JCARM
Journal of Contemporary Academic Research and Methodologies

An Online Peer Reviewed / Refereed Journal
Volume 1 | Issue 9 | 2026
ISSN: 3139-7247 (Online)
Website: www.journal.jcarm.in

Original Research Article

Multi-Temporal RUSLE Assessment of Soil Loss and Its Drivers in the Idah Catchment, Kogi State, Nigeria (2000–2025)

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Article No: 017 | **Accepted**: 17 October 2026 | **Published**:10 November 2026

Abstract: Few West African catchments have the monitoring records needed to track erosion over time. For the Idah Catchment (1,642 km²), Kogi State, Nigeria, annual soil loss was modelled at 30 m resolution for 2000, 2010, 2020 and 2025 with the Revised Universal Soil Loss Equation (RUSLE), and the roles of erosivity and land cover in the change were examined. Erosivity was estimated from the modified Fournier index (2000–2020) and storm EI30 (2025); erodibility from ISRIC SoilGrids; the topographic (LS) term from 30 m SRTM elevation data; cover management from classified Landsat imagery (2025 accuracy 85.09%, κ = 0.82); and support practice from field-observed conservation measures. Mean soil loss fell from 13.29 to 6.87 t ha^{-1} yr^{-1} (48%), and high and very high risk land contracted from 19.6% to 6.7% of the catchment. The decline is not a statistically established trend ($p = 0.128$, $n = 4$), and the 2025 value is affected by a change in the erosivity method. Between 2010 and 2020, however, erosivity fell 21.8% while mean soil loss rose 1.2%, the mean cover-management factor rose from 0.115 to 0.128, moderate-risk land expanded by 116.65 km², and soil loss in Ofu Local Government Area rose 31.0% as cropland reached its maximum extent (61.3%). Agricultural expansion therefore cancelled the climatic benefit at catchment scale and reversed it in Ofu. Topography governed the spatial pattern, with the LS term the most variable (coefficient of variation 123.0%). The 2025 surface should be read as a reference point for future monitoring.

Keywords: RUSLE, Erosion Modelling, Cropland Expansion, Rainfall Erosivity, Erosion Risk Mapping, Guinea Savanna

1. Introduction

Copyright © 2026 by the authors https://doi.org/10.5281/zenodo.24091092

Of the processes that degrade land, water erosion is one of the most extensive, and it is most intense on tropical farmland (Owens, 2020; Poesen, 2018; Quinton and Fiener, 2023). In West Africa, intense seasonal rainfall, weakly aggregated soils and expanding cultivation produce locally severe erosion (Nwilo, Olayinka, Okolie, Emmanuel, Orji, and Daramola, 2020; Sanogo, Birhanu, Sanogo, and Ba, 2023). In Nigeria, the resulting losses have been put at about 1.5% of gross domestic product (Obateru, 2022), with the Guinea and derived savanna zones among the worst affected (Bizi and Sidi, 2023; Egbueri, Igwe, and Ifediegwu, 2022).

Plot measurements, sediment gauging and sub-hourly rainfall records are scarce in these settings, so RUSLE (Renard, Foster, Weesies, McCool, and Yoder, 1997), run on open-access satellite and terrain data, has become the standard tool. It is empirical, ignores gully and channel processes and was calibrated outside Africa (Benavidez, Jackson, Maxwell, and Norton, 2018), yet it remains the only widely applicable means of producing distributed soil-loss estimates from the data that exist (Ezeh, Igwe, Asare, Ndulue, Ayadiuno, and Preko, 2024).

Most Nigerian RUSLE studies report a single-date surface; fewer ask which factor drives change over time. Over a few decades, the soil, terrain and conservation terms of the equation (K, LS and P) barely change, so any change in modelled loss must come from erosivity (R) or from cover (C). Telling the two apart matters for policy: a decline caused by lower erosivity may reverse with the climate, whereas one caused by reduced cropland can be influenced, and undone, by land-use decisions (Borrelli, Robinson, Fleischer, Lugato, Ballabio, Alewell, Meusburger, Modugno, Schütt, Ferro, Bagarello, Van Oost, Montanarella, and Panagos, 2017; Eekhout and de Vente, 2022).

The Idah Catchment offers a case in which both drivers changed markedly: erosivity fell throughout 2000–2025, while cropland expanded to a peak in 2020 and then contracted. Earlier work on the surrounding Idah–Ankpa Plateau examined gully morphometry and causes (Imasuen, Omali, and Ibrahim, 2011; Oparaku, Enokela, and Akpen, 2015; Oparaku, Oluwaseun, and Ogbeh, 2018) and rainfall erosivity alone (Oparaku, Iwar, and Ogbeh, 2016); no full or multi-temporal RUSLE assessment exists for the catchment. This study therefore (i) implements RUSLE at four dates between 2000 and 2025, (ii) maps soil loss and erosion risk and aggregates them to Local Government Areas (LGAs), and (iii) examines how the change relates to its erosivity and land-cover components. The 77 erosion features mapped on the ground in the catchment are reported separately (Ojih and Yelwa, under review).

2. Study area

The Idah Catchment covers about 1,642 km² of southern Kogi State in the lower Niger basin and spans parts of Dekina, Ibaji, Idah, Igalamela-Odolu and Ofu LGAs (Figure 1). Elevation rises from 19 m on the Niger floodplain to 434 m on dissected eastern uplands; mean slope is 4.2° and the maximum 40°. The friable Ajali Sandstone beneath Ofu and parts of Dekina contains 65–95% sand (Imasuen *et al.*, 2011; Ocholi, Idoko, and Ogidiolu, 2015), whereas the Idah and Ibaji floodplains are underlain by finer alluvium

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(Ukabiala, Amanze, Omatule, and Kolo, 2023). Rainfall of 1,200–1,600 mm a year, under a tropical wet-and-dry regime, comes mostly in intense convective storms between June and September (Adeaga, Lawal, Adedeji, and Akinbaloye, 2022; Oparaku *et al.*, 2016). Guinea Savanna woodland (Kershaw, 1968) has been widely converted to rain-fed cultivation of cassava, yam, maize and vegetables.

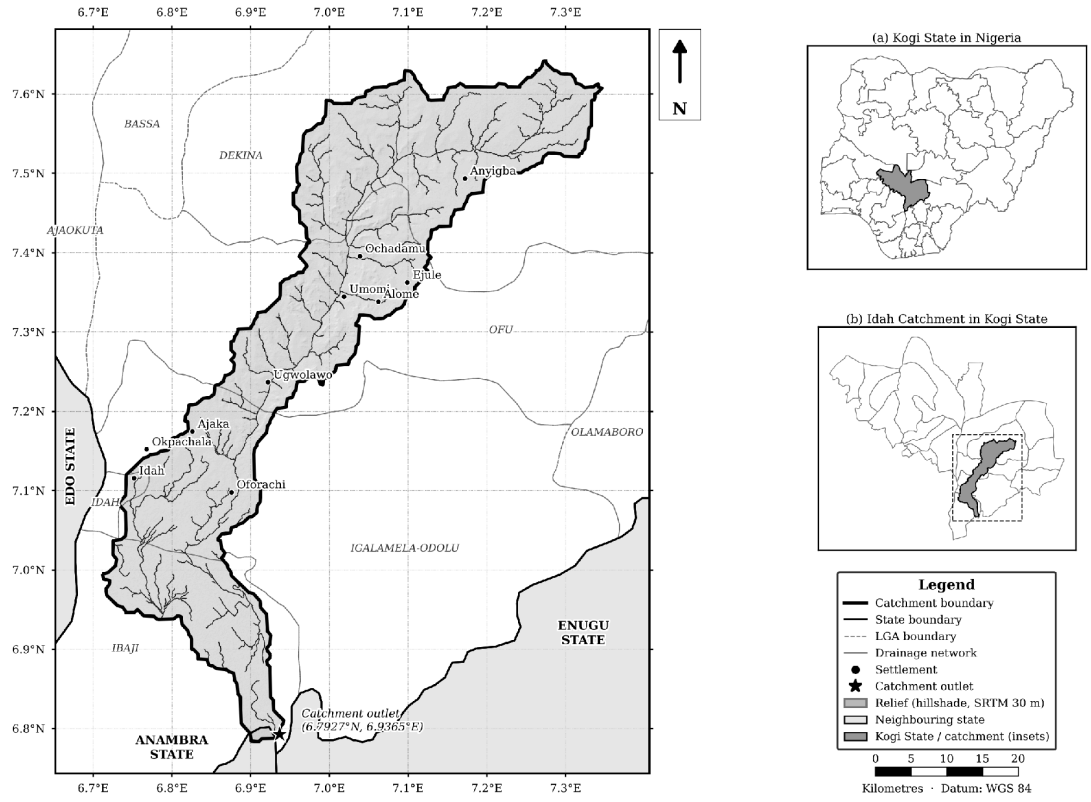

Figure 1. The Idah Catchment, Kogi State, Nigeria, showing the catchment boundary and outlet, drainage network (derived from the 30 m SRTM DEM), relief, Local Government Areas, neighbouring states and principal settlements. Insets show (a) Kogi State in Nigeria and (b) the catchment in Kogi State.

3. Materials and methods

3.1 Model framework

RUSLE (Renard *et al.*, 1997) expresses mean annual soil loss, A (t ha^{-1} yr^{-1}), as the product of five factors:

$$A = R \times K \times LS \times C \times P \quad (1)$$

in which R denotes the erosive power of rainfall (MJ mm ha^{-1} h^{-1} yr^{-1}), K the susceptibility of the soil (t ha h ha^{-1} MJ^{-1} mm^{-1}), LS the combined effect of slope length and gradient, C the protection given by cover and P the effect of conservation practice, the last three being unitless. Each factor was built as a 30 m raster (WGS 84 / UTM Zone 32N) and multiplied in ArcGIS 10.8.1; R and C were produced for each date and K, LS and P once.

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Outputs represent gross sheet and rill detachment: gully and channel erosion and deposition are not modelled, and no sediment delivery ratio was applied.

The datasets and their roles are listed in Table 1, and the processing sequence from data acquisition to the soil-loss and risk outputs is summarised in Figure 2.

Table 1: Data and materials used in the study.

Data / material	Source	Resolution / period	Use
Rainfall (monthly; sub-hourly)	NiMet; Centre for Atmospheric Research, Anyigba (NASRDA)	2000, 2010, 2020; 2025	*R* (Fournier index; EI_{30})
Soil texture and organic carbon	ISRIC SoilGrids	250 m	*K*
Digital elevation model	SRTM (USGS)	30 m	*LS*, drainage
Landsat 5 TM, 7 ETM+, 8 OLI	USGS, via Google Earth Engine	30 m; 2000–2025 (4 dates)	Land cover, *C*
Field survey (handheld GPS)	Authors' fieldwork	2025: 161 GCPs; 77 erosion sites; conservation practices	Accuracy, validation, *P*
Boundaries	Nigeria state and Kogi LGA layers	Vector	Zonal statistics, mapping
Software	ArcGIS 10.8.1; Google Earth Engine; Python 3.8; IBM SPSS 28	—	Processing, modelling, statistics

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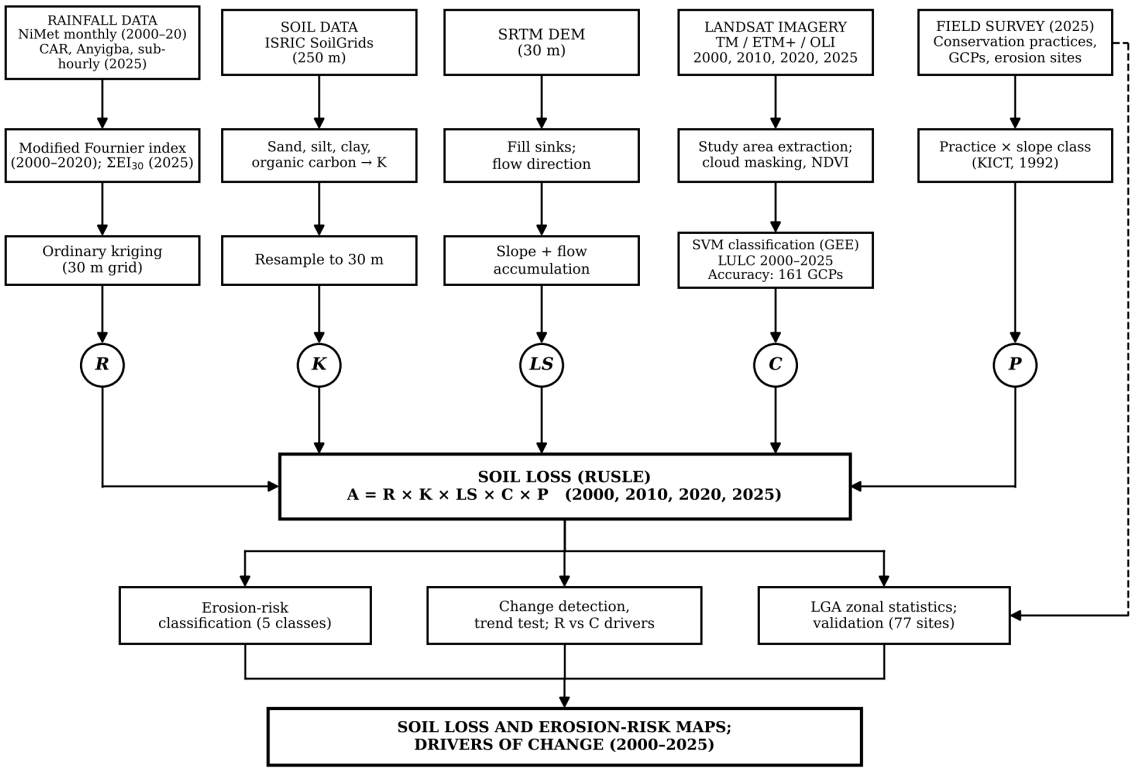

Figure 2: Methodological flowchart of the study, from input data through derivation of the five RUSLE factors to soil-loss estimation, risk classification, change analysis and validation.

3.2 Factor derivation

Sub-hourly rainfall was unavailable for 2000, 2010 and 2020, so *R* for those dates was estimated from NiMet monthly rainfall with the modified Fournier index (Arnoldus, 1980) from [n] NiMet stations and interpolated by ordinary kriging:

$$R = \Sigma\ 1.735 \times 10^{(1.5\ \log_{10}(p_i^2/P)\ -\ 0.08188)} \qquad (2)$$

with p_i the rainfall of month i and P the yearly total. For 2025, R was the sum of storm EI_{30} values from sub-hourly records (Table 1). Each date uses a single year of rainfall and the 2025 estimator differs, so the 2020–2025 step is not strictly comparable with earlier intervals. K was derived from ISRIC SoilGrids texture and organic carbon (250 m, resampled to 30 m); no soil samples were taken. Slope and flow accumulation came from the SRTM elevation model (30 m); slope length (λ) was taken from flow accumulation (Moore and Wilson, 1992), and LS was then calculated after Wischmeier and Smith (1978):

$$LS = (\lambda/22.13)^m \times (65.41\ \sin^2\theta + 4.56\ \sin\theta + 0.065) \qquad (3)$$

where m is an exponent of 0.2–0.5 and θ the slope angle. At each date, a support vector machine in Google Earth Engine mapped land cover from Landsat 5, 7 and 8 scenes, using their spectral bands and NDVI, and C values adapted from Wischmeier and Smith (1978) were checked in the field: forest 0.001, shrubland 0.05, built-up land 0.10, cropland 0.20, bare/degraded land 0.90 and water 0. P was assigned to cropland from field-observed

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conservation practice and slope class after KICT (1992), from 0.55 (contouring on slopes below 7%) to 1.00 (no practice); all other classes received 1.00. The same P layer, built from the 2025 field survey, was applied at all dates. Because observations were restricted to accessible sites, *P* is the least constrained factor.

3.3 Risk classification and analysis

Soil loss was grouped into five risk classes after Morgan (2009) and NEWMAP (2020), anchored on a tolerable loss of about 5 t ha^{-1} yr^{-1}, the rate at which soil forms; the class breaks at 5, 10, 25 and 50 t ha^{-1} yr^{-1} are given with the results in Section 4.3. Means were aggregated by LGA with zonal statistics, rasters for successive dates were differenced, and catchment-mean soil loss was regressed on year; with four dates this test has low power. Because RUSLE is multiplicative, every factor has a sensitivity ratio of one, so the factors were ranked instead by how much each varies across the catchment, measured by the coefficient of variation (CV). The 2025 classification was assessed against 161 ground control points (Congalton, 1991); the earlier classifications could only be checked visually. Finally, LGAs were ranked on modelled soil loss and on the number of features in the companion inventory, and the 2025 risk class was extracted at each mapped site; these are tests of spatial correspondence rather than of predicted magnitude.

4. Results

4.1 RUSLE factors

Mean *R* declined at every date, from 13,640.34 in 2000 to 13,200.41 in 2010 (−3.2%), 10,323.48 in 2020 (−21.8%) and 8,591.83 MJ mm ha^{-1} h^{-1} yr^{-1} in 2025 (−16.8%), a net fall of 37.0% (Table 2). Its standard deviation halved, while higher values persisted in the south (Figure 3a, b). *K* was low and near-uniform (mean 0.0168 t ha h ha^{-1} MJ^{-1} mm^{-1}, CV 10.6%), slightly higher on the Idah and Ibaji alluvium than on the Ofu and Dekina uplands. *P* averaged 0.59 on cropland (CV 15.9%); contouring was common on gentle slopes, but steep cropland in Ofu and Dekina was largely unprotected. *LS* was by far the most variable factor (mean 0.79, CV 123.0%, maximum 11.96), with values above 5.0 concentrated on the dissected Ajali Sandstone of eastern Ofu and western Dekina (Figure 3c). *C* was the next most variable (CV 72.7–92.2%). Its catchment mean fell from 0.121 in 2000 to 0.115 in 2010, rose 11.5% to 0.128 in 2020 as cropland reached its peak, and fell to 0.107 in 2025 (Table 2; Figure 3d–f).

Table 2: Rainfall erosivity, cover management and annual soil loss statistics, Idah Catchment.

Statistic	2000	2010	2020	2025
R method	Fournier	Fournier	Fournier	EI_{30}
R mean (MJ mm ha^{-1} h^{-1} yr^{-1})	13,640.34	13,200.41	10,323.48	8,591.83
R standard deviation	2,249.57	2,146.48	1,334.70	1,066.60
R change from previous date (%)	—	−3.2	−21.8	−16.8
C mean (dimensionless)	0.121	0.115	0.128	0.107
C change from previous date (%)	—	−5.2	+11.5	−16.1

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Statistic	2000	2010	2020	2025
Soil loss mean (t ha^{-1} yr^{-1})	13.29	10.89	11.02	6.87
Soil loss standard deviation	25.58	23.59	23.91	16.45
Soil loss maximum†	797.87	688.65	455.19	1,275.41
Soil loss change from previous date (%)	—	−18.1	+1.2	−37.7

Static factors (all dates): *K* 0.0168 ± 0.0018 (0.0145–0.0183) t ha h ha^{-1} MJ^{-1} mm^{-1}; *LS* 0.79 ± 0.97 (0.00–11.96); *P* (cropland) 0.59 ± 0.09 (0.55–1.00). All other statistics computed over the modelled catchment area. Percentage changes in C computed from unrounded values. † Channel-cell artefacts of flow-accumulation-based *LS*; not interpreted as hillslope rates.

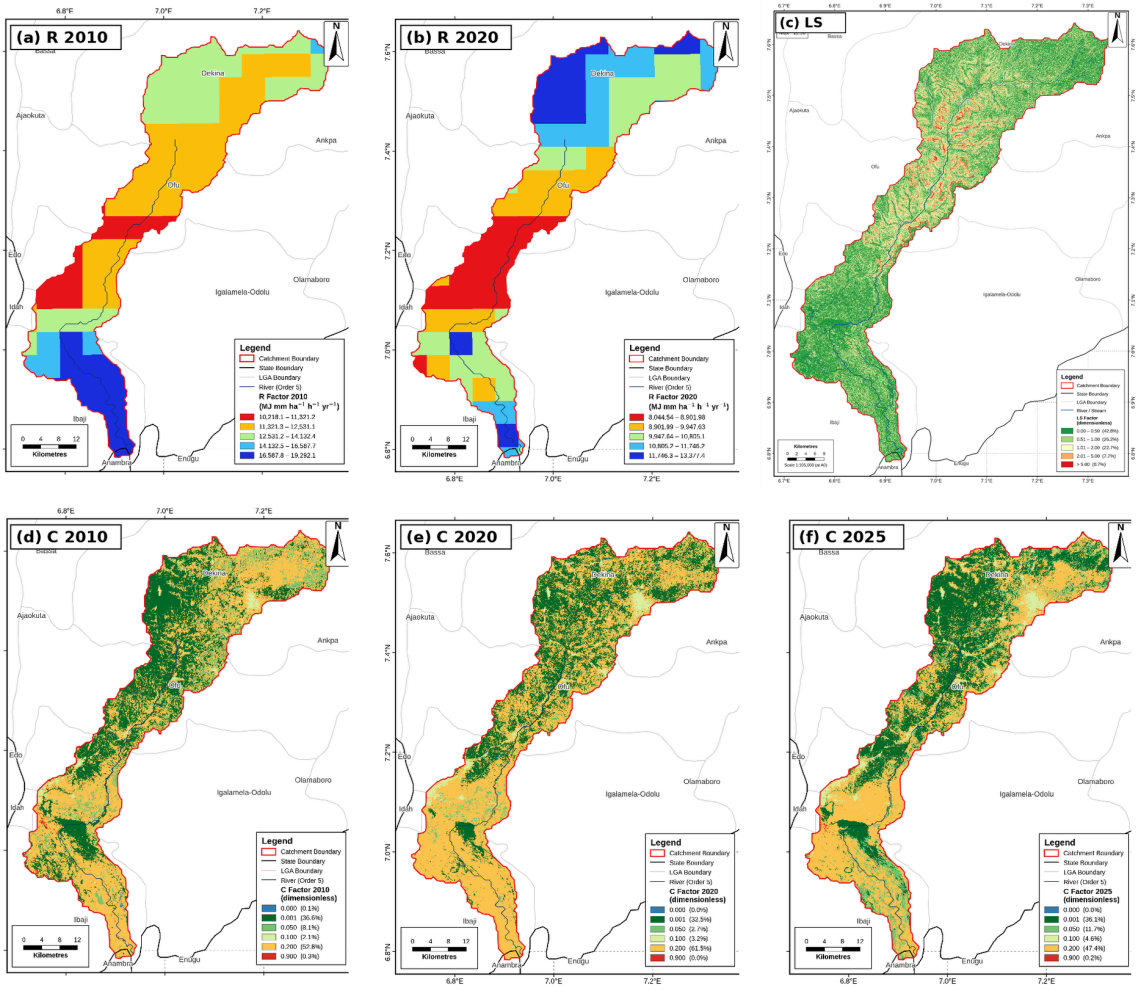

Figure 3: Rainfall erosivity in (a) 2010 and (b) 2020; (c) the *LS* factor; and the *C* factor in (d) 2010, (e) 2020 and (f) 2025. Erosivity fell 21.8% between (a) and (b), and the C = 0.20 (cropland) class covered 61.5% of raster cells in (e), its widest extent.

4.2 Land cover and classification accuracy

Cropland land fell slightly from 896.50 km² (54.6%) in 2000 to 862.11 km² (52.5%) in 2010, rose by 16.7% to a peak of 1,006.12 km² (61.3%) in 2020, and then fell to 773.70 km² (47.1%) in 2025 (Table 3). Shrubland followed the reverse course, falling from 213.65 km² (13.0%) to 47.00 km² (2.9%) in 2020 before recovering to 198.89 km² (12.1%), while

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forest showed a net rise from 497.47 km² (30.3%) to 587.20 km² (35.8%) and built-up land increased by 168.9%. The 2020 configuration therefore left the largest area under cultivation and the least under protective shrub cover, although part of the 2020–2025 swing may reflect seasonal differences between images and confusion between fallow, shrubland and cropland. The 2025 classification reached 85.09% overall accuracy (κ = 0.82); producer's accuracy ranged from 72.73% for bare/degraded land, the class with the highest *C* value, to 100% for water.

Table 3: Land use and land cover, Idah Catchment, 2000–2025 (km², % of catchment in parentheses).

Class	2000	2010	2020	2025
Cropland	896.50 (54.6)	862.11 (52.5)	1,006.12 (61.3)	773.70 (47.1)
Forest	497.47 (30.3)	600.91 (36.6)	534.45 (32.6)	587.20 (35.8)
Shrubland	213.65 (13.0)	136.48 (8.3)	47.00 (2.9)	198.89 (12.1)
Built-up land	29.02 (1.8)	35.73 (2.2)	53.42 (3.3)	78.04 (4.8)
Bare/degraded land	4.90 (0.3)	4.95 (0.3)	0.04 (0.0)	3.54 (0.2)
Water	0.27 (0.0)	1.64 (0.1)	0.71 (0.0)	0.38 (0.0)

Total classified area 1,641.8 km² at each date. The Niger channel lies on the catchment boundary, so open water inside it is negligible.

4.3 Soil loss and erosion risk

Mean soil loss was 13.29, 10.89, 11.02 and 6.87 t ha^{-1} yr^{-1} in 2000, 2010, 2020 and 2025, a net reduction of 48% (Table 2; Figure 4), but the change was uneven: −18.1%, +1.2% and −37.7% across the three intervals. The regression on year was not significant (slope −0.21 t ha^{-1} yr^{-1} per year, R^2 = 0.76, p = 0.128), so the reduction is treated as change between dates rather than as a trend. Standard deviations exceeded the means at every date, reflecting a skewed distribution in which a small area supplies most of the loss.

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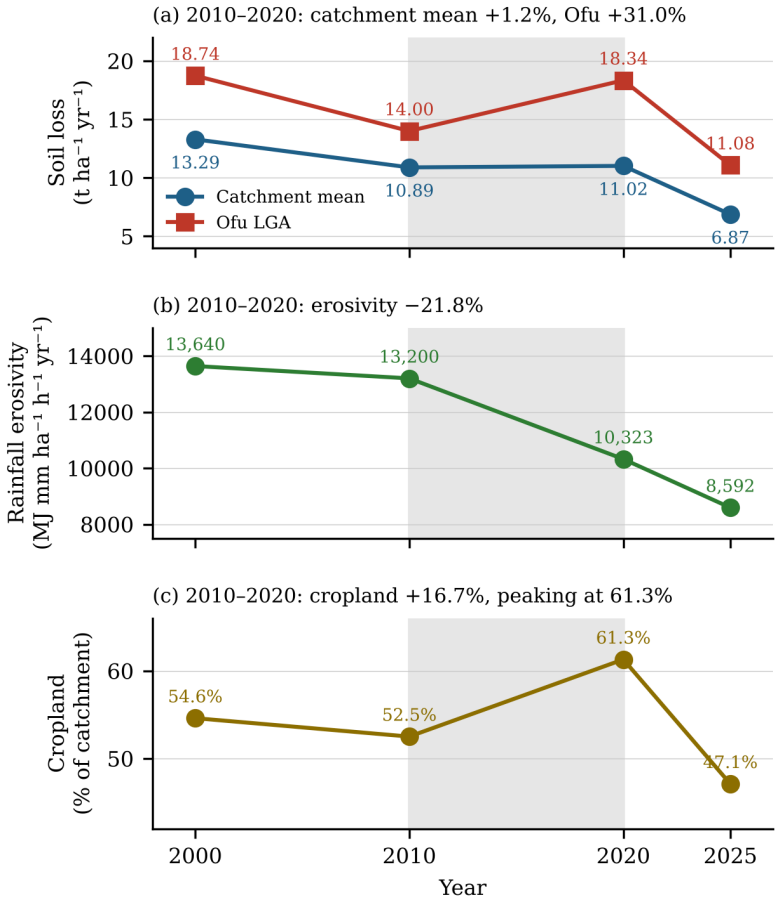

Figure 4: Change between dates in (a) catchment-mean soil loss, (b) rainfall erosivity and (c) cropland extent, 2000–2025. Shading marks 2010–2020, when mean soil loss rose 1.2% despite a 21.8% fall in erosivity.

High and very high risk land contracted from 319.50 km² (19.6%) to 108.96 km² (6.7%) (Table 4; Figure 5). The moderate class behaved differently, expanding from 238.44 km² (14.6%) in 2010 to 355.09 km² (21.7%) in 2020, a gain of 116.65 km², before falling to 296.99 km² (18.2%) in 2025. High-risk land remained concentrated in eastern Ofu and western Dekina at every date, and very low risk land dominated the Idah and Ibaji floodplains and the forested parts of Igalamela-Odolu.

Table 4: Area in each risk class, Idah Catchment (km², with percentage of modelled area).

Risk class (t ha⁻¹ yr⁻¹)	2000	2010	2020	2025
Very low (<5)	1,007.95 (61.7)	1,099.80 (67.4)	1,044.14 (64.0)	1,141.85 (69.9)
Low (5–10)	60.86 (3.7)	43.07 (2.6)	25.23 (1.5)	84.87 (5.2)
Moderate (10–25)	244.38 (15.0)	238.44 (14.6)	355.09 (21.7)	296.99 (18.2)
High (25–50)	218.00 (13.4)	176.80 (10.8)	130.80 (8.0)	72.46 (4.4)
Very high (>50)	101.50 (6.2)	74.58 (4.6)	77.43 (4.7)	36.50 (2.2)

Modelled area 1,632.68 km² (valid soil-loss cells); the remainder of the 1,642 km² catchment is water and no-data edge cells.

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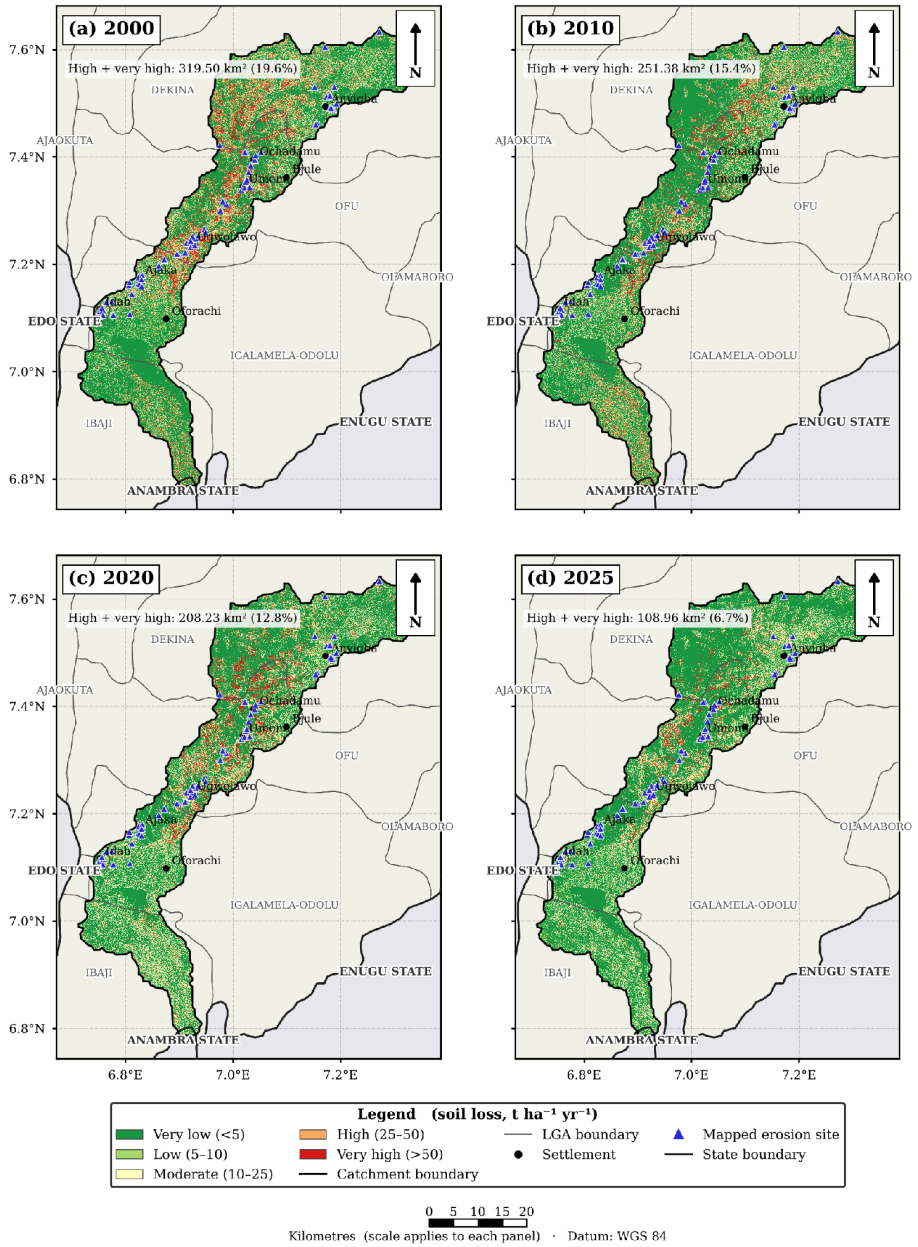

Figure 5: Erosion risk classes in (a) 2000, (b) 2010, (c) 2020 and (d) 2025, classified on the breaks in Table 4, with the mapped erosion sites. The inset value in each panel gives the combined area of high and very high risk land.

4.4 Local Government Areas and mapped erosion features

At every date, Ofu recorded the greatest mean loss of any LGA (Table 5). Reductions over 2000–2025 ranged from −57.5% in Dekina to −30.9% in Ibaji, and Ofu, the most eroded unit, improved second least (−40.9%). Between 2010 and 2020, Ofu's mean rose from 14.00 to 18.34 t ha^{-1} yr^{-1} (+31.0%), far more than the catchment's 1.2%, while every other LGA declined. Ofu also holds 34 of the 77 mapped erosion sites and 49.02 ha (59.3%) of the 82.66 ha of eroded land, and ranking the four field-surveyed LGAs on 2025 soil loss reproduces their ranking on feature count exactly (Ofu, Dekina,

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Igalamela-Odolu, Idah), although the modelled means of Igalamela-Odolu (5.01) and Idah (4.96 t ha^{-1} yr^{-1}) are almost equal. Of the 76 sites with recorded coordinates, 14 (18.4%) lie in cells classed as high or very high risk in 2025, about 2.7 times the share of those classes in the catchment (6.7%), while 28 (36.8%) lie in the very low class, which covers 69.9% of the area. The model therefore identifies where erosion concentrates, but not individual gully sites, which it is not designed to represent; the rank agreement rests on only four units.

Table 5: Mean annual soil loss by Local Government Area (t ha^{-1} yr^{-1}) and mapped erosion features.

LGA	2000	2010	2020	2025	Change (%)	Features	Eroded area (ha)
Ofu	18.74	14.00	18.34	11.08	−40.9	34	49.02
Dekina	13.95	10.29	9.81	5.93	−57.5	17	12.17
Igalamela-Odolu	10.53	8.59	7.08	5.01	−52.4	15	14.31
Idah	10.27	8.90	6.33	4.96	−51.7	11	7.16
Ibaji	7.03	10.13	7.40	4.86	−30.9	—	—

Change is 2000–2025. LGA boundaries from the Kogi State LGA layer. Features and eroded area from the field inventory of 77 sites, 82.66 ha (Ojih and Yelwa, under review); Ibaji was inaccessible because of flooding.

5. Discussion

5.1 Climate and land use pulled in opposite directions

With *K*, *LS* and *P* held static, change over time can arise only from *R* and *C*. Between 2010 and 2020, *R* fell 21.8%; with unit sensitivity, this alone would have reduced soil loss by the same proportion. Instead, mean soil loss rose by 1.2%, as mean *C* rose by 11.5% with the cropland maximum and shrubland minimum of 2020. The rise in mean C by itself offsets only about half of the erosivity decline; the remainder reflects the expansion of cultivation onto steep, high-LS land, where each unit of cover change carries more soil loss. Land-cover change thus more than cancelled the reduction that lower erosivity would otherwise have delivered. In Ofu the reversal was far stronger: soil loss rose 31.0% where cultivation spread onto the steepest, highest-*LS* terrain, and the 116.65 km² growth of the moderate class is the areal expression of the same process.

In a multiplicative model, a favourable climatic change and an unfavourable land-use change do not average out; the local outcome depends on where cultivation expands relative to slope. This agrees with the global role of cropland expansion identified by Borrelli *et al.* (2017) and with Oparaku *et al.* (2018) on agricultural expansion and gullying on this plateau. The other intervals fit the same pattern. Between 2000 and 2010, when cropland contracted slightly and mean *C* fell 5.2%, soil loss fell by 18.1%, more than the 3.2% fall in erosivity alone would produce; between 2020 and 2025, when erosivity and cropland both fell, it fell by 37.7%, the largest change in the series.

The 2025 improvement may not last. The fall in erosivity runs against projections of more intense West African rainfall (IPCC, 2022; Sidibe, Dieppois, Eden, Mahé, Paturel,

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Amoussou, and Lawler, 2020) and against global modelling of erosion under climate change (Borrelli, Robinson, Panagos, Lugato, Yang, Alewell, Wuepper, Montanarella, and Ballabio, 2020; Eekhout and de Vente, 2022), and the use of single-year rainfall means part of it may be inter-annual variation. On the model's own arithmetic, a return to 2000 erosivity with 2025 land cover would raise mean soil loss to about 10.9 t ha^{-1} yr^{-1}, close to the 2020 value. The cause of the 2020–2025 cropland contraction is also unknown; it may reflect lasting withdrawal from marginal land, temporary economic or security conditions, or classification error.

5.2 Comparison and limitations

Catchment means of 6.87–13.29 t ha^{-1} yr^{-1} sit within the spread of values published for other Nigerian catchments (Egbueri *et al.*, 2022; Fagbohun, Anifowose, Odeyemi, Aladejana, and Aladeboyeje, 2016; Olorunfemi, Komolafe, Fasinmirin, Olufayo, and Akande, 2020). *K* values (0.0145–0.0183 t ha h ha^{-1} MJ^{-1} mm^{-1}, equivalent to 0.110–0.139 t acre h hundred $acre^{-1}$ ft^{-1} pd^{-1} in US customary units) are lower than those of Ugese, Ajiboye, Ibrahim, Gajere, Itse, and Shaba (2022) and Ezenwa, Jacob, and Yelwa (2024), largely because of differing unit conventions, while the *R* values here exceed those obtained for Anambra by Egbueri *et al.* (2022) and Fagbohun *et al.* (2016), a gap that comes from the estimator and the use of single-year rainfall rather than from any real difference in erosivity. Absolute magnitudes should therefore be compared only between studies using the same estimator; the argument in Section 5.1 rests on relative change within one catchment and is unaffected.

RUSLE does not represent gullying, which accounts for 70 of the 77 mapped features (82.66 ha of eroded land in total; Ojih and Yelwa, under review), nor sediment delivery (cf. Aldrees, El-pateh, Dan'azumi, and Abba, 2024). *K* comes from a coarse 250 m product, and its errors pass one-for-one into soil loss; soil sampling stratified by formation and slope position would most improve future work. *P* may be optimistic, given that 67.1% of farming households use slash-and-burn preparation and only 32.0% take part in erosion control (Ojih and Yelwa, in preparation), in which case modelled loss is conservative. Pre-2025 classifications were not validated, so error in *C*, the factor that drives the temporal result, remains unquantified.

5.3 Implications for management

Cover management is the lever available to land managers, since erosivity cannot be controlled. Terrain with *LS* above 5.0 on Ajali Sandstone in eastern Ofu and western Dekina was high-risk at every date and is the priority for permanent cover and exclusion from cultivation. Steep cropland still largely at $P = 1.00$ offers the largest low-cost gain: cover and support practices are among the most effective controls available (Ebabu, Tsunekawa, Haregeweyn, Tsubo, Adgo, Fenta, Meshesha, Berihun, Sultan, Vanmaercke, Panagos, Borrelli, Langendoen, and Poesen, 2022), and Ugese *et al.* (2022) estimated an 81% reduction in potential soil loss from their introduction in the Koromi-Federe catchment.

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6. Conclusions

Mean soil loss in the Idah Catchment fell by 48% between 2000 and 2025, and high and very high risk land shrank from 19.6% to 6.7% of the catchment, but the decline is not a statistically established trend. The clearer result concerns the drivers: between 2010 and 2020 erosivity fell 21.8% while mean soil loss rose 1.2%, and in Ofu it rose 31.0%, as cropland reached its maximum extent. Topography governs the spatial pattern, and ranking LGAs on modelled soil loss reproduces their ranking on mapped erosion features. Because much of the improvement rests on a driver that cannot be managed and may not persist, the 2025 surface should serve as a baseline for monitoring rather than as evidence of lasting recovery.

Data availability. Landsat and SRTM data (USGS) and SoilGrids (ISRIC) are open access; NiMet and the Anyigba Atmospheric Research Centre of NASRDA provided the rainfall records.

Funding. This research received no external funding.

Acknowledgements. The authors are grateful to NASRDA's Centre for Atmospheric Research at Anyigba and to the Nigerian Meteorological Agency for access to rainfall records.

Author contributions. O.S.A.: conceptualisation, methodology, data curation, GIS modelling, formal analysis, writing (original draft). S.A.Y., G.O.S., A.U. and H.A.M.: supervision, methodology, writing (review and editing).

Declaration of competing interests. No author has a competing financial or personal interest to declare. The paper is drawn from the first author's M.Sc. dissertation, Nigerian Defence Academy, Kaduna (2026).

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