TECHNICAL BRIEF

Conservation technology

Strengthening Effective and Equitable Area-based Conservation to achieve the Kunming-Montreal Global Biodiversity Framework

October 2026

Summary

• Technology can accelerate conservation outcomes, but uneven readiness, weak governance, and inequitable access limit impact.

• Poorly governed technology introduces risks – from data misuse to exclusion of rights-holders – undermining conservation effectiveness.

• A governance-centred, rights-based approach is essential to ensure technology strengthens, rather than replaces, conservation practice.

• The Guidance for Effective and Equitable Area-based Conservation Technology and Innovation, Consultation Version V1.0 and the GSAP SKILLS Platform provide practical guidance for governments and site managers.

• Technology companies, solution providers, and practitioners also have a responsibility to ensure that digital tools are designed, deployed, and governed in ways that uphold rights-based conservation and strengthen long-term institutional capacity.

What is the issue?

Digital tools – including drones, camera traps, eDNA, AI analytics, and IoT sensors – are increasingly used to support conservation planning, monitoring, enforcement, and reporting. These technologies can significantly enhance progress toward the Kunming–Montreal Global Biodiversity Framework (GBF), particularly Target 3 and species-related targets under Goal A.

However, technology is not inherently effective. Many protected and conserved areas (PCAs) face persistent challenges: fragmented pilots, insufficient capacity, unclear data governance, lack of Free, Prior and Informed Consent (FPIC), and tools that sit outside established management systems. Without safeguards, technology can create operational, environmental, and rights-based risks.

These risks are amplified when technology developers and applicants do not align their products, data practices, or deployment models with conservation governance systems, FPIC requirements, or the long-term needs of protected and conserved areas.

To support governments, Indigenous Peoples, local communities, and PCA managers, IUCN has developed the Operational Framework for Effective and Equitable Conservation Technology and Innovation. Complementing this, the Global Species Action Plan (GSAP) SKILLS Platform provides a list of actions required to achieve species outcomes for each of the GBF target, as well as a dynamic, open-access hub of tools, training, and guidance to help countries implement species-related GBF targets using appropriate, well-governed technologies.

What should be done?

CBD Parties and environment agencies are urged to:

- Embed conservation authorities in national digital and environmental data governance platforms, ensuring alignment with biodiversity, climate, and digital policy.

- Integrate technology considerations into NBSAPs, PCA management plans, and OECM recognition processes, ensuring readiness, governance, and rights-based safeguards.
- Use the GSAP SKILLS Platform to identify appropriate tools, training, and implementation pathways for species monitoring, threat reduction, and reporting.
- Require FPIC and culturally appropriate engagement before deploying technologies in Indigenous and Traditional Territories.
- Assess readiness and sustainability (infrastructure, skills, financing, maintenance, e-waste) before procurement or deployment.
- Strengthen ethical data governance, including data sovereignty, access rules, benefit-sharing, and safeguards for

sensitive information.
- Support capacity building for rangers, communities, and PCA managers, including digital literacy, data interpretation, and long-term system management.
- Promote interoperable, open, and transparent systems, reducing fragmentation and supporting national reporting under the GBF.
- Invest in lifecycle-based financing, ensuring long-term maintenance, upgrades, and responsible end-of-life management of devices.

Technology companies, solution providers, and applicants play a critical role in ensuring that digital tools strengthen – rather than undermine – conservation governance, rights-based processes, and long-term biodiversity outcomes.

Technology companies are urged to:

- Align product design with conservation governance and rights-based standards, ensuring tools support existing management systems and FPIC requirements.
- Ensure transparency, interoperability, and open documentation to reduce fragmentation and enable integration with national biodiversity monitoring systems.
- Embed ethical data governance and data sovereignty safeguards into products and services, including clear rules for access, storage, benefit-sharing, and protection of sensitive ecological and cultural information.
- Co-design solutions with rangers, Indigenous Peoples, local communities, and PCA managers to ensure usability, cultural appropriateness, and long-term sustainability.
- Commit to lifecycle-based responsibility, including maintenance pathways, repairability, and responsible end-of-life management to reduce e-waste.

Technology users and applicants are urged to:

- Demonstrate readiness before deployment, including infrastructure, skills, financing, and long-term management capacity.

- Ensure FPIC and rights-based engagement when working in Indigenous and Traditional Territories, and uphold data sovereignty and equitable benefit-sharing.
- Integrate technology into existing conservation workflows so tools strengthen – not replace – ecological knowledge and governance systems.
- Use the GSAP SKILLS Platform and IUCN Operational Framework to select appropriate tools, training, and implementation pathways aligned with GBF targets.
- Adopt transparent data practices, including clear data-sharing agreements, risk assessments, and safeguards for sensitive species and community information.

Practitioners seeking funding or approval should:

- Provide evidence of governance alignment, including FPIC processes, data governance plans, and integration with PCA management systems.
- Demonstrate sustainability, including financing for maintenance, training, and long-term operation.
- Show how proposed technologies contribute to measurable biodiversity outcomes consistent with the GBF and national reporting needs.

Why is it important?

Technology can significantly enhance conservation effectiveness – but only when embedded in strong governance, rights-based processes, and long-term institutional capacity.

Poorly governed, poorly designed, or poorly integrated technology – including tools introduced without FPIC or long-term sustainability planning – can:

• Create data risks, including privacy breaches, misuse, or loss of Indigenous knowledge sovereignty.
• Increase inequities, excluding women, youth, and local communities from decision-making.
Generate operational burdens, including maintenance failures, stranded devices, and e-waste.
• Undermine trust and legitimacy, especially where FPIC is absent.
• Fail to deliver conservation outcomes when not aligned with management workflows.

These challenges underscore the need for technology developers and applicants to adopt governance-aligned, rights-based, and sustainability-focused approaches that reinforce conservation institutions rather than creating dependency or inequity.

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The Guidance for Effective and Equitable Area-based Conservation Technology and Innovation, Consultation Version V1.0 identifies practical actions for PCA managers across:
• Technology selection and readiness
• Inclusive innovation and co-design
• Ethical data governance
• Capacity building and learning
• Monitoring, evaluation, and adaptive planning
• Sustainable financing
• Greening conservation technology

The GSAP SKILLS Platform complements this by providing:
• Target-specific guidance for species-related GBF

• Curated tools and resources for monitoring, threat assessment, and recovery planning
• Training materials for practitioners and authorities
• A global collaboration space for sharing solutions and scaling effective approaches

Together, these resources help ensure that technology strengthens conservation governance, supports rights-holders, and delivers measurable biodiversity outcomes.

Conservation technology:
An approach that integrates digital tools, data systems, and innovation into conservation planning, monitoring, governance, and adaptive management in ways that are ethical, inclusive, sustainable, and aligned with rights-based conservation. It recognises that technology must support – not replace – ecological knowledge, governance systems, and long-term stewardship.

Useful tools and references

Together, these resources help ensure that technology strengthens conservation governance, supports rights-holders, and delivers measurable biodiversity outcomes.

The Guidance for Effective and Equitable Area-based Conservation Technology and Innovation, Consultation Version 1.0 provides practical guidance, decision pathways, and indicators for responsible technology adoption.

The GSAP SKILLS Platform offers curated tools, training, and implementation guidance to support species-related GBF targets.

The IUCN Global Standard for Effective and Equitable Protected and Conserved Areas Version 2.0 offers criteria for governance, management, and monitoring that technology initiatives should align with.

The IUCN Biodiversity Monitoring Framework provides guidance on integrating technology into credible, sustainable monitoring systems.

The Guidance on OECMs and ICCAs outlines rights-based governance requirements, including FPIC and data sovereignty, relevant to technology deployment.

The PANORAMA – Solutions for a Healthy Planet platform provides real-world case studies on conservation technology, co-design, and digital innovation.

Solutions in Focus: Tech4Nature Award: showcases how innovative digital technologies — including AI, drones, IoT sensors, mobile applications, blockchain, and community-based monitoring systems — are being used worldwide to strengthen biodiversity conservation, protected area management, ecosystem restoration, and inclusive community engagement through the Tech4Nature initiative and awards programme

Solutions in Focus: Tech4Nature: highlights how innovative digital technologies such as AI, remote sensing, acoustic monitoring, blockchain, and community-based data systems are being applied across global conservation projects to strengthen protected area management, species conservation, community engagement, and biodiversity monitoring for more effective and equitable nature conservation outcomes.

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