

Securing Kenya's Prosperity:

The need for a robust Biodiversity Offset Framework

By expanding:

KWCA EarthAcre TERRASOS

With support from:

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Acronyms

Acronym	Meaning
AfDB	African Development Bank
BBOP	Business and Biodiversity Offsets Programme
BETA	Bottom-Up Economic Transformation Agenda
CBD	Convention on Biological Diversity
EIA	Environmental Impact Assessment
EMCA	Environmental Management and Co-ordination Act
EPIC	Economic Policy Innovation Center
ESG	Environmental, Social and Governance
ESS	Environmental and Social Standards
FPIC	Free, Prior and Informed Consent
GDP	Gross Domestic Product
GESIP	Green Economy Strategy and Implementation Plan
GSSB+	Green, Social, Sustainability, Blue, and Sustainability-Linked Bonds
IFC	International Finance Corporation
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
ISS	Integrated Safeguard System
IUCN	International Union for Conservation of Nature
KBA / KBAs	Key Biodiversity Areas
KFS	Kenya Forest Service
KNBS	Kenya National Bureau of Statistics
KSh	Kenyan Shilling
KWS	Kenya Wildlife Service
KWCA	Kenya Wildlife Conservancies Association
MoECCF	Ministry of Environment, Climate Change and Forestry
MoTW	Ministry of Tourism and Wildlife
MTP IV	Fourth Medium-Term Plan
NBSAP	National Biodiversity Strategy and Action Plan
NDC	Nationally Determined Contribution
NEMA	National Environment Management Authority
NBCM	National Biodiversity Coordination Mechanism
NG	Net Gain
NNL	No Net Loss
SEI	Stockholm Environment Institute
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme

Executive summary
for Policy Makers



While nature fuels Kenya's growth agenda, the expansion of development infrastructure is quietly depleting these crucial resources. **The Bottom-Up Economic Transformation Agenda (BETA), Vision 2030**, and the new **National Infrastructure Fund (NIF)** Act are driving an unprecedented expansion of roads, railways, energy, and mining, with the NIF alone aiming to mobilize **KSh 5 trillion (US$ 38.6 billion)** for infrastructure.

Yet the same ecosystems that support this growth remain fundamental to national prosperity. A profound structural mismatch threatens this trajectory:

44%

of Kenya's Gross Domestic Product (GDP) depends directly on nature-based sectors (World Bank, 2025)

70%

of national employment is anchored in agriculture, tourism, water supply, and energy (Government of Kenya, 2016).

By expanding linear infrastructure, geothermal energy, and mining into ecologically sensitive landscapes, development projects are actively depleting the natural assets required for their own long-term success. Currently, 31 out of 58 Key Biodiversity Areas (KBAs) are in an "unfavorable" condition due to habitat fragmentation and land-use change (Government of Kenya, 2026). Without mechanisms to address residual biodiversity impacts, economic growth risks progressively eroding the natural capital on which much of that growth depends.

This situation generates ecological costs that do not disappear. They shift from developers' balance sheets to the Government's as unfunded public liabilities, straining budgets, degrading critical ecosystems and threatening future capital access from nature-conscious global financial markets.

Purpose and audience

This analysis supports the discussion on why biodiversity offsets should be incorporated into Kenya's regulatory framework as a strategic market solution to reconcile economic expansion with ecological integrity. It is intended for a variety of stakeholders involved in development planning, biodiversity conservation, and sectoral regulation, including:

Government Ministries:

- The Ministry of Environment, Climate Change and Forestry (MoECCF)
- The Ministry of Tourism and Wildlife (MoTW)
- The Ministry of Energy and Petroleum (MoEP)
- The Ministry of Roads and Transport (MoRT)
- The Ministry of Mining, Blue Economy and Maritime Affairs (MiBEMA)The Ministry of Agriculture and Livestock Development
- The Ministry of Agriculture and Livestock Development (MoALD)
- The National Treasury and Economic Planning (TNT&EP)

Environmental and Natural Resource Management Institutions and Coordination Mechanisms:

- National Environment Management Authority (NEMA)
- Kenya Wildlife Service (KWS)
- Kenya Forest Service (KFS)
- National Biodiversity Coordination Mechanism (NBCM)

Financing Institutions, NGOs, academia, research institutions and development partners along with other actors contributing to Kenya's biodiversity finance and environmental governance agenda.



The Policy Gap

Kenya possesses a strong constitutional, legal, and policy foundation for environmental management. The Constitution, the Environmental Management and Coordination Act (EMCA), Vision 2030, the National Environment Policy, the ongoing update of the National Biodiversity Strategy and Action Plan (NBSAP), and sectoral legislation all support sustainable development and biodiversity conservation.

However, a critical gap remains: while the EMCA requires environmental assessment and mitigation against environmental damage, Kenya currently lacks a binding regulatory mechanism requiring developers to compensate for significant residual biodiversity losses that remain after mitigation measures have been applied. In practice, this means:



Projects can follow every legal procedure and still cause loss of biodiversity.



Ecological damage accumulates with no mechanism to guarantee measurable and verifiable biodiversity recovery.



Public institutions absorb growing environmental liabilities with no corresponding funding streams to address them.

The problem is not a lack of environmental regulation, but the absence of a framework that ties development impacts to measurable biodiversity outcomes.

The Core Problem:

Hidden Fiscal Liabilities and Capital Access Risks

Because the EMCA and its current Environmental Impact Assessment (EIA) system allows procedural compliance rather than ecological outcomes, Kenya carries three compounding risks:

1 Accumulation of Unfunded public liabilities:

Biodiversity degradation generates costs that ultimately fall on public institutions. The Kenya Wildlife Service (KWS) illustrates the scale: in FY2024, it was allocated KSh 9.3 billion against an operational requirement of KSh 19.8 billion, leaving a KSh 10.5 billion shortfall (National Treasury, 2024). More broadly, Kenya's Seventh National Report to the CBD estimates a US$5 billion gap in financing national conservation goals (Government of Kenya, 2026), and the environment and wildlife ministries alone face strategic-plan financing gaps of KSh 144 billion (MoECCF) and KSh 139 billion (MoTW) (MoECCF, 2023; MoTW, 2023).

2 Economic and Development Risks:

Declining ecosystem integrity affects sectors that depend directly on nature. Continued degradation of ecological infrastructure increases economic and social fragility by weakening essential ecosystem services. This raises costs for nature-dependent sectors, affects employment and livelihoods

3 Limited Investor Alignment and Capital Access:

Multilateral development banks (World Bank ESS, AfDB ISS, IFC Performance Standard 6) and global green finance markets like Green, Social, Sustainability, Blue, and Sustainability-Linked Bonds (GSSB+) increasingly require credible environmental safeguards, No Net Loss (NNL) or Net Gain (NG) commitments, and measurable biodiversity outcomes. Without a domestic offset framework, Kenya risks losing access to this growing pool of nature-positive capital.

These risks concentrate in development sectors that are both most dependent and disruptive to natural capital:

Table 1. Kenya's growth sectors dependence and impact on Natural Capital

Sector	GDP Contribution	Dependency on Natural Capital	Expected Biodiversity Footprint
Agriculture & Agro-industry	KSh 3.65 trillion	**Very High:** Surface water, pollination, soil fertility, climate regulation.	**Very High:** Land conversion, vegetation clearing, soil erosion, water abstraction.
Construction (Roads & Rail)	KSh 1.03 trillion	**Medium to High:** Minerals, timber, natural flood and storm protection.	**High:** Habitat fragmentation, river sand mining, disruption of wildlife corridors.
Tourism	KSh 255 billion	**High to Very High:** Wildlife, scenic landscapes, coastal ecosystems, coral reefs, cultural services	**Moderate to High:** Infrastructure development, human-wildlife conflict, waste generation, wildlife disturbance
Electricity Supply (Energy)	KSh 290 billion	**High to Very High:** River flows (hydro), forested catchments, watershed stability.	**High:** Water system alterations, land disturbance in sensitive areas (e.g., Rift Valley).
Extractives & Mining	KSh 109 billion	**Medium to High:** Surface/groundwater, soil stability.	**Very High:** Land degradation, toxic leaching, irreversible habitat conversion.

[1] *The Seventh National Report does not specify the currency. For the purposes of this analysis, the figure is interpreted as US dollars.*

Source: Own elaboration based on data from the Kenya National Bureau of Statistics (2025) combined with the World Bank's Nature's Bottom Line: The Economic and Financial Costs of Ecosystem Degradation in Kenya (2025) and sectoral biodiversity impact analyses drawn from Environmental and Social Impact Assessments (ESIAs) of strategic national projects (SGR Phase 2B, Olkaria II Geothermal Plant, and Kwale Mineral Sands).

The Strategic Solution:
High-Integrity Biodiversity Offsets

Biodiversity offsets provide a mechanism to reconcile development and conservation by ensuring that significant residual biodiversity impacts are compensated through measurable conservation outcomes. They represent the last step of the mitigation hierarchy, a sequential framework for managing biodiversity impacts from development projects that requires first avoiding damage, then minimizing it, then restoring it on-site, and only then compensating the impacts that remain. The goal is to achieve No Net Loss (NNL) where nature ends up no worse off than before, or preferably Net Gain (NG), where it ends up better off.

When properly designed, biodiversity offsets:

- **Internalize environmental costs** within project economics.
- **Operationalize** the polluter-pays principle.
- Mobilize private capital **for conservation.**
- **Reduce pressure** on public budgets.
- **Support national biodiversity** objectives
- **Generate measurable ecological** and social outcomes.

Three technical conditions **define a credible offset framework**

Expert international organizations (such the Business and Biodiversity Offsets Programme (BBOP) and the International Union for Conservation of Nature (IUCN)) demonstrate that biodiversity offsets only deliver credible outcomes when supported by robust technical standards. Based on this, a Kenyan framework should be built around three core principles:

Additionality

Offsets must generate conservation gains that would not occur under business-as-usual scenarios and must avoid simply funding activities already required by law or already adequately financed. They must create new ecological value, account for baseline trajectories, and actively mitigate the risk of "leakage" (displacing degradation elsewhere).



Permanence

Conservation outcomes must be secured for at least the duration of the impact, typically 20 years or more, ideally aiming for perpetuity. This requires legal instruments (e.g., conservation easements) and financial guarantees (e.g., endowment trust funds) to secure long-term management.

Ecological Equivalence

Offsets must enforce a strict "like-for-like" standard, guaranteeing that the identical habitat type is maintained and specific ecological communities are not traded away. For this, robust indicators and defined biodiversity outcomes are imperative.

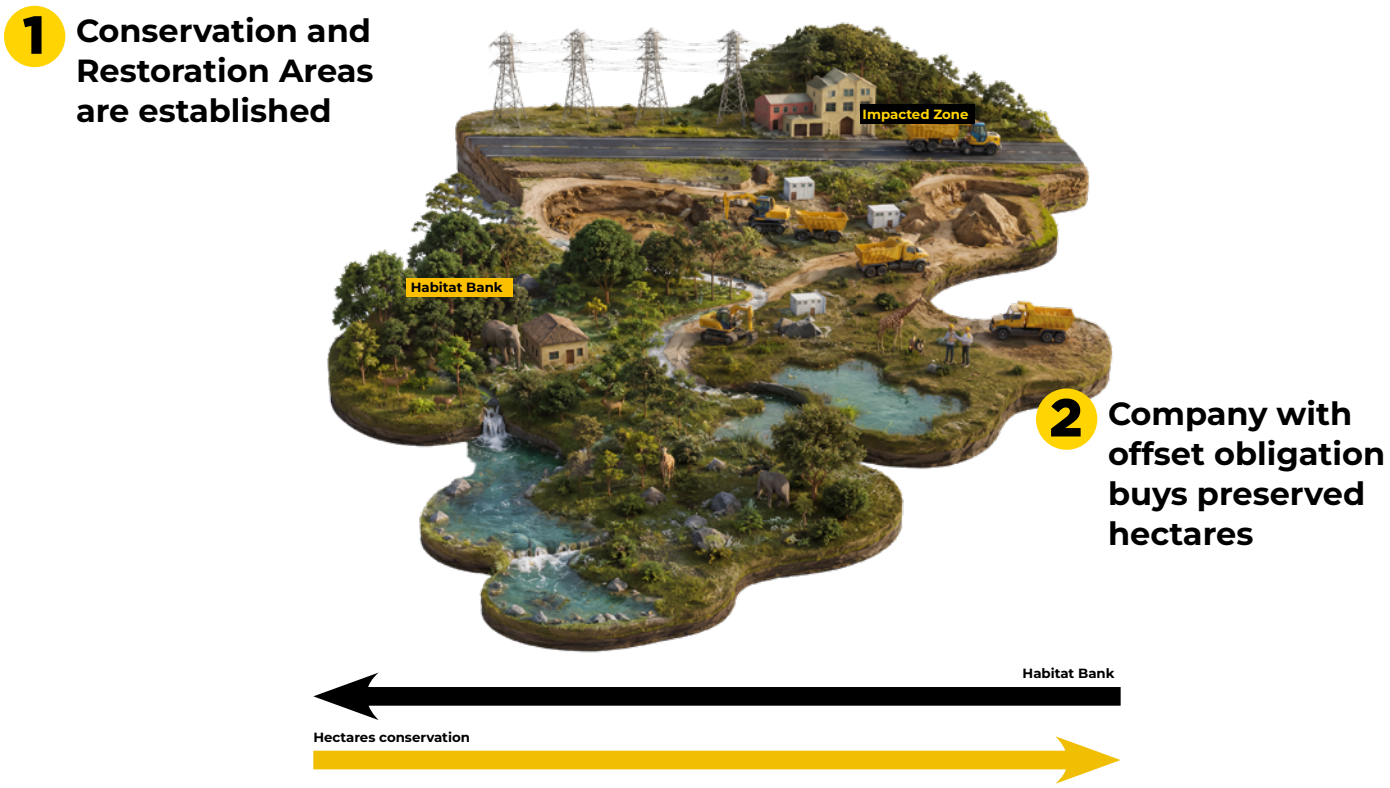
1. The mitigation hierarchy is a sequential framework for managing biodiversity impacts from development projects. It requires project proponents to first avoid impacts where possible, then minimize unavoidable impacts, restore or rehabilitate affected areas, and only then offset significant residual impacts through measurable conservation outcomes. Under this framework, offsets may only be considered after all appropriate avoidance, minimization and restoration measures have been applied, and must not be used to justify avoidable biodiversity loss (IUCN, 2016)

Habitat Banks: Recommended pathway for Kenya

Rather than requiring each project to design its own offset scheme, Kenya can benefit from habitat banks as a ready to use option for compensation obligations. They establish conservation or restoration areas in advance and manage and monitor them against defined ecological metrics. The verified biodiversity gains generated by these areas can then be purchased by developers to meet offset obligations, pooling obligations from multiple projects, and help direct finance toward priority ecosystems where long-term conservation outcomes can be aggregated and managed more effectively.

This reduces implementation risks for project developers and simplifies oversight for authorities, as institutions can verify standardized biodiversity gains in approved sites rather than assessing multiple fragmented, project-specific compensation actions.

Figure 1. Habitat banks Operation for offset obligations



Source: Terrasos (2026)

Roadmap for **Kenya's Biodiversity Offset Framework**

Kenya does not need to build an offset scheme from scratch. Strong foundational architecture for its design encompasses Article 69 of the Constitution, Current Vision 2030 MTP IV, and National Targets 14 and 15 of its updated National Biodiversity Targets for their next National Biodiversity Strategy and Action Plan (NBSAP) which explicitly considers biodiversity offsets (Government of Kenya, 2026).

Other existing enabling points include:

EMCA and the Environmental Impact Assessment system.

The Wildlife Conservation and Management Act.

The National Environment Policy.

Existing institutions: MoECCF, NEMA, KWS, KFS, and the NBCM.



By transitioning from a framework of procedural compliance to one of verified ecological outcomes, Kenya can operationalize the "polluter pays" principle and:

- Ensure that infrastructure growth does not impact in a negative way the natural capital that supports Kenya's economy, jobs, and long-term prosperity.
- Reduce pressure on public conservation budgets by shifting part of the cost of biodiversity loss to the actors generating the impact.
- Maintain access to international green finance by aligning with stronger nature-related investment standards.

This is an opportunity to nurture Kenya's long-term prosperity while ensuring that progress enhances the vital health of the entire living system.

Implementation can be executed through four targeted interventions:

Figure 2. Four recommended pillars for biodiversity offset implementation in Kenya

Strategic roadmap for the operationalization of environmental policy on biodiversity offsets

1. Institutionalize the mitigation hierarchy & biodiversity offsets	**2. Biodiversity offsets institutional architecture & roles**	**3. Offsets High Integrity Technical Standardization**	**4. Establish implementation mechanisms**
- introduce mitigation hierarchy & biodiversity offsets into upcoming policy and legal reforms. - Update EMCA regulations to make mitigation hierarchy mandatory. - integrate biodiversity offset into NEMA's EIA license conditions . - incorporate offset requirements into sectoral legislation	→ Define a coordinated governance framework with clearly separated roles and responsibilities across relevant public institutions to ensure that biodiversity offsets can be planned, approved, implemented, monitored and verified efficiently, transparently and without conflicts of interest.	→ Define clear rules for high-integrity offsets encompassing: • No Net Loss • Technical Criteria (Permanence, • Ecological Equivalence and Additionality) Alignment with National Conservation Priorities and Ratio Methodology for offset ratios.	→ Develop sector-specific EIA guidelines, starting with Linear Structure Construction Sector and energy and mining in the medium term, and enable Habitat Banks to deliver offsets at scale in infrastructure, energy, and mining.

1 Institutionalize Biodiversity Offsets within Kenya's Regulatory Framework

Integrate the mitigation hierarchy and biodiversity offsets into existing policy and legal reforms, including the National Environment Policy, the Wildlife Conservation and Management Act, the EMCA's EIA Regulations, and the Integrated Ecosystem-Based Conservation Policy under development. As an immediate transitional measure, Kenya should use EIA licence conditions to require biodiversity offsets for projects with significant residual impacts while broader regulatory reforms are developed. These conditions should mandate a Biodiversity Offset Plan, and enable NEMA to enforce compliance throughout the project lifecycle.

2 Establish a clear inter-institutional architecture

Designate NEMA as the lead regulatory and permitting authority for biodiversity offsets. Regarding the Monitoring, Reporting and Verification system (MRV), create a dedicated, specialized body that checks whether offsets deliver what they promise, and manages the national offsets registry. Separating these roles avoids conflicts of interest between the regulator and the bodies implementing or overseeing offsets.
Additionally, empower the National Biodiversity Coordination Mechanism (NBCM) to align NEMA, the wildlife sector, and other agencies.

3 Establish High-Integrity Technical Standards

Develop standardized national rules for biodiversity offsets that require No Net Loss as a minimum outcome (with Net Gain preferred in endangered ecosystems) and ensure additionality, permanence, and ecological equivalence.

4 Operationalize Biodiversity Offsets through Clear Implementation Mechanisms like habitat banks

Develop sector-specific EIA guidelines and update NEMA's EIA guidance to establish standardized procedures for delivering biodiversity offsets across sectors most likely to generate residual impacts. These guidelines should enable aggregated, market-based mechanisms such as habitat banks, which can pool offset demand and direct investment toward pre-established, long-term conservation and restoration areas.

- **Energy sector:** Use habitat banks to compensate for residual impacts from geothermal, hydropower, transmission lines, and associated infrastructure, particularly where projects affect sensitive habitats, wildlife movement, and watershed functions. The Olkaria II Geothermal Power Plant, located inside Hell's Gate National Park, is an example of this as it caused vegetation clearing and habitat disturbance (ELC & KenGen, 2024). Offsets, operated through habitat banks, can fund conservation of ecologically equivalent habitat within the same landscape.

- **Linear infrastructure sector:** Roads, railways, and transmission lines generate permanent and predictable impacts on habitat connectivity and landscape fragmentation. Habitat banks can aggregate offset demand from projects like the Naivasha–Kisumu Standard Gauge Railway project (SGR Phase 2B) and LAPSSET-corridor to fund wildlife-corridor restoration at landscape scale (Kenya Railways Corporation, 2026).

- **Mining:** Apply habitat banks to address residual biodiversity losses that remain after avoidance, minimization, rehabilitation, and mine closure, especially where mining affects habitats, soils, water systems, and adjacent ecosystems. The case of the Kwale Mineral Sands Operation (South Dune Extension) shows how projects interfere with key biodiversity areas as it sits adjacent to the Buda Forest Reserve within the Coastal Forests of Eastern Africa biodiversity hotspot (Base Titanium, 2018).

The Way Forward:
A High-Integrity Offset Framework for Kenya

Offsets are not a new mechanism to manage environmental impacts and have been used internationally, as a mechanism to reconcile economic expansion with ecological integrity. Lessons drawn from these experiences reflect how jurisdictions have moved from general compensation principles to operational offset systems. Established biodiversity offset frameworks in the United Kingdom, Australia, the United States, and Colombia show that high-integrity offsets work best when they are legally anchored, technically standardized, and independently verified.

To follow this path and achieve an offset framework that adapts and answers to the national context and environmental objectives, Kenya would not be starting from a blank page. Based on the enabling policy framework, the established institutionality and the technical conditions to define a credible scheme, the country is on the right track to develop high integrity offsets. By building on the given recommendations, the country can shift conservation costs from the public sector to private capital, while giving developers a clear incentive to avoid and reduce biodiversity impacts, and assuring that environmental impacts are compensated, or surpassed, through measurable and quantified results.

Bottom line:

a high-integrity biodiversity offset framework lets Kenya keep building the infrastructure its economy needs, while protecting the natural capital that infrastructure ultimately depends on — reducing future fiscal exposure and keeping the door open to international green capital.

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