www.panorama.solutions

We would like to sincerely thank all Tech4Nature Award applicants for their contributions and time.

PANORAMA partners

Development partners

On behalf of:

Federal Ministry
for the Environment, Nature Conservation
and Nuclear Safety

of the Federal Republic of Germany

Klima- og miljødepartementet
Norwegian Ministry of Climate and Environment

Contents

Preface

The Tech4Nature Award represents a growing recognition that technology, when thoughtfully developed and deployed, can be a powerful ally in conservation. This flagship publication brings together a diverse set of Solutions that demonstrate how emerging technology and digital tools – from satellite imaging to data platforms – are helping protect biodiversity and support communities working on the front lines of nature conservation. It is a privilege to introduce this collection of the very best Solutions, which reflect both the urgency of our environmental challenges and the creativity of the partners and communities striving to address them.

Each Solution featured here offers a practical example of how technological innovation and digital solutions can and should be guided by purpose. Now more than ever, examples of such grounded efforts, often led by local communities and partners, show how emerging technology can enhance transparency, improve decision-making, and strengthen collaboration to scale and accelerate area-based conservation. Therefore, the Tech4Nature Award 2025 celebrates not just technical achievement, but the values that underpin it: inclusion, sustainability, and a deep respect for nature.

As you explore each Solution in the pages ahead, I hope you'll find inspiration in the commitment and ingenuity of this community of practitioners. Their work reminds us that it is more important than we continue to strive to ensure that conservation is a shared endeavour, enriched by partnerships across sectors and borders. The Tech4Nature Award is a testament to what's possible when we align innovation with impact, and I look forward to seeing how these efforts and the community continue to grow and rise to the challenge to drive conservation action at scale.

James McBreen
Tech4Nature Manager
Senior Programme Manager,
Technology and Innovation
IUCN

PANORAMA - Solutions for a Healthy Planet

PANORAMA – Solutions for a Healthy Planet is a global partnership initiative to facilitate learning from success in conservation. It promotes examples of inspiring Solutions that showcase how nature conservation can benefit society. Through a modular case study format, Solutions are being dissected into their replicable "building blocks" and their broader application is supported through cross-sectoral learning and exchange, relying on online as well as offline mechanisms.

PANORAMA allows practitioners to share and reflect on their experiences, increase recognition for successful work, and to learn with their peers how similar challenges have been addressed around the globe.

IUCN co-leads PANORAMA together with a growing number of partner organizations including GIZ, GRID-Arendal, UNDP, ICCROM, ICOMOS, IFOAM - Organics International, OCTO, UNEP and World Bank.

Explore over 1,600 Solutions from around the world, including the ones being introduced in this brochure, through the PANORAMA web platform, and submit your own Solution!
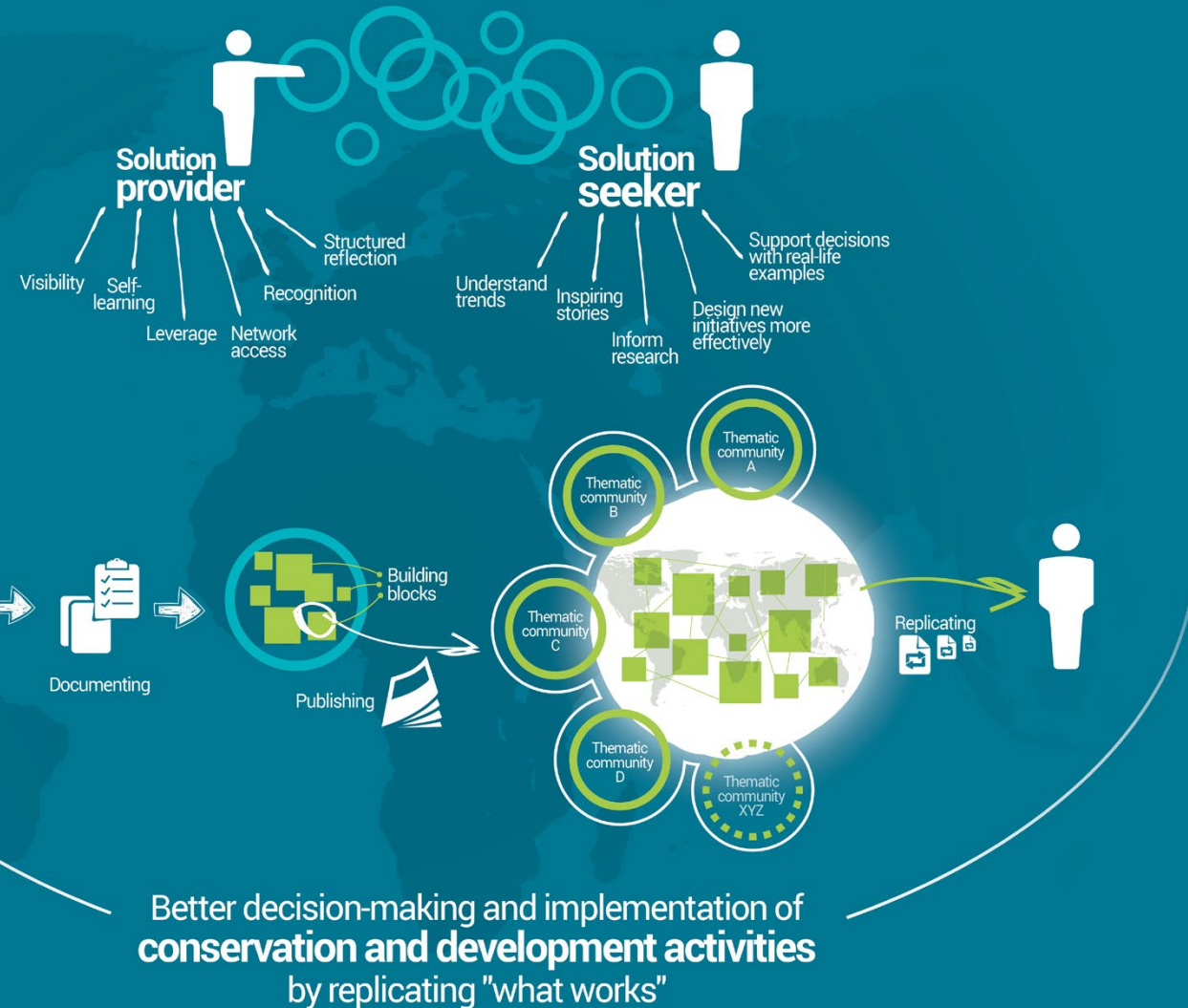
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What if we could learn from each other's success?

PANORAMA
SOLUTIONS FOR A HEALTHY PLANET

Cross-sectoral, global **learning and exchange**

Solution **provider**

Solution **seeker**

Visibility · Self-learning · Leverage · Network access · Recognition · Structured reflection

Understand trends · Inspiring stories · Inform research · Design new initiatives more effectively · Support decisions with real-life examples

Documenting · Publishing · Building blocks · Thematic community A · Thematic community B · Thematic community C · Thematic community D · Thematic community XYZ · Replicating

Better decision-making and implementation of **conservation and development activities** by replicating "what works"
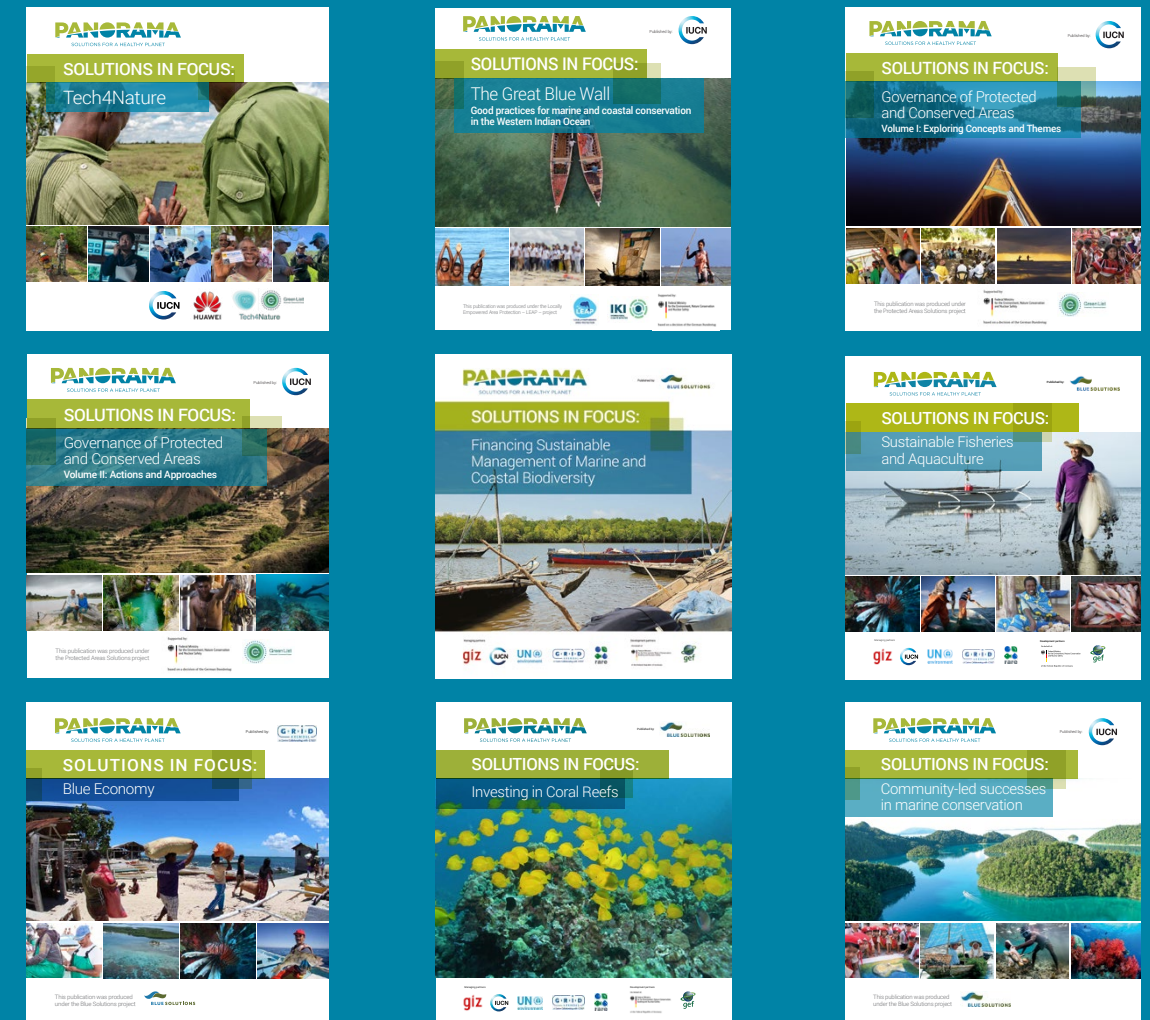
The "Solutions in Focus" series

This booklet is part of a series of compilations assembling PANORAMA solution case studies on a defined topic. "Solutions in Focus" zooms in on a topic of interest covered by PANORAMA, allowing to explore common elements and shared learnings across success stories. It is a snapshot of the PANORAMA portfolio at a given time, rather than a representative assembly of selected "best practices" on the issue at hand.

Further "Solutions in Focus" booklets:

panorama.solutions/en/resources

SOLUTIONS IN FOCUS: Tech4Nature

SOLUTIONS IN FOCUS: The Great Blue Wall — Good practices for marine and coastal conservation in the Western Indian Ocean

SOLUTIONS IN FOCUS: Governance of Protected and Conserved Areas — Volume I: Exploring Concepts and Themes

SOLUTIONS IN FOCUS: Governance of Protected and Conserved Areas — Volume II: Actions and Approaches

SOLUTIONS IN FOCUS: Financing Sustainable Management of Marine and Coastal Biodiversity

SOLUTIONS IN FOCUS: Sustainable Fisheries and Aquaculture

SOLUTIONS IN FOCUS: Blue Economy

SOLUTIONS IN FOCUS: Investing in Coral Reefs

SOLUTIONS IN FOCUS: Community-led successes in marine conservation

What is Tech4Nature?

In a rapidly changing world, the need for effective and inclusive nature conservation has never been greater. Biodiversity loss, climate change and increasing pressures on ecosystems demand not only stronger commitments, but smarter solutions. **Tech4Nature is a global partnership to scale up success in nature conservation through digital technology innovation.**

Created by IUCN and the Huawei TECH4ALL programme, Tech4Nature is designed as an open partnership to apply and promote appropriate technology and digital solutions for fair and effective area-based conservation. The project's second phase builds on the momentum of its early successes in phase 1, focusing on harnessing the power of tech and digital tools to transform conservation practices and outcomes, driving measurable results for nature and people while directly contributing to the Kunming-Montreal Global Biodiversity Framework (KMGBF) Targets.

At its core, Tech4Nature leverages the **IUCN Green List Standard**, a globally recognised benchmark for fair and effective protected and conserved areas (PCAs). By aligning technology with this standard, the partnership ensures that digital tools are deployed responsibly and ethically, providing a structured framework for conservation success. This approach helps sites and stakeholders set clear objectives, demonstrate measurable progress, and build lasting resilience.

Innovative Conservation Leadership

Tech4Nature represents a pioneering collaboration, uniting IUCN's science-based approach with Huawei's technological expertise. The vision is transformative: to demonstrate how cutting-edge digital innovation can scale up success in biodiversity conservation and strengthen global collaboration across the Information and Communication Technology (ICT) and conservation sectors.

Phase 1: Demonstrating What Works

Launched in 2020, Tech4Nature's first phase piloted digital solutions across flagship sites worldwide. Tools such as AI-powered species detection, acoustic sensors, IoT-enabled deterrent systems, and cloud-based data platforms were tested in collaboration with local partners. These initiatives demonstrated that digital technologies can strengthen ecological monitoring, enhance management effectiveness, and foster meaningful community engagement.
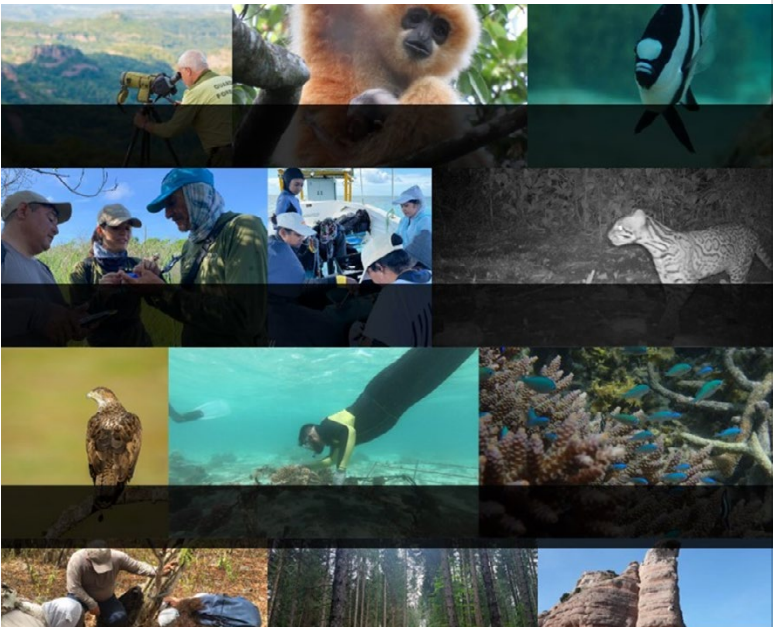
Phase 2: Scaling Up for Greater Impact

Now in its second phase, Tech4Nature is expanding its portfolio and ambition. To date, **11 flagship projects across eight countries** are showcasing how digital tools can address site-specific conservation challenges. The initiative's goals are clear:

- Support improved management effectiveness in at least 300 protected areas globally.
- Secure Green List certification for at least 100 sites.
- Develop a digital benchmarking tool to track progress, improve monitoring, and strengthen stakeholder engagement at multiple levels.

Flagship Projects in Action

The diversity of ecosystems engaged under Tech4Nature demonstrates the flexibility of its approach. Across its flagship sites, projects are applying digital tools to tackle a wide range of conservation challenges. These include monitoring endangered species such as primates, porpoises, raptors, and ungulates; strengthening marine park management through coral reef monitoring and anti-illegal fishing systems; and developing innovative platforms to support decision-making and community capacity-building. Other initiatives are testing solutions for climate resilience, such as tracking water levels and ecosystem dynamics in mangroves, or documenting biodiversity baselines to guide long-term restoration. Together, these projects illustrate how conservation expertise and technological innovation can be combined to improve monitoring, enhance stakeholder participation, and advance the fair and effective management of PCAs.

A Growing Global Partnership

Beyond the flagship sites, Tech4Nature serves as a model for community empowerment and inclusion, ensuring that local voices and rights-holders are engaged in technology-enabled conservation. The partnership promotes transparency and accountability, with clear safeguards to ensure ethical deployment of digital tools. Most importantly, Tech4Nature emphasizes measurable impact, showing how technology can deliver tangible results for species, ecosystems, and communities.

In a world facing biodiversity loss, climate change, and mounting pressures on natural systems, Tech4Nature demonstrates that smarter, more inclusive solutions are essential. By bridging conservation practice with ICT innovation, the partnership is not only advancing global biodiversity goals but also setting new standards for collaboration and accountability in digital conservation.

The Tech4Nature Award

Concept and Objectives

The **Tech4Nature Award** was launched in 2024 as a flagship initiative under the Tech4Nature partnership. It represents a platform to identify, recognise, and scale the most impactful uses of digital technology in conservation. It showcases how appropriate, innovative tools can support species protection, improve area-based conservation, and empower local stewards of biodiversity.

The Award pursues several objectives:

- **Celebrate innovation** – highlight the best technology-enabled conservation practices worldwide.

- **Foster replication and scaling** – inspire others to adopt and adapt successful approaches.

- **Encourage collaboration** – connect conservationists, technologists, donors, and communities.

- **Support sustainability** – provide winners with funding, visibility, and platforms to expand their impact.

The Tech4Nature Award 2025 featured three main categories:

Tech Innovation for Area-based Conservation – advancing digital tools for managing and monitoring ecosystems to meet GBF Target 3.

Species Conservation – applying technology to protect, recover, and monitor threatened species, especially those on the IUCN Red List.

NatureTech Stewards – recognising the role of Indigenous Peoples, local communities, and civil society organisations in leading technology-aided conservation.

PANORAMA as the Platform Behind the Award

The Award is anchored in the PANORAMA – Solutions for a Healthy Planet platform, which serves as the submission and knowledge-sharing hub. All shortlisted entries are published as PANORAMA Solutions, ensuring long-term visibility and access for practitioners worldwide. This process:

- Guarantees consistent quality through PANORAMA's review and "building block" methodology.

- Enables cross-linking with similar solutions across geographies and themes.

- Provides an enduring knowledge base beyond the Award cycle.

Link to the Pathfinder Award

The Tech4Nature Award builds on the momentum of IUCN's involvement in the **Pathfinder Award** — particularly the "Technology for Nature" category introduced in 2021. Lessons learnt from the Pathfinder experience informed the Award's design, especially in integrating technology assessment criteria with conservation impact metrics. Together, the Pathfinder Award and Tech4Nature Award contribute to a global ecosystem of recognition programmes that elevate innovation and collaboration for a sustainable future.

Tech Innovation for Area-based Conservation

advancing digital tools for managing and monitoring ecosystems to meet GBF Target 3.

Winner Solution

Radical Restoration: Democratizing Climate Tech for Ecosystem Recovery

Solution Provider: Jane Glavan, Distant Imagery Solutions

Location: Dubai, United Arab Emirates; projects in Brazil, Tonga, Kenya, and Indonesia (global expansion)

Technology in Action: Degraded mangrove ecosystems face biodiversity loss, declining carbon storage and rising climate risks. Distant Imagery's solution pairs modular, self-engineered planting drones with a community licensing and training model to deliver affordable, large-scale restoration. Early wooden airframes with fewer than six screws and zip ties made local assembly, repair and replication simple; current prototypes add hybrid-electric and hydrogen fuel-cell options to boost endurance and lower footprints. Drones conduct precision sowing—up to 2,000 seeds in under 10 minutes—while the AI-powered monitoring, reporting and verification system integrates satellite and drone imagery to track survival, vegetation health and illegal activities. Because aviation rules vary by country, projects co-design operations with civil aviation and environmental authorities so local teams can secure permits and fly legally. The platform lets communities build, operate and own the technology and revenue, turning restoration into a scalable, climate-resilient livelihood model.

Organisations involved: Environment Agency–Abu Dhabi; Engie; ADNOC; Mubadala Energy; GRID-Arendal

GBF Targets: 2, 8, 20, 22

Impacts
Distant Imagery Solutions contributes to GBF Targets 2, 8, 9, 10, 19, and 21 through scalable drone restoration, AI monitoring, and community empowerment. We have planted over 9 million mangroves to date, including 5.5 million in 2024, with a survival rate of over 98 percent. This supports habitat recovery, carbon storage, and biodiversity protection. Our AI system tracks vegetation health and species data, ensuring adaptive and measurable outcomes. We address Target 8 by reducing climate risks through coastal restoration, and Target 21 by training communities to build, operate, and maintain drone systems. Our licensing model enables knowledge sharing and local ownership. In Brazil, Tonga, Kenya, and Indonesia, women and Indigenous groups are leading restoration using our tools.
Our drones operate at one-fifth of the cost of alternatives, meeting Target 10 by making sustainable land management accessible. We also support Target 19 by enabling access to carbon markets, linking restoration with income. Our work adds value by solving key cost and monitoring gaps in global restoration efforts, combining innovation with community-driven impact.

SUCCESS FACTORS:

1. **Modular Drone Technology**

2. **Licensing and Training Platform**

3. **AI-Powered Monitoring, Reporting, and Verification (MRV) System**

4. **Cost-Effective Restoration Processes**

Story:

Cory and I founded Distant Imagery Solutions because we couldn't stand by and watch ecosystems and communities suffer from the lack of accessible restoration solutions. Cory's practical experience in helicopter engineering and my years working with conservation data showed us how technology could bridge the gap. But the real turning point came when communities started reaching out, asking for tools that could help them restore their ecosystems on their terms.

In Kenya, a coastal village approached us after seeing the success of our drones elsewhere. They wanted to save their mangroves and access carbon markets to secure their future livelihoods. We're now designing a project tailored to their specific needs, ensuring the tools are easy to maintain and use locally. In Brazil, Indigenous leaders contacted us to restore traditional plant habitats while safeguarding biodiversity. In Tonga, communities wanted to map flood-prone areas to plan agriculture alongside restoration, while in Indonesia, villages sought help to protect mangroves critical to withstanding rising seas.

These communities are shaping the projects with us. They know the challenges, and we're here to provide the tools, training, and support to make restoration scalable, empowering them to lead the change they envision. Their determination is why we do what we do—and why we believe this model can truly make a difference.

Ready to Scale — Built to Replicate:

Our modular drones and AI tools are adaptable to diverse terrains and ecosystems. Paired with community training and licensing, this solution can scale globally, empowering local communities to restore ecosystems, foster biodiversity, and combat climate change across regions.

Leveraging Remote Sensing for Ecological Management and Conservation at Jiangsu Yancheng Wetland & Rare Birds National Natural Reserve

Solution Provider: Zhaoyuan Yu, Nanjing Normal University

Location: Yancheng, Jiangsu, People's Republic of China

Technology in Action: The Jiangsu Yancheng Wetlands are a globally significant reserve, home to endangered species such as the Red-crowned Crane. Yet, the spread of the invasive plant Spartina alterniflora threatens native vegetation, disrupts ecological balance, and reduces biodiversity.
To address this, an integrated technological framework was developed combining satellite remote sensing, GIS analysis, digital twin ecosystem modeling, and deep learning. Over three decades of time-series satellite data enable accurate classification of vegetation changes, tracking both invasive expansion and native recovery. GIS tools map distribution patterns, fragmentation, and migration trends, providing spatial insights for conservation planning. A digital twin of the wetland integrates ecological, climatic, and human variables, simulating scenarios such as sea-level rise or salinity change. A user-friendly dashboard translates complex analyses into accessible formats for managers, scientists, and local communities, ensuring inclusive, data-driven decisions that strengthen monitoring and guide long-term protection of this unique wetland ecosystem.

Other Organisations involved: Suzhou University of Science and Technology

GBF Targets: 2, 6, 8, 20, 21

"For the first time, it is possible to monitor how environmental factors, human activities, and interspecies competition are driving ecological changes across the reserve."

Impacts
Improved Monitoring Efficiency: The remote sensing technology developed in this project enables long-term, cost-effective monitoring of wetland vegetation evolution. This enhancement has significantly expanded the time scale for monitoring, allowing for a more comprehensive understanding of wetland dynamics and effectively elevating the standard of conservation monitoring in the reserve.
Contribution to the Study of Invasive Alien Species: The project has advanced our understanding of the invasion process of Spartina alterniflora and other invasive species, highlighting the influence of environmental factors, human activities, and interspecific competition. This data helps researchers better predict and manage the spread of invasive species, ensuring timely and more effective interventions.
Support for Biodiversity Conservation: By revealing the evolutionary patterns of invasive species, the technology lays the groundwork for the prevention and control of these threats in the reserve. This directly benefits the Grus japonensis and other native species by protecting critical wetland habitats, contributing to long-term biodiversity conservation efforts.
Raising Awareness of Conservation: The project fosters knowledge exchange on the use of remote sensing in wetland conservation, offering valuable insights into wetland management and vegetation monitoring.

SUCCESS FACTORS:

1. **Data collection**

2. **Wetland Vegetation Type Identification**

3. **Data Quantification and Database Establishment**

4. **Spatial and Temporal Characteristics Analysis of Wetland Vegetation**

5. **Key Drivers of Vegetation Evolution**

6. **Academic Communication**

7. **Training and Capacity Building**

Madagascar Lemur Portal : Bridging technology and biodiversity conservation

Solution Provider: Lova Rakotoarimanana, Fondation pour les Aires Protégées et la Biodiversité de Madagascar (FAPBM)

Location: Madagascar; Antananarivo, Analamanga

Technology in Action: Madagascar Lemur Portal (MLP) tackles habitat loss, hunting, scattered data, and limited capacity by unifying field monitoring and knowledge sharing in a single, inclusive digital platform. A mobile application enables real-time, geotagged observations of lemurs and habitat conditions, functioning offline for remote areas and syncing to a centralized, open database when connectivity is available. A web platform visualizes and analyzes submissions, providing species pages, occurrence maps, and decision-ready dashboards. The interface is designed for varied digital literacy and will support Malagasy, French, and English, empowering park rangers, students, researchers, and local communities. Open-source foundations improve transparency, adaptability, and long-term maintenance by national partners. Together, these tools close data gaps, strengthen collaboration among conservation actors, and enable adaptive, results-based management of protected areas across Madagascar—creating a scalable model that can be replicated for other taxa and ecosystems.

Other Organisations involved: GERP

GBF Targets: 1, 4, 21, 22

"The goal was simple yet ambitious: create a platform where local communities, researchers, and park managers could all contribute to lemur conservation."

Impacts
Environmental: Mobile app launched in 2024; field agents tested across seven parcels; 2,080 lemur observations recorded (pending validation), supporting habitat protection, species monitoring, and evidence-based planning.
Social: 190+ stakeholders (park managers, patrols, students, communities) trained; educational tools increased awareness and fostered ownership and citizen science participation.
Economic: Supports sustainable development via ecotourism and conservation visibility; cost-effective monitoring model for Madagascar's protected areas.

SUCCESS FACTORS:

1. **Robust scientific database**

2. **Mobile application and online platform**

3. **Data and knowledge sharing**

Empowering Conservation with AI-Powered Monitoring and Early Warning Systems

Solution Provider:	Dipu Varghese, NoArk Technologies
Location:	Idukki, Kerala, India
Technology in Action:	WildGuard AI, developed by NoArk Technologies, is a monitoring and early warning system that combines artificial intelligence at the edge of devices and the Industrial Internet of Things. It uses bioacoustic sensors to detect species-specific calls such as elephants and hornbills, alongside temperature, gas, and humidity sensors to identify wildfires, climate anomalies, and human-wildlife conflict in real time. Data are processed directly on the device with artificial intelligence models, which enables immediate alerts while reducing dependence on internet connectivity. Information is transmitted through long-range wide-area networks and mobile networks, ensuring coverage in remote areas. All processed data feed into the Protected Area Management and Security System, a web-based dashboard that provides real-time alerts, predictive analytics, and spatial visualization for forest departments, farmers, and disaster management teams. Piloted in India's Western Ghats, the system has reduced crop losses, fire spread, and wildlife threats, while offering a scalable, cost-efficient, and community-driven model for conservation.

Other Organisations involved: TBI NIT Calicut; Kerala Startup Mission (KSUM); iHub IIT Mandi

GBF Targets: 4, 6, 8, 20

"NOARKTECH wasn't born to merely build new gadgets—it was created to design purposeful systems that protect both ecosystems and the communities that depend on them."

Impacts
Environmental: More than 300,000 data points collected; early detection of wildfires, illegal logging, poaching, and land degradation; monitoring of air and water quality supports healthier ecosystems.
Social: Human-wildlife conflict reduced through early warnings; Indigenous Peoples and local communities engaged in monitoring; localized climate data improves health preparedness and resilience.
Economic: Low-cost, scalable design; hyperlocal climate data improves productivity and income stability; early warnings help avoid disaster-related losses.

SUCCESS FACTORS:

1. **WildGuard AI Sensor Ecosystem (Bio-Acoustic + Chemical + Climate Sensing)**

2. **Edge Artificial Intelligence + Long-Range Wide-Area Network Infrastructure**

3. **Protected Area Management and Security System Dashboard + Community Co-Design**

Himalayan wolf conservation. Human-carnivore conflict mitigation to support traditional Tibetan mountain communities face global warming

Solution Provider: Geraldine Werhahn, Himalayan Wolves Project

Location: Limi Valley, Humla, Karnali Province, Nepal

Technology in Action: The Himalayan wolf (Canis lupus chanco) lives in fragile high-altitude ecosystems under pressure from climate change and human conflict. Traditional monitoring methods and limited resources hinder conservation efforts. This solution integrates scientific research with local knowledge to foster coexistence. Community Conservation Groups (CCG) receive training and equipment such as camera traps, GPS devices, and binoculars to monitor wolves and herbivores. Artificial intelligence tools like Traptagger support species and individual identification from extensive camera trap data. Predator-proof corrals, co-funded and maintained by communities, and fox lights reduce livestock depredation. Conservation workshops and mini-libraries build awareness among herders, women, and schoolchildren, strengthening cultural stewardship of biodiversity. By combining technology with participatory approaches, the project provides robust ecological data, mitigates conflict, and enhances resilience for both wolves and local Tibetan communities, offering a scalable model across the Himalayas.

Other Organisations involved: Himalayan Wolves Project

GBF Targets: 4, 8, 9, 20

"There hasn't been any trouble with wolves or snow leopards since we started using the fox lights - we now enjoy peaceful nights without having to make noise to scare predators."

Impacts
61 camera traps generated 190,000+ images, documenting wolf occupancy patterns and overlap with herders.
Conflict Mitigation: Predator-proof corrals and fox lights strongly supported local herders in depredation conflict mitigation, and we have received very positive feedback. However, these mitigations need to be continued for a longer period in order to detect changes in depredation trends.
Behavioral Insights: Camera traps documented wolves and herders with their livestock using overlapping areas. This data informed how wolves and herders coexist using the same geographic patches.
Community Involvement: Community Conservation Groups now include 11 village members, who co-manage collective infrastructure maintenance, preventing attacks on vulnerable livestock by carnivores.

SUCCESS FACTORS:

1. **Technology deployment and field monitoring**
2. **Capacity building through Community Conservation Groups (CCG)**
3. **Livestock protection infrastructure building**

"Smart Wetland" - Where Traditional Management Meets Innovation & Technology

Solution Provider: Xianji Wen, World Wide Fund for Nature Hong Kong

Location: Hong Kong (Mai Po Nature Reserve, Inner Deep Bay)

Technology in Action: Mai Po Nature Reserve faces climate-driven extremes, sensitive waterbird habitats, limited power/connectivity, and labour shortages. WWF Hong Kong piloted an Internet of Things approach: 30 water-level sensors, water-quality probes and GPS buffalo collars transmit via Long Range Wide Area Network (LoRaWAN) to Government-Wide IoT Network gateways provided by the Electrical and Mechanical Services Department; one mudflat gateway runs on solar power. A cloud-based Central Management System aggregates near-real-time data for managers on desktop and mobile, with configurable alerts (e.g., high water, abnormal pH, buffalo out-of-geofence). The system supports adaptive hydrology and vegetation management, targeted patrols, and rapid anomaly response while reducing manual monitoring effort. Designed for resilience, data are backed up and can be viewed in the field; transmission intervals are adjustable to balance sampling needs and battery life. This proof-of-concept has strengthened operations at Mai Po and provides a replicable model for wetland conservation parks and flyway sites.

Other Organisations involved: Electrical and Mechanical Services Department (EMSD) – Government-Wide IoT Network; Countryside Conservation Office of the Hong Kong SAR Government – Countryside Conservation Funding Scheme (donor)

GBF Targets: 1, 2, 3, 9

"Through the integration of IoT, countryside resources can be more effectively monitored and conserved while fostering a management model for wetland conservation."

Impacts
First IoT-based wetland monitoring in Hong Kong (MPNR); improves habitat, hydrology, and vegetation management.
24/7 water level/quality data supports trend analysis and long-term conservation (especially wetland birds).
Real-time anomaly detection enables prompt response and mitigation.
Shifts resources from manual data collection/patrols to targeted threat management.
Builds innovation and management capacity through stakeholder collaboration.
Raises public awareness of Ramsar Site value from an I&T perspective; showcases cooperation.
Replicable "living case" for future Wetland Conservation Parks (Northern Metropolis), aligned with Smart City Blueprint 2.0.

SUCCESS FACTORS:

1. **Foundation – Consultation with stakeholders, identify and prioritize suitable device, platform and network to be applied at MPNR for efficient wetland monitoring**

2. **Deployment – Partnership with local Government Department – Electrical and Mechanical Services Department (EMSD) for the utilization of Government-Wide IoT Network (GWIN)**

3. **Dissemination – To promote the application of IoT technology on wetland management**

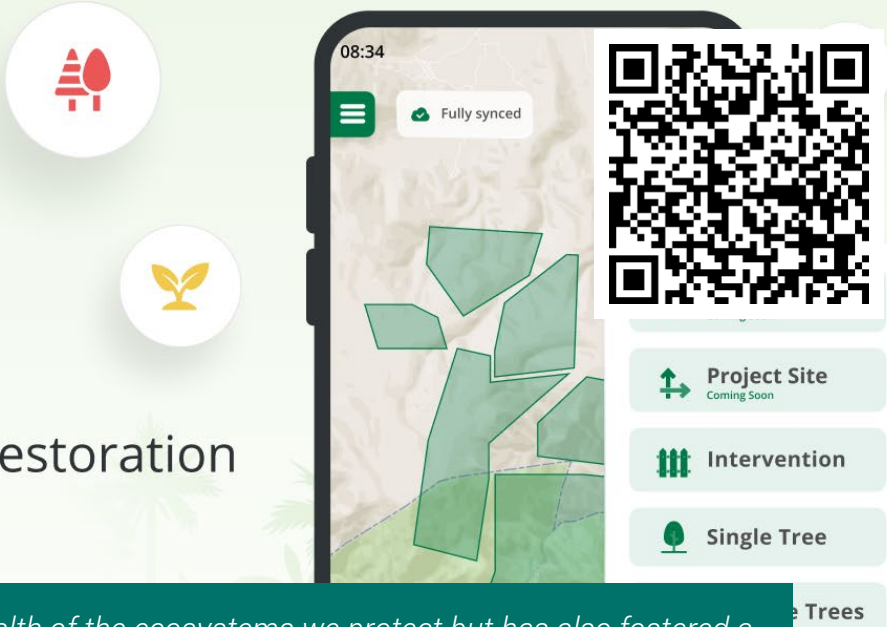# Forest Cloud: A Digital Hub for Global Restoration and Conservation

Solution Provider: Maximilian Schmid, Plant-for-the-Planet Foundation

Location: Yucatán (Mexico); Bamboi, Savannah (Ghana); Spain; Prague (Czech Republic); São Paulo (Brazil); Vicenza (Italy); Sursee, Lucerne (Switzerland); West & Central Africa; Caribbean; Central America; South America; Eastern Europe

Technology in Action: Many restoration initiatives struggle to stay aligned with science and secure sustained finance. Forest Cloud addresses this by uniting donors, restoration organizations and researchers on an open-source Restoration Platform. Projects are vetted against science-based standards and supported by free advisory services. On the ground, the TreeMapper mobile app records geotagged species and plot data (using the Global Positioning System) with offline functionality; data flows into public project pages and the DataExplorer dashboard for analysis. Satellite remote sensing layers verify progress, while the FireAlert tool delivers real-time fire-risk notifications to enable rapid response. Together, transparent fundraising, rigorous due diligence, and end-to-end monitoring improve design, implementation and impact at scale—helping credible projects attract funding and continuously improve.

Organisations involved: Plant-for-the-Planet Foundation (lead); Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH; Salesforce

GBF Targets: 1, 2, 4, 6, 8, 19, 20, 21

TreeMapper

track & monitor forest restoration

treemapper.app

"This has not only enhanced the health of the ecosystems we protect but has also fostered a sense of security and pride among the community."

Impacts
ForestCloud contributes directly to multiple GBF targets by providing a digital infrastructure that enables restoration, monitoring, fundraising, and knowledge-sharing at scale. It empowers over 75,000 users and supports nearly 300 projects across 64 countries, primarily in biodiversity-rich developing regions like Brazil, Colombia, Kenya, and Indonesia. The FireAlert tool monitors 2,984 sites covering 700 million hectares, enabling early wildfire detection and prevention. To date, the platform has facilitated the financing of over 94 million trees, while 56 projects have received in-depth restoration advice. Restoration is guided by science-based standards aligned with SER, IUCN, UN, and FAO, helping address Target 4. Through TreeMapper, users access a vetted native species database, minimizing the use of invasive species and advancing Target 6. The tool is also a key mechanism for Target 19 and channels donations transparently towards biodiversity conservation, where over 75% of funds directly benefit local men and women equally through employment and participatory restoration. Our open-source tools—FireAlert, TreeMapper, SeedManager—support **Targets 20 and 21**, enabling technical cooperation and transparency across all stakeholders.

SUCCESS FACTORS:

1. **Forest ecosystem restoration and conservation platform**

2. **Organization due diligence and project verification**

3. **Improved monitoring and reporting efforts for restoration**

4. **Strengthening community engagement and expert knowledge**

Species Conservation

applying technology to protect, recover, and monitor threatened species, especially those on the IUCN Red List

Winner Solution

Protecting endangered Olive Ridley Turtles and guiding fishers along Odisha Coast, India through Mobile technology

Solution Provider: Velvizhi Singaravelu, M.S. Swaminathan Research Foundation (MSSRF)

Location: Odisha, India (national roll-out across India's coastal states)

Technology in Action: The Fisher Friend Mobile Application (FFMA) helps small-scale fishers operate safely and sustainably while protecting endangered Olive Ridley Turtles. The app delivers real-time ocean information (wave height, wind, sea surface temperature) sourced from the Indian National Centre for Ocean Information Services (INCOIS), plus potential fishing zones, weather alerts, and navigation via Global Positioning System (GPS). A key feature is an offline "No Fishing Zone" alert that uses geo-fencing to mark critical turtle habitats (e.g., Gahirmatha Sanctuary and river mouths) and triggers audio and vibration warnings within 200 meters—preventing accidental intrusions and fines. Built through 56 user-driven iterations in nine regional languages, FFMA now serves over 122,000 users across 66 coastal districts. The latest version adds "ghost gear" location marking to reduce entanglement risks, aligning fisher safety and livelihoods with biodiversity conservation.
Other Organisations involved: Qualcomm Wireless Reach; Indian National Centre for Ocean Information Services (INCOIS); Departments of Fisheries; Indian Coast Guard; fisher associations and local NGOs.

GBF Targets: 4

M S Swaminathan Research Foundation
Center for Research on Sustainable Agriculture and Rural Development

Impacts
FFMA has brought tangible environmental, social, and economic benefits to Odisha's coastal communities; supporting conservation and sustainable livelihoods.
Environmental Impacts: FFMA's geofencing technology protects endangered Olive Ridley Turtles along Odisha's coast, notably around Gahirmatha Marine Wildlife Sanctuary and river mouths. The No Fishing Zone alert was triggered 6,866 times across six districts—Ganjam (3,502), Kendrapara (1,241), Jagatsinghpur (90), Puri (992), Balasore (14), and Bhadrak (1,027) as of November 2024, significantly reducing unintentional fishing in critical nesting sites and aiding turtle conservation.
Social Impacts: FFMA's technology empowers Odisha's fishers by providing accurate, real-time alerts on restricted zones, fostering compliance with conservation laws and building trust between fishers and authorities. Fishers report increased awareness of marine protection zones, which has reduced accidental violations and promoted safer, community-friendly fishing practices.
Economic Impacts: FFMA helps fishers avoid costly penalties, loss of fishing gear, and potential income disruptions by guiding them away from no-fishing zones. Additionally, features like weather forecasts, disaster alerts, and navigation support have improved safety at sea, helping fishers reduce operational risks, save on fuel, and make more informed decisions.

BUILDING BLOCKS:

1. **A multi-stakeholder partnership facilitate the successful journey of FFMA**

2. **Multi-pronged capacity building efforts**

"Saving Turtles, Sustaining Livelihoods: FFMA's Transformation in Odisha"

Fishing communities along Odisha's coastline have long faced a delicate challenge: protecting the endangered Olive Ridley Turtles while sustaining their livelihoods. Every year, these turtles migrate for mass nesting along Odisha's shores, prompting the government to establish no-fishing zones near key river mouths and marine sanctuaries. However, without tools to identify these zones, fishers often unknowingly entered restricted areas, resulting in fines, boat seizures, and ecological damage. This dual struggle of protecting biodiversity and ensuring fishers' livelihoods called for an innovative solution.

The Fisher Friend Mobile Application (FFMA) answered this need, transforming fishing practices in Odisha. The app's "No Fishing Zone" alert system uses geofencing to notify fishers when they approach restricted areas. Its loud alarms, vibrations, and flashing notifications make it impossible to miss the boundaries, even amid the noise of the sea. Beyond conservation, FFMA makes fishing smarter, safer, and more profitable, driving a wave of transformation in coastal communities.

For fishers like Bipra Charan Behera, a 28-year-old from Purunabandha village, FFMA has been life-changing. For years, Bipra struggled during the turtle nesting season, unintentionally crossing boundaries despite efforts to avoid them. "We tried to follow instructions, but estimating boundaries by eye wasn't accurate," he recalls. These mistakes often led to penalties, adding financial strain to his family.

Two years ago, Bipra learned about FFMA during a government meeting. After downloading the app, he discovered its no-fishing alert feature, which became a game-changer. "The alarm warns me whenever I'm near a restricted area. It keeps me on the right side of the boundaries, avoiding penalties and protecting the turtles," he explains.

FFMA's benefits didn't stop there. Its GPS navigation ensures Bipra returns safely, even at night, while potential fishing zone maps help him locate productive areas, boosting his catch and income. Weather forecasts allow him to avoid risky trips, reducing costs and ensuring his family's security.

In just nine months, FFMA's alerts have been triggered over 6,811 times, preventing countless violations and safeguarding vital nesting habitats. For fishers like Bipra, FFMA isn't just an app—it's a lifeline, bridging the gap between conservation and livelihoods while setting an inspiring model for communities worldwide.

Ready to Scale — Built to Replicate:

The FFMA is highly scalable and can be replicated in other coastal regions or ecosystems with similar conservation needs. The app's core functionality—real-time navigation, risk alerts, and conservation zone management—can be adapted to protect diverse marine species and habitats and to address regional challenges.

Its scalability lies in its modular design, which allows customization of features such as geofencing for specific conservation zones, support for vernacular languages, and integration with local regulations. The successful implementation of FFMA for Olive Ridley Turtles in Odisha could be replicated for other endangered species and habitats in coastal areas, such as dugongs or coral reefs. Moreover, FFMA's technology can be expanded to include new regions or countries by collaborating with relevant government and conservation bodies where local marine ecosystems need protection.

This adaptability ensures that the FFMA solution can contribute to biodiversity conservation and sustainable fisheries management in a wide variety of contexts beyond Odisha.

PANORAMA
SOLUTIONS FOR A HEALTHY PLANET

PANORAMA
SOLUTIONS FOR A HEALTHY PLANET

Women's leadership in jaguar conservation

Solution Provider: Letícia Benavalli, Pró-Onça Institute

Location: Cocalzinho de Goiás; Brasília; Pirenópolis; Corumbá de Goiás; Padre Bernardo — Brazil

Technology in Action: The project addresses drought, rising temperatures, land degradation, biodiversity loss, and human–jaguar conflict by combining community leadership with technology. Across 70,000 hectares, teams deploy drones for rapid aerial assessments, satellite data to detect environmental change, camera traps to capture jaguar movements and livestock interactions, and geospatial analysis to map corridors and guide restoration. Data flow via mobile/satellite networks into a cloud platform for real-time analysis by conservation teams, local committees, and park authorities, informing coexistence strategies with ranchers. Training centers rural women as conservation leaders and technicians, building local capacity and equity. Responsible e-waste practices route damaged batteries and devices to certified recyclers, ensuring environmental integrity alongside durable conservation outcomes.

Other Organisations involved: Other contributors: Luma Astun Lopes (Pró-Onça Institute); Larissa Corino (Cultural Club of Cocalzinho de Goiás); Fabio Soares (Brasília é o Bicho).

Donors/Funding: Panthera; BirdLife International; Fauna & Flora; Born Free Foundation; Oklahoma City Zoo (OKC); Alongside Wildlife Foundation; Neotropical Bird Club; The Explorers Club; Conservation Leadership Programme; Taronga Conservation Society; IDEA WILD.

GBF Targets: 4, 20, 22, 23

"She stands as a testament to the power of individual action, reminding us that when we invest in people and their passion for the environment, we can create ripples of change that extend far beyond individual lives, nurturing both nature and communities for generations to come."

Impacts

Environmentally, the technology we use has enabled local communities to monitor over 70,000 hectares of critical habitat, leading to a 22% increase in wildlife sightings and improved biodiversity indicators. The data collected through the technology informs management while also supporting eco-tourism by identifying key wildlife areas for responsible visitation.

Socially, the initiative has trained over 100 community members in wildlife monitoring and data collection techniques, fostering a sense of ownership and stewardship among participants, including 67 women. This capacity-building effort has led to a 20% increase in community engagement in conservation activities and the establishment of local conservation committees, promoting collaboration and conflict resolution.

Economically, eco-tourism generated from these conservation efforts has provided an additional income stream, increasing household incomes by an average of 18%. Most of these activities are ongoing, suggesting that the impact will grow over time. Revenue from eco-tourism will continue to support local businesses and fund training and restoration projects, creating a self-sustaining cycle that encourages continued community participation in conservation. As these initiatives expand, we anticipate even greater benefits for both local livelihoods and biodiversity conservation.
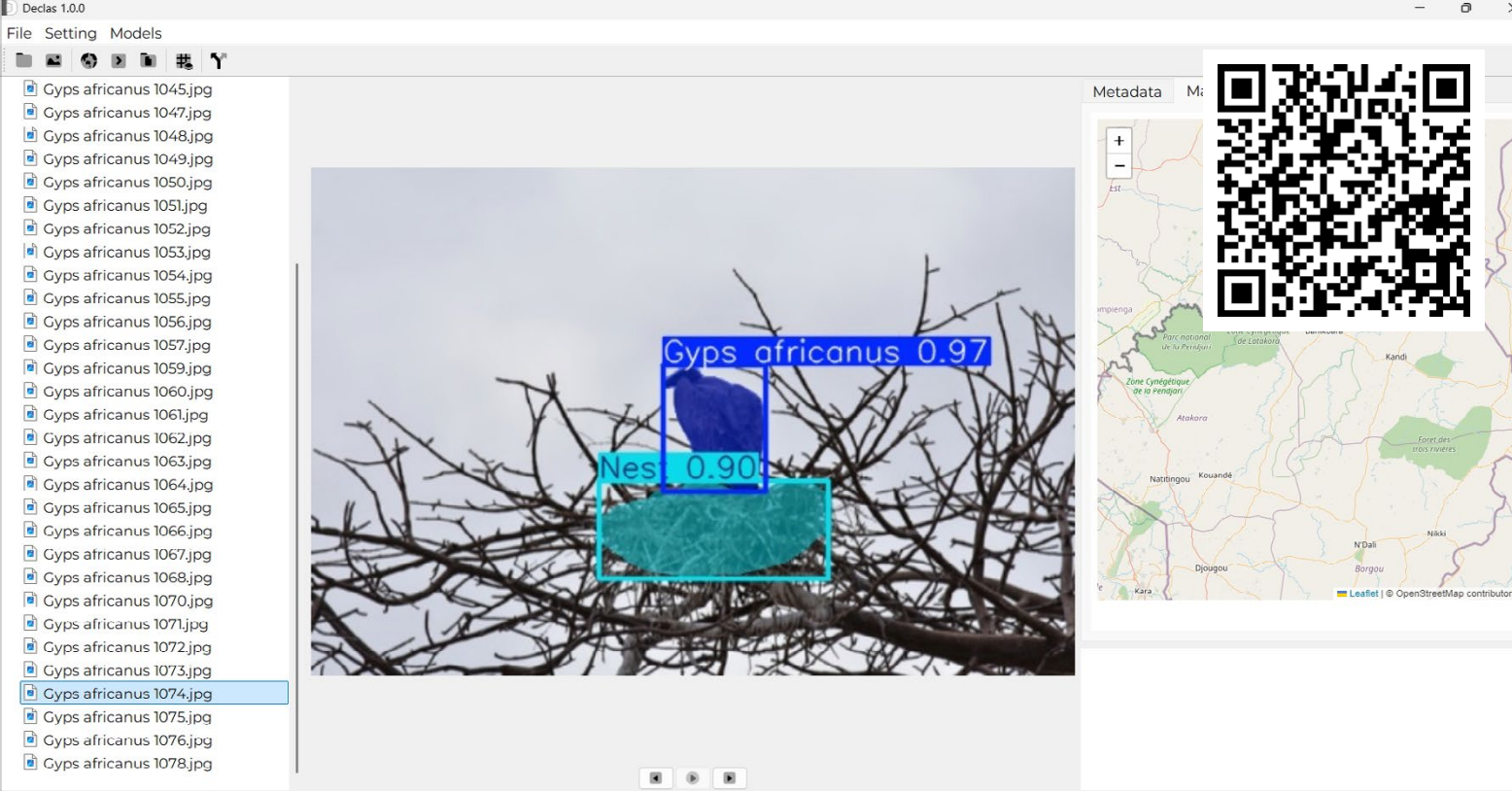
SUCCESS FACTORS:

1. **Community-based conservation training**
2. **Technology-enhanced wildlife monitoring**
3. **Ecotourism development**
4. **Collaborative land management planning**
5. **Gender integration in conservation**

Computer vision for vulture species monitoring across Africa

Solution Provider: Stanislas Mahussi Gandaho, Centre National de Gestion des Réserves de Faune (CENAGREF)

Location: Benin; South Africa; West & Central Africa; North Africa; East & South Africa

Technology in Action: The solution tackles ecosystem loss, limited technical capacity, and weak monitoring by automating vulture identification in visual data. A deep-learning detector — You Only Look Once version 11 (YOLOv11) — is trained on drone and camera-trap imagery to recognize critically endangered species (e.g., white-backed, Cape, Rüppell's, and lappet-faced vultures). The model is packaged in open-source tools (Wildfier and the scalable Declas platform) so rangers and researchers can upload images or videos and receive real-time detections and counts. Field deployments in South Africa and Benin demonstrate robust performance across habitats, while hybrid trainings build local capacity to run analyses, interpret results, and feed insights into conservation planning. The project's open architecture, community engagement, and low-resource footprint enable cost-effective, repeatable monitoring and faster, data-driven action.

Other Organisations involved: African Parks Network; Southern African Wildlife College (SAWC); Endangered Wildlife Trust (EWT); Naben NGO; Phorux; Kandi Forestry Inspectorate (Benin); iNaturalist; GBIF; European Union Commission.

GBF Targets 17, 20

Impacts

Environmental Impacts: The AI-powered model was tested in Sota, Trois Rivières, and the Alibori Supérieur Forest (Benin), and in the Kempiana and Manyeleti reserves (South Africa). Across these sites, it accurately identified *Gyps africanus* in over 89% of analyzed images, confirming their presence in these ecosystems. In Benin, it detected a 15% higher abundance than previous manual surveys, underscoring its effectiveness in providing reliable data for monitoring vulture populations. By identifying peak daily activity patterns, it helped refine conservation strategies, such as ensuring carcass availability during peak feeding times.

Social Impacts: Declas software has already been downloaded multiple times since its release (https://zenodo.org/records/14166440), even before promotion or hybrid training.

Economic Impacts: The tool significantly reduced monitoring costs by 40%, saving resources previously spent on post-field surveys with camera traps. The protection of vultures has indirectly benefited local economies.

SUCCESS FACTORS:

1. **AI-powered vulture species recognition model**

2. **Open-source software for vulture monitoring**

3. **Hybrid training & conservation advocacy**

Shorebirds conservation

Solution Provider: Yifei Jia, Center for EAAF Studies, Beijing Forestry University

Location: Tiaozini Wetland, Dongtai, Yancheng, Jiangsu, China

Technology in Action: Coastal reclamation has reduced foraging areas and safe high-tide roosts, pushing shorebirds into unstable, human-dominated zones. This project restored a 720-acre seaward fish pond via micro-terrain modification, active water-level management, vegetation control, and long-term evaluation. An automatic, camera-based system processes high-definition video to identify, count, and estimate waterbird densities. To detect small, distant targets, the team built an improved deep-learning model based on YOLOv7 (You Only Look Once, version 7) with extra prediction heads, SimAM (Simple Attention Module) for better feature focus, and multi-frame inputs. The result — "YOLOv7 Waterbirds"—trained on a dedicated dataset, achieved higher mean average precision and better recall on small birds, giving managers real-time insights. Together, habitat engineering and AI monitoring enable timely, evidence-based decisions on roost structure and water quality while reducing manual effort and error.

Organisations involved: National Natural Science Foundation of China; Yellow Sea Wetland Project; Shenzhen Mangrove Wetlands Conservation Foundation (MCF)

GBF Targets 2, 3, 4, 21

"I love this land, I love TZN720, I love those massive shorebirds clouded the sky in front of my eyes."

Impacts
Since its establishment in 2020, the Tiaozini 720 High-tide Roost site has supported 56,800 waterbirds and has grown year by year. As of 2024, up to 189,000 waterbirds roosted here, with Nordmann's Greenshank (EN) increasing from 1,150 in 2020 to over 2,000 in 2024, which has consistently been the largest single NG flock in the world, providing crucial data for population estimation. The successful experience gained from the restoration and management of TZN720 has been included in the "Biodiversity 100+ Cases" released at the 15th Conference of the Parties to the Convention on Biological Diversity NGO Forum. It is also a well-known Chinese example of World Natural Heritage protection, frequently reported by major Chinese media and attracting a large public audience. It has been included in the *Collated Guidance for the Restoration and Management of Salt Marshes and Interfacial Flats: an Evidence-based Approach* compiled by the Conservation Evidence group at the University of Cambridge and Wetlands International. Meanwhile, we tested the effectiveness and performance of the waterbird automatic auxiliary monitoring framework at TZN720, and the results showed that our method is superior to many other popular deep learning algorithms. This algorithm can be used by protected area management departments or other organizations, which will contribute to wildlife conservation.
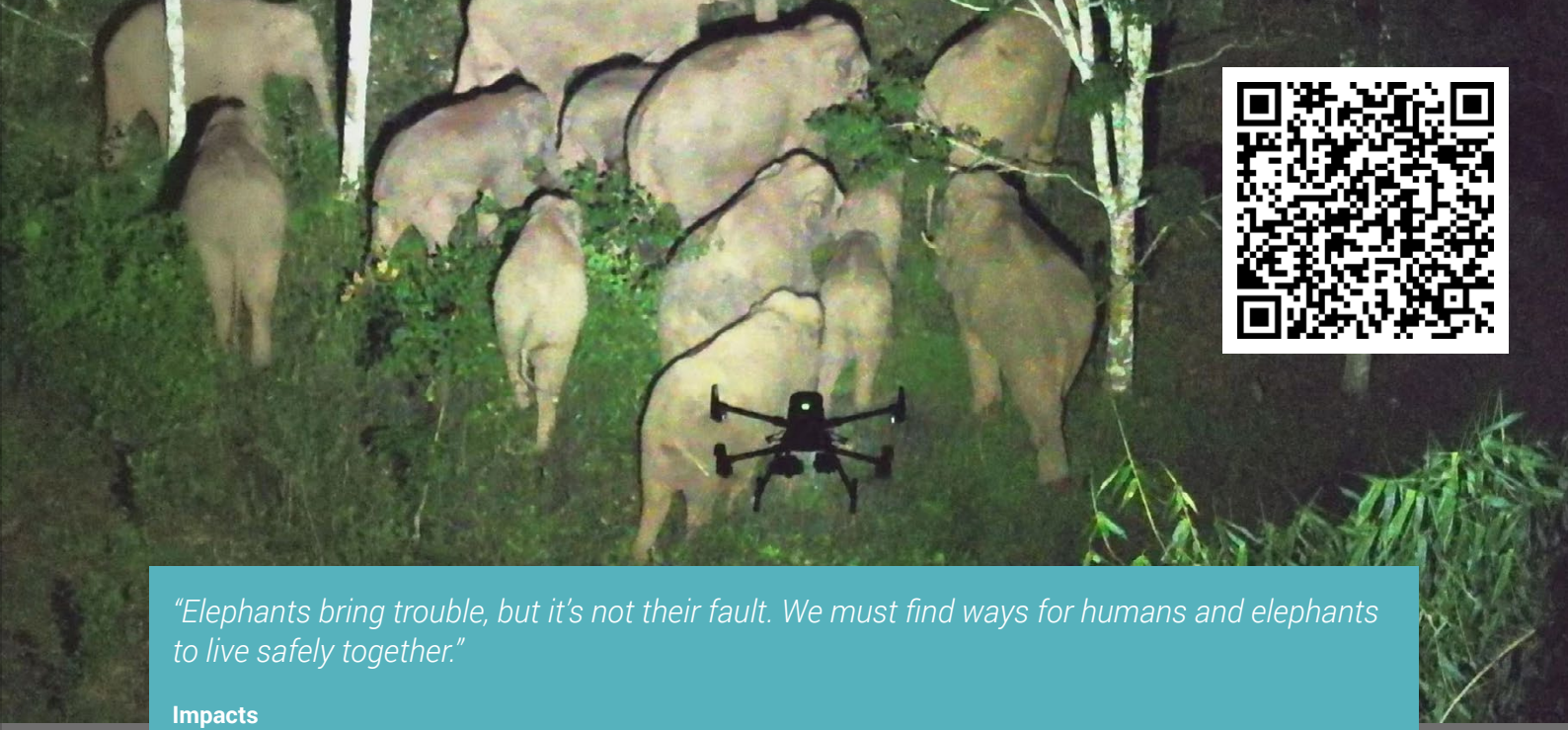
SUCCESS FACTORS:

1. **Create and manage a high quality roost site for shorebirds**

2. **Video surveillance monitoring of waterbird communities**

Tech-Driven Coexistence: Integrating "Sky & Ground" Monitoring and Early Warning to Mitigate Human-Elephant Conflict in Yunnan, China

Solution Provider: Fei Chen, Southwest Survey and Planning Institute of National Forestry and Grassland Administration

Location: Xishuangbanna Dai Autonomous Prefecture, Yunnan, People's Republic of China

Technology in Action: Human–elephant conflict in Yunnan stems from expanding elephant ranges, nocturnal movements, and limited situational awareness. This solution fuses "sky & ground" sensing—thermal/zoom drones plus a network of 600 infrared cameras—into a closed-loop system that detects elephants, applies AI filtering (>99% accuracy for removing non-elephant images), and issues geolocated alerts within ~13–15 seconds via app, SMS, phone calls, and village smart broadcasting. A province-wide operations model ("one herd, one strategy") pairs dedicated drone teams with village monitors to deliver 24/7 coverage and safer fieldwork, including in dense forest and at night. A centralized platform aggregates 3M+ images for management and research, while established maintenance, battery-replacement, and equipment-recycling measures address long-term sustainability. The program trains local youth as full-time monitors, strengthening community capacity and participation and providing a scalable blueprint for other high-risk human–wildlife interfaces.

Organisations involved: China National Forestry and Grassland Administration; Yunnan Forestry and Grassland Bureau; Xishuangbanna National Nature Reserve; Yunnan Zhenghao Monitoring Technology Co.

GBF Targets 1, 4, 20, 21

"Elephants bring trouble, but it's not their fault. We must find ways for humans and elephants to live safely together."

Impacts

This solution delivers strong environmental, social, and scientific impacts through the integration of drone and infrared camera technologies. It supports GBF Targets 1, 4, 20, and 21.

A real-time, wide coverage monitoring system has been built using drones with thermal and high-resolution cameras and 24/7 infrared camera networks. These tools enhance detection in forests and at night.

Over 130,000 alerts have been issued, helping communities avoid danger and greatly reducing human-elephant conflict. The system covers all known elephant areas, protecting both animals and people.

Local youth are trained as full-time monitors, and alerts reach communities via apps, broadcasts, and SMS. This improves local skills and public awareness.

The system has generated valuable data for planning and management. Maintenance and battery replacement systems are in place, and recycling of damaged devices is being explored to reduce environmental impact.

In 2021, the northward migration of a Yunnan elephant herd gained global attention, with over 11 billion views across 190 countries, showcasing China's conservation success and the power of technology-enabled outreach.
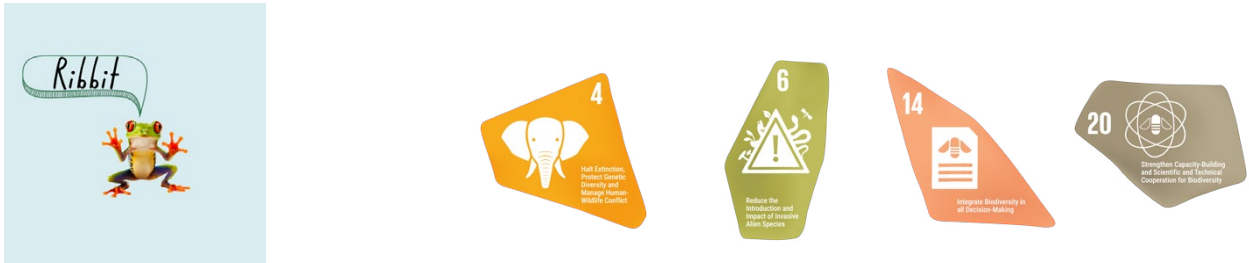
SUCCESS FACTORS:

1. **Monitoring Coordination and Technology Integration**

2. **Drone and Infrared Camera Monitoring System**

3. **Optimization of Big Data and Intelligent Recognition System**

4. **Supporting Monitoring and Early Warning Platform**

5. **Community Awareness and Early Warning Promotion**

Ribbit - a web app for automated identification and classification of anuran species

Solution Provider:	Juliana Gómez Consuegra, Ribbit
Location:	Global
Technology in Action:	Ribbit turns citizen frog/toad recordings into science-ready data. To build it, the team used "few-shot transfer learning": they started with BirdNET, an existing AI that already knows patterns in wildlife sounds (built on EfficientNet-B1, a strong audio/image recognizer). Instead of training from scratch, they "taught" this model frogs using only small numbers of labeled examples from iNaturalist and Anuraset, plus some non-frog sounds to avoid confusion. After this fine-tuning, it recognizes 71 species with ~72% top-1 accuracy (best guess) and ~91% top-5 accuracy (within five suggestions). The open web app lets people record or upload audio and, with consent, share verified observations to the Global Biodiversity Information Facility (GBIF), a public database used by researchers. Multilingual content, privacy-by-design (location obscured), and regular retraining broaden participation and keep accuracy improving—an affordable complement to field surveys.
Organisations involved:	UC Berkeley School of Information; Global Biodiversity Information Facility (GBIF); iNaturalist; Anuraset
GBF Targets	4, 6, 14, 20

Explorar Espécies
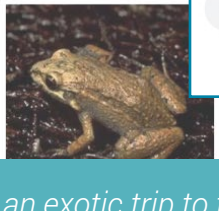
Pesquisar uma espécie

Acris blanchardi   Acris crepitans   Acris gryllus

Adelphobate

Frog of the day

(c) Ioana Mita, some rights reserved (CC BY-NC), uploaded by Ioana Mita
License: cc-by-nc
True Frogs

0:00 / 0:00

Pelophylax bedriagae

"What if we could combine an exotic trip to the rainforest with a contribution to science?"

Impacts
Environmentally, Ribbit was trained on 71 distinct anuran species, creating a comprehensive tool for monitoring endangered amphibian populations. Beta testing successfully recorded and classified 16 distinct anurans, with the model accurately identifying species in the top-5 most likely matches 91% of the time, comparable to other transfer learning solutions for bioacoustics (Ghani et al., 2023). Utilizing a dataset of ~67,000 unique anuran calls, Ribbit enables identification of potential habitat shifts and population changes in understudied regions.
Socially, Ribbit's beta testing engaged 50 participants, creating a new pathway for community-driven scientific research. The platform democratizes data collection, reducing barriers to ecological research participation. 95% of surveyed users were willing to share their recordings with GBIF, contributing to global biodiversity data.
Economically, Ribbit significantly reduces monitoring costs. Traditional biodiversity monitoring for 50 locations would cost approximately $118,413 USD, including equipment, labor, and data analysis. In contrast, Ribbit's monthly operational cost is estimated at $48,543.77, including AWS infrastructure and skilled personnel. This cost-effective approach allows practitioners to focus resources on conservation actions based on collected data.

SUCCESS FACTORS:

1. **Democratization of data**
2. **Citizen science and community engagement**
3. **Mitigate biodiversity loss**
4. **Education tools**

Using drones for non-invasive monitoring and assessment of crocodilian populations - a generalizable and accessible tool for stakeholders in conservation

Solution Provider: Clément Aubert, Nature Conserv'Action

Location: West and Central Africa; North Africa; East and South Africa; Caribbean; Central America; South America; North America; Southeast Asia; South Asia; Oceania

Technology in Action: This standardized, non-invasive monitoring approach uses consumer-grade drones with high-resolution cameras to survey crocodilians efficiently and safely. Optimized flight parameters (e.g., altitude, time of day) maximize detectability while minimizing disturbance. Images are analyzed with a novel allometric framework that estimates total body length from head length, enabling reliable demographic assessments without capture. The method reduces cost, logistics, observer bias, and risk versus traditional surveys, works in remote areas, and creates a permanent photographic record for repeatable monitoring. Easy-to-use size-estimation tables (abaques) are available for 17 of 27 species, making the approach accessible to Indigenous Peoples and Local Communities, protected-area staff, and conservation practitioners with minimal training – supporting broader adoption, better conflict mitigation, and science-based management.

Organisations involved: Centre national de la recherche scientifique (CNRS); Nature Conserv'Action (NCA); IUCN/SSC Crocodile Specialist Group; Fonds de Solidarité et de Développement des Initiatives Étudiantes de l'Université de Montpellier; European Croc Networking Meeting; Projet Mecistops; Foundation Biotope; Groupe Ondulia Énergie Renouvelables

GBF Targets 4, 20

"Today, I am proud to contribute to and promote an inclusive conservation approach that highlights the importance of associating Indigenous peoples and local communities with conservation projects."

Impacts

This first study on the use of drones for crocodilian monitoring has delivered significant results and has been published in two peer-reviewed scientific journals. Optimized flights enabled the detection, precise identification, and measurement of crocodiles. By combining high-resolution imagery with allometric tables, reliable size estimates were generated for 17 of the 27 crocodilian species (within 11–18% accuracy). These data were crucial in assessing the demographic structure of *Crocodylus suchus* populations in W National Park, Niger.

This approach has the advantage that it can be easily implemented by a variety of environmental stakeholders without requiring particularly advanced skills or experience with drones and crocodiles. In addition, it is cheaper to set up than traditional methods. Methods based on the use of drones can detect crocodiles and robustly estimate their total length without capturing them, and should be considered a viable approach by researchers, managers, and all stakeholders such as Indigenous Peoples and local communities. This solution has been specially developed for use by everyone.

The study brought together 22 researchers and crocodile conservationists from over 20 countries. It gathered 7,368 biometric measurements from 17 crocodilian species to create the world's largest database, which will be used for other studies on a variety of themes.

SUCCESS FACTORS:

1. **Standardized Drone Survey Protocols**
2. **Estimating total length of crocodylians from drone-captured images by using a model**
3. **Allometric Framework for Crocodilian Size Estimation**
4. **Empowering Local Stakeholders through Drone Technology**
5. **Evolution of on-board technologies and AI integration**

The Mamba: A Drone-based Robotic Arm to Preserve Endangered Plants in Cliff Environments

Solution Provider: Ben Nyberg, National Tropical Botanical Garden

Location: Kauai, Hawaii, United States; Réunion; Madeira, Portugal; Federated States of Micronesia; East & South Africa; West & South Europe; Oceania

Technology in Action: Steep cliff refugia shelter many critically endangered island plants but make surveys and seed collection dangerous, slow, and costly. The Mamba system pairs a lifting drone with a long-cable, actively stabilized robotic arm to reach vertical faces up to ~8 m from the drone and under overhangs, enabling precise, single-pilot collections in high winds and GPS-denied conditions. Interchangeable end-effectors (clippers, miniature sampler, seed net) take cuttings or seeds without abseiling, speeding transfer to nurseries and seed labs. Built from widely available components and 3D-printed parts, the system is easy to learn and has operated at ranges up to 2.6 km. Together with drone-based surveys and mapping, the tool turns inaccessible "botanical dark spots" into actionable conservation sites — supporting rapid ex situ rescue, boosting genetic diversity in collections, and reducing risk and cost for practitioners.

Organisations involved: Outreach Robotics; Plant Extinction Prevention Program; National Tropical Botanical Garden

GBF Targets 1, 4, 20, 21

"We have located, collected and grown Hibiscadelphus woodii with modern technology, and are hopeful that we have prevented the extinction of this species."

Impacts

In the past seven years of deploying drones for the documentation and conservation of cliff taxa, we have significantly increased the known populations of at least 30 critically endangered plant species. In some cases, we have mapped numerous individual plants, leading to tenfold increases in the known populations of these species. When paired with the newly developed Mamba sampling arm, we have collected 17 critically endangered species to aid in their conservation. In addition, we have described one new species (perhaps the first species described from drone-collected specimens) and documented a range of other botanical anomalies (range extensions, island records, and undescribed species).

So far, conservation staff and the species we work with have greatly benefited from this partnership and technology development. Many species have had their conservation status improved by this system, leading to revisions in species prioritization.
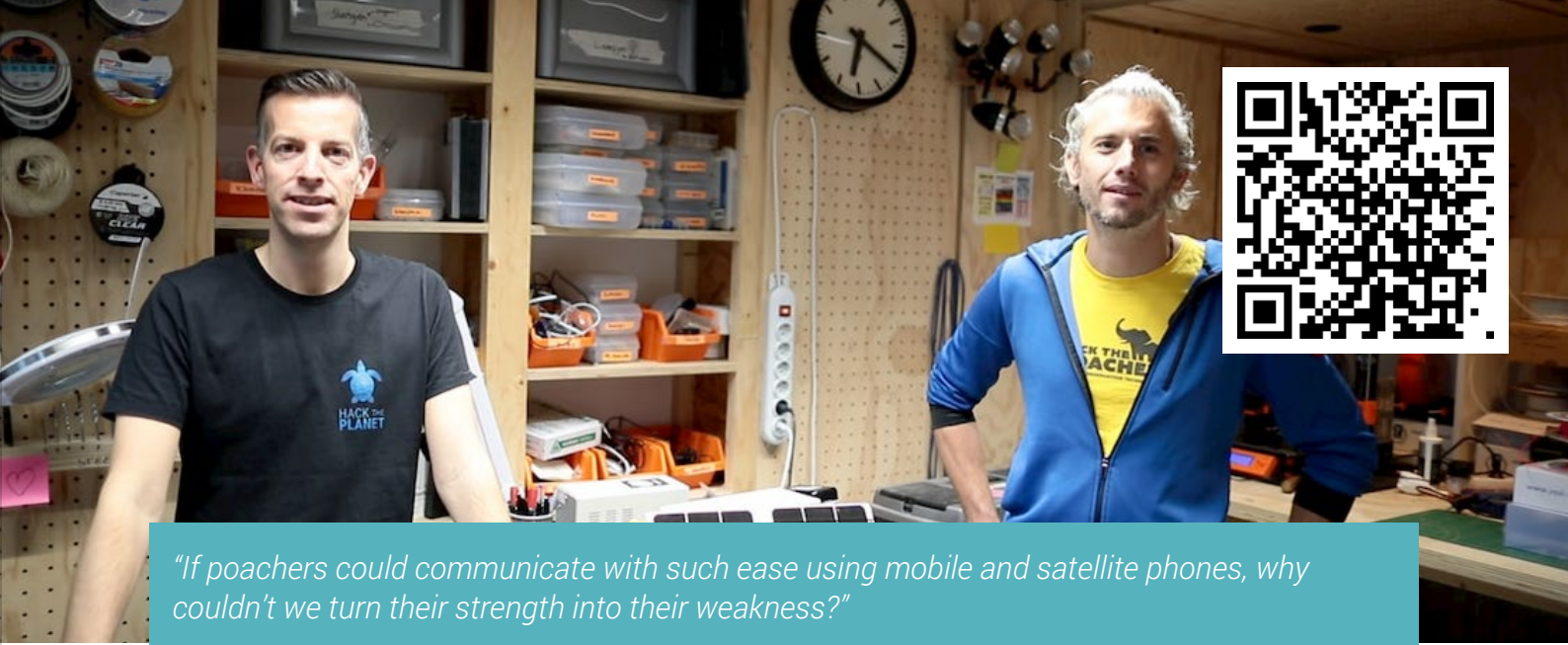
SUCCESS FACTORS:

1. **Drone Survey: location, mapping, and inventory of remote plant populations**

2. **Drone Collection: Using a drone-based robotic arm to collect inaccessible plants**

3. **Plant Propagation: increased efficiency with improved collecting techniques**

ScannerEdge – Version 2

Solution Provider: Stan Russell, Hack The Planet

Location: Gabon; South Luangwa National Park, Zambia (pilot); Africa & Asia (scale-up)

Technology in Action: ScannerEdge counters organized poaching by detecting radio-frequency (RF) signals from mobile and satellite phones, very-high-frequency (VHF) radios, Wi-Fi networks, and Bluetooth devices in remote parks. Rugged, solar-powered sensors scan a three-kilometre radius and send location-stamped alerts using GPS over long-range, low-power networks (LoRaWAN) or satellite links. Alerts flow into EarthRanger park-management software to guide rapid, data-driven patrols. Devices are low-cost, field-ready, configured with a smartphone app, and monitored remotely – reducing blind spots and improving ranger safety. The system addresses limited budgets and vast patrol areas by providing persistent, real-time intelligence, while on-site training builds local capacity. A pilot in South Luangwa, Zambia, confirmed reliable detection of ranger teams and set key performance indicators for accuracy, response time, and reliability. Partnerships with park authorities and conservation tech groups support scale-up to 50+ parks across Africa and Asia.

Organisations involved: SmartParks; African Parks; Game Rangers International; IUCN; WWF (World Wide Fund for Nature); Gonarezhou National Park (Zimbabwe); EarthRanger; local national parks & park technicians.

GBF Targets 1, 4, 20, 21

"If poachers could communicate with such ease using mobile and satellite phones, why couldn't we turn their strength into their weakness?"

Impacts
The ScannerEdge has already demonstrated its effectiveness during our pilot project in Zambia, where it successfully demonstrated its capability to identify human presence in protected areas.
To measure the impact of the ScannerEdge technology, we have implemented several key performance indicators (KPIs) and monitoring strategies:
Detection Accuracy: During our pilot project in South Luangwa (Zambia), the ScannerEdge devices successfully detected the presence of ranger teams, demonstrating the device's accuracy in identifying human activities within its detection radius.
Response Time: We track the time the Quick Reaction Force takes to respond to detected incursions. The aim is to ensure that any potential illegal activities are quickly intercepted, thus preventing harm to wildlife.
Event Logs and Data Analysis: Each detection event is logged and analyzed to identify patterns in illegal activities. This data is crucial for adjusting deployment strategies and improving the overall effectiveness of the technology.
Operational Reliability: The continuous, uninterrupted operation of the ScannerEdge devices in the field, powered by their solar capabilities, demonstrates their reliability and suitability for long-term conservation efforts.
These measures provide concrete evidence of the technology's impact in the field, supporting its potential to significantly enhance conservation efforts.
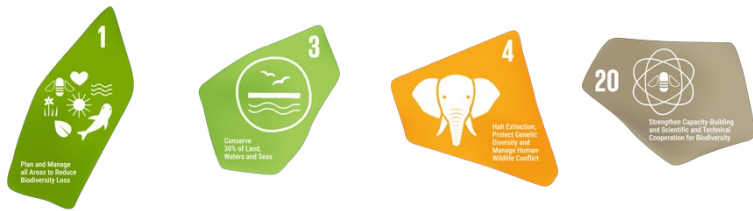
SUCCESS FACTORS:

1. **Technical Installation and Training**

2. **Mobile/Satellite Phone Monitoring**

3. **Quick Response Unit acting on suspicious threats based on real-time data**

4. **Building Cross sectoral Partnerships**

Connected Conservation Foundation

Solution Provider: Sophie Maxwell, Connected Conservation Foundation (CCF)

Location: Kenya; South Africa; Uganda

Technology in Action: Many African parks lack infrastructure. Connected Conservation Foundation deploys long-range, low-power Internet-of-Things (IoT) networks using LoRaWAN (a radio standard that sends small data over many kilometers) plus an easy platform to stream real-time data for protection and operations. Actility's ThingPark network server and EarthRanger (a conservation operations dashboard) let field teams onboard wildlife, ranger, vehicle, and environmental sensors, run diagnostics, and act on early-warning alerts. Since a 2019 pilot at Lewa, 131 radio base stations and 1,000+ sensors span ~10 million hectares in Kenya, South Africa, and Uganda, tracking rhinos, elephants, livestock, rainfall, water, and more. Rugged, mains-powered hardware (7-year lifespan), an e-waste take-back program, and a new Protected Area Technician training build local capacity and sustainability – cutting costs and external IT dependence while strengthening anti-poaching, coexistence, and climate resilience.

Organisations involved: Actility; Cisco; EarthRanger (Allen Institute for AI); Northern Rangelands Trust; Lewa Wildlife Conservancy; Big Life Foundation; Kenya Wildlife Service; Uganda Wildlife Authority; Loisaba Conservancy.

GBF Targets: 1, 3, 4, 20

"Their return doesn't just mark the revival of an iconic species; it completes Loisaba's 'Big Five' and ignites a new wave of eco-tourism, job creation and investment in local communities."

Impacts

Case study: Northern Rangelands Trust (NRT)

Improving peace and security: Data from ranger, vehicle, and wildlife sensors are helping rangers monitor and respond to rhino threats to prevent poaching, share information on vulnerabilities, bolster conservation management strategies, and redeploy security measures between conservancies.

Rhino recovery: Kenya is one of the few places in the world where black rhino populations are increasing. But with this success comes an urgency to establish safe and connected rangelands for these critically endangered species to roam. This project has enabled innovative ways to monitor the rhino population and has helped bring about the removal of fences between conservancies, creating larger, connected habitats for rhinos.

Managing and verifying natural resources: 2022 saw extreme drought in East Africa, sweeping away grasslands, water, local food, and animals. NRT faces huge challenges in managing its natural resources sustainably and pre-empting and reducing human–wildlife conflict. The IoT network supports the plug-in of livestock and environmental sensors to monitor foraging conditions, track livestock movements, and observe water levels that threaten the successful coexistence of wildlife and local people.

SUCCESS FACTORS:

1. **Filtering data types and onward rooting**

2. **Transporting data from the field to the operations room**

3. **Centralising data for management and control**

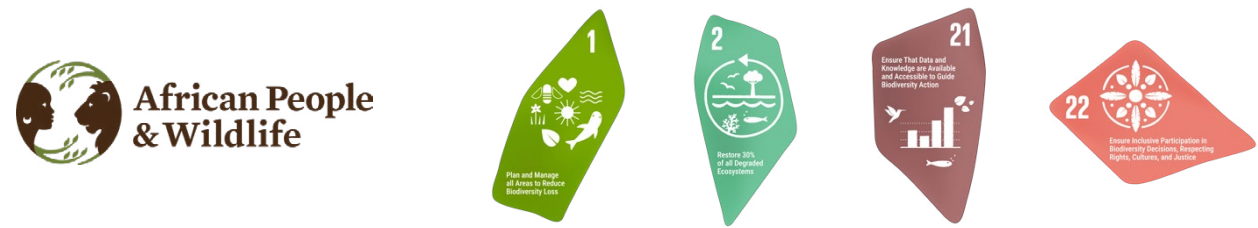4. **Technical support and training**

5. **Community engagement**

NatureTech Stewards

recognising the role of Indigenous Peoples, local communities, and civil society organisations in leading technology-aided conservation

Winner Solution

Empowering Community Action for Resilient Grasslands

Solution Provider: Neovitus Sianga — African People & Wildlife

Location: Tanzania (Northern Tanzania; Subnational)

Technology in Action: African People & Wildlife's (APW) Sustainable Rangelands Initiative blends Indigenous knowledge with Esri-powered mobile data collection to guide community-led grazing decisions. Trained community habitat monitors record monthly pasture metrics (e.g., grass height, bare ground, invasive species) using customized Survey123 forms on smartphones. Data stream to Esri's cloud, where APW's MELA team reviews, runs Arcade scripts to track invasive species trends, and serves real-time insights via ArcGIS Dashboards and culturally relevant visualizations. Conservation Technology Centers with internet, computers, and large displays host discussions so village leaders can plan rotational grazing, restoration, and corridor connectivity. This long-term dataset enables coordinated action across villages, keeping grasslands open for people, livestock, and wildlife while improving resilience to drought and seasonal shifts.

Organisations involved: Esri; WWF Land for Life Project; Trias; The Nature Conservancy (Darwin Biodiversity Challenges funds); Wildlife Conservation Network's Lion Recovery Fund; IUCN–SOS (previously); USAID (previously); local government and wildlife authorities.

GBF Targets: 1, 2, 21, 22

Impacts
African People & Wildlife's Sustainable Rangeland Initiative has supported communities in the management of over 800,000 acres of grassland. Spanning across 50 villages in northern Tanzania, the program has actively restored 20,000 acres of grasslands – uprooting invasive and problematic species and implementing soil erosion prevention. As the program has developed, the village-based model has transitioned to a landscape approach to ensure continuity in management and connectivity for ecological benefits.

Since 2020, APW has conducted harmonization meetings that unite stakeholders from the village level, wards, divisions, districts, regions, different ministries, parastatal institutions, and NGOs to discuss rangeland management and policy agendas. Our approach has been formally recognized by the Ministry of Livestock and Fisheries and will inform future policy – a remarkable accomplishment that ensures the voices of rural pastoralists are included in the natural resource management decisions upon which their lives and livelihoods depend.

APW was honored to receive Esri's prestigious Special Achievement in GIS (SAG) Award for the organization's innovative application of mapping and analytics technology as well as thought leadership in the field of conservation. Subsequently, APW's customization of the Esri suite of applications and back-end coding has been adopted in other landscapes.

SUCCESS FACTORS:

1. **Access & Connect with the Community**

2. **Team & Implement**

3. **Verify**

4. **Evolve**

Story

Maria Eliaz Lenjashi is one of eight volunteer community rangeland monitors in the Engaruka Valley of northern Tanzania — and one of just two women in this role. She is committed to collecting essential data on pasture health and empowering her community to make informed land-use decisions. Equipped with a mobile-based reporting tool, Maria and her fellow monitors collect data, evaluate grazing conditions, and share insights through community networks, bridging local knowledge with sustainable practices.

She joined as a volunteer rangeland monitor out of a desire to protect the communal grazing lands that are so vital to her village's way of life. With training from African People & Wildlife (APW), she rapidly became involved in the local decision-making process, attending site assessments and grazing committee meetings. She sees the importance of technology in helping her community track pasture health, plan for seasonal changes, and measure the program's impact.

Maria notes that the program is making a difference not only for people but also for wildlife. The Engaruka Valley is an essential corridor for migrating species, some of which travel from protected areas like the Ngorongoro Conservation Area and Manyara National Park. By helping to maintain landscape connectivity and pasture quality, Maria hopes to reduce livestock losses in the dry season, improving both community resilience and conservation outcomes.

"As a woman, becoming a rangeland monitor has changed my life. In my community, women traditionally don't have a voice, especially on land issues. But since I began volunteering, I've been invited to participate in forums within my village and beyond. Now, as a woman and a pastoralist, I am part of the decision-making process about our grazing lands. I thank APW for recognizing women's voices and helping us raise them in our communities."

The program addresses an array of challenges at both local and landscape levels, providing communities with a better understanding of rangeland health and an early warning system for issues such as pasture shortages, land-use changes, and invasive species. "This program equips us with the knowledge and tools to adapt and mitigate the impacts of climate change," Maria says proudly.

Ready to Scale — Built to Replicate:

African People & Wildlife's (APW) signature ACTIVE™ community engagement approach was created to be applicable in any ecological and social context and can be used as a framework to deploy technology in service of people and nature in other regions and ecosystems. Esri's ArcGIS Online Platform and Esri mobile applications like Survey123, ArcGIS Earth, ArcGIS Collector, and ArcGIS Field Maps make real-time data collection and analysis easier than ever. One of the benefits of APW's GIS technology stack is the ability to provide access to data and reports anywhere in the world with internet access — reducing barriers to use.

Tecnología con Raíces: Guardianes indígenas guaraníes, salvaguardando el guanaco y sus territorios colectivos

Solution Provider: Lilian Apaza — Fundación Natura Bolivia

Location: Área de Vida Guajukaka, Charagua Iyambae, Santa Cruz, Bolivia (Subnational)

Technology in Action: In the Área de Vida Guajukaka (284,670 ha), ten Guaraní community guardians combine traditional knowledge with modern tools to conserve the Chaco guanaco (Lama guanicoe). Using camera traps and the offline-capable SMART app, guardians record habitat and threat data (e.g., poaching), which feed into a structured monitoring system alongside non-invasive DNA sampling from feces to identify individuals. Fundación Natura Bolivia trains guardians, ensures data quality, and integrates results into local governance, strengthening Indigenous leadership and culturally grounded decision-making. This low-cost, replicable model builds long-term datasets, guides rangeland management, and reinforces Guaraní identity while improving species knowledge and response capacity.

Organisations involved: Fundación Natura Bolivia; Gobierno Autónomo Indígena de Charagua Iyambae (GAIOC); Capitanía Alto Isoso; Community Guardians of Guajukaka. (Donors: Pew; World Land Trust; The Thin Green Line Foundation.)

GBF Targets: 1, 3, 20, 21

"This pilot experience not only improved species conservation but also empowered communities, who now play an active role in caring for their territory."

Impacts

In the Área de Vida Guajukaka, community monitoring increased knowledge of species distribution—identifying five reproductive units of the Chacoan peccary (Parachoerus wagneri) and confirming guanaco groups whose continuity was uncertain. Guardians now serve as the first line of alert to threats such as poaching and habitat degradation, enabling early, effective responses. Socially, ten Guaraní guardians were trained, strengthening cultural identity and technical skills; through this intervention they entered the "bosque mi primer empleo" scheme and gained access to broader territorial governance spaces that integrate traditional knowledge with modern tools. The estimated monthly budget for ten guardians' per diems, remuneration, operations, and logistics is 18,300 BOB (≈USD 2,500).

SUCCESS FACTORS:

1. **Guaraní roots and wisdom**

2. **SMART technology for Monitoring and Surveillance**

3. **Territorial governance**

A Park-Led Conservation Education Model: Ranger Goes to School in Komodo National Park

Solution Provider: Muhammad Ikbal Putera, Komodo National Park

Location: Labuan Bajo, Komodo, West Manggarai Regency, East Nusa Tenggara, Indonesia

Technology in Action: Ranger Goes to School (RGTS) is a park-led, school-based program that reconnects youth with Komodo National Park through experiential learning and accessible tech. Rangers blend classroom and field sessions with plant-ID apps (PictureThis), creative tools (Canva), and interactive quizzes (Kahoot). Drone and camera-trap visuals are turned into short films to spark place attachment, while social media amplifies student voices. Lessons integrate real ecological and social data from park operations to show how biodiversity is monitored and protected. Since 2022 the program has reached 1,000+ students across five high schools; UNESCO support (2025) is helping formalize the curriculum and train trainers so schools and rangers can sustain and scale the model—building conservation literacy and a pipeline of local youth leaders.

Organisations involved: Komodo National Park; UNESCO Jakarta; North Carolina State University; SMK Negeri 1 Labuan Bajo; SMK Stella Maris Labuan Bajo; Gadjah Mada University; SIRKULA Indonesia; INFLORES Project; AMARTHA; Politeknik Negeri Lampung; BPDLH; JAPESDA; Provincial Government of East Nusa Tenggara.

GBF Targets 1, 4, 20, 22

"RGTS is more than a program. It is proof that empowering youth through locally led education can build the next generation of conservation leaders—rooted in place, pride, and purpose."

Impacts
The integration of technology into the Ranger Goes to School (RGTS) program has generated measurable environmental, social, and economic benefits for the people and ecosystems of Labuan Bajo. Tools such as plant ID apps, drone footage, and camera trap data have transformed conservation education into a practical, engaging experience rooted in local ecological realities.
Environmental Impact: Camera trap and drone visuals help students observe Komodo dragon behavior, ecosystem changes, and biodiversity patterns. These tools make invisible ecological dynamics visible, reinforcing the importance of protecting Komodo National Park as a living World Heritage Site.
Social Impact: Since 2022, RGTS has reached over 1,000 students in four high schools. The program improves environmental literacy and instills pride in Komodo's natural heritage. Students begin to view rangers as role models and see conservation not as abstract science, but as a meaningful part of their identity.
Economic Impact: Graduates receive certificates that support access to internships, scholarships, and local job opportunities. This helps reduce youth unemployment while building a future workforce committed to sustainable tourism and conservation. In this way, RGTS bridges education, technology, and livelihoods—empowering communities from the classroom to the forest.

SUCCESS FACTORS:

1. **Empowering Youth through Conservation Education: The Ranger Goes to School (RGTS) Program**

2. **Connecting with Komodo: Building Place Attachment for Conservation Leadership**

A Suitable Home for Antonio: A Community-Based Biocultural Corridor for Wild Felid Conservation in Private Reserves within the Serranía de los Paraguas KBA, Colombia

Solution Provider: Esteban Grajales-Suaza, Corporación Serraniagua

Location: El Cairo, Versalles, and El Dovio, Valle del Cauca, Colombia

Technology in Action: Human–wildlife conflict around private reserves in the Serranía de los Paraguas KBA stems from land-use change and livestock predation. The project combines landscape planning with practical, low-cost tech: GIS and remote sensing for land-use planning and vegetation change; community camera-trap networks to track jaguars ("Antonio") and other mammals; and adaptive husbandry on pilot farms—automatic water troughs, solar-powered electric fencing, and motion-sensor lights—to reduce losses while improving productivity. Radio programs, posters and other media support behaviour change, while solar solutions also bring basic services (power, water) to households. Together, these tools enable participatory monitoring, target mitigation in corridors near water sources, and strengthen coexistence, while building local capacity and communication among authorities, farmer associations and reserves.

Organisations involved: Corpoversalles; Smithsonian Conservation Biology Institute

GBF Targets: 1, 4, 10, 20

"For us, it was both the most beautiful and problematic news: a jaguar in our territory."

Impacts

With this solution, we expect to establish key actions for coexistence with wild cats through a transdisciplinary plan adapted to the DRMI Serranía de los Paraguas. Advocate for its adoption as part of the DRMI management plan. Expand knowledge on jaguar ecology through scientific research. Assess mammal diversity and identify jaguar corridors near water sources and protected areas via baseline studies. Reduce threats to forests, biodiversity, and water by implementing adaptive livestock practices on at least 4 farms in El Cairo, Versalles, and El Dovio. Strengthen biological corridors through forest restoration in degraded areas and productive planning for conservation. Establish 4 sustainable, adaptive production models and sign 4 conservation agreements to protect riparian forests. Improve access to renewable energy for 4 farming families. Promote positive perceptions of jaguars among students from 3 nearby schools. Strengthen coordination with environmental authorities and local actors. Increase incomes from sustainable agroecological practices. Reinforce Serraniagua's grassroots base through the project's results.
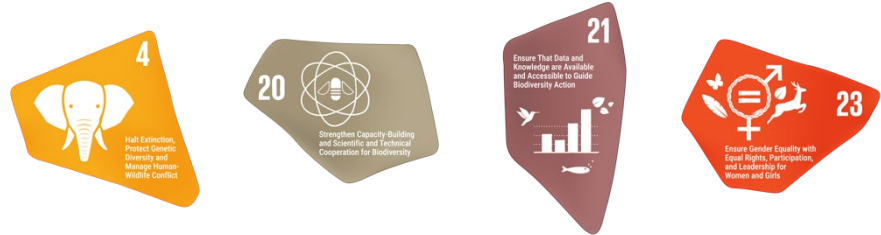
SUCCESS FACTORS:

1. **Development of a transdisciplinary plan for managing human–jaguar interactions at the regional scale**

2. **Implementation of community-based monitoring of jaguars and, mammal diversity using camera traps**

3. **Applying a behavior change approach to address human dimensions related to jaguars in strategic areas where the species is present**

4. **Implementation of adaptive livestock management strategies on farms adjacent to water source protection forests and public and private reserves**

Empowering Women in Conservation Technology: Shaping Africa's Conservation Future

Solution Provider:	Meredith Palmer — WILDLABS
Location:	Tanzania; Kenya; East & Southern Africa
Technology in Action:	A blended training and mentorship programme tackles gender and geographic gaps in conservation tech by equipping early-career women from the Global South with practical skills and networks. Two in-person workshops bookend six months of supported virtual learning focused on tools for biodiversity monitoring, protected-area management, and human—wildlife coexistence (e.g., camera traps, acoustics, GPS, data apps, AI dashboards). Local female tech experts serve as trainers and mentors to ensure cultural relevance and lasting impact. Participants receive seed funding to launch tech-based projects, build portfolios, and continue development through an active alumni community.
Organisations involved:	Fauna & Flora; WWF; Research and Innovation for the Serengeti Ecosystem (RISE) / Grumeti Fund; Ol Pejeta Conservancy Tech Lab; ConTech Africa; University of Dar es Salaam; EarthRanger; SMART; Google Earth Engine; Arm (donor).
GBF Targets:	4, 20, 21, 23

"The road ahead is full of promise, and I am committed to continuing my efforts in integrating technology with conservation for a better, sustainable world."

Impacts

To date, we have trained 35 East African women in conservation technology. Our participants have gone on to secure leadership roles in conservation organizations, win international awards, and contribute to global conservation dialogues (see Links). Our alumni form an active community via our online platform and WhatsApp to share opportunities, troubleshoot challenges, and support one another in a male-dominated field.

In addition to training, each participant receives a $500 grant. These funds have catalyzed innovative protected area management, species monitoring, and human—wildlife coexistence projects. Tools developed or deployed include camera traps, underwater imaging, AI-assisted workflows, mobile data collection apps, and community engagement platforms.

Our participants consistently report in annual post-course surveys that the skill sets and portfolios gained during our program have enabled them to secure new opportunities. As shared in the links above, four participants have received internships supported by our program and partners, one has begun a new career as a conservation tech trainer, three have gone on to receive scholarships, five have published papers, and many others have advanced within their conservation organizations.
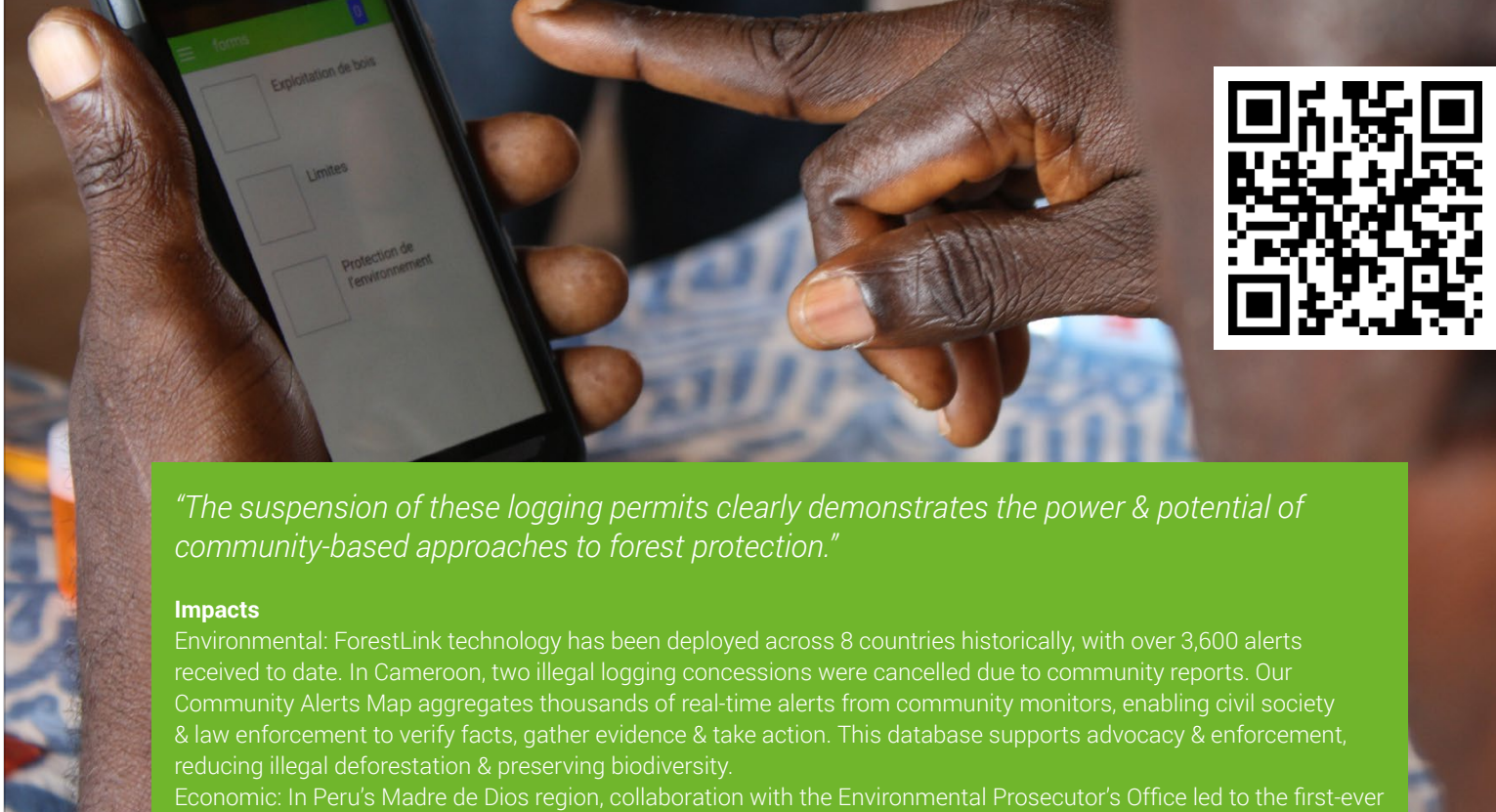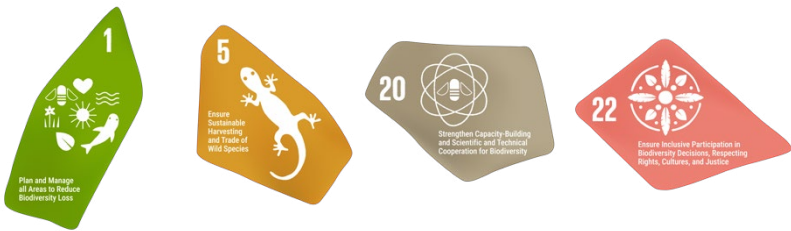
SUCCESS FACTORS:

1. **Forming partnerships with local institutions**
2. **Identifying impactful mentors, trainers, and allies**
3. **Developing core adaptable training materials**
4. **Focusing on hands-on engagement**
5. **Strengthening early career potential**
6. **Unlocking future impact: Funding and professional development**

ForestLink

Solution Provider: Louise Cordery — Rainforest Foundation UK

Location: Democratic Republic of the Congo; Republic of the Congo; Cameroon; Kenya; Peru (West & Central Africa; South America)

Technology in Action: ForestLink is a low-tech, real-time monitoring system that empowers Indigenous Peoples and local communities to document and report forest illegalities and rights violations—even without connectivity. Trained community observers transmit compressed alerts (via SMS, internet, or satellite) from basic phones or a smartphone app to a secure geospatial database. Local NGOs analyze reports to identify hotspots and trigger targeted enforcement, legal action, and advocacy. Built on a rights-based, consent and do-no-harm approach, the tool is highly adaptable (from GBV and land tenure to logging and mining) and inclusive for remote users. In 2025, ForestLink II with ForestEye will fuse satellite deforestation intelligence with ground reports to strengthen transparency, law enforcement, and locally led decision-making.

Organisations involved: EcoDev (Cameroon); SNOIE – Standardised Independent External Monitoring System; FENAMAD (Peru); Environmental Prosecutor's Office (Peru); national and local NGO partners.

GBF Targets: 1, 5, 20, 22

RAINFOREST FOUNDATION UK
SECURING LANDS, SUSTAINING LIVES

"The suspension of these logging permits clearly demonstrates the power & potential of community-based approaches to forest protection."

Impacts

Environmental: ForestLink technology has been deployed across 8 countries historically, with over 3,600 alerts received to date. In Cameroon, two illegal logging concessions were cancelled due to community reports. Our Community Alerts Map aggregates thousands of real-time alerts from community monitors, enabling civil society & law enforcement to verify facts, gather evidence & take action. This database supports advocacy & enforcement, reducing illegal deforestation & preserving biodiversity.

Economic: In Peru's Madre de Dios region, collaboration with the Environmental Prosecutor's Office led to the first-ever apprehension of illegal miners & the destruction of $17.6 million worth of machinery used in illegal mining, setting a precedent for forest protection.

Social: Over 588 community monitors trained, empowering local & Indigenous communities to document & report illegalities. In Peru, FENAMAD's engagement in governmental roundtables enhances justice access & collaboration. ForestLink fosters unprecedented partnerships between community observatories & legal systems, strengthening Indigenous rights & advocacy efforts. In Kenya, data collected were presented to the Judiciary in two counties to demonstrate a backlog of unresolved tenure cases that violated women's land rights. The judiciary intervened using the data.

SUCCESS FACTORS:

1. **Co-Designing Solutions with Grassroots & Indigenous Partners: Strengthening Community-Led Action for Inclusive & Sustainable Development**

2. **Flexible, Community-Centered Reporting & Monitoring System for Real-Time Accountability & Impact Tracking**

3. **Strengthening Multilevel Advocacy Networks Among NGOs to Amplify Collective Action**

4. **Empowering Communities Through Sustainable Livelihoods and Equitable Access to Economic and Environmental Justice**

Grasshopper Project Management Tool for Invasive Species Management

Solution Provider: Sabelo Lindani — Grasshopper Green Technologies

Location: South Africa; East & South Africa

Technology in Action: Grasshopper is a web- and mobile-based project management tool that helps Micro, Small and Medium Enterprises (MSMEs) contractors in invasive species management plan and deliver work reliably. Designed for low digital literacy and offline use, it standardizes quoting with ML-assisted estimates from historical clearing data, tracks teams, person-days and costs, and generates invoices to replace paper workflows. Conservation agencies gain real-time oversight, asset tracking, and performance analytics, reducing disputes and improving transparency. As part of the Conservation MSME Development Programme, contractors receive mentoring and onboarding, then manage projects independently on Grasshopper. Forthcoming mapping, time-tracking, and ecological-impact modules will link restoration outputs to livelihoods and future income streams.

Organisations involved: Contour Enviro Group; Table Mountain Fund (WWF-SA); WWF-South Africa; CATHSSETA; Department of Forestry, Fisheries and the Environment; Department of Small Business Development; CapeNature; City of Cape Town; Cape Winelands Fire Protection Association; Kogelberg Biosphere Reserve; The Nature Conservancy – South Africa; Agulhas Biodiversity Initiative.

GBF Targets: 1, 2, 6, 20

"The results were transformative: over 300 jobs were created, incomes improved, and the contractors gained confidence and independence."

Impacts
Grasshopper was developed through the Conservation MSME Development Programme, launched in 2022 with support from the Table Mountain Fund. The initial pilot included four female-led MSMEs, creating over 300 job opportunities from 2022 to 2024 and significantly increasing business income. During mentorship, the need for a scalable, user-friendly project management tool became clear—leading to the creation of Grasshopper.
The project has since expanded to 10 more MSMEs through a partnership with a national Sector Education and Training Authority (SETA), with a focus on digital capacity-building. Grasshopper improves efficiency, quoting accuracy, and financial independence, enabling MSMEs to participate more competitively in the conservation economy.
Environmental: Improved ecosystem health through invasive species control.
Social: Job creation and MSME empowerment.
Economic: Increased income stability and operational efficiency.

SUCCESS FACTORS:

1. **Conservation MSME Development Programme**
2. **Inclusive Work Opportunity Facilitation**
3. **Strategic Partnerships for Scalable Impact**
4. **Grasshopper Digital Tool for Conservation MSMEs**
5. **Green Platform for Green Opportunities**
6. **Grasshopper adoption among MSMEs**

Arribada Clubs

Solution Provider: Francisco Gouveia — Arribada Initiative

Location: Príncipe (São Tomé and Príncipe); Maio (Cape Verde); Laikipia (Kenya)

Technology in Action: Arribada Clubs integrate Science, Technology, Engineering and Mathematics (STEM) education with conservation technology to bridge digital and environmental gaps in underserved communities. Through free after-school programs, children aged 10–12 gain first exposure to laptops, coding, 3D design, GPS mapping, and bioacoustics, linking digital skills to local biodiversity challenges such as sea turtle conservation or habitat loss. Students build device prototypes, scan and replicate species in 3D, and analyze biodiversity data, while teachers—trained locally—adapt curricula to community needs. Since 2017, more than 750 students have participated, with over half completing the three-year program. The clubs improve digital literacy, strengthen conservation awareness, and create a replicable model that fosters future conservation leaders and equips youth with skills for wider employability.

Organisations involved: Fundação Príncipe; Fundação Maio Biodiversidade; Ol Pejeta Conservancy; local educational departments; Earth Ranger Tech Award (supporting expansion).

GBF Targets: 4, 20

ARRIBADA initiative

4 Halt Extinction, Protect Genetic Diversity and Manage Human-Wildlife Conflict

20 Strengthen Capacity-Building and Scientific and Technical Cooperation for Biodiversity

"As well as changing students' lives and futures, The Arribada Club also greatly benefits the Clubs' local, community-member teachers."

Impacts

The Arribada Club has delivered measurable social, economic, and environmental impacts. Socially, 60% of our students report never having used a computer before joining. With formal computer classes scarce or poorly equipped, the Clubs are often the only place where students gain real digital skills. Since 2017, we've reached more than 750 students and delivered 2,500+ classes. Participation is free, and over half of students (54% girls, 46% boys) complete the full 3-year program (Year 1: 73%, Year 2: 85%, Year 3: 86%). Economically, the Clubs build skills that increase employability, especially in conservation sectors. Environmentally, students apply GPS, bioacoustics, and 3D design to address local biodiversity challenges. Outcomes include prototype tools, digital biodiversity replicas, and enhanced awareness of species and habitat threats.
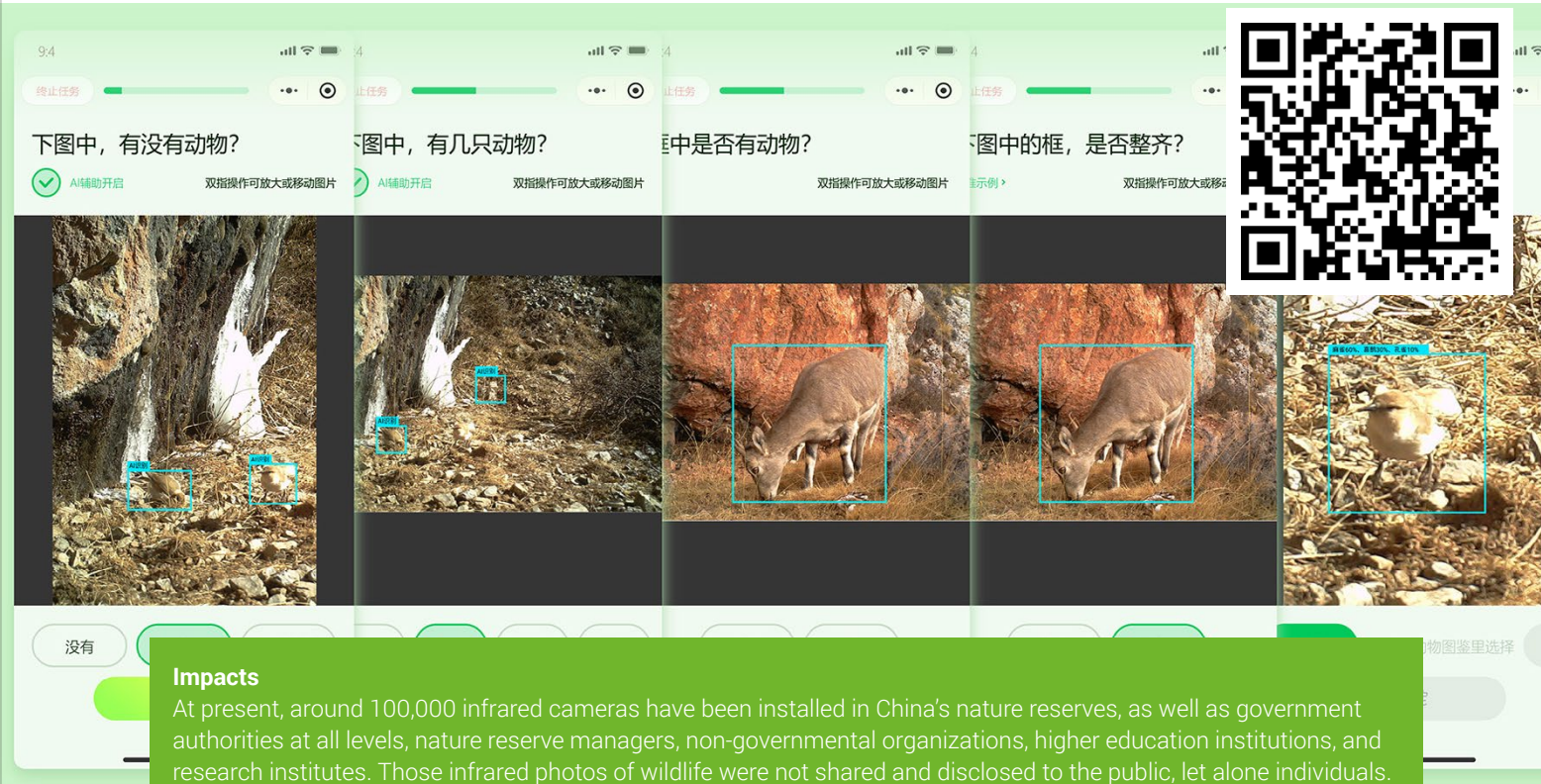
SUCCESS FACTORS:

1. **Empowering Local Youth as Conservation Stewards**

2. **Hands-On Conservation Tech in STEM Learning**

3. **Co-Designing Education with Local NGOs and Schools**

4. **Building STEM Foundations for Digital Literacy**

Adam's Wildlife Friends

Solution Provider: Adam Gao — Tencent Tech Philanthropy

Location: Huairou District, Beijing, People's Republic of China

Technology in Action: Adam's Wildlife Friends is China's largest intelligent wildlife photo management system, built as a WeChat Mini Program. Using AI recognition ("Species Eye"), it processes millions of infrared camera images to identify species like snow leopards, roe deer, and leopard cats with high accuracy. Previously confined to academic research, these images are now accessible to the public via QR codes at the Great Wall and other parks, letting citizens connect with "unseen" wildlife in their surroundings. The platform balances education and conservation: offering simple access for tourists while protecting habitats. With a database of over 200,000 images from leading conservation groups, it transforms hidden data into an "ecological map" of China, fostering awareness, participation, and biodiversity protection.

Organisations involved: Chinese Felid Conservation Alliance (CFCA); Shan Shui Conservation Center; Paradise International Foundation; Taohuayuan Ecological Protection Foundation; Shenzhen Dapeng New Area Coral Conservation Volunteer Federation

GBF Targets: 1, 4, 22

Impacts

At present, around 100,000 infrared cameras have been installed in China's nature reserves, as well as government authorities at all levels, nature reserve managers, non-governmental organizations, higher education institutions, and research institutes. Those infrared photos of wildlife were not shared and disclosed to the public, let alone individuals. Wildlife Friends, however, is a mini program featuring pure openness to the society, tapping into the social values of those infrared photos to a maximum extent.

China's nature reserves were involved in a contradiction: On the one hand, the public is not allowed to explore in such areas, especially to avoid disturbing protected wild animals. On the flip hand, natural reserves ought to play the role of popular science education for the society, introducing to citizens flora and fauna therein and corresponding protective measures. Wildlife Friends abridges the gap in practical tools before and can defuse this contradiction by balancing the aforementioned two aspects well.

To citizens, it is also a great harvest to view some objects invisible in regular days in the simplest way when visiting a forest park. It is also fruitful to, by walking on the ancient Great Wall in Beijing and scanning a QR code board there, encounter such surprise that roe deer and gorals will also wander on the Great Wall when there are few tourists.

SUCCESS FACTORS:

1. **WeChat Mini Program Development**

2. **Processing of Numerous Infrared Images Driven by AI Species Recognition**

3. **Connection with Citizens**

4. **Interactive Interface for Citizen Scientists**

Voices & People Behind the Award

Quotes and Testimonials

The Tech4Nature Award jury brought together experts from conservation, technology, and community leadership. Their voices reflect the diversity of perspectives guiding the recognition of technology-enabled solutions. A selection of their reflections is captured below.

Max Cuvellier Giacomelli (GSMA):
"The world is at a critical point for nature and biodiversity conservation, and we must use every means at our disposal to act. Digital innovation in particular has a strong role to play in supporting nature-positive, sustainable and inclusive solutions that can monitor, protect and restore wildlife populations and their ecosystems."

Yen Parico (IUCN WCPA):
"Each project is like a thread in a much bigger tapestry of conservation. What inspired me most is seeing how technology is being used as a tool to protect nature in inclusive and community-driven ways."

Michael Ngugi Kimani (RCMRD):
"The creativity and innovations behind these solutions show how technology can be harnessed to address conservation challenges."

Dr. Carly Vynne (RESOLVE):
"The Tech4Nature Award submissions are inspiring examples of how technology can be harnessed to deliver tangible conservation outcomes. What stood out to me is the creativity, collaboration, and real-world impact these initiatives demonstrate—from empowering local communities to strengthening global biodiversity monitoring. They show that when innovation is rooted in purpose, it can truly help nature thrive."

Jury, Credits and Thanks

Dr. Carly Vynne
Chief Program Officer & Director, RESOLVE

Prof. Dr. Ma Keping
Professor of Ecology in Institute of Botany, Chinese Academy of Sciences, IUCN Regional Councillor

Malidadi Langa
Chairman, Alliance for Indigenous Peoples and Local Communities for Conservation in Africa

Max Cuvellier Giacomelli
Head of Mobile for Development, GSMA

Michael Ngugi Kimani
Geospatial Data and Technologies Manager, Regional Centre for Mapping of Resources for Development

Mónica Álvarez Malvido
Federation Development Officer, International Ranger Federation

Yen Parico
Executive officer of World Commission on Protected Areas

We extend our heartfelt thanks to all Jury members for their time, expertise, and commitment. Special appreciation also goes to the Technical Reviewers, whose careful assessments helped ensure consistency and quality across all three highly competitive Award categories.

We also warmly thank all applicants and solution providers, who made such outstanding contributions to nature conservation and generously shared their solutions with us.

We gratefully acknowledge the support of all IUCN colleagues who contributed their time and expertise to the Award process, particularly the IUCN Tech4Nature and PANORAMA teams for coming together to deliver this exciting first Tech4Nature Award.

Finally, our sincere thanks go to Huawei's TECH4ALL Programme, as the global partner of Tech4Nature, for their continued collaboration and commitment to scaling up digital innovation for nature conservation.

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