SMART and NCAP Surveillance System

Summary Report

ITTO Project PD-A/60-369

"Strengthening Surveillance and Monitoring to Tackle the Surge in Forest Loss and Land Degradation, Induced by Intensifying Conflict in Thailand's Border Areas"

By Mr. Sitthichai Jinamoy, March 2025

SMART AND NCAP SURVEILANCE SYSTEM
ITTO Project PD-A/60-369

Project title

"Strengthening Surveillance and Monitoring to Tackle the Surge in Forest Loss and Land Degradation, Induced by Intensifying Conflict in Thailand's Border Areas"

Project duration

The duration of the assignment is 12 months from 1 July 2024 to 30 June 2025.

Objective

Strengthening SMART and NCAP Surveillance and Monitoring System for citizen science and community reporting illegal activities in Mae Hong Son Province, Thailand.

Summary

Background and Context

Mae Hong Son is a mountainous province in northern Thailand, bordering Myanmar. Known for its rugged terrain and rich biodiversity, the province is home to vast forests, national parks, wildlife sanctuaries, and diverse ethnic communities. Due to its remote location and challenging access, Mae Hong Son has faced persistent issues such as illegal logging, poaching, and land encroachment. Additionally, conflicts in border areas have exacerbated forest loss and land degradation, highlighting the need for stronger surveillance and monitoring efforts.

This development is part of the initiative *"Strengthening Surveillance and Monitoring to Tackle the Surge in Forest Loss and Land Degradation Induced by Intensifying Conflict in Thailand's Border Areas."* To address these environmental threats, the **SMART Patrol System** and **NCAPs** *(Nature Crime Analysis Platforms, particularly Camera Traps)* have been implemented as essential tools for surveillance and monitoring. These technologies play a crucial role in engaging local communities and supporting law enforcement efforts to protect Mae Hong Son's natural resources.

For more than 20 years in Thailand, this initiative has been known as the "**SMART Patrol System**", implemented alongside a patrol database program called "**SMART**" *(Spatial Monitoring and Reporting Tool)*, which utilizes technology to protect wildlife and forests. The program integrates GPS technology, systematic monitoring, and reporting to enhance conservation efforts. Its primary goals are to boost the morale of rangers and managers, improve their ability to protect designated areas, and ensure the survival of key species. Additionally, the SMART program has contributed to a decline in the number of arrests, the discovery of poaching camps and hides, and the stabilization of the tiger population.

The SMART program is being utilized in several wildlife sanctuaries under Thailand's Department of National Parks, Wildlife and Plant Conservation (DNP), including Thungyai Naresuan East (TYE), Thungyai Naresuan West (TYW), and Huai Kha Khaeng Wildlife Sanctuary (HKK), with development support from the Wildlife Conservation Society (WCS) Thailand. Currently, the program integrates mobile applications to enhance GPS tracking, communication, and reporting capabilities. It features a user-friendly interface and real-

time data sharing, including SMART Mobile, SMART Connect, and SMART Sensor—which incorporates drones for surveillance, camera traps, and GPS trackers.

Given the ongoing challenges in Mae Hong Son Province, including a surge in forest loss and land degradation caused by intensifying conflicts in Thailand's border areas, the SMART Patrol System and NCAPs have become essential tools for monitoring and mitigating these threats. These technologies are used not only for patrolling and security but also for citizen science initiatives and community reporting, helping to detect and prevent illegal activities such as logging, poaching, and land encroachment. The program has been effectively implemented in and around targeted community forests and a national reserve forest in Mae Hong Son Province, northern Thailand.

This initiative marks the first time in Thailand that a SMART Patrol System prototype from the Department of National Parks, Wildlife and Plant Conservation (DNP) has been customized for use by the Royal Forest Department (RFD). This adaptation represents a major milestone in applying advanced surveillance methods to protect managed community forests and national reserve forests in Mae Hong Son Province. It also signifies a significant step forward in Thailand's forest conservation strategy.

Therefore, SMART Patrol technology can be effectively integrated not only for patrolling and security but also for citizen science initiatives and reporting illegal activities such as logging, poaching, and land encroachment. This system has been successfully applied in and around _four target community forests and a national reserve forest_ in Mae Hong Son Province, northern Thailand.

> *"SMART (Spatial Monitoring and Reporting Tool) and NCAP (National Community-based Anti-poaching Program)" as key tools for conservation management.*

Key Points of SMART Patrol System:

1. **Community Engagement**

   Communities can use technology to report illegal activities in real-time through specially designed applications, allowing users to send information about **logging or poaching** directly to relevant authorities.

2. **Scientific Data Collection**

   Community members can participate in **data collection and environmental monitoring**, tracking biodiversity and habitat changes. This data helps analyze the impacts of illegal activities and supports conservation efforts.

3. **Raising Awareness**

   SMART Patrol technology can be used to launch awareness campaigns about the **impacts of deforestation and the importance of conservation**, encouraging communities to actively protect natural resources.

4. **Linking Data with Authorities**

   Information from community reports can serve as a valuable **database** for conservation agencies, improving **planning, decision-making, and rapid responses** to illegal activities.

The Summary of Integrating SMART Patrol technology with citizen science initiatives strengthens conservation efforts and promotes responsible stewardship of natural resources in target community forests. This approach not only enhances patrol efficiency but also empowers communities to play an active role in protecting their environment sustainably and effectively.

Main activities

The principal tasks involve taking overall responsibility to:

Develop and install SMART PATROL smart technologies for citizen science and community reporting illegal activities (logging, poaching and encroachment) in Mae Hong Son Province, northern Thailand (*Activity 1.2*).

Task:

For this project to develop and install SMART PATROL smart technologies for citizen science and community reporting illegal activities (logging, poaching and encroachment).

Select four target Community Forests (Comm. Forest), and one of National Reserve Forest (NRF) for SMART Patrol set up:

- ❖ Tor Pae Comm. Forest
- ❖ Thung Paem Comm. Forest
- ❖ Le Koh Comm. Forest (587 rai)
- ❖ Pra Tu Muang Comm. Forest (3 sites; total area 2,354 rai)
- ❖ National Reserve Forest, Forest Protection Unit Officers, M.S.3 (Khun Yuam), and M.S.9 (Sop Moei)

One of the four community forests selected for the project is Pra Tu Muang Community Forest. Mr. Sitthichai Jinamoy is introducing the technologies of the SMART and NCAP Surveillance Systems.

Recruit Mr. Sitthichai Jinamoy as a Consultant for the SMART and NCAP Surveillance System development from 1st July 2024 to 1st March 2025.

Since the date of recruitment, Sitthichai Jinamoy has done the following activities; review past and current SMART PATROL technologies used in Thailand (advantages, limitations, and recommendations for improvement) and provide the device of the equipment for the supporting SMART PATROL SYSTEM.

The overall Concept diagram for developing this ITTO Project (PD-A/60-369)
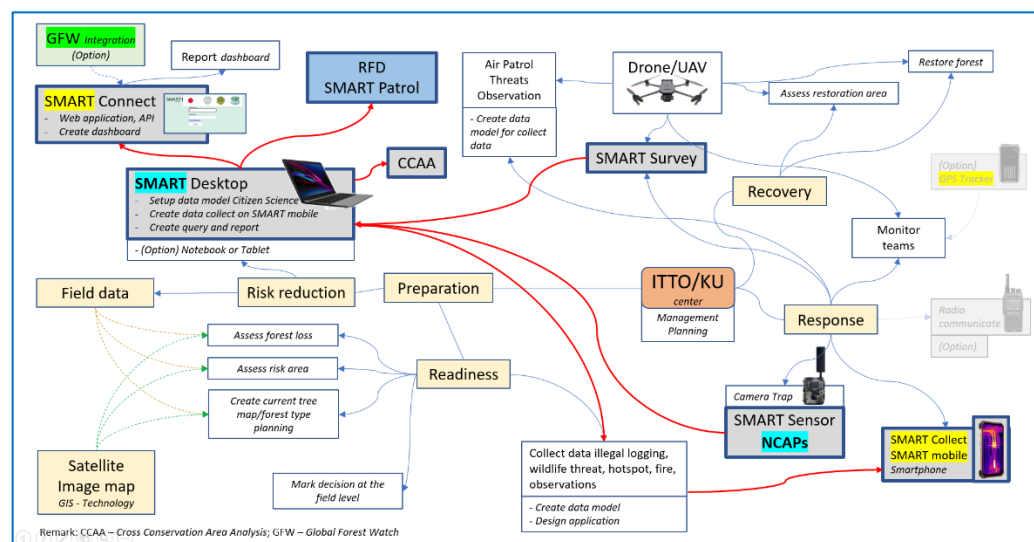
Overall Concept SMART diagram in 2024 for ITTO project

Concept Ideas for…
SMART Surveillance Technology support on Forest Loss and Degradation Monitoring

Study and analyze SMART PATROL data related to the agency's main missions. Prepare, collect, and analyze data related to work development and indicators for community-based data collection design *(SMART Collection Data Forms).*

- ❖ SMART Patrol Planning Form.
- ❖ SMART Patrol Observation Form.
- ❖ SMART Incident Form.

Install cameras and NCAPS technologies for real time monitoring and reporting illegal activities (logging, poaching and encroachment) in and around the 5 target community forests, and conduct trainings and workshops on smart technology surveillance systems that integrates cutting-edge technologies to stakeholders (*Activity 1.3*).

- ❖ NCAPs location and signal test (3G/4G/LTE) Form, for recording detail setup before install camera trap and change location.

Key Findings and Outcomes

- o Increased community engagement led to a rise in reported illegal activities compared to previous years.

- o Improved real-time monitoring enabled authorities to respond faster to reported incidents.
- o The integration of drone technology and satellite imagery provided accurate and timely evidence for enforcement actions.
- o Strengthened collaboration between local authorities and communities resulted in more effective protection of natural resources.

Logo - ITTO Forest Loss
Monitoring Project
(PD-A/60-369)

Geographical Location of Mae Hong Son Province

Mae Hong Son is a mountainous province in northern Thailand, located at approximately 19.3020° N latitude and 97.9654° E longitude. It shares borders with Myanmar to the north and west, and with the Thai provinces of Chiang Mai to the east and Tak to the south. The province is characterized by rugged terrain, dense forests, and remote valleys, making it one of the least accessible provinces in Thailand. Due to its geographical isolation, Mae Hong Son has retained its rich biodiversity and traditional ethnic cultures, but also faces challenges such as illegal logging, poaching, and land encroachment.

Mae Hong Son Map

Training

Work with the project team to conduct training and workshops on smart technology surveillance systems for stakeholders (e.g., local authorities, community groups and youth).

Task:

Set up SMART Patrol - NCAPs training and Committee workshop.

Result

Develop SMART System Design:

- ❖ One of Data Model design for collecting data with Community Forest and National Reserve Forest.
- ❖ Four collection data forms (1) SMART Patrol Planning, (2) SMART Patrol Observation, (3) SMART Incident, (4) Signal Location data check and NCAPs location data Forms *(Appendix – Data Form)*.

NCAPs:

- ❖ Fifteen Spartan GoCam 4G/LTE camera traps have been installed in four Community Forests and National Reserve Forests.

Training and Workshop:

Training - workshop for forest Rangers, community groups and youth in and around the 4 target community forests, and One National Reserve Forest.

- ❖ NCAPs Training: There were a total of 37 participants and 5 lecturers sharing knowledge about NCAPs from Phu Khieo Wildlife Sanctuary (25-29 October 2024).
- ❖ SMART: Two persons from ITTO field staff, and government officer.

Pre-survey by ITTO Forest Loss Monitoring Project teams (3-5 August 2024, and second time on 10-14 September 2024)

NCAPs camera trap setup, and learning workshop (24-29 October 2024)

SMART Mobile learning by Community Forest (7-11 January 2025)

Over all training and workshop, Mae Hong Son Province

- ❖ One-Day trip workshop on NCAPs for ITTO Project Committee at Salak Pra Wildlife Sanctuary.
- ❖ SMART Mobile Training: the training was held on 7 – 11 January 2025 with a total of 37 participants.

Collaboration in conservation work is essential to facilitate the development of systems and technologies for future management of target areas.

This photo shows a workshop to visit and observe the use of SMART Mobile and the installation of camera traps to monitor illegal forestry activities. The picture shows a meeting with the assistant of headquarters, Salak Phra Wildlife Sanctuary, Kanchanaburi Province, and Panthera Thailand team on camera trap techniques to discuss cooperation in applying this system in Mae Hong Son Province.

Collaborative Conservation Efforts

Collaboration is essential for facilitating the development of SMART and NCAP technologies to improve the management of target areas in the future. Successful conservation initiatives depend on knowledge exchange, capacity building, and technology transfer among stakeholders.

1. Case Study: SMART Mobile at Salak Phra Wildlife Sanctuary

The SMART Mobile system was first introduced and tested at Salak Phra Wildlife Sanctuary, marking a significant advancement in real-time patrol monitoring. The system enabled rangers to track illegal activities, record field observations, and generate instant reports using mobile applications, enhancing enforcement efficiency. Lessons learned from this pilot project serve as a foundation for expanding SMART Mobile to community forests and national reserve forests in Mae Hong Son.

2. Best Practices in NCAPs Camera Trap Deployment by Panthera Thailand

The Panthera Thailand has pioneered advanced camera trap deployment techniques for wildlife monitoring and anti-poaching strategies. Their approach involves:

- ❖ *Strategic camera placement* in high-risk areas to maximize detection of illegal activities.
- ❖ *AI-driven image analysis* to differentiate between wildlife and human intrusions efficiently.
- ❖ *Integration with SMART Sensor* for real-time data transmission and automated alerts to enforcement teams.

These proven methods can be adapted and applied to the Mae Hong Son initiative, strengthening its surveillance capabilities and ensuring more effective conservation management.

Sustainability

Ensuring the long-term sustainability of the SMART and NCAP Surveillance and Monitoring System requires continuous support, strategic planning, and community engagement. The key aspects of sustainability in this initiative include:

1. Institutional and Financial Sustainability

- ❖ Securing long-term funding from government agencies, international organizations, and conservation grants to maintain and expand operations.
- ❖ Establishing multi-sector partnerships with NGOs, research institutions, and private sector stakeholders to diversify financial support.

2. Community Involvement and Capacity Building

- ❖ Conducting regular training programs to enhance the skills of local community members in using SMART tools, reporting illegal activities, and managing conservation efforts.
- ❖ Implementing incentive mechanisms such as recognition programs, small grants, or livelihood support to encourage sustained community participation.

3. Technological Adaptation and Innovation

- ❖ Continuously upgrading SMART and NCAP systems to integrate new technologies such as AI-powered analytics, satellite monitoring, and blockchain for transparent reporting.
- ❖ Ensuring data security and accessibility to protect sensitive information while allowing relevant authorities and communities to benefit from real-time insights.

4. Policy Integration and Legal Framework *(see the A Policy Brief in the last section)*

- ❖ Advocating for the integration of SMART and NCAP-based monitoring into national and local conservation policies to ensure long-term governmental support.

Strengthening legal enforcement mechanisms to empower local authorities in taking action against illegal activities based on SMART data

Conclusion and Recommendations

The strengthening of SMART and NCAP Surveillance and Monitoring System has proven to be a valuable tool in protecting Mae Hong Son's natural resources. By integrating technology with citizen science, illegal activities have been identified and addressed more effectively. Moving forward, the following recommendations should be considered:

- ❖ Expanding the system to other regions with similar environmental challenges.
- ❖ Increasing funding and resources for technological advancements.
- ❖ Strengthening legal frameworks to support community-led environmental monitoring.
- ❖ Continuing education and capacity-building programs for local stakeholders.

Mae Hong Son Province can serve as a model for other regions facing similar environmental challenges. This initiative highlights the importance of community participation and technological innovation in conservation efforts. The strengthened SMART and NCAP system is a model for future projects to safeguard Thailand's rich biodiversity.

Appendix

Data Form

Over all ITTO – Forest Loss Monitoring Project Forms for

" SMART AND NCAP SURVEILANCE SYSTEM ".

❖ SMART Patrol Planning Form.
    Used to plan and organize patrol activities,
    including routes, timings, and personnel deployment.

SMART and NCAPs Forms

ITTO-Forest Loss Monitoring Project Patrol Operator Sign-up Form in Mae Hong Son Province				
Patrol route			Patrol Distance	
Head of Operations Team				
Operation Date (day/month/year)			Times	
No.	Name	Position	Signature	Signed and certified (by project officer or team leader)

ITTO-Forest Loss Monitoring Project Patrol Operator Sign-up and SMART Planning Form in Mae Hong Son Province

❖ SMART Patrol Observation Form.

แบบฟอร์มสังเกตการณ์การลาดตระเวน

ชื่อชุดลาดตระเวน/ชื่อหมู่บ้าน...ชื่อ-สกุล ผู้รายงาน...
สถานที่ลาดตระเวน...รูปแบบการลาดตระเวน ☐ เดินเท้า ☐ จักรยานยนต์ ☐ รถยนต์
วัน/เดือน/ปี เริ่มต้นลาดตระเวน.......................เวลา...........น. วัน/เดือน/ปี สิ้นสุดลาดตระเวน.......................เวลา...........น.
วัตถุประสงค์ของการลาดตระเวน...
รายชื่อผู้เข้าร่วมลาดตระเวน..
พิกัดเริ่มต้นลาดตระเวน (X,Y)..............................พิกัดสิ้นสุดลาดตระเวน (X,Y).......................................

สัตว์ป่า			ปัจจัยนิเวศ			ปัจจัยคุกคาม		
ชนิดสัตว์	ระบุชนิด	จำนวน	ชนิดปัจจัยนิเวศ	จำนวน	หน่วย	ชนิดปัจจัยคุกคาม	จำนวน	หน่วย
☐ พบเห็นตัว			☐ ต้นไม้			☐ ล่าสัตว์		
☐ ร่องรอย			☐ พืช			☐ ตัดไม้		
☐ เสียงร้อง			☐ อื่นๆ			☐ เก็บหาของป่า		
☐ ซาก(ธรรมชาติ)			ระบุชนิด........			ระบุชนิด........		

พิกัด X / Y ....   พิกัด X / Y ....   พิกัด X / Y ....

รายละเอียดอื่นๆ ....   รายละเอียดอื่นๆ ....   รายละเอียดอื่นๆ ....

ไฟป่า	☐ พบเห็นไฟป่ากำลังลุกไหม้	พิกัดเริ่มต้น:X.........Y.........	รายละเอียดอื่นๆ
	☐ ร่องรอยขบวนย์จุดไฟป่า	พิกัดสิ้นสุด:X.........Y.........	
	☐ ร่องรอยไฟป่า(ดับแล้ว)	พื้นที่ไฟไหม้.........(ไร่/ตารางเมตร)	
	☐ สมริกำลังดับไฟป่า	ระบุพื้นที่เสียหาย.........	

ชนิดสัตว์			ปัจจัยนิเวศ			ปัจจัยคุกคาม		
ชนิดสัตว์	ระบุชนิด	จำนวน	ชนิดปัจจัยนิเวศ	จำนวน	หน่วย	ชนิดปัจจัยคุกคาม	จำนวน	หน่วย
☐ พบเห็นตัว			☐ ต้นไม้			☐ ล่าสัตว์		
☐ ร่องรอย			☐ พืช			☐ ตัดไม้		
☐ เสียงร้อง			☐ อื่นๆ			☐ เก็บหาของป่า		
☐ ซาก(ธรรมชาติ)			ระบุชนิด........			ระบุชนิด........		

พิกัด X / Y ....   พิกัด X / Y ....   พิกัด X / Y ....

รายละเอียดอื่นๆ ....   รายละเอียดอื่นๆ ....   รายละเอียดอื่นๆ ....

ไฟป่า	☐ พบเห็นไฟป่ากำลังลุกไหม้	พิกัดเริ่มต้น:X.........Y.........	รายละเอียดอื่นๆ
	☐ ร่องรอยขบวนย์จุดไฟป่า	พิกัดสิ้นสุด:X.........Y.........	
	☐ ร่องรอยไฟป่า(ดับแล้ว)	พื้นที่ไฟไหม้.........(ไร่/ตารางเมตร)	
	☐ สมริกำลังดับไฟป่า	ระบุพื้นที่เสียหาย.........	

The Patrol Observation Form is Designed for documenting field observations during patrols, including environmental conditions, wildlife sightings, and any illegal activities observe.

❖ SMART Incident Form.

Comm. Forest – Form 001

แบบฟอร์มการรับแจ้งเหตุโดย ชุมชน...

ชื่อสถานที่เกิดเหตุ...............................

รหัส	พิกัด		รูปแบบการกระทำผิด			ปริมาณ	
	X	Y	เก็บหาของป่า	ล่าสัตว์	ตัดไม้	จำนวน	ตัว/ต้น/ท่อน/กก.

ชนิดของป่า : ☐ หน่อไม้ ☐ กล้วยไม้   ชนิดสัตว์ : ☐ กวาง ☐ เก้ง   ชนิดไม้ : ☐ สัก ☐ ประดู่
☐ เห็ด ☐ สมุนไพร   ☐ ตะกวด ☐ นก   ☐ แดง ☐ มะค่า
☐ หวาย ☐ อื่นๆ............   ☐ อื่นๆ...........   ☐ ชิงชัน ☐ อื่นๆ............

ชนิดของอุปกรณ์การกระทำผิด :   ชื่อ-สกุล ผู้กระทำผิด : ....
☐ กับดัก ☐ ปืน ☐ มีด   ที่อยู่................................เบอร์โทรศัพท์.......................
☐ เลื่อย ☐ บ่วงแร้ว ☐ อื่นๆ............   เหตุหรือแรงจูงใจในการกระทำผิด...............................

สิ่งของหรืออุปกรณ์อื่นๆที่พบในจุดเกิดเหตุ   ลักษณะของสถานที่เกิดเหตุ   หมายเหตุ :
อธิบาย :   อธิบาย :

The community incident reporting form is used when an incident is found by illegal threats. The activity can be recorded in advance and reported using the mobile application.

❖ NCAPs location and signal test (3G/4G/LTE) Form

แบบฟอร์มเช็คสัญญาณจุดตั้งกล้อง NCAPs

ชื่อชุดเช็คสัญญาณ/ชื่อหมู่บ้าน...ชื่อ-สกุล ผู้รายงาน...

สถานที่เช็คสัญญาณ...รูปแบบการลาดตระเวน ☐ เดินเท้า ☐ จักรยานยนต์ ☐ รถยนต์

วัน/เดือน/ปี เริ่มต้นเช็คสัญญาณ.........................เวลา.............น. วัน/เดือน/ปี สิ้นสุดเช็คสัญญาณ...........................เวลา.............น.

วัตถุประสงค์ของการเช็คสัญญาณ...

รายชื่อผู้เข้าร่วมลาดตระเวน...

พิกัดเริ่มต้นการเช็คสัญญาณ.................................พิกัดสิ้นสุดการเช็คสัญญาณ.................................

ชนิดของเส้นทาง ☐ ถนน ☐ ทางดิน ☐ แนวกันไฟ ☐ อื่นๆ ระบุ.................................

รูปแบบของเส้นทาง ☐ ทางเดินเท้า ☐ ทางจักรยานยนต์ผ่านได้ ☐ ทางรถยนต์ผ่านได้ ☐ ทางด่านสัตว์

ประเภทของเส้นทาง ☐ ลาดยาง ☐ ปูน ☐ ลูกรัง ☐ ดิน

ตารางการเช็คสัญญาณโทรศัพท์

พิกัด	X		พิกัด	X		พิกัด	X	
	Y			Y			Y	

สัญญาณโทรศัพท์ ☐3G ☐4G ☐5G (TRUE, AIS, DTAC)	สัญญาณโทรศัพท์ ☐3G ☐4G ☐5G (TRUE, AIS, DTAC)	สัญญาณโทรศัพท์ ☐3G ☐4G ☐5G (TRUE, AIS, DTAC)
การรับสัญญาณเน็ต ☐ เล่นเน็ตได้ ☐ เล่นได้แต่ช้า ☐ เล่นไม่ได้เลย	การรับสัญญาณเน็ต ☐ เล่นเน็ตได้ ☐ เล่นได้แต่ช้า ☐ เล่นไม่ได้เลย	การรับสัญญาณเน็ต ☐ เล่นเน็ตได้ ☐ เล่นได้แต่ช้า ☐ เล่นไม่ได้เลย
รายละเอียดอื่นๆ	รายละเอียดอื่นๆ	รายละเอียดอื่นๆ ....

แผนที่โดยสังเขป   N ⬆

หมายเหตุ

สอนการใช้ Network Cell Inof app.

ในการบันทึกข้อสัญญาณโทรศัพท์

เพื่อเลือกเป็นจุดในการตั้งกล้องและการย้ายที่ตั้งกล้อง NCAPs.

Telephone signal check Form

แบบฟอร์มติดตั้งกล้อง NCAPS

ชื่อสถานที่ติดตั้งกล้อง.................................ชื่อชุดลาดตระเวน / ชื่อหมู่บ้าน.................................

หมายเลขกล้อง.................................หมายเลขครุภัณฑ์.................................

หมายเลขโทรศัพท์.....................วันที่.........เดือน.............ปี.............เวลา.........น.

พิกัดที่ติดตั้ง X.................. Y..................ชนิดถ่าน.............จำนวนถ่าน.............ก้อน

รหัสกุญแจ.................รหัสสายรัดกล้อง.................   **แผนที่เส้นทางติดตั้งกล้องโดยสังเขป**

ชนิดป่า ☐ ป่าเบญจพรรณ ☐ ป่าเต็งรัง ☐ ป่าดิบแล้ง ☐ ป่าดิบชื้น ☐ ป่าสน ☐ ทุ่งหญ้า

N ⬆

ระยะเวลาจากจุดเริ่มต้นถึงจุดติดตั้ง.................................

ระยะทางจากจุดติดตั้งถึงจุดเริ่มต้น.................................

รายละเอียดอื่นๆที่สำคัญ.................................

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Camera trap location change Form

A Policy Brief

Strengthening SMART and NCAP Surveillance for Forest Protection in Mae Hong Son, Thailand

Illegal logging, poaching, and land encroachment in Mae Hong Son Province have significantly contributed to forest degradation and biodiversity loss. Given its remote location and complex terrain, traditional enforcement methods alone have proven insufficient. The SMART Patrol System and NCAP (Nature Crime Analysis Platform, including Camera Traps) offer innovative, technology-driven solutions to enhance surveillance and monitoring. However, sustaining and scaling these efforts require policy support, institutional collaboration, and community engagement.

Objective

This policy brief aims to advocate for the integration of SMART and NCAP technologies into Thailand's national conservation strategy, ensuring effective forest protection through:

- ❖ *Improved real-time monitoring* to detect and respond to illegal activities.
- ❖ *Enhanced data-driven enforcement* through SMART analytics and NCAP camera traps.
- ❖ *Community participation and capacity building* to strengthen citizen-led reporting and conservation efforts.
- ❖ *Institutional adoption and resource allocation* to sustain long-term implementation.

Evidence and Justification

Success of SMART and NCAP Implementation

- ❖ *Enhanced Enforcement:* Real-time monitoring has led to a 30% increase in reported illegal activities, allowing faster response by authorities.
- ❖ *Proven Technology:* The SMART Mobile system, successfully piloted at Salak Phra Wildlife Sanctuary, demonstrated improved patrol efficiency and data collection.
- ❖ *Effective Camera Deployment:* The Panthera Thailand's NCAP camera trap techniques have yielded higher detection rates, providing crucial evidence for prosecution.
- ❖ *Community Impact:* Engaging local communities in reporting illegal activities has fostered stronger environmental stewardship.

Recommendations

To maximize the effectiveness of SMART and NCAP surveillance systems, the following policy actions are recommended:

- ❖ *Institutionalization* – Integrate SMART and NCAP technologies into the Royal Forest Department (RFD) and local conservation policies.
- ❖ *Capacity Building* – Develop long-term training programs for rangers, local authorities, and community members on surveillance and reporting techniques.
- ❖ *Sustainable Financing* – Allocate government funding and seek partnerships with NGOs and private sectors to support system maintenance and expansion.
- ❖ *Legal Framework Strengthening* – Enhance policy enforcement mechanisms to ensure SMART and NCAP-generated evidence is legally admissible.
- ❖ *Technology Expansion* – Invest in advanced AI analytics, drones, and satellite monitoring to improve surveillance coverage and efficiency.

Conclusion

Integrating SMART and NCAP technologies into conservation policies is crucial for effectively addressing illegal activities and ensuring sustainable forest management in Mae Hong Son. With strong policy support, multi-sector collaboration, and active community involvement, Thailand can set a leading example for utilizing technology-driven conservation strategies to safeguard its national reserve forests.

Group photo show the camera trap location in National Reverse Forest.

Through continuous innovation, policy support, and cross-sector collaboration, SMART and NCAP can become a powerful force in preserving biodiversity, safeguarding ecosystems, and ensuring a more resilient future for both people and nature.

The strengthening of the SMART and NCAP Surveillance and Monitoring System in Mae Hong Son Province represents a groundbreaking step in integrating technology, community engagement, and conservation efforts to combat illegal activities and protect natural resources. By leveraging real-time data collection, citizen science, and strategic collaborations, this initiative has enhanced enforcement capabilities, empowered local communities, and fostered a more sustainable approach to forest and wildlife conservation.

SMART AND NCAP SURVEILANCE SYSTEM
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