



Time2Graze Nigeria

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Nigerian Conservation Foundation
(Sept, 2026)



About The Nigerian Conservation Foundation (NCF)

Established in 1980, the Nigerian Conservation Foundation (NCF) is the premier Non Governmental Organisation (NGO) dedicated to nature conservation and sustainable development in Nigeria.



ncfnigeria.org

Our Vision

"A leader in creating sustainable societies where people and nature thrive."

Our Mission

NCF pursues the conservation of nature and its resources with the aim of improving the quality of human life both the present and the future by:

- Protecting and restoring natural resources for the benefit of present and future generations.
- Tackling emerging environmental threats in partnership with communities and other stakeholders

Affiliations

BirdLife International Partner;

Associate of Worldwide Fund for Nature (WWF);

Member of International Union for Conservation of Nature (IUCN).

Royal Society for the Protection of Birds (RSPB)

Wetlands International

Fauna and Flora International (FFI).

Other environmental NGOs

Government institutions,

Business community, academia, and

Rural-urban communities that share its vision with the aim of building and sustaining a more lasting union to safeguard the environment.

Introduction: The Rangeland Crisis



Despite their significance, rangelands face accelerating degradation, drought, rising emissions, and growing pastoral vulnerability — and communities lack the tools to respond effectively.

14.5%

Of global GHG emissions from livestock

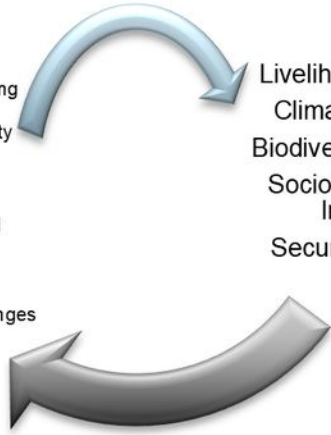
6-8%

Of Nigeria's agricultural GDP from livestock

The Rangeland Crisis in Nigeria

-low productivity

- Limited access to training and extension services
- Poor market connectivity
- Land rights issues
- Overgrazing
- Farmer-herder crisis
- Increasing dryness and drought
- Climate change
- Impact on biodiversity
- Socio-economic challenges



Livelihood Impact
Climate Impact
Biodiversity Impact
Socio-economic Impact
Security Impact

HERDER-FARMER CLASHES IN NIGERIA

Recent Incident Summary — January–September 2026

Date	State / LGA	Summary
Sep 2026	FCT — Karshi	1 farmer killed (machete) after confronting cattle on farmland; reprisal attacks on Fulani residents
Sep 2026	Plateau — Barkin Ladi	1 herder killed, 18 cattle lost, in attack MACBAN attributes to Berom militia
Sep 2026	Plateau — Mangu	3 herders killed, 2 missing, 36 cattle slaughtered by suspected militia
Jul 2026	Plateau — Riyom / Benue South — Otukpo	27 killed combined; incl. 9 members of one family; followed MACBAN Benue chairman's assassination
Jul 2026	Benue (state-wide)	40+ farmers killed over one month during planting season; markets closed
Jun 2026	Kebbi — Argungu	8 killed after a crop-damage dispute escalated into reprisal killings
Jun 2026	Bauchi — Darazo	7 killed; farmers attacked while fertilising fields, followed by reprisal raid
Jun/Jul 2026	Niger — Tegna	48 killed; clashes begun in May over a disputed community donation
Mar 2026	Benue — Logo	4 killed; mass displacement of farmers across 7 council wards
Jan 2026	Taraba — Donga	10+ killed, incl. a serving councillor, after a herder was killed for crop damage

Pattern: Benue and Plateau remain the epicentre, with a recurring cycle of crop-damage → killing → reprisal. **Caveat:** initial casualty tolls are frequently revised upward in the days after an incident.

Source: Nigerian news media (Vanguard, BusinessDay, Premium Times, Xinhua, AllAfrica, TheGuild, AgroNigeria) — see full briefing for citations

Nigeria's Pastoral Landscape



A pastoral economy

Millions of Nigerians depend on transhumant livestock keeping — predominantly cattle, sheep and goats — for food and livelihoods.



~417 grazing reserves nationwide

Established since 1965, but chronically underfunded, poorly demarcated, and widely encroached upon.



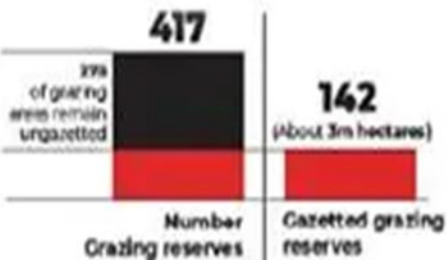
A new federal Ministry of Livestock Development

Signals rising national priority — alongside the World Bank-funded L-PRES (Livestock Productivity and Resilience) programme remodelling reserves nationwide.

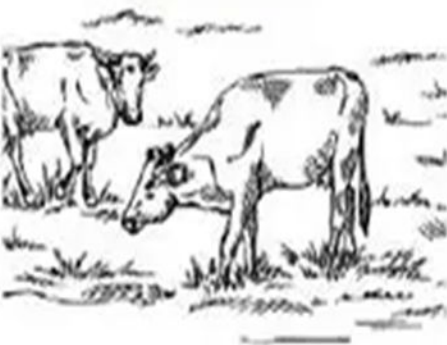


MACBAN

The Miyetti Allah Cattle Breeders Association of Nigeria — the key pastoralist body and a critical engagement partner.



Grazing land covers
4m+ hectares of land across
21 states and FCT



66% of the ungated grazing areas are at risk of encroachment by individual, cooperative, or farming communities.

BLOCKED CATTLE ROUTES

Karoo reserve in Namakwa
from Beaufort, through
Plateau down to
Beaufort and Koppies



Route from Velue, Shendam in Plateau down to Asale in Lafia, Nasarawa State, through a forest reserve at the outskirts of Lafia, ending the cattle's right of way to the Lafia Cattle Market.

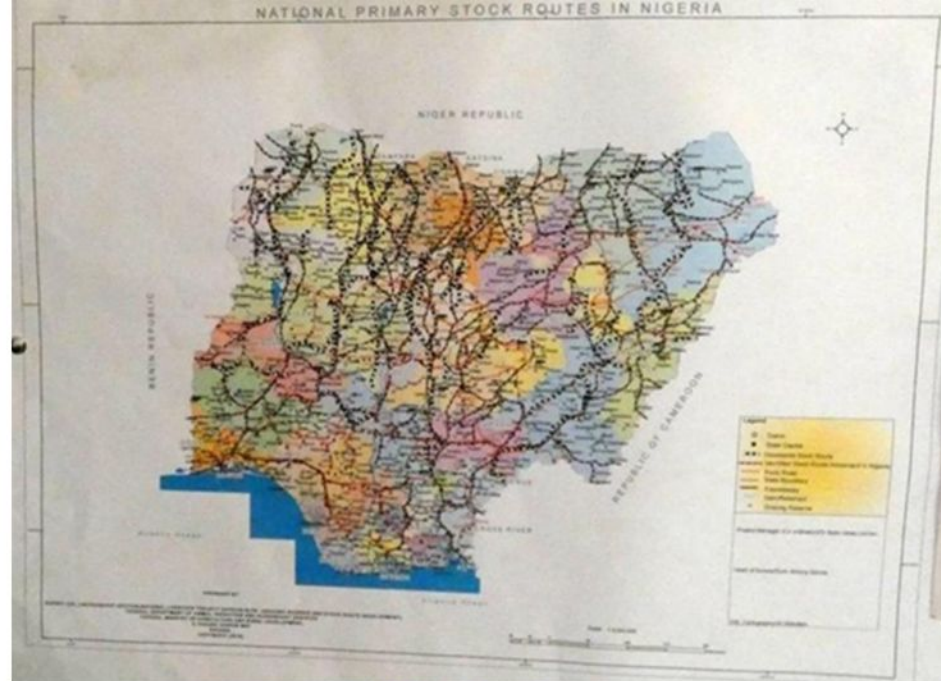
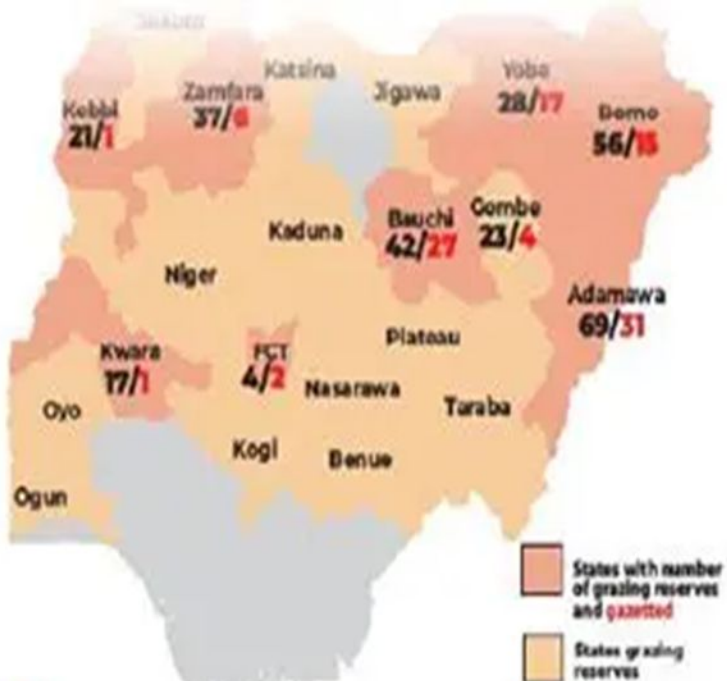
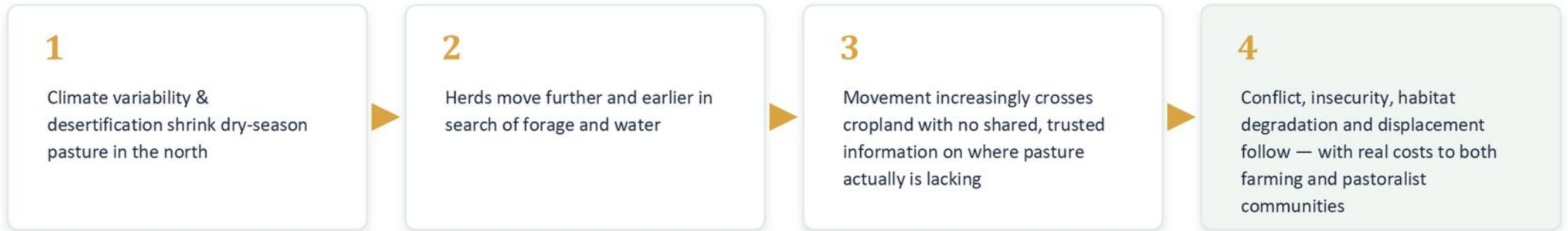


Photo 2. Kachia Grazing Reserve



The Farmer-Herder Conflict Driver



Policy response, December 2025:

President Tinubu directed the National Economic Council to identify grazing reserves that can be converted into economically viable ranches — part of a nationwide push to curb farmer-herder conflict and insecurity.

Data & Information Gaps



No real-time pasture or water information

Herders currently move on tradition and word-of-mouth, not on current ground conditions (**no one has the information to respond adequately to land use and climate change** — a root cause of encroachment into farmlands, protected areas and ultimately low productivity).



Limited Nigeria-specific ground-truth data

Satellite biomass estimates need to be calibrated and validated against Nigeria's own savanna and grassland ecology before they can be trusted.



Fragmented reserve and stock-route mapping

Many of the ~417 gazetted reserves and traditional stock routes are poorly documented, encroached upon, or missing from usable digital records.



Low visibility of conflict hotspots

There is no shared layer linking grazing pressure to where farmer-herder conflict actually occurs, making prevention reactive rather than proactive.

Institutional & Capacity Gaps



A reserve rehabilitation backlog

Decades of underinvestment mean water points, veterinary services and boundary demarcation need rebuilding — a DST is only as useful as the reserves it points people to.



Extension worker & agency digital capacity

State livestock/agriculture ministries and field extension workers need training to interpret and act on satellite-derived guidance.



Conflict-sensitive land-use planning

Grazing decisions need to be made with an eye to farmer-herder tension, not just pasture availability alone.



Reach beyond smartphones

Many pastoralists have limited smartphone access or literacy — guidance must work through SMS and trusted intermediaries (associations, extension agents), not app downloads alone.

What the DST Combines



Satellite EO Biomass Data

Sentinel-2 grassland biomass, 10m x 10m, every 5 days



Pasture Growth Models

Predictive models of forage availability by season and location



Nigeria Ground-Truth Data

Field-sampled biomass from Nigerian trial sites, to calibrate the satellite models



Producer & Pastoralist Knowledge

Local herd-movement patterns, traditional grazing calendars and lived experience



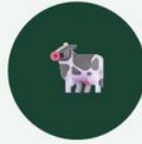
A single Decision Support Tool for Nigerian rangeland management

What we think the DST will deliver



Near-Real-Time Pasture Maps

Visual, up-to-date biomass and ground-cover maps at reserve or corridor level.



Stocking-Rate & Grazing Guidance

Practical recommendations on where and when to graze, based on current conditions.



Ground-Cover & Degradation Alerts

Early warning when pasture is thinning, to prevent overgrazing before it happens.

Delivered through three channels, so no one is locked out by connectivity or literacy:



SMS

For pastoralists and remote users with basic phones



Web Dashboard

For reserve managers, ministries and NCF/WWF field teams



Mobile App

For extension workers and tech-enabled users

Nigeria-Specific Features

Beyond the global DST design, five additions make the tool fit Nigeria's realities:



Grazing reserve, stock-route and Protected Areas overlays

The gazetted reserves, protected areas and traditional stock routes as a digital base layer, not a separate document.



Hausa & Fulfulde SMS content

Guidance delivered in the languages pastoralist users actually speak, not translated as an afterthought.



MACBAN & extension-worker integration

Trusted intermediaries who already have pastoralist reach, rather than asking users to adopt a brand-new channel.



Seasonal forecast linkage

Connecting near-term pasture data to seasonal climate outlooks, to help plan movement further ahead.

Who will use it



Pastoralists & Herder Associations

Primary end-users — via SMS and MACBAN's networks



Grazing Reserve Managers

Day-to-day reserve and stock-route management



State Livestock & Agriculture Ministries

Policy planning and reserve-to-ranch conversion decisions



Protected Areas Management

Field validation, community engagement, and DST refinement



Researchers & Extension Workers

Ground-truthing, training delivery, and farmer support



Development & Government Partners

Ministry of Livestock Development at the state and national levels

A Five-Phase Roadmap



Our site selection decisions will be stratified to prioritise grazing routes and reserves

Relevance

Despite growing international recognition of the climate-livestock nexus...

- ▶ The Paris Agreement, Kunming-Montreal GBF, and national NDCs all acknowledge livestock's climate impact, yet actionable tools remain out of reach for frontline communities.
- ▶ Nigeria's livestock sector contributes 6-8% of agricultural GDP and is dominated by smallholder and mobile pastoralists who lack data-driven management support.
- ▶ There are no near-real time datasets on pasture biomass or forage quality available to pastoral communities at the point of decision-making.
- ▶ The least managed cattle systems have low productivity and an even disproportionate share of environmental impacts relative to the food they produce.



Time2Graze Solution Perspectives for Nigeria

Close the critical gap between global climate commitments and local pastoral realities.

Real-Time Pasture Intelligence

Enable access to real-time standing biomass data, forage growth rates, nutritive value, and forage composition through satellite-integrated Decision Support Tools.

Adaptive Management Support

Monitor how changed grazing practices improve environmental and social outcomes, providing the opportunity to feed results back to communities in usable form.

Scalable Use-Cases

Amplify proven models to reach new users across Nigeria and beyond: creating a reference point for climate-smart rangeland governance.

Evidence for Policy & Finance

Generate MRV-verified data on emissions reduction and carbon sequestration to support Nigeria's NDC and unlock climate finance.

Goal

To enhance farm and rangeland productivity by increasing animal performance and producer income, while promoting sustainable land and water resource management and reducing methane emissions through the provision of timely, accessible pasture data to support improved grazing management decisions in Nigeria.

Objectives

Create

- Create a replicable, durable, adaptable, and regionally appropriate near-real time dataset of forage resources that enables co-creation of decision-relevant tools for pastoralists and ranchers.

Equip and incentivize

- Equip and incentivize pastoralists and ranchers in focal countries to use decision support tools to efficiently and sustainably manage their herds through engagement with trusted partners and stakeholders.

Influence

- Influence the global vision on grasslands conservation and climate action to elevate sustainable grazing management as a priority, including leveraging resources toward scaling improved practices.

Theory of Change

IF...

Near-real-time, easily accessible pasture data (standing biomass, forage composition & nutritive value) is integrated into co-created Decision Support Tools for ranchers and pastoralists to make informed grazing management decisions...

THEN...

Producers will use natural resources more efficiently through better grazing management, and supply-chain actors will quantify environmental goods, leading to increased productivity, sustainably managed land and reduced methane emissions.

BECAUSE...

The least managed cattle systems are inefficient and produce a disproportionate amount of environmental impacts. A decision-useful tool connecting communities to information and incentives will be the catalytic element for change.

Propose Approach: A Three-Pillar Approach

1

Digital Decision Support Tools

- ✓ Real-time forage forecasts
- ✓ Data supported grazing plans
- ✓ Stocking density guidance
- ✓ Localized weather alerts
- ✓ Low-literacy visual interfaces

2

Satellite Technology Integration

- ✓ Forage biomass monitoring
- ✓ Land use change detection
- ✓ Ground-truth validation
- ✓ Sentinel-2 satellite imagery

3

Community-Grounded Knowledge

- ✓ Indigenous pastoral knowledge
- ✓ Participatory co-design
- ✓ Traditional stock routes (Burtali)
- ✓ Community monitoring capacity
- ✓ Farmer-herder conflict sensitivity

WHAT HAVE WE DONE

- National Contextualization through thorough stakeholder mapping that brought together;
 - Academia/researchers
 - Policy makers
 - Community heads
 - Conservation practitioners
 - Media
- Site visit and review of field data mobilization methodology

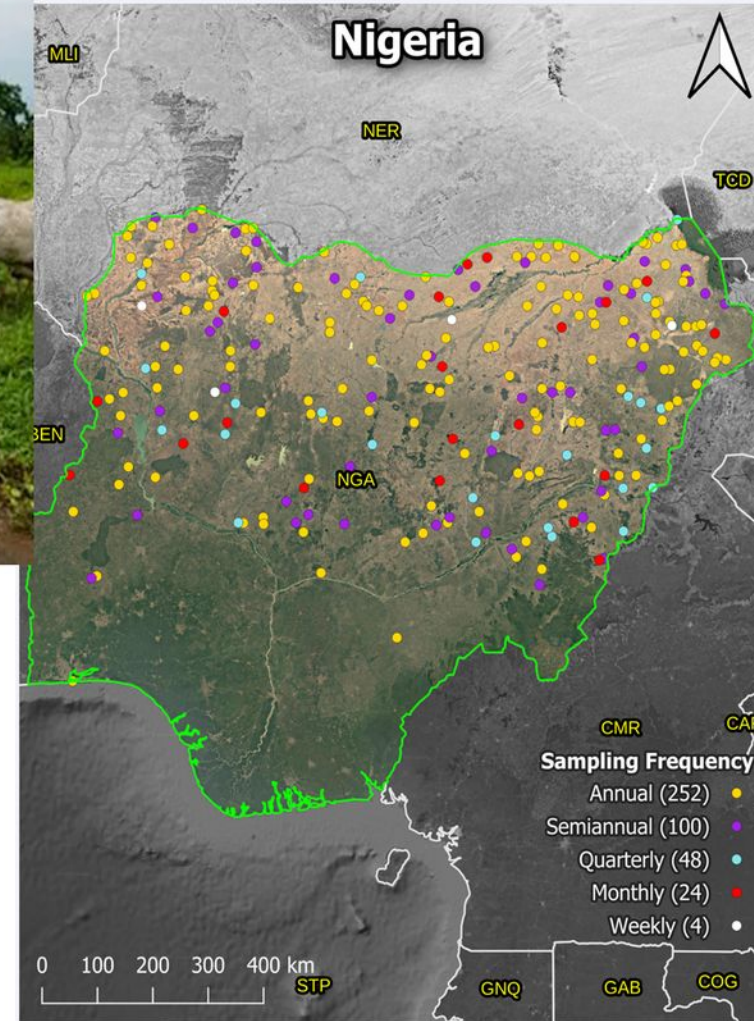


Nigeria: What Did We Find

- Three grazing systems are consistently named across presentations: transhumance, agro-pastoralism, and ranching.
- As of 2022 and 2023, the total number of cattle in Nigeria is approximately 54.81 million, and these include goats, sheep, and other animals.
- Rangeland spans a gradient from Sahel and Sudan savanna in the north through Guinea savanna to derived savanna, rainforest and coastal mangrove in the south, with rainfall ranging from ~500mm in the far north to over 3,000mm in the south.
- The Fulanis are largely nomadic/semi-nomadic approximately 100 million individuals who live in the semi-arid climate of West Africa the Nigerian population is estimated to be 13 million.



Zone	Climate Change Impact	Effect on Grazing
Sahel	Severe drought	Extreme pasture scarcity
Sudan Savanna	Rainfall variability	Reduced forage biomass
Guinea Savanna	Floods and dry spells	Seasonal pasture fluctuations
Rainforest	Land conversion	Reduced grazing areas



Naturally Occurring Forage Resources

- Key native/naturalized grass species repeatedly cited in Nigerian forage research: *Andropogon gayanus*, *A. tectorum*, *A. ascinodis*, *Panicum maximum*, *Pennisetum purpureum* (elephant grass), *P. pedicellatum* ("Nigeria grass"), *Cynodon dactylon* and *C. nlemfuensis*, *Brachiaria jubata*, *Hyparrhenia dissoluta*, *Sporobolus pyramidalis*, and *Setaria anceps*.
- Browse species (important dry-season protein/mineral sources when grasses senesce): *Annogeissus leiocarpus*, *Bridelia ferruginea*, *Crossopteryx febrifuga*, *Dichrostachys cinerea*, *Khaya senegalensis*, and various *Mimosa* species, among others sampled in Northern Guinea Savanna browse surveys.



WHAT DID WE FIND

- Nigeria's roughly 415–417 gazetted grazing reserves cover approximately 3.8 million hectares, but many are underutilised or encroached upon.
- Traditional stock routes have shrunk from an estimated 18,463km up to the 1980s to about 12,299km by 2012 — a 33.4% reduction — driven first by colonial-era settlement policy favouring grazing-area protection over route preservation, and later by population growth, cropland expansion and weak institutional/legal protection.
- Approximate 43% of Nigeria's land area is affected by desertification, with about 350,000 hectares lost annually to desert encroachment.
- Examples of DST:
 - i. EX-ACT (FAO) — Ex-Ante Carbon-balance Tool: EX-ACT has been used in Nigeria-focused studies and World Bank/AGDF analyses of low-carbon development. It's widely used in country project appraisals.
 - ii. GLEAM (FAO) - *Global Livestock Environmental Assessment Model* – It is dedicated to livestock emissions modelling (enteric CH₄, manure, feed/processing) and useful if livestock is a major emission source in your study.
 - iii. PrAEctiCe DST (EU-funded) - Nigeria (through partner Apodissi), and more broadly East Africa but Nigeria as a commercialisation target, It is expected to help Sub-Saharan African farmers.

Stakeholders Prioritized the following

Pastoralists: strong consideration Nigeria's historical grazing routes and sites, pasture availability prediction maps, water-point locations, seasonal grazing forecasts, drought warnings, livestock disease alerts, and safe migration routes.

Extension officers: spatial analysis of grazing zones, training materials, climate/seasonal forecasts, and land-degradation data to inform policy support.

Incorporation of traditional grazing calendars, indigenous knowledge and continuous community feedback.

Traditional stock routes prioritised to support community, state and national policy on grazing land management and climate mitigation.

Stakeholders Prioritized the following outcomes

- Pastoralists: strong consideration Nigeria's historical grazing routes and sites, pasture availability prediction maps, water-point locations, seasonal grazing forecasts, drought warnings, livestock disease alerts, and safe migration routes.
- Extension officers: spatial analysis of grazing zones, training materials, climate/seasonal forecasts, and land-degradation data to inform policy support.
- Incorporation of traditional grazing calendars, indigenous knowledge and continuous community feedback.
- Traditional stock routes prioritised to support community, state and national policy on grazing land management and climate mitigation.
- Protected areas management with a priority for equitable use of the natural resources around support zones.

CATEGORY	OUTCOMES
<i>Systems Level Outcomes</i>	Weekly, calibrated satellite data for grassland biomass is available for tool developers and users.
	Data and tools are used by producers to improve grazing management
<i>Beef & dairy farm productivity and profitability</i>	Beef and dairy productivity is increased.
	Producer incomes are increased
<i>Reduced environmental impacts in grazing landscapes</i>	Reduced degradation of grazing lands.
	Supporting Landscape Level Biodiversity and reducing loss of ecosystems to grazing
	Grazed cattle production results in reduced GHG emissions

Stakeholders Prioritized the following outcomes



Accessibility of the Tool: A Nigeria-specific DST knowledge base: a co-designed document capturing data inputs, user-interface requirements, forage-forecasting logic, rotational grazing parameters and endorsed by all stakeholder groups.



Multilingual and voice-based interfaces, to serve varied literacy levels.



Icons, visual maps, audio prompts and pictorial alerts rather than dense text.

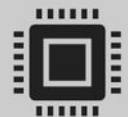


Design for low-bandwidth (2G/3G) networks, with offline functionality and SMS/USSD alerts for areas with limited connectivity.

Current Steps



Refine data mobilization (biomass, socio-economic and indigenous knowledge data from 500 households) strategies – the workshop provides more guidance as we localize our strategy across stakeholders, including the local communities, housemethods and data outputs.



Co-visualization of data outcomes and integration into a practical DST to meet the national vision.



Comprehensive engagement and communication to drive acceptability with a primary targets being policy/decision makers, cattle farmers, community-heads and academia.

Next Steps

Time2Graze is anchored in Nigeria's key national and international frameworks:

Site Prioritization

Training on Field Data Mobilization

Community engagement and awareness

Data Collection

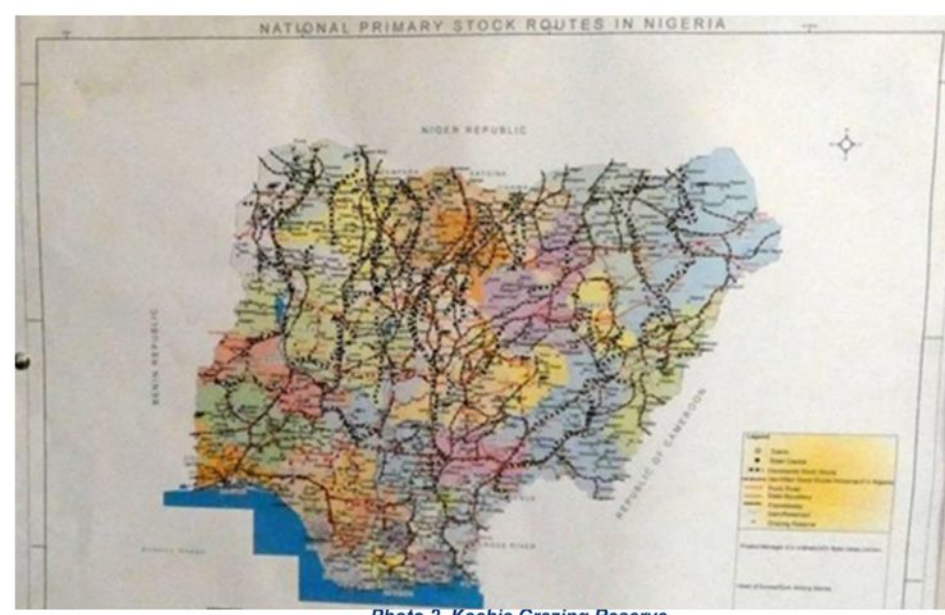
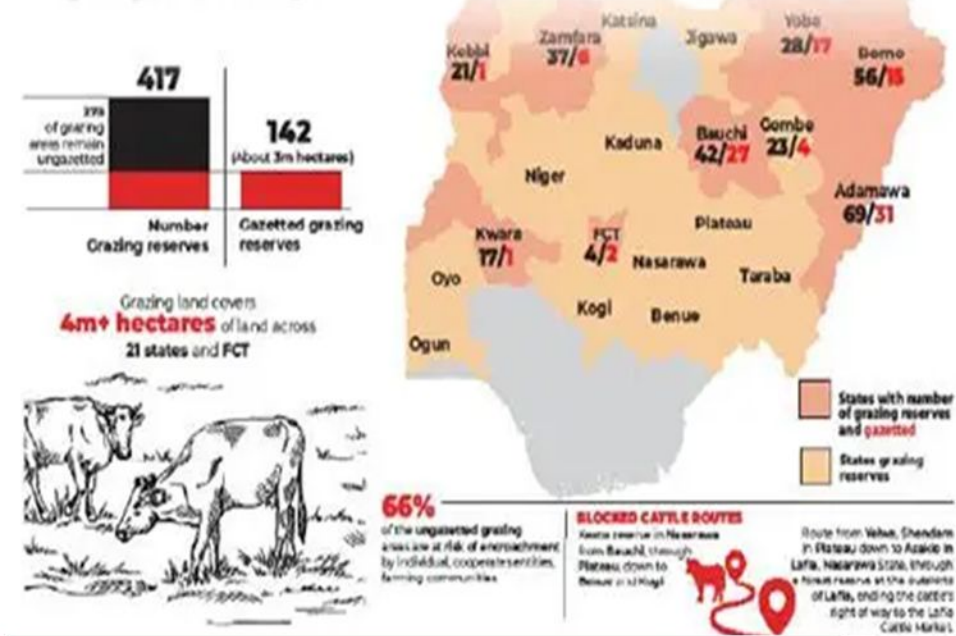


Photo 2. Kachia Grazing Reserve



Policy Alignment

Time2Graze is anchored in Nigeria's key national and international frameworks:

Nigeria's NDC

Livestock methane reduction & rangeland carbon sequestration targets

ACReSAL Project

Rangeland restoration & community-based natural resource management

Paris Agreement

Sub-national climate action and MRV reporting

National Livestock Transformation Plan

Productivity improvement & sustainable grazing systems

Kunming-Montreal GBF (Targets 2,8,10,19)

Biodiversity conservation in rangeland ecosystems

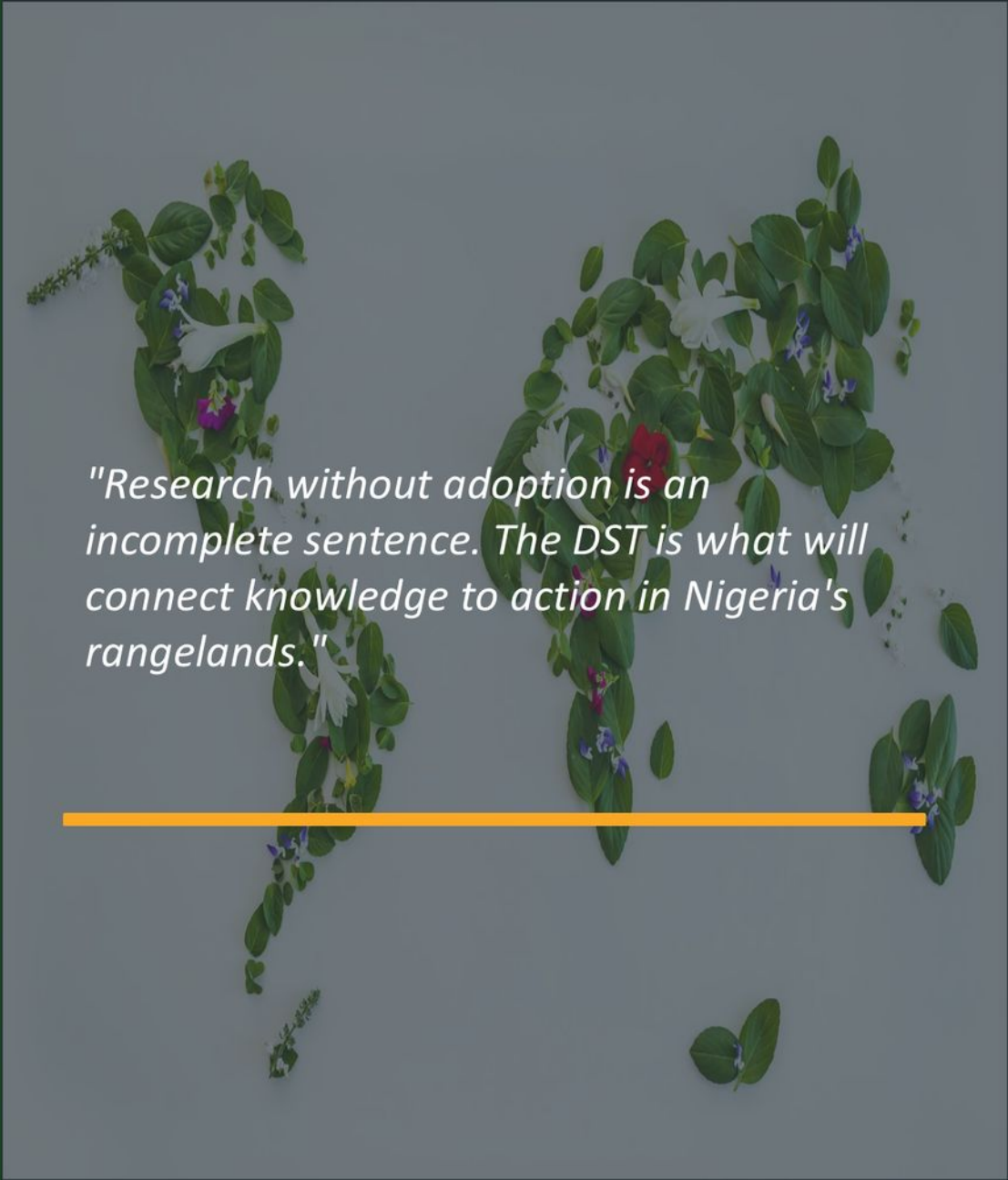
NBSAP

National biodiversity strategy implementation alignment

CONCLUSION

From Data to Decision to Change

- ▶ Partner with local and global stakeholders to co-create tools that truly serve pastoral communities.
- ▶ Designed a tool that reflect the real needs, constraints, and knowledge of Nigerian rangeland managers.



"Research without adoption is an incomplete sentence. The DST is what will connect knowledge to action in Nigeria's rangelands."

THANK YOU

