under extreme pressure, targeted restoration can find footholds.

2.3 Dan Musa: The Resilience Corridor

Dan Musa shows the most favourable indicators among the three sites. NDVI decline is modest at 0.12 per decade, the fragmentation index is lowest at 0.41, and the landscape retains corridor connectivity and seasonal regeneration capacity. Camera traps captured evidence of active mesocarnivore populations — including mongoose and small-spotted genet — indicating functional trophic relationships and genuine ecosystem health. Higher internal cohesion, active women's cooperatives, and effective informal governance make Dan Musa the most viable location for pilot certification interventions.



Map note: This map does not currently exist as a single composite. It would require overlaying NDVI decline gradients, fragmentation indices, biodiversity corridor remnants, and bioacoustic/camera trap monitoring sites across all three LGAs in a single frame, with colour-coded ecological condition zones (e.g. green for Dan Musa's resilience corridor, amber for Jibia's transitional stress zone, red for Batsari's degradation hotspot). Existing per-LGA vegetation density and landcover maps from the Data Consolidation report can serve as base layers.

3 Life Persists

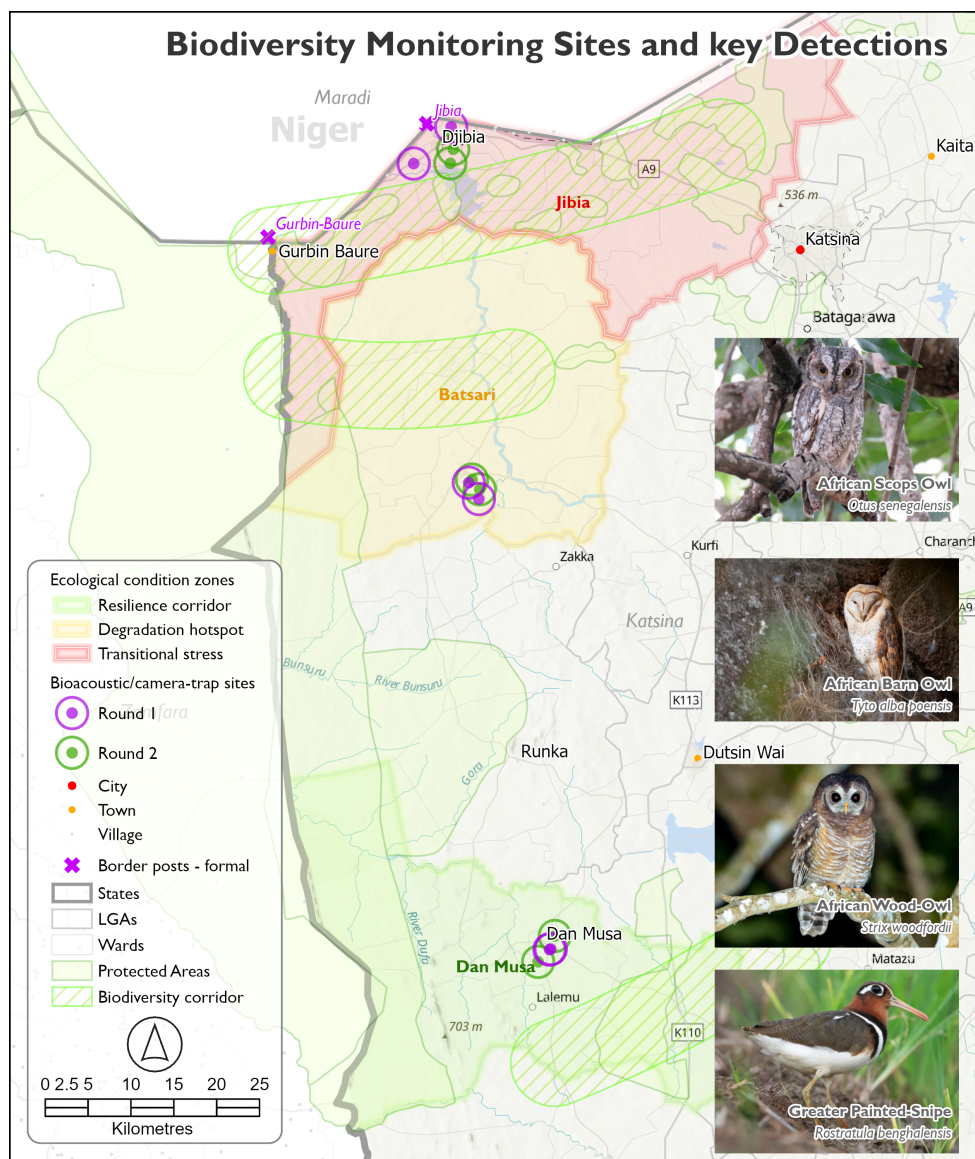
The first systematic ecological monitoring of its kind in these locations revealed that biodiversity value persists across all three study areas, despite decades of landscape modification, conflict, and climate stress.

3.1 What the Sensors Found

AudioMoth bioacoustic recorders and Zeiss Secacam camera traps were deployed at twelve sites across two data collection rounds spanning the wet and dry seasons. Together they generated over 12,000 validated biodiversity detections across 151 unique species.

- **Bioacoustic monitoring** detected frogs, insects, and birds across all sites. Species of conservation significance included the Greater Painted Snipe in Jibia's wetland areas and multiple owl species (African Scops, Wood, and Barn Owls) indicating functional nocturnal predation chains.
- **Camera traps** captured evidence of functioning trophic relationships. Mesocarnivore detections including mongoose and small-spotted genet in Dan Musa indicate active predation and ecosystem health in forest-edge habitats. Small mammals, bats, butterflies, and ground-foraging birds were recorded across sites.
- **Spatial gradients** were clear. Dan Musa emerged as the most ecologically stable site with strong forest remnants and consistent small-mammal activity. Batsari, despite acute security pressures, showed surprising biodiversity resilience in protected rangeland. Jibia retains residual wetland systems that serve as critical refugia.

These findings confirm that natural capital assets exist that are worth protecting and could generate credible certification claims. The challenge is designing certification systems that recognise and reward the protection of these assets while remaining accessible to the communities who steward them.



IUCN, UNEP-WCPAC (2016). The World Database on Protected Areas (WDPA). [Jun. 2016] release. Cambridge (UK): UNEP World Conservation Monitoring Centre. URL: www.protectedplanet.net. Lines digitized by Dr John Glover of the University of Redlands. Attribute information created by Jeremiah Huggins of the University of Redlands. Sources: Esri, TomTom, Garmin, FMO, NOAA, LIGGS © OpenStreetMap contributors, and the GIS User Community, Esri, USGS. Photographs: Brad Arthur, Tomáš Grim, David Irving, Ayuwat Jearwattanakanok from the Macaulay Library.

Map note: This map would show the twelve bioacoustic and camera trap deployment locations across the three LGAs, with species icons or detection counts at each site, overlaid on the biodiversity corridor map. Existing per-LGA biodiversity corridor maps from the

Data Consolidation report provide the base layer. Key species detections (Greater Painted Snipe, mesocarnivores, owl species) should be highlighted at their respective locations.

4 Communities Are Ready

Community consultations across all three LGAs revealed strong appetite for certification, but with clear conditions attached. Over 200 participants engaged through gender-disaggregated focus group discussions, participatory mapping, seasonal calendars, and stakeholder consultations. The message was consistent: communities recognise that current resource management practices are unsustainable, and they want new approaches — but those approaches must deliver tangible, visible benefits.

4.1 What Communities Want

- Improved market access and fair prices for sustainably produced goods.
- Income diversification and training opportunities, particularly for women and youth.
- Support for ecosystem restoration that visibly improves land, water, and grazing quality.
- Transparency in how certification works, who benefits, and how decisions are made.

4.2 What Would Undermine Engagement

- Schemes that promise long-term benefits but deliver nothing in the near term.
- External programmes that bypass local governance structures and traditional authorities.
- Certification processes that are opaque, complex, or controlled by outsiders.
- Interventions that ignore the security realities shaping everyday mobility and access.

Validation sessions confirmed that simple visual outputs — green-yellow-red colour coding of indicator performance — are preferred over complex technical scores. Communities wanted to see how their LGA performs across ecological, livelihood, and governance dimensions, and how that performance translates into concrete implications for their participation.

“We know the forests are shrinking every year, and the rivers dry up earlier. We are ready to do something different — but we need to see the benefit.”

— FGD Participant, Batsari

5 Three Models for Three Contexts

A single certification approach cannot serve the diversity of conditions found across Katsina’s conflict-affected landscapes. The research developed three certification prototypes, each tailored to different socio-ecological realities but built on a common analytical architecture of 27 validated indicators across ecological, livelihood, and governance domains.

5.1 The Ecological Gatekeeper — Dan Musa

Ecological integrity is the primary criterion. Certification candidacy depends on meeting minimum ecological thresholds before livelihood or governance co-benefits are considered. Dan Musa’s strong forest remnants, functioning trophic relationships, and active cooperatives make it the ideal pilot site. This model targets conservation buyers, biodiversity credit markets, and impact investors seeking verifiable ecological outcomes. It offers the strongest alignment with international certification standards and the lowest risk of greenwashing.

5.2 The Livelihood Transition — Batsari

Livelihood co-benefits and economic returns drive engagement, with ecological improvement pursued as a co-outcome that strengthens over time. Certification is granted conditionally, with performance expectations structured around progressive improvement rather than immediate compliance. Batsari’s acute livelihood pressures and security constraints make a phased approach essential — communities

cannot sustain engagement with schemes that promise only long-term conservation benefits. This model is suited to donor-supported programmes and blended finance mechanisms.

5.3 The Market Access Model — Jibia

Institutional coherence, data integrity, and supply-chain traceability determine certification readiness. Jibia's cross-border trade dynamics, fragmented production landscapes, and complex market systems make traceability the primary challenge and opportunity. Ecological and livelihood indicators function as credibility safeguards rather than primary drivers. This model is suited to aggregation points and market hubs where certification value derives from chain-of-custody integrity.

6 Inclusion by Design

Systematic exclusion of women, youth, and marginalised groups from land, governance, and benefits persists across all three LGAs. The research identified these gaps not as barriers to certification but as design parameters that must shape how certification models are built.

6.1 Gender and Participation

Women dominate post-harvest processing and petty trade but are largely excluded from land governance and formal decision-making. In Dan Musa, active women's cooperatives and processing groups provide existing institutional foundations for inclusive certification design — structures with regular meetings, savings schemes, and demonstrated capacity for collective action. In Jibia and Batsari, women's mobility is restricted by insecurity, but women's coping strategies are more diverse than men's, underscoring their potential as adaptation agents if given access.

6.2 Youth and Economic Alternatives

Youth engagement emerged as both a risk and an opportunity. Young people are drawn into arms facilitation and protection economies partly through economic calculation — there are few alternatives offering comparable returns. Certification pathways that create visible, near-term economic opportunities for youth are not just socially desirable; they are a demand-side intervention against arms proliferation.

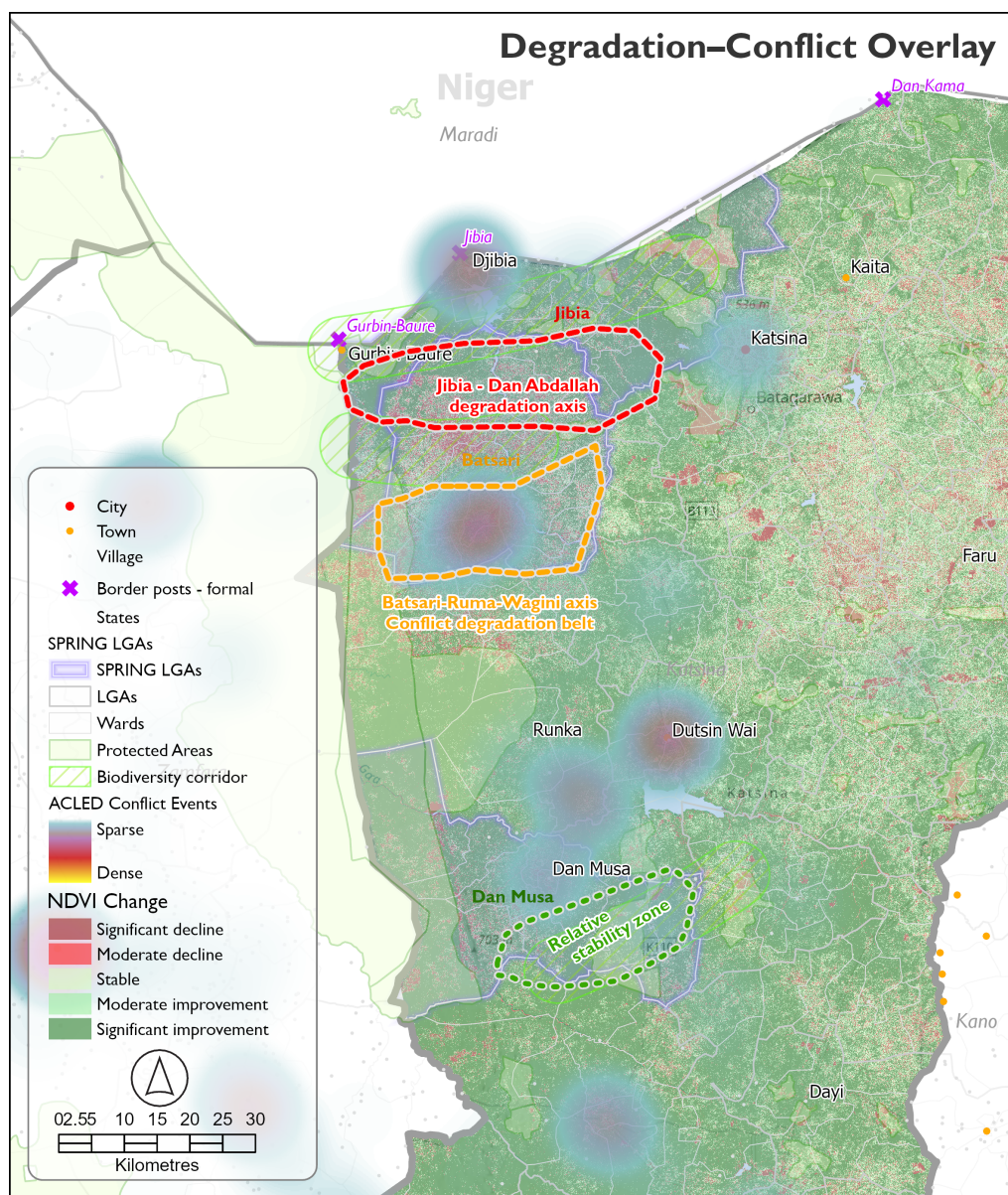
The GESI analysis confirmed that 100% of respondents expressed willingness to join cooperative or reward-based schemes if transparency and security improve. The appetite is there. The design must meet it.

7 The Degradation–Conflict Feedback Loop

The natural capital assessment revealed that ecological degradation and conflict are not separate problems running in parallel. They are causally linked through feedback loops that reinforce each other.

- **The degradation-displacement loop:** Environmental decline forces migration that concentrates pressure on remaining productive areas, accelerating further degradation.
- **The arms-livelihood loop:** Weapons availability enables extraction economies that further degrade natural capital. Armed actors control access to forests, grazing reserves, and mining sites.
- **The governance-trust loop:** Hybrid authorities derive legitimacy from managing both security and resource access. When they fail or are co-opted, trust collapses and communities disengage from external programmes — 67% of Batsari respondents expressed mistrust of external interventions.

These feedback loops mean that environmental programming cannot succeed without addressing the conflict dynamics that drive degradation, and security interventions cannot stabilise communities whose natural capital base is collapsing. The two must be integrated.



Map note: This map would overlay NDVI decline gradients with ACLED conflict density across all three LGAs, showing the spatial correlation between ecological stress and violence hotspots. Existing per-LGA ACLED conflict density and NDVI maps from the Data Consolidation report provide the individual layers. A composite showing the Jibia–Dan Abdallah degradation axis, Batsari’s Wagini–Ruma conflict-degradation belt, and Dan Musa’s relative stability would make the feedback loop argument visually compelling.

8 The Evidence Base

The research produced a comprehensive analytical foundation for certification design and pilot implementation. The scale and rigour of the evidence base distinguishes this work from typical feasibility assessments.

- **27 validated indicators** across ecological, livelihood, and governance domains, cross-referenced against Gold Standard and Verra certification requirements.
- **12,000+ validated biodiversity detections** across 151 unique species, from two rounds of bioacoustic and camera trap monitoring spanning wet and dry seasons.
- **200+ community participants** engaged through gender-disaggregated focus groups, participatory mapping, seasonal calendars, and stakeholder consultations.

- **Multi-source geospatial analysis** integrating Sentinel-2 NDVI, ESA land cover classification, hydrological modelling, groundwater recharge mapping, biodiversity corridor analysis, and ACLED conflict overlay.
- **Three certification prototypes** developed through stakeholder co-design, each tailored to different socio-ecological conditions and market pathways.

This evidence base is not a one-off assessment. It is designed as a living baseline that can be updated with subsequent monitoring rounds, enabling adaptive certification management and longitudinal tracking of ecological and livelihood outcomes.

9 What Comes Next

The feasibility assessment provides the foundation for moving from analysis to action. The recommended next steps are sequenced, practical, and grounded in the field evidence.

- **Launch pilot certifications:** The Ecological Gatekeeper model in Dan Musa, the Market Access model in Jibia, and the Livelihood Transition model in Batsari. Running three pilots in parallel enables comparative learning across different certification logics and landscape conditions.
- **Establish multi-stakeholder coordination platforms:** Bringing together traditional authorities, local government, cooperatives, and market actors to govern certification processes transparently.
- **Invest in GESI-focused capacity building:** Specifically targeting women's cooperatives, youth groups, and persons with disabilities to ensure certification benefits reach marginalised groups.
- **Continue ecological monitoring:** Sustained bioacoustic and camera trap deployment provides the longitudinal data needed to track certification impact and calibrate indicators over time.
- **Connect to climate finance pathways:** The 27-indicator framework aligned to Gold Standard and Verra requirements positions these landscapes for biodiversity credit markets, payments for ecosystem services, and impact investment. The evidence base is ready; the market connections need building.

9.1.1 The Framing Question

How can certification create visible, near-term economic value for communities while building long-term ecological resilience, in landscapes where conflict, degradation, and livelihood stress intersect?

This research demonstrates that it is possible. The ecological assets exist. The communities are willing. The models have been designed. What is needed now is the investment and institutional commitment to move from feasibility to implementation.