

A close-up photograph of a tiger's face, looking directly at the camera. The image is overlaid with a dark, textured digital pattern, possibly representing data or artificial intelligence. The tiger's fur is a mix of orange, black, and white stripes.

ARTIFICIAL INTELLIGENCE FOR ENVIRONMENTAL CRIME ENFORCEMENT

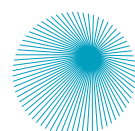
**INSIGHTS FROM THE BANGKOK WORKSHOP
ON AI AND ENVIRONMENTAL CRIME**

MAY 2026

**ECO
SOLVE**



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Programme



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SUMMARY

Artificial intelligence (AI) is rapidly emerging as an important tool in environmental crime enforcement. Environmental crimes, such as illegal logging, mining, fishing, wildlife trafficking and waste trafficking, are becoming increasingly complex and transnational, while enforcement agencies remain constrained by a lack of resources. In many environmental crime hotspots, enforcement bodies must monitor vast and remote areas, analyze fragmented and incomplete data, and respond to adaptive criminal networks with limited staff and infrastructure. AI offers a way to extend capacity – enabling large-scale data processing, pattern detection and more targeted prioritization of enforcement actions.

Yet early experience shows that the main barriers to effective AI use are structural rather than technical. Weak data foundations, limited digitization, fragmented governance, legal uncertainty (particularly around the permissibility of using AI tools, including issues such as regulatory compliance) and stretched institutional capacity all shape any meaningful outcomes that AI can deliver. In many cases, these structural factors determine success or failure more decisively than the sophistication of the tools themselves.

The use of AI in environmental crime enforcement is primarily a governance challenge, particularly in contexts with unequal access to data and resources – conditions that both increase the need for AI and make its deployment more difficult. Tools that have been designed for high-capacity environments frequently do not always translate into these settings, and poorly adapted systems risk reinforcing inequalities by targeting visible actors while missing more complex criminal networks.

Case studies show that AI can deliver tangible benefits when it is aligned with operational realities. It is successful when its applications – ranging from satellite monitoring to AI-assisted investigations and community-driven reporting – are problem-orientated, embedded in existing workflows, supported by human oversight and based on sufficiently robust data. AI is most

effective when it augments rather than replaces human judgement. AI alone cannot capture the local context, legal nuance and situational interpretation on which enforcement decisions often depend. Systems that enable human review and support decision-making are therefore more reliable and actionable.

Environmental crime poses several strategic challenges in relation to AI. First, environmental crime is transnational, yet most AI systems are confined to a single country or project, limiting their effectiveness. Second, environmental criminal actors are also adopting AI, meaning adaptive and resilient responses are required. Third, the concentration of technical expertise and tool development in a relatively small number of institutions raises concerns about ownership, dependency and whose priorities shape these systems.

Overall, these findings lead to a clear conclusion: effective use of AI in environmental crime enforcement depends less on advancing technology and more on strengthening the underlying systems that enable it to function. This includes investing in data infrastructure, building institutional capacity, aligning tools with clearly defined problems and developing effective governance frameworks. Without such investments, AI is unlikely to move beyond isolated pilots or deliver sustained impact in the areas where it is most needed.

Methodology

This report is informed by a workshop convened by ECO-SOLVE in Bangkok, Thailand, in January 2026. The event brought together 26 stakeholders from government, civil society, academia, and the private sector to explore the application of AI in monitoring and enforcing environmental crime. The insights generated through these discussions were further complemented by targeted consultations with additional stakeholders and a review of relevant English-language literature.



A biologist holds a magpie querequerre as rescued wildlife – victims of illegal trafficking – are prepared for release in Colombia. AI-driven monitoring and data analysis are increasingly used to detect and disrupt such crimes. © Luis Robayo/AFP via Getty Images

Key findings

- **AI's potential is constrained more by structural barriers than technology.** Although AI can significantly enhance monitoring and detection, its effectiveness is limited by weak data systems, fragmented governance, legal constraints and limited institutional capacity rather than technical shortcomings.
- **Foundational systems determine AI effectiveness.** Successful deployment of AI depends on strong data infrastructure, institutional capability and clear legal frameworks – conditions that are often weakest in regions where environmental crime is most prevalent.
- **Human oversight is essential to successful AI use.** Case studies show that AI is most effective when integrated into operational workflows with clear objectives and a human-in-the-loop approach to decision-making. This ensures accuracy, accountability and contextual understanding.
- **High-need environments face the greatest implementation challenges.** There is a 'deployment paradox', in that AI is most valuable in under-resourced, data-poor contexts, but these same conditions make responsible and effective deployment significantly more difficult.
- **Transnational crime requires cross-border AI approaches.** Environmental crime operates across jurisdictions, but most AI systems are nationally designed, creating challenges around legal fragmentation, interoperability and data-sharing.
- **AI can unintentionally reinforce existing inequalities.** If not carefully designed, systems may disproportionately target visible, small-scale actors and overlook more complex and less visible criminal networks that operate at higher levels.
- **AI should be treated as a public good, not a proprietary product.** Open, collaborative approaches – supported by shared data and infrastructure – are critical to discouraging dependency, ensuring adaptability and promoting equitable access.
- **Governance and integration – not technology alone – drive impact.** The success of AI in environmental crime enforcement ultimately depends on how well these systems are governed, implemented and aligned with real-world needs; otherwise, AI risks improving visibility without enabling meaningful enforcement.



INTRODUCTION

The growing use of AI in environmental crime enforcement indicates an increasing operational need. Illegal resource extraction and pollution are occurring more frequently while becoming more complex, transnational and data intensive.¹ At the same time, enforcement agencies – particularly in environmental crime hotspots – remain chronically under-resourced, with limited capacity to monitor vast geographies, analyze fragmented data or respond to rapidly evolving criminal tactics.²

AI offers clear potential to address some of these gaps. It can process satellite imagery at scale, identify anomalies in trade flows, detect suspicious behaviour of vessels and support the prioritization of investigations.³ However, experience to date indicates that the main barriers to effective use of AI are not technical. Rather, they are structural, arising from weak data systems, fragmented governance, legal constraints, limited institutional capacity, and uneven power dynamics in how these technologies are developed and deployed.⁴

There is therefore a clear need for more practical guidance on how AI can be used responsibly and effectively in environmental crime enforcement. In January 2026, the ECO-SOLVE programme convened a multistakeholder workshop with experts from law enforcement, government, civil society, academia, and the technical and scientific community to explore the opportunities and limitations of AI in this field. The findings presented here build on those discussions, bridging the gap between innovation and operational reality. They draw from current examples of AI in practice and provide a series of guiding principles to support more effective, scalable and responsible implementation.



AI IN PRACTICE

AI is being applied in practice to support environmental crime detection, investigation and enforcement. It is used by law enforcement agencies and civil society initiatives across different regions, demonstrating a range of approaches, from large-scale national monitoring systems to targeted analytical tools and community-driven platforms. Each of the following examples highlights how AI is integrated into operational workflows and the outcomes that have been achieved. Together, they show that AI applications vary significantly depending on context but that they are successful when they consistently combine technological capability with human oversight, strong data foundations and clearly defined operational objectives.

Law enforcement

BRAZIL

The Brazilian Federal Police have developed two initiatives that support environmental crime enforcement through integrated monitoring, intelligence generation and interagency coordination – Ouro Alvo (TraceForGold) and Brasil MAIS.⁵ Both use AI at scale.

Ouro Alvo, which was launched in 2019,⁶ traces the origin of gold primarily through chemical and isotopic analysis of seized materials, compared against a reference library of samples from major legal and illegal producing areas. Accessory components integrate production



A gold mining area in Pará state, Brazil. The Brazilian Police have developed an initiative that uses AI to analyze satellite imagery and remote sensing data to detect land-use changes linked to illegal mining. © Mauro Pimentel/AFP via Getty Images

records, trade documentation and geospatial data to flag supply-chain inconsistencies that may indicate illegal activity. In parallel, Brasil MAIS, which was instituted the following year, uses AI to analyze satellite imagery and remote sensing data to detect land-use changes arising from deforestation and mining. The system automatically generates and distributes alerts to relevant authorities through a shared platform.

Each of these projects follows its own workflow. Brasil MAIS is centred on AI, using remote-sensing data collection, AI-enabled pattern and anomaly detection, prioritized alert generation and analyst review to determine appropriate enforcement responses. Ouro Alvo is instead anchored in laboratory forensic science – sample collection, instrumental chemical and isotopic analysis, and comparison against the reference library – with AI-assisted cross-checking of trade and geospatial records as a supporting layer. In both cases, a human-in-the-loop model ensures that AI augments, rather than replaces, professional judgement.

A defining feature of the Brasil MAIS programme is the scale and level of coordination achieved: nearly 730 institutions and around 130 000 users are connected through the programme, with tens of thousands of alerts generated monthly. Ouro Alvo investigators also draw on Brasil MAIS for intelligence and field operations. This enables faster response times, more targeted resource allocation and improved cross-agency collaboration. Between the programme's inception and April 2025, deforestation rates dropped and the project yielded billions of dollars in fines, seized goods and frozen assets related to illegal logging and mining.⁷

The organizational model is also notable. Brasil MAIS ensures strategic oversight remains with the Brazilian Federal Police, while technical development and operation are outsourced to a private contractor – illustrating an effective public-private partnership for delivering complex AI capabilities. Ouro Alvo, by contrast, is built on in-house forensic capability at the Federal Police's National Institute of Criminalistics.

CZECH REPUBLIC

The Police Presidium of the Czech Republic's AI Digital Assistant (AIDA) embeds AI directly into investigative workflows to streamline complex case management and analysis, particularly in cybercrime enforcement.

AIDA functions as an end-to-end support system. It begins by processing victim and witness interviews, automatically generating structured case descriptions, identifying key entities (such as suspects and victims) and preparing the formal documentation required to initiate proceedings. It then integrates additional data sources, including financial information from banks, to map transaction flows and identify relevant patterns.

The system also automates the preparation of essential procedural steps, such as requests to freeze funds, obtain banking records or secure prosecutor approval. In parallel, it supports telecommunications analysis by identifying relevant data connections and generating requests for access to communication records. As investigations progress, AIDA compiles timelines and produces documentation for case development, suspension or closure.

A defining feature of AIDA is its ability to integrate multiple stages of the investigative process within a single system, reducing fragmentation and administrative burden while maintaining a human-in-the-loop approach.

Reported results include reductions in case processing times of approximately 40%–70%, alongside lower error rates and improved analytical consistency. The system has also strengthened coordination with external partners, such as banks, telecommunications providers and prosecutors. AIDA illustrates how AI can enhance speed, accuracy and coherence in high-volume investigative environments.

SOUTH AFRICA

South Africa's Department of Forestry, Fisheries and the Environment is integrating AI into its Environmental Enforcement Fusion Centre to enhance intelligence analysis and strengthen environmental crime enforcement through existing systems.⁸ The Fusion Centre is an intelligence hub that coordinates tactical anti-poaching strategies and investigations to protect rhinos and other endangered wildlife.⁹

The approach centres on embedding AI-enabled analytics within current databases and workflows, rather than building standalone tools. Data from diverse sources – including financial transactions, geolocation data, licence plate recognition, social media and mobile phone records – is centralized through the Fusion Centre. AI is then applied to automate core analytical processes, including linking related cases, identifying patterns across datasets and generating predictive insights into potential crime hotspots.

The workflow is being implemented in phases. Initial deployment focuses on automated linkage analysis and predictive modelling to map relationships between suspects, locations and activities. A second phase introduces image-processing capabilities to support the analysis of visual evidence. Outputs are reviewed by analysts and used to generate intelligence reports and evidentiary material for investigations and prosecutions, maintaining a clear human-in-the-loop model. A defining feature of this approach is its focus on augmenting existing infrastructure, enabling incremental adoption while improving interoperability across systems.

Although still at the pilot stage, early results indicate reduced manual processing time, faster intelligence production and more timely sharing of information. The initiative highlights how AI can enhance analytical capacity and support more proactive, coordinated responses to complex environmental crime networks.

Civil society

GLOBAL INITIATIVE AGAINST TRANSNATIONAL ORGANIZED CRIME

Under its ECO-SOLVE project, initiated in 2024, the Global Initiative Against Transnational Organized Crime has developed a hybrid AI workflow to support law enforcement investigations into the online illegal wildlife trade, combining automated data collection with AI-enabled classification and search optimization.¹⁰

The system integrates web scraping, large language models (LLMs) and AI agents into a multistage process. ECO-SOLVE analysts input search parameters such as species names, locations and sales-related terms. A web scraper collects relevant online content, which is then

analyzed by an LLM to assess whether or not it is a wildlife advertisement. Relevant records are stored in a database with associated confidence scores, and human analysts validate outputs to ensure reliability. These validation decisions are then fed back into the system, enabling continual refinement of search rules and improving future performance.

A notable feature is the use of AI agents to enhance search strategy. Rather than relying on static keywords, the system dynamically generates refined, multilingual queries – including advanced search techniques such as ‘Google dorking’, which uses preset keywords and questions to access parts of websites that normal searches cannot – to identify content across diverse and hard-to-reach platforms. It also analyzes text and images to improve detection accuracy.

This combination of human-in-the-loop automated filtering and human validation significantly reduces the volume of irrelevant results while improving precision. Investigators can prioritize high-value leads, increasing efficiency and consistency. In this way, AI supports scalable, timesaving, adaptive intelligence-gathering for monitoring online wildlife crime.

THE ACADEMIC SUCCESS FOUNDATION

EcoScan AI, an initiative of The Academic Success Foundation based in Ghana, is a community-driven model for environmental crime detection that combines accessible reporting with AI-supported analysis. EcoScan AI enables community members to submit reports anonymously through widely used platforms such as WhatsApp, including text, images and other observations. The system processes this unstructured data using AI tools to extract crucial information, identify patterns and flag potential areas of concern.

A defining feature is its strong human-in-the-loop model. Trained local analysts review, validate and categorize all AI-generated outputs before any intelligence is shared, ensuring that it is given local context to reduce the risk of misinterpretation. This approach is paired with a focus on accessibility to communities and trust through anonymity, allowing communities to contribute directly to environmental monitoring without requiring formal reporting channels.

During its pilot phase, the platform generated over 100 community reports, which were converted into actionable intelligence to identify emerging environmental crime hotspots. The initiative also built local capacity by training more than 20 youth data analysts to support validation and analysis.

EcoScan AI illustrates how AI can be extended beyond formal enforcement structures, enabling civil society-led intelligence generation. Its combination of low-barrier reporting, AI-enabled structuring of unstructured data, and embedded human oversight highlights a scalable model for environmental crime detection that is more inclusive and context-sensitive.

CENTRE FOR RESEARCH AND TECHNOLOGY HELLAS

The PERIVALLON platform, developed by the Information Technologies Institute of the Centre for Research and Technology Hellas in northern Greece, shows how multimodal AI and data fusion can support environmental crime investigations across Europe. It does this by integrating diverse intelligence sources into a single analytical environment.¹¹

The platform operates as an end-to-end system, combining geospatial intelligence, online monitoring and sensor data. It consolidates information from satellite and aerial imagery, drone sensors, maritime automatic identification systems (AIS) and online marketplaces. AI models then process this data using techniques such as remote-sensing analysis, object detection and recognition in multimedia content, and semantic analysis of online textual content. For example, the system can detect illegal waste sites in aerial imagery, identify suspicious objects in X-ray scans, or extract useful insights from online marketplaces and open-access databases.

A defining feature is the platform's ability to work with heterogeneous datasets. AI models identify correlations, detect anomalies and assess risks across multiple data streams, presenting outputs through a decision-support dashboard. This allows investigators to visualize patterns, analyze routes and prioritize potential cases. Secure data management and audit trails support operational use and evidentiary requirements.

The result is a shift from fragmented, manual analysis to a more unified intelligence picture. Investigators can identify suspicious activities earlier, improve analytical consistency and strengthen coordination across agencies. PERIVALLON showcases how integrated, multimodal AI systems can turn complex and disparate data into actionable intelligence for environmental crime enforcement.

WILDLIFE PROTECTION SOLUTIONS

The Colorado-based non-profit organization Wildlife Protection Solutions (WPS) has developed wpsWatch, an AI-enabled monitoring system that combines sensor networks and automated image analysis to support real-time detection of wildlife crime in protected areas.¹²

The system operates through an integrated workflow that links field devices, AI models and monitoring platforms. Camera traps and other sensors capture images of wildlife, people and vehicles, and transmit these using cellular, satellite or internet connections to a central platform. AI models then analyze the images in two stages: an initial detection layer (e.g. MegaDetector, an open-source AI model) identifies objects such as animals, humans or vehicles; then, customized classifiers trained for specific regions conduct more precise identification of species and potential threats. Additional classification tools, such as SpeciesNet, further enhance classification accuracy, while broader conservation technology systems, such as those of the SMART-EarthRanger Conservation Alliance (SERCA), enable interoperability.

A defining feature of wpsWatch is its ability to generate near real-time alerts from remote environments. Outputs are delivered directly to conservation and enforcement teams, supporting immediate operational responses and longer-term planning, such as identifying hotspots and optimizing patrol routes. The platform also integrates with broader conservation technology systems, enabling interoperability and collaboration across organizations.



Images captured by wpsWatch, an AI-enabled monitoring system that supports real-time detection of wildlife crime in protected areas. *Photos: Wildlife Protection Solutions*

At scale, the system processes approximately 40 000 images per day across thousands of cameras and has contributed to more than 1 000 detections, leading to several arrests. WpsWatch demonstrates how AI-enabled sensor networks can extend monitoring coverage, accelerate detection and enable faster, more targeted responses to wildlife crime.



PRINCIPLES FOR USING AI IN ENVIRONMENTAL CRIME ENFORCEMENT

The use of AI in environmental crime enforcement is a governance challenge shaped by specific political economies, geographies and operational realities. The following eight principles reflect this. Grounded in practitioner experience, they aim to define what responsible, effective and context-sensitive AI adoption should look like in this field.

1. START WITH THE PROBLEM, NOT THE TECHNOLOGY

When it comes to environmental crime enforcement, there is a persistent tendency towards solution-first adoption of AI tools. This is not accidental. The sector is significantly under-resourced and technological innovation is often attractive to donors who seek scalable, visible interventions. As a result, AI is sometimes introduced as a way to plug gaps before the operational case for its use has been fully defined.

This dynamic creates risks. Tools may be deployed without a clear understanding of the specific enforcement problem they are intended to solve, leading to limited impact, duplication of effort or unsustainable systems. In some cases, relatively simple improvements – such as better coordination between agencies, improved data-sharing agreements or strengthened manual processes – could deliver greater immediate benefit than introducing new technologies.

Starting with the problem first requires breaking down environmental crime into its distinct forms. Illegal logging, mining, fishing, wildlife trafficking and waste crimes each involve different actors, supply chains, data environments and enforcement challenges.¹³ AI applications must be tailored accordingly. For example, satellite-based monitoring may be appropriate for detecting deforestation, while analysis of trade data may be more relevant for waste trafficking or the illegal wildlife trade.



Students train at a staged wildlife crime scene in South Africa. AI-assisted forensic tools and data analysis are helping improve the investigation and prosecution of poaching cases. © Marco Longari/AFP via Getty Images

Importantly, resistance to AI adoption – particularly within parts of the conservation sector and among some non-governmental organizations (NGOs) – reflects this gap between technology and clearly defined use cases. If AI is perceived as abstract, imposed or misaligned with operational realities, it is likely that its uptake will remain limited.¹⁴ Demonstrating concrete, problem-driven use is therefore not only a technical requirement but a strategic entry point for broader adoption.

2. ACCEPT THAT HIGH NEED IS HIGH RISK: THE AI DEPLOYMENT PARADOX

Environmental crime is disproportionately concentrated in remote, under-governed and data-poor contexts. These are precisely the environments in which traditional monitoring and enforcement approaches have struggled most – whether because of geographical scale, limited state presence or resource constraints.¹⁵

This creates a central paradox. These contexts are where AI holds the greatest promise, but they are also where its responsible and effective deployment is most difficult. Several structural challenges underpin this tension:

- Limited digitization and poor data quality constrain the ability to train and deploy reliable AI systems.
- Empirical verification is difficult, making it challenging to validate outputs or establish verified, real-world information (the ‘ground truth’).¹⁶
- Institutional capacity is often low, limiting the ability to maintain, interpret and oversee AI tools.¹⁷

- Legal and regulatory frameworks are fragmented or underdeveloped, particularly with regard to data use and evidentiary standards.¹⁸
- Pilot-to-scale failure is common, because tools developed in controlled environments are often inadequate for more complex real-world conditions.

At the same time, AI systems are evolving faster than regulatory frameworks, which creates uncertainty about their legal status – particularly in relation to evidence in court.¹⁹ In many jurisdictions, AI-generated outputs are unlikely to meet evidentiary thresholds in the near term, limiting their role to intelligence generation rather than prosecution.²⁰

Recognizing this paradox is essential. It implies that responsible AI deployment in environmental crime cannot be assumed to scale easily from high-capacity contexts to low-capacity ones. Instead, it requires deliberate investment in the enabling conditions – data systems, institutional capacity and governance frameworks – that make effective use possible.

3. DESIGN FOR TRANSNATIONAL ENVIRONMENTAL CRIME WHILE DELIVERING LOCAL IMPACT

Environmental crime is inherently transnational.²¹ Supply chains for timber, minerals, waste, fish and other wildlife routinely span multiple jurisdictions, from source regions and transit hubs to destination markets.²² However, most AI applications – and much of the institutional thinking around them – are designed for and remain limited to issues at the national level. This mismatch creates operational and ethical challenges.

On the one hand, legal and regulatory fragmentation complicates cross-border deployment.²³ Differences in data protection laws, evidentiary standards, procurement rules and institutional structures limit interoperability and constrain how data can be shared and analyzed.²⁴ AI systems that function effectively in one jurisdiction may not be legally or operationally viable in another.

On the other hand, AI-based monitoring can result in uneven visibility.²⁵ In under-governed contexts, it often makes front-line actors – such as small-scale fishers, artisanal miners or local communities – more vulnerable to enforcement.²⁶ Meanwhile, more complex transnational networks, including financial intermediaries and organized criminal groups, may remain less visible.

This dynamic is particularly pronounced in the case of illegal, unreported and unregulated (IUU) fishing. Although vessel-tracking technologies (such as AIS and satellite monitoring) provide unprecedented visibility of fishing activity, many coastal states lack the resources, legal frameworks or operational capacity to act on this information meaningfully.²⁷ For example, AI can increase scrutiny of local or small-scale actors without necessarily addressing the larger, often transnational criminal networks that drive large-scale IUU fishing. This highlights a critical challenge: detection does not automatically translate into enforcement or justice.

At the same time, these structural gaps are exploited by criminal actors. AI is already being used by environmental crime networks to evade detection – through tactics such as generating synthetic documents, adapting online listings or analyzing enforcement patterns.²⁸ These developments reinforce the need for enforcement tools that are designed with adversarial use in mind.²⁹

A transnational design approach therefore must do two things: It must address cross-border legal and operational fragmentation while simultaneously ensuring that AI deployment does not disproportionately target the most vulnerable actors and leave systemic criminal networks less affected.

4. PRESERVE HUMAN OVERSIGHT WHERE IT MATTERS MOST

The necessity of human oversight in AI systems is widely recognized, but in environmental crime enforcement it takes on particular importance because of the high degree of contextual and local knowledge required to interpret behaviour.³⁰ Determining whether an activity is illegal often depends on factors that are difficult to capture in data alone: for example, local licensing arrangements, customary land use, seasonal variations or informal economic practices. AI systems, particularly those trained on incomplete or biased datasets, are not well equipped to account for these nuances.

At the same time, enforcement agencies in many environmental crime hotspots are severely overstretched. AI is often introduced precisely because of these capacity constraints. This creates a tension: the contexts where human oversight is most critical are often those where it is hardest to sustain. Several well-documented risks arise in this setting, including automation bias, where users disproportionately trust AI outputs;³¹ alert fatigue, where high volumes of system flags overwhelm analysts;³² and tunnel vision, where investigations focus narrowly on what the system highlights.

Addressing these risks requires more than procedural safeguards. It depends on building meaningful human oversight, supported by:

- AI literacy that enables users to critically interpret outputs;³³
- clear workflows that embed review and validation;³⁴
- audit trails and documentation that support accountability;³⁵ and
- the ability to challenge and override system outputs.

In practice, AI should support tasks such as data processing, pattern detection and prioritization, but decisions with legal or operational consequences must remain grounded in human judgement.³⁶

5. BUILD AI AS A PUBLIC GOOD, NOT A PRIVATE PRODUCT

A defining feature of many AI tools currently used in environmental crime enforcement is that they are designed, owned and governed by institutions in the Global North, often with limited input from the regions most affected by these crimes.³⁷ This creates normative and practical problems.

From a governance perspective, it raises questions about whose priorities are embedded in these systems, what they optimize for and how decisions about their use are made. From a practical perspective, reliance on proprietary tools creates multiple risks, including vendor lock-in, limited transparency, loss of institutional control and rising costs or withdrawal of services.³⁸

For enforcement agencies in lower-capacity contexts, these risks are particularly acute. Dependence on externally developed systems can undermine long-term sustainability and limit the ability to adapt tools to local needs. The alternative is not to reject private-sector involvement but to make a clear case for treating AI systems in this field as shared infrastructure – by investing in open-source tools and models, developing shared data resources and supporting collaborative governance arrangements.³⁹

Existing initiatives – such as global data-sharing platforms or intragovernmental collaborations – demonstrate elements of this approach, even if they are not fully realized in the AI domain.⁴⁰ Ultimately, treating AI as a public good is both a governance choice and a strategic necessity for ensuring that the benefits of these technologies are equitably distributed and sustainably maintained.

6. TREAT DATA AS CORE INFRASTRUCTURE: INVEST IN DIGITIZATION, STANDARDS AND EQUITABLE ACCESS

AI systems are only as effective as the data they rely on.⁴¹ In environmental crime enforcement, data limitations are not a secondary issue – they are a foundational constraint. Relevant data is often fragmented across institutions, non-digitized or poorly structured, inconsistent in format and classification, or restricted due to legal or sensitivity concerns.⁴²

Moreover, well-structured digitized datasets are disproportionately concentrated in high-capacity institutions, often in the Global North.⁴³ This creates the risk that AI systems trained on available data will encode systemic blind spots, failing to capture patterns and dynamics in under-represented regions.

Addressing this risk requires a shift in perspective: data should be treated as core infrastructure for environmental crime enforcement. This implies sustained investment in digitizing records, development of shared data standards, secure and trusted data-sharing mechanisms, and open and accessible training datasets. It also requires engaging with more complex questions about how to incorporate community and Indigenous knowledge into data systems in ways that are both useful and respectful.⁴⁴ Emerging initiatives, such as the EcoScan project, are beginning to explore how such knowledge can be translated into formats that AI systems can use without undermining local ownership or context.

Without these investments, AI systems will remain limited in their effectiveness, and risk reinforcing existing inequalities in what is visible, measurable and actionable.

7. NAVIGATE THE POLITICS OF ADOPTION: BUILD INTERNAL CHAMPIONS AND ADDRESS CONCERNS

The adoption of AI in environmental crime enforcement is not only a technical process but also a political and organizational one.⁴⁵ Within institutions, it often brings competing perspectives, including concerns about job displacement or the loss of expertise, scepticism about overreliance on technology, and uncertainty about leadership direction and priorities.⁴⁶

These concerns are not simply barriers to be overcome – they reflect legitimate questions about how AI will reshape roles, responsibilities and decision-making processes. Successful adoption therefore depends on actively managing these dynamics. This includes:

- building internal AI ambassadors who can bridge technical and operational perspectives;
- providing role-specific training and support;⁴⁷
- clearly communicating the purpose and limitations of AI tools; and
- aligning adoption with institutional priorities and workflows.

Experience from existing initiatives, such as Brasil MAIS, highlight the importance of deliberate political and organizational strategies to build support, particularly within government systems where coordination across agencies is essential.⁴⁸ Addressing these dynamics is critical not only for uptake but also for ensuring that AI is used in ways that are consistent, accountable and aligned with institutional mandates.

8. BUILD CAPACITY TO GOVERN AI, NOT JUST TO USE IT

A recurring risk within the environmental crime sector is dependence on technologies that institutions cannot independently evaluate, adapt or govern. Although training end-users to operate specific tools is necessary, it is not sufficient. What is needed is broader institutional capacity to engage critically with AI systems, including the ability to assess vendor claims and system performance, identify and address bias, audit and validate outputs, and adapt tools to local contexts.⁴⁹

This capacity is particularly important in environmental crime hotspots, where external tools are often introduced without corresponding investment in local expertise. Building this capacity requires long-term investment in AI literacy across organizations;⁵⁰ cross-disciplinary collaboration between technical, legal and operational experts;⁵¹ and institutional knowledge that remains within the sector, rather than being outsourced.

Strengthening governance capacity in this way enables organizations not only to use AI more effectively but to shape how it develops – ensuring that it remains aligned with environmental protection, the rule of law and local priorities.



CONCLUSION AND RECOMMENDATIONS

AI has the potential to significantly enhance environmental crime enforcement. However, its impact will be determined less by the sophistication of the technology than by the quality of the systems – legal, institutional and political – within which it is embedded.

The principles outlined above highlight a central argument: environmental crime presents a distinctive set of conditions that require a tailored approach to AI governance. These include its concentration in under-governed contexts, its transnational nature, its reliance on fragmented data, and the structural inequalities that shape how technologies are developed and deployed.

Addressing these challenges requires moving beyond technology-centric solutions towards strategies that emphasize problem-driven design, investment in data and institutional capacity, equitable and collaborative governance, and sustained attention to legal and ethical frameworks. If these conditions are met, AI can play a meaningful role in strengthening environmental enforcement. If they are not, there is a risk that it will reinforce existing gaps – improving visibility without improving accountability and generating insight without enabling action.

The task, therefore, is not simply to adopt AI but to shape how it is governed in ways that reflect the realities of environmental crime and the needs of those working to address it. The following are recommendations for the environmental crime sector where AI risks reinforcing existing gaps if it is not deployed carefully. They are structured for key stakeholder groups and highlight practical steps to ensure that AI contributes meaningfully to address environmental crime while safeguarding ethical, legal and operational integrity.



An illegal rubbish dump in England. Deploying AI for environmental crime enforcement requires prior differentiation of crime types, as waste crimes involve different actors, supply chains and enforcement challenges from other environmental crimes. © Marco di Lauro via Getty Images

DEVELOPERS – BUILD FOR LOW-CAPACITY, HIGH-RISK ENVIRONMENTS

Most AI tools in this space are not designed for the realities of environmental crime enforcement in contexts of limited connectivity, weak data systems and overstretched users.

- **Design for data scarcity and uncertainty.** Systems should function with incomplete, inconsistent or low-quality data and clearly communicate uncertainty. Over-reliance on ‘clean’ datasets will produce tools that fail in real-world conditions.
- **Prioritize explainability for enforcement use.** Outputs must be interpretable by non-technical users and defensible in investigative contexts. This is not a generic transparency issue – it directly affects whether outputs can support enforcement or legal processes.
- **Build for human decision-making under pressure.** Interfaces should reduce, not increase, cognitive burden – avoiding alert overload and enabling prioritization. Systems must support, not overwhelm, analysts working with limited time and resources.
- **Avoid dependency traps.** Minimize vendor lock-in by enabling interoperability, data portability and modular design. Tools should be usable and maintainable by local institutions, not dependent on continuous external support.
- **Account for adversarial use.** Environmental crime actors are already using AI to evade detection. Systems must be designed with this in mind, including the ability to adapt to changing tactics rather than relying on static rules.

IMPLEMENTERS AND ENVIRONMENTAL CRIME HOTSPOTS – FOCUS ON CONTROL, NOT JUST ADOPTION

For enforcement agencies operating in high-risk contexts, the priority is not to adopt AI quickly but to first ensure that it can be used, understood and governed locally.

- **Start with operational gaps, not available tools.** Identify where capacity constraints are most acute (e.g. monitoring remote areas, analyzing trade flows) and assess whether AI adds value compared to simpler solutions like improved coordination or data-sharing.
- **Retain human control over decisions.** AI should support prioritization and analysis, but decisions – especially those with legal consequences – must remain grounded in human judgement and informed by local context.
- **Invest in internal capacity to evaluate systems.** Build the ability to question outputs, assess performance and identify bias. Without this, there is a high risk of overreliance on tools that cannot be independently scrutinized.
- **Strengthen basic data systems first.** Digitization, standardization and record-keeping are prerequisites for effective AI use. Skipping this step will limit impact and increase the risk of unreliable outputs.
- **Adopt incrementally and test in context.** Pilot tools in real operational settings and evaluate whether they improve outcomes. Many systems fail when moved from controlled pilots to complex field environments.
- **Design for controllability and transparency from the outset.** Prioritize simple, modular architectures with multiple points for human oversight, verification and intervention, embedding auditability and control mechanisms during design rather than after deployment.
- **Be cautious of external dependency.** Ensure that systems can be maintained, adapted and governed locally. Reliance on external providers without local capacity creates long-term vulnerability.

DONORS – FUND FOR SYSTEMS, NOT PILOTS

The application of AI to environmental crime enforcement is heavily shaped by donor incentives. At present, these often favour short-term, technology-led pilots, rather than systems that build sustained impact.

- **Shift funding from tools to infrastructure.** Prioritize investments in data digitization, standardization and secure sharing mechanisms in environmental crime hotspots. Without this, AI systems will remain ineffective or skewed towards data-rich regions.
- **Fund long-term operational capacity.** Support the full lifecycle of systems – maintenance, staffing, training and governance – not just development. Many pilots fail because they cannot be sustained locally once initial funding ends.
- **Back public-good approaches.** Incentivize open-source tools, shared datasets and collaborative platforms rather than proprietary solutions. This will reduce dependency on external vendors and enable adaptation in low-capacity contexts.

- **Rebalance power in tool design.** Ensure that countries most affected by environmental crime have a meaningful role in shaping what tools are built and how they function. Current models risk embedding Global North priorities and blind spots into global systems.
- **Support independent evaluation.** Fund rigorous, field-based assessments of what AI actually delivers in environmental enforcement – not just technical performance, but operational impact and unintended consequences.

INTERNATIONAL NGOS AND LARGE CONSERVATION ORGANIZATIONS – BRIDGE GLOBAL TOOLS AND LOCAL REALITIES

International NGOs are important in shaping the field but risk driving AI adoption in ways that are misaligned with local enforcement realities.

- **Move beyond technology demonstration to operational integration.** Pilot projects should be designed with clear pathways to adoption by enforcement agencies, including alignment with legal mandates, workflows and capacity constraints.
- **Co-design with law enforcement agencies.** Engage law enforcement agencies early to align tools with investigative workflows, evidentiary requirements and operational realities, improving uptake and relevance.
- **Act as intermediaries, not just implementers.** Use convening power to connect governments, communities and technical providers – ensuring that tools reflect local priorities and knowledge, not just external assumptions.
- **Address uneven visibility effects.** Be alert to the risk that AI monitoring disproportionately spotlights small-scale or local actors (e.g. artisanal fishers or miners) while leaving higher-level criminal networks less visible. Design interventions that account for this imbalance.
- **Invest in local data ecosystems.** Support the collection, digitization and governance of data in environmental crime hotspots, including approaches that responsibly incorporate community and Indigenous knowledge.
- **Build trust and legitimacy.** Resistance to AI in parts of the conservation sector reflects real concerns. Transparent communication about what tools can and cannot do – and how they affect communities – is essential for uptake and accountability.
- **Build capacity and feedback loops.** Support law enforcement agencies to interpret AI outputs and test their use in practice, adapting systems based on operational and legal feedback.

NOTES

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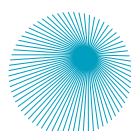
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