



SMART Mobile System

# Final 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 and Mr. Tanavi prasopsuk, March 2025





# SMART System

“DEVELOP SMART PATROL

AND SMART SYSTEM (SMART MOBILE SYSTEM)”

*By Mr. Sitthichai Jinamoy and Mr. Tanavi prasopsuk, March 2025*

# DEVELOP SMART PATROL AND SMART SYSTEM (SMART MOBILE 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 Systems for citizen science and community reporting illegal activities in Mae Hong Son Province, Thailand.

## Summary

### Background and Context

Mae Hong Son, a province in northern Thailand bordering Myanmar, is distinguished by its mountainous terrain, rich biodiversity, and diverse ethnic communities. Despite its natural beauty, the region faces persistent threats, including illegal logging, poaching, and land encroachment. Additionally, increasing border conflicts have contributed to accelerated deforestation and land degradation, underscoring the need for improved monitoring and conservation strategies.

To counter these environmental challenges, the initiative *“Enhancing Surveillance and Monitoring to Address Escalating Forest Loss and Land Degradation Amid Rising Border Conflicts in Thailand”* has introduced advanced technologies such as the **SMART Patrol System** and **NCAPs** (*Nature Crime Analysis Platforms, particularly Camera Traps*). These tools have proven instrumental in supporting local conservation efforts, enabling better law enforcement, and engaging communities in safeguarding Mae Hong Son’s forests and wildlife.

For over two decades, Thailand has utilized the **“SMART Patrol System”**, a surveillance approach that integrates **SMART** (*Spatial Monitoring and Reporting Tool*), a data-driven system that incorporates GPS tracking, systematic monitoring, and real-time reporting. This technology has played a critical role in improving ranger efficiency, enhancing area protection, and stabilizing wildlife populations, particularly tigers. The system has also contributed to a decrease in illegal activities by aiding in the detection of poaching camps and other environmental crimes.

The SMART program is currently in operation across multiple 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 the support of Wildlife Conservation Society (WCS) Thailand. Recent advancements in SMART technology have introduced mobile applications like SMART Mobile, SMART Connect, and SMART Sensor, which integrate GPS tracking, communication systems, and real-time data sharing. These tools, combined with drones, camera traps, and GPS trackers, enhance surveillance and facilitate proactive conservation efforts.

In response to the growing environmental concerns in Mae Hong Son, the **SMART Patrol System and NCAPs** have become essential for monitoring and mitigating threats to the region's forests. Beyond law enforcement, these technologies are being leveraged for **citizen science initiatives and community-led monitoring**, allowing local stakeholders to report and prevent illegal activities such as deforestation, wildlife poaching, and land encroachment. The program has been successfully implemented within **key Community Forests and a National Reserve Forest in Mae Hong Son Province**, strengthening regional conservation initiatives.

This initiative marks a significant milestone, as it represents the first time in Thailand that the **SMART Patrol System, originally developed by the Department of National Parks, Wildlife, and Plant Conservation (DNP), has been adapted for use by the Royal Forest Department (RFD)**. This adaptation highlights an important step in utilizing advanced surveillance technology to safeguard both **community-managed and national reserve forests**, reinforcing Thailand's national conservation strategies.

Ultimately, the **SMART Patrol System** has proven to be a highly effective conservation tool, not only for security and patrol operations but also for fostering **community engagement in environmental protection**. By incorporating citizen science and local participation, the initiative strengthens efforts to combat illegal activities in the **four designated Community Forests and a National Reserve Forest in Mae Hong Son Province, northern Thailand**.

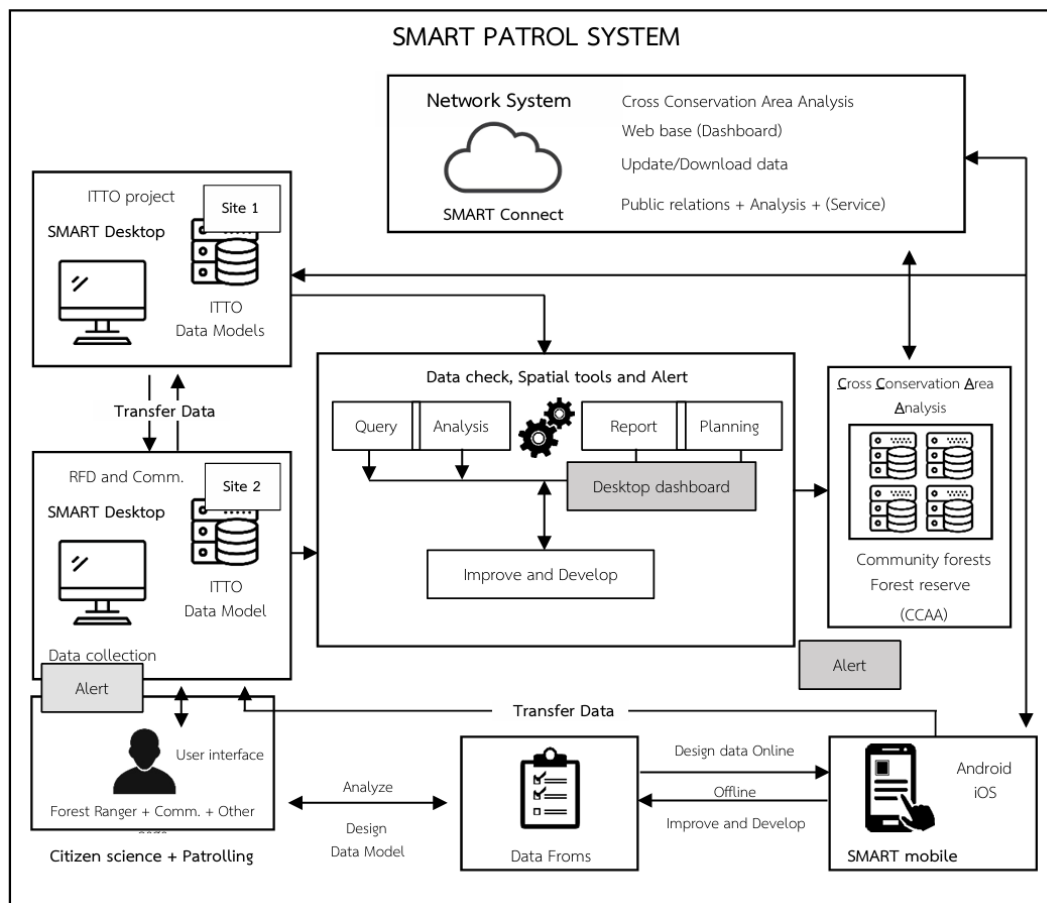
### **What is the SMART System?**

The SMART System (Spatial Monitoring And Reporting Tool) is a technology-driven approach designed to enhance wildlife and forest protection through systematic patrols, data collection, and real-time monitoring. Key features of the SMART System include:

- ❖ **GPS and Digital Mapping:** Enables rangers to track patrol routes, record incidents, and collect geospatial data.
- ❖ **Systematic Monitoring and Reporting:** Rangers document illegal activities such as poaching, logging, and land encroachment using a structured database.
- ❖ **Real-time Data Analysis:** The system uses software to analyze collected data, identifying trends and threats to conservation areas.
- ❖ **Enhanced Ranger Efficiency:** SMART helps optimize patrol efforts, boosting morale and effectiveness in protecting biodiversity.

SMART has been successfully implemented in various wildlife sanctuaries in Thailand, including Thungyai Naresuan and Huai Kha Khaeng. For the first time, it has now been adapted for community forests and national reserve forests under the Royal Forest Department (RFD), expanding conservation efforts beyond National Parks (NP) and Wildlife Sanctuary (WS).

The overall SMART PATROL system for this project:



Overall SMART Patrol in 2024  
for ITTO project

## Main activities

The principal task of the Sub-contractor is to collaborate and assist the project staff to develop and install SMART PATROL smart technologies for citizen science and community reporting illegal activities (logging, poaching and encroachment) in and around the target community forests (*support - activity 1.3, item 44.2 SMART mobile system*).



The specific functions and responsibilities will include the following:

## SMART Patrol

SMART Patrol is a strategic system designed to enhance the protection of forests and wildlife through systematic monitoring, data collection, and law enforcement. It is a key component of the SMART System, which uses GPS, mobile applications, and real-time data analysis to improve conservation efforts.

Key features of the SMART System include:

- ❖ GPS and Digital Mapping: Allows rangers to track patrol routes, record incidents, and collect geospatial data.
- ❖ Systematic Monitoring and Reporting: Rangers document illegal activities, such as poaching, logging, and land encroachment, using a structured database.
- ❖ Real-time Data Analysis: The system utilizes software to analyze collected data, identifying trends and potential threats to conservation areas.
- ❖ Enhanced Ranger Efficiency: SMART optimizes patrol efforts, increasing ranger morale and effectiveness in protecting biodiversity.

SMART Patrol has been successfully implemented in Thailand's national parks and wildlife sanctuaries. For the first time, this system has been adapted for use in community forests and national reserve forests under the Royal Forest Department (RFD) to improve conservation and security in areas like Mae Hong Son Province.

### Task:

This project aims to develop and install SMART PATROL technologies for citizen science and community-based reporting of illegal activities (such as logging, poaching, and encroachment).

The project will establish four target Community Forests (Comm. Forests) and one National Reserve Forest (NRF):

- ❖ Tor Pae Comm. Forest
- ❖ Thung Paem Comm. Forest
- ❖ Le Koh Comm. Forest
- ❖ Pra Tu Muang Comm. Forest
- ❖ Additionally - National Reserve Forest, Forest Protection Unit Officers from M.S.3 and M.S.9

*Collaborate with Mr. Sitthichai Jinamoy (Consultant #2) to link SMART Patrol with SMART Desktop and SMART Connect.*

*Since his recruitment, Mr. Sitthichai Jinamoy has carried out the following activities: reviewing past and current SMART PATROL technologies used in Thailand (including their advantages, limitations, and recommendations for improvement), and providing the necessary equipment for supporting the SMART PATROL SYSTEM. He then*

**SMART Patrol is a strategic system designed to enhance the protection of forests and wildlife through systematic monitoring, data collection, and law enforcement.**

forwarded the information to Mr. Tanavi Prasopsuk to assist with data analysis and to design the required database structure for data storage.

Based on the SMART Collection Data Forms, design a data model for structured data collection for the SMART ITTO Forest Loss Project. Develop SMART PATROL, SMART CONNECT, and SMART MOBILE to meet specific needs and connect to personal devices (mobile phone applications) and the SMART Connect website. This will assist local authorities, community groups, and youth in addressing community forest loss and degradation.

Create a data model for the SMART program to collect data and report illegal activities (such as logging, poaching, and encroachment)..

#### ❖ SMART Desktop Program “ITTO – Forest Loss Monitoring Database” for this project



Welcome to the SMART Desktop Program Login Page.

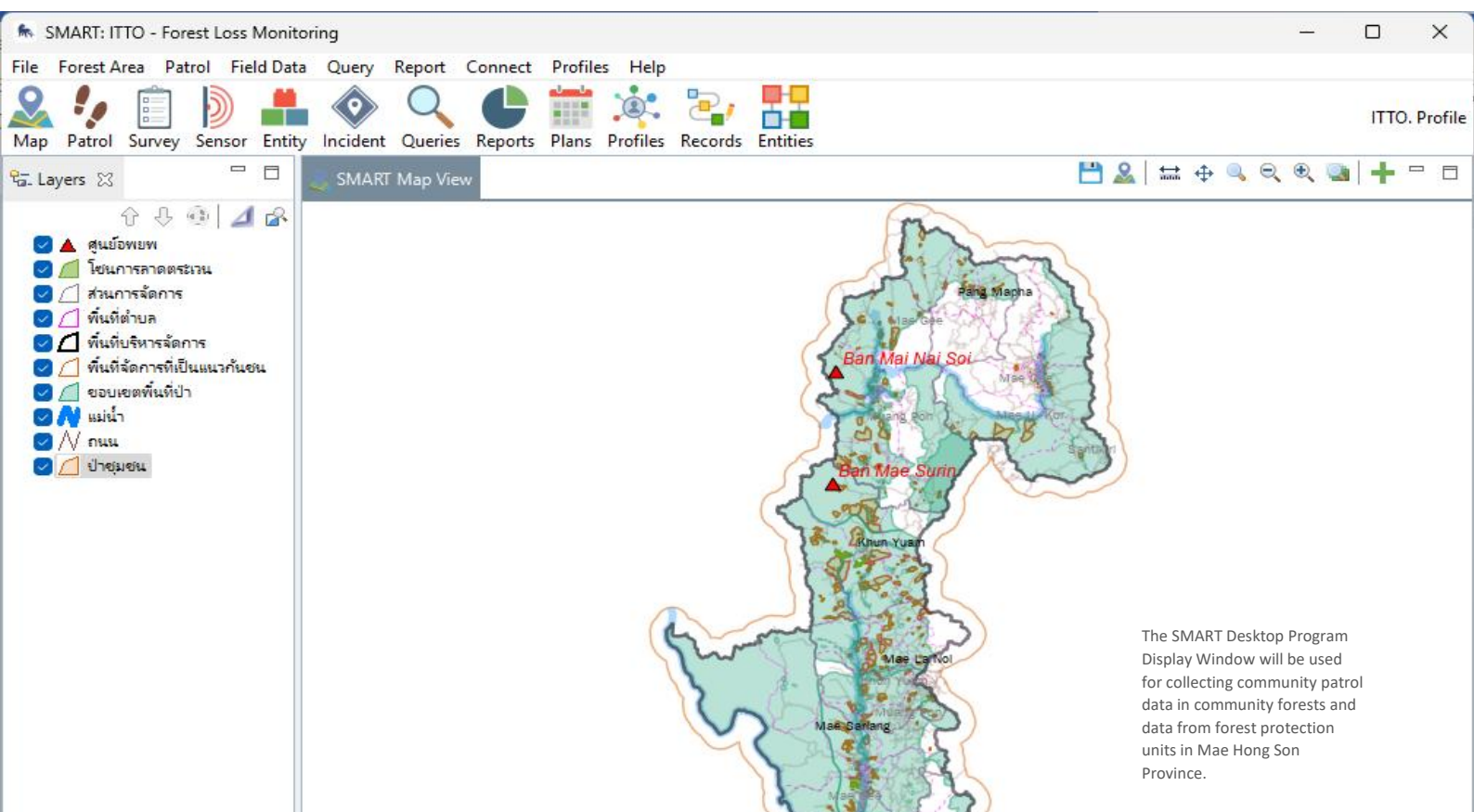
#### ❖ SMART Desktop

Create the SMART database and provide training for ITTO field staff in February 2025.

### LEARNING SMART



SMART training, suggest, introduction history, and developing of SMART Desktop Program in Thailand by Mr. Sitthichai Jinamoy (consultant of ITTO Project).



The SMART Desktop Program Display Window will be used for collecting community patrol data in community forests and data from forest protection units in Mae Hong Son Province.

# NCAPs

NCAPs (Nature Crime Analysis Platforms) is an advanced surveillance system designed to support environmental law enforcement and conservation efforts. It integrates camera traps, satellite imagery, and data analytics to monitor and analyze illegal activities such as deforestation, poaching, and land encroachment..

How NCAPs Links to SMART Desktop and SMART Sensor:

## NCAPs & SMART Sensor:

- ❖ Camera traps within NCAPs function as part of the SMART Sensor system, capturing images and videos of wildlife and human activities.
- ❖ These images serve as evidence of illegal activities, assisting law enforcement in taking immediate action.

## NCAPs & SMART Desktop:

- ❖ Data from camera traps is transferred to SMART Desktop, where it is analyzed, visualized, and mapped for conservation planning.
- ❖ Authorities use this platform to identify hotspots of illegal activities and enhance patrol strategies.

In Mae Hong Son Province, NCAPs play a crucial role in enhancing the efficiency of SMART Patrols, supporting community-led conservation efforts, and improving data-driven decision-making for law enforcement. Installed cameras and NCAPS technologies for real time monitoring and reporting illegal activities (logging, poaching and encroachment) in and around the 5 target forests.

### Task:

Review the camera trap technologies used in Thailand, known as 'NCAPs,' including their advantages, limitations, and recommendations for improvement. Additionally, provide the necessary equipment to support and integrate with the SMART PATROL SYSTEM.

*NCAPs is an advanced surveillance system designed to assist environmental law enforcement and conservation efforts.*

Collaborate with forest rangers and the heads of target community forests to identify suitable sites (three sites per target area) for installing NCAP cameras.

Purchase and install NCAP cameras, and regularly monitor their operation.

- ❖ Purchase 15 Spartan GoCam 4G/LTE camera traps.

## LEARNING NCAPS



Training on Setting Up the Spartan GoCam 4G/LTE Camera Trap

## NCAPs Technology Support for the ITTO Forest Loss and Degradation Monitoring Project



The International Spartan GoCam 4G/LTE is supported in Europe, Middle East, Africa, Korea, Thailand, and India. This cellular trail camera gives you flexibility in the quality of images and videos, keeping you energy-efficient while serving your scouting and surveillance needs. External power options can reduce trips with a compatible solar panel kit for a more permanent setup.



- ❖ Obtain 15 SIM cards from True service to transmit real-time data (videos and pictures).
- ❖ Register the Spartan camera on the website for real-time data monitoring:

<https://my.spartancamera.com/home>



NCAPs Training:  
How to set up  
tree-mounted  
and hidden  
camera traps.  
Training  
conducted by  
five trainers  
from the Phu  
Khieo Wildlife  
Sanctuary team.



NCAPs Setup Manual

The Spartan GoCam 4G/LTE is a wireless camera trap designed for remote surveillance and wildlife monitoring. It uses cellular connectivity to transmit images and videos in real time, making it an effective tool for integrating SMART Sensors and NCAPs in environmental protection and law enforcement.

#### Key Features of Spartan GoCam 4G/LTE:

- ❖ **Real-Time Image Transmission:** Sends captured images and videos instantly through 4G LTE networks.
- ❖ **Motion-Activated Camera:** Uses infrared (IR) sensors to detect movement and automatically capture photos or videos.
- ❖ **Cloud-Based Storage:** Supports remote data access and integration with SMART Desktop for data analysis and reporting.
- ❖ **Weatherproof Design:** Built for long-term outdoor use in extreme weather conditions.
- ❖ **Remote Configuration:** Can be controlled and adjusted via a mobile app or web platform.

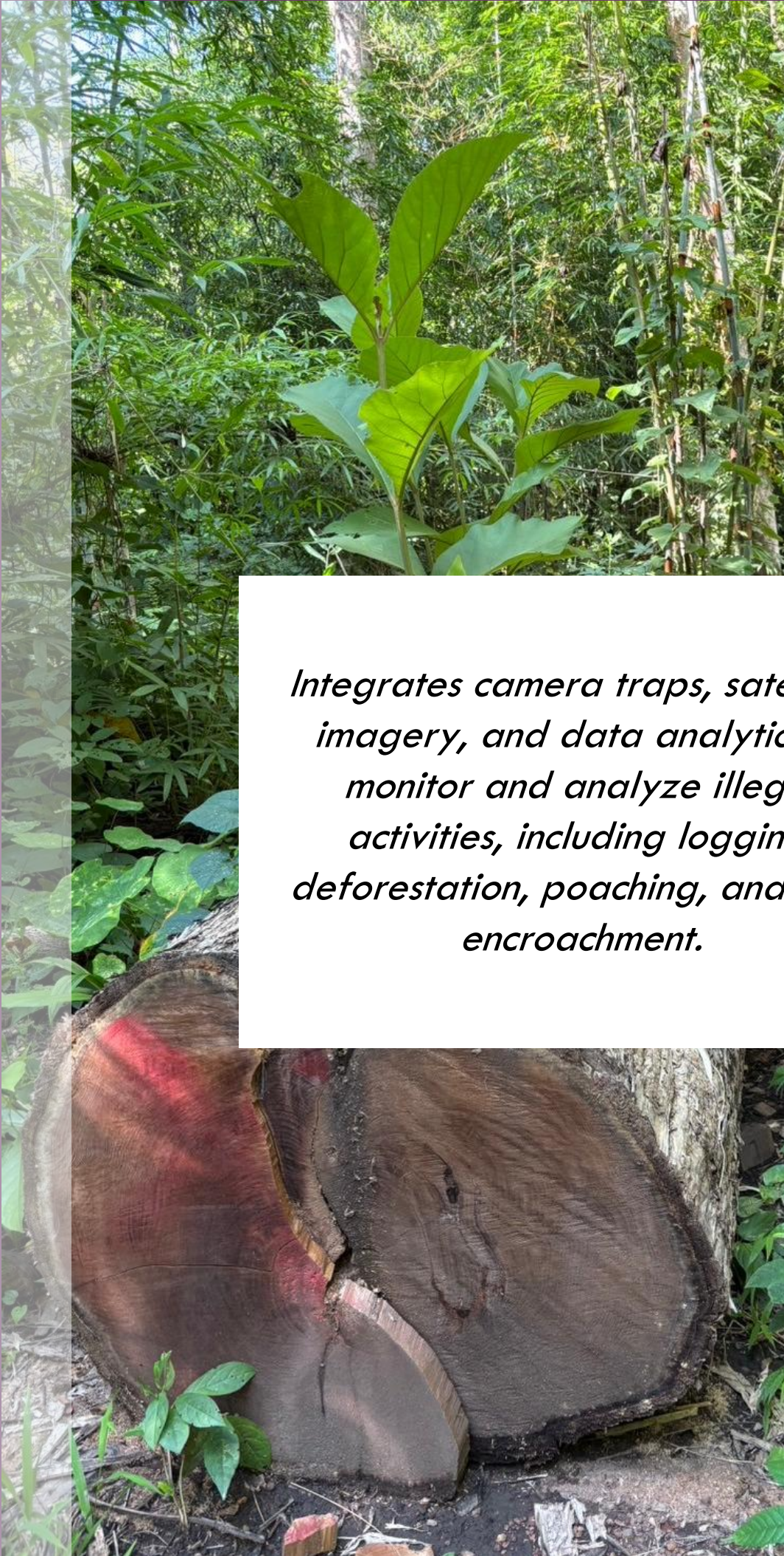
#### *Integration with SMART and NCAPs:*

- ❖ **SMART Sensor:** Spartan GoCam 4G/LTE operates as part of the SMART Sensor system, providing real-time surveillance data for law enforcement and conservation teams.
- ❖ **SMART Desktop:** Captured images are analyzed through SMART Desktop, enabling authorities to monitor illegal activities such as poaching, logging, and land encroachment.
- ❖ **NCAPs Platform:** The data processed in SMART enhances response strategies and strengthens conservation efforts.

Set up NCAP cameras to connect with the mobile phones of selected stakeholders, enabling alerts for evidence of illegal activities and ensuring continuous operation.

Prepare documents, reports, and manuals for the community and Royal Forest Department (RFD) officers. The manuals should include instructions on using NCAPs and GPS trackers.



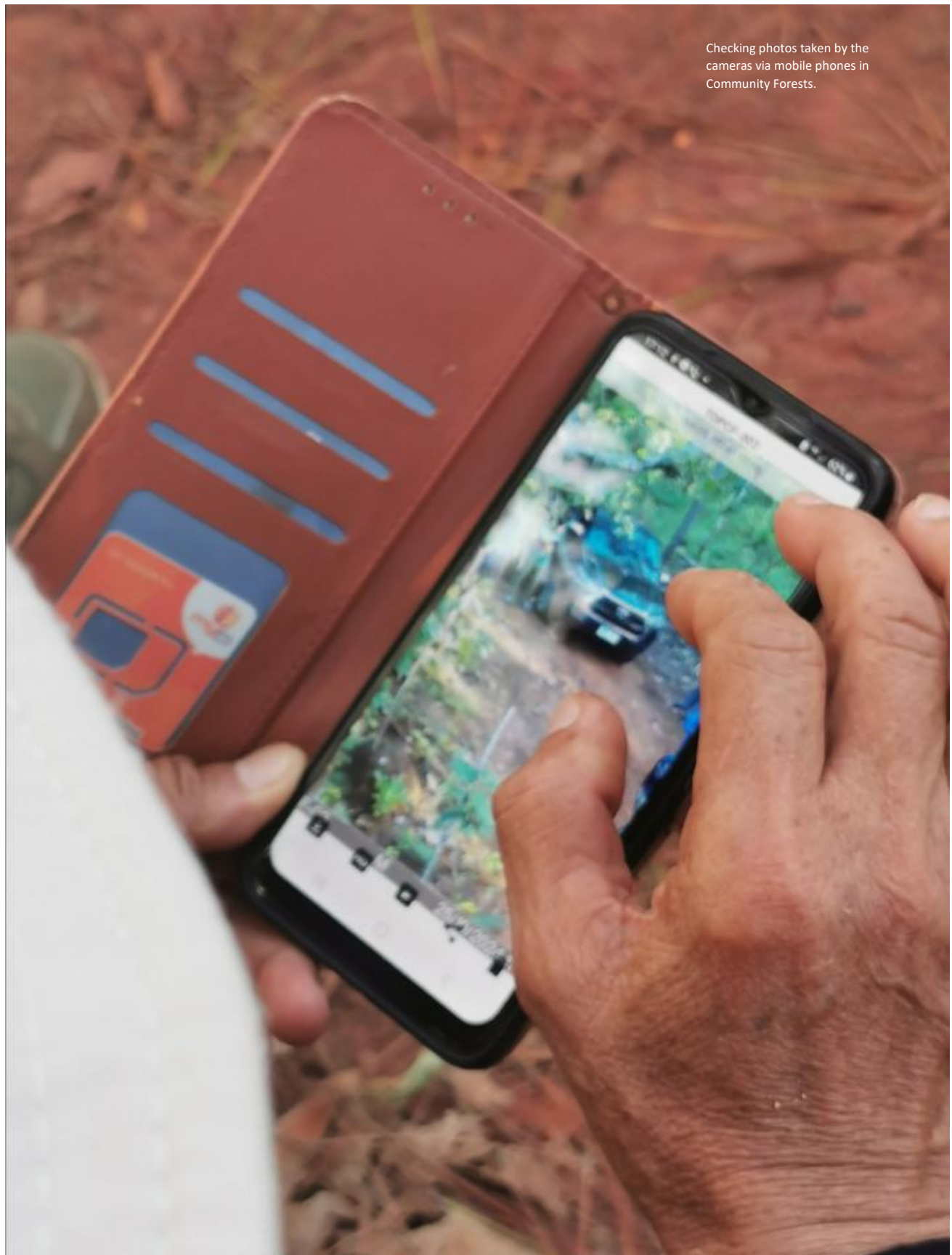
The image is a vertical composition. The top half shows a young plant with large, bright green leaves growing in a dense forest. The bottom half shows a large, freshly cut tree stump with a prominent reddish-brown interior, likely teak wood. The background is a solid purple color.

*Integrates camera traps, satellite imagery, and data analytics to monitor and analyze illegal activities, including logging, deforestation, poaching, and land encroachment.*

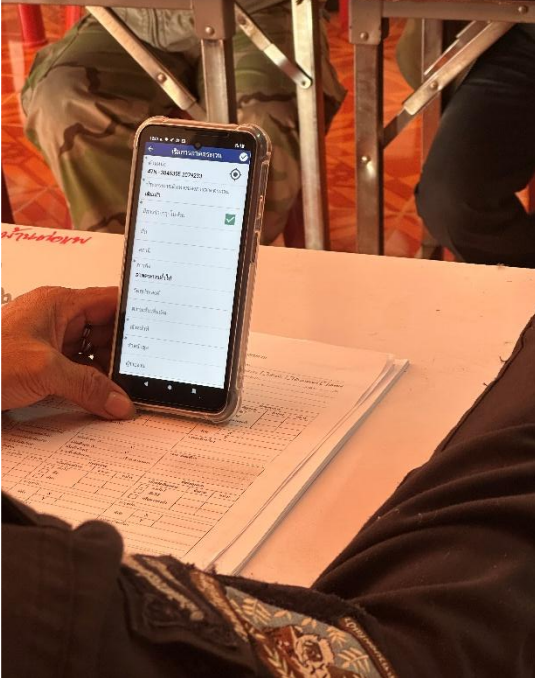
Teak trees were cut in the Ban To Pae Community Forest.



Write NCAPs manual for training, how to use and setup Spartan GoCam 4G/LTE.







**SMART Mobile enhances the efficiency of the SMART Patrol System, making it a crucial tool for conservation efforts in the area.**

## SMART Mobile

SMART Mobile is a mobile-based extension of the SMART (Spatial Monitoring And Reporting Tool) System, designed to enhance real-time data collection, reporting, and communication for environmental monitoring and law enforcement. It allows rangers, conservationists, and local communities to report illegal activities, track patrols, and analyze data directly from their smartphones or tablets.

Key Features of SMART Mobile:

- ❖ **Real-Time Data Collection:** Allows users to instantly record incidents, patrol routes, and observations.
- ❖ **GPS Integration:** Enables precise location tracking for more efficient monitoring.
- ❖ **User-Friendly Interface:** Designed for ease of use, even in remote or challenging environments.
- ❖ **Instant Reporting:** Facilitates seamless communication between patrol teams and authorities.
- ❖ **Offline Functionality:** Data can be stored offline and synchronized when an internet connection is available.

SMART Mobile enhances the efficiency of the SMART Patrol System, making it an essential tool for conservation efforts in areas like Mae Hong Son Province, where remote monitoring is critical for protecting natural resources.

### Task:

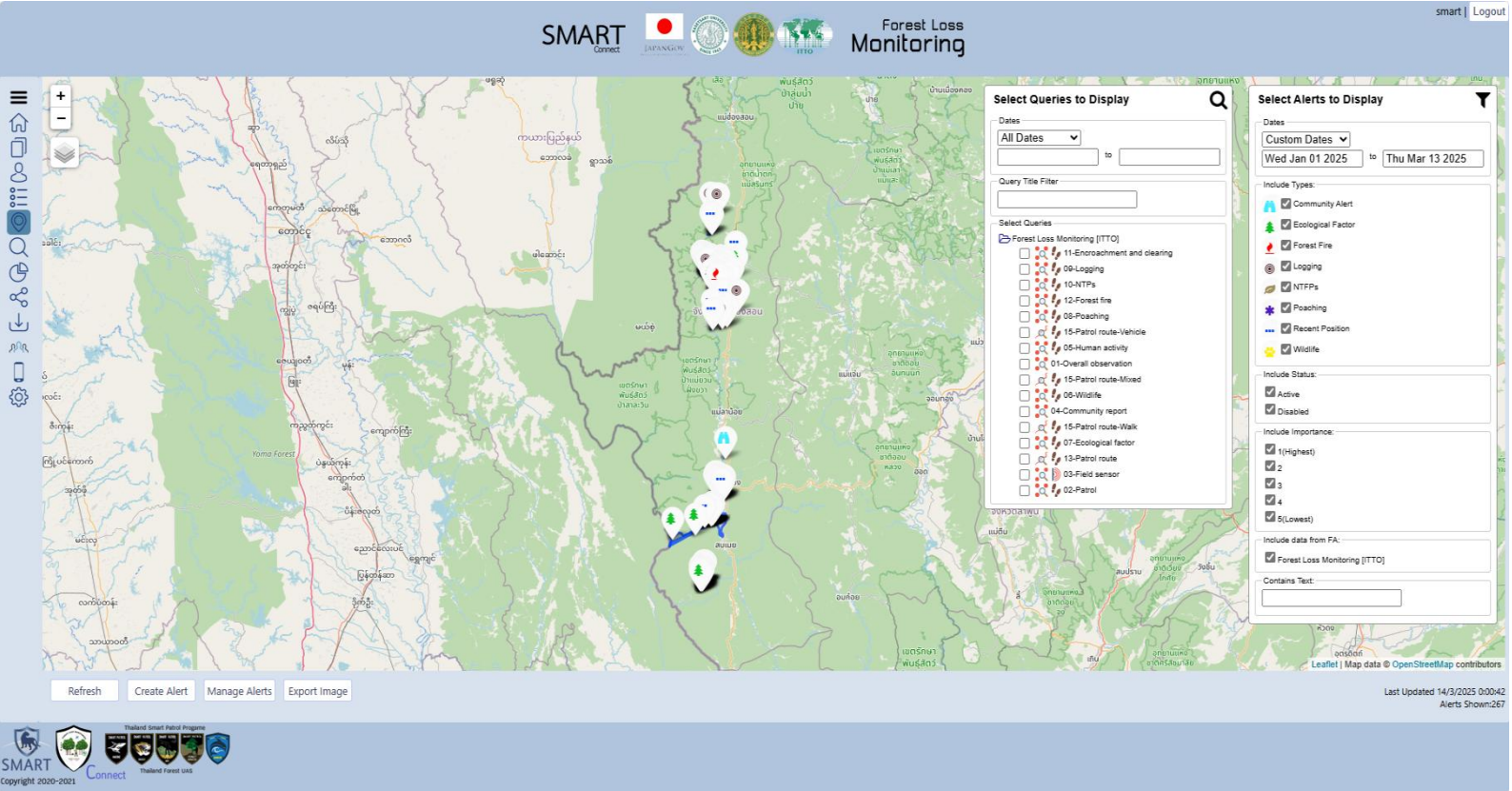
*Design SMART Mobile collection data platform on smartphone similar with SMART Patrol Observation Form in SMART desktop, and training.*



SMART Mobile



SMART Mobile and NCAPs Training: Forest Protection Unit Officers, M.S. 9 (Huai Pho), are learning how to use SMART Mobile and set up NCAPs camera traps.



The Smart Connect program window displays the patrols of community forests and forest protection units in Mae Hong Son Province. The image shows each type of patrol station point and each patrol route in real-time.

## SMART Connect

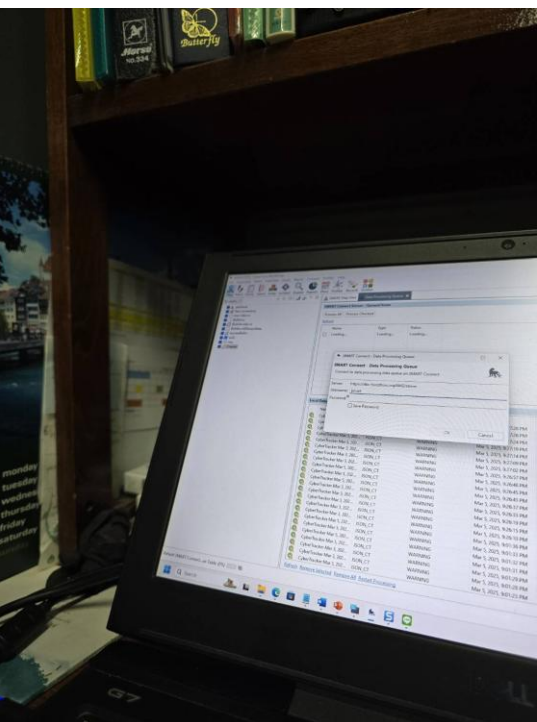
SMART Connect is an advanced data-sharing and communication feature integrated into the SMART System. It enables real-time connectivity between patrol teams, conservation managers, and law enforcement agencies, enhancing the effectiveness of wildlife and forest protection efforts.

### Key Features of SMART Connect:

- ❖ **Real-Time Data Sharing:** Allows patrol teams to instantly upload reports, incident data, and GPS locations for immediate analysis.
- ❖ **Remote Access and Cloud Storage:** Enables conservation managers to access patrol data from anywhere, improving decision-making and response times.
- ❖ **Automated Alerts and Notifications:** Sends instant alerts to authorities when illegal activities are detected, ensuring quick intervention.
- ❖ **Seamless Integration with SMART Mobile and SMART Sensors:** Works alongside mobile applications, drones, camera traps, and GPS trackers to enhance surveillance and monitoring capabilities.
- ❖ **Improved Coordination and Collaboration:** Facilitates better communication among government agencies, NGOs, and community-based conservation groups.

In the Mae Hong Son initiative, SMART Connect plays a crucial role in linking field patrols with law enforcement, ensuring rapid response to illegal activities such as poaching, illegal logging, and land encroachment.

SMART Connect on Windows 11 connects to the data website.  
<http://itto-forestloss.org:8443/server>





SMART Connect

### Task:

#### *Install SMART Connect*

Specify and set up Domain + SSL for SMART Connect.

The domain namely: <https://itto-forestloss.org/>

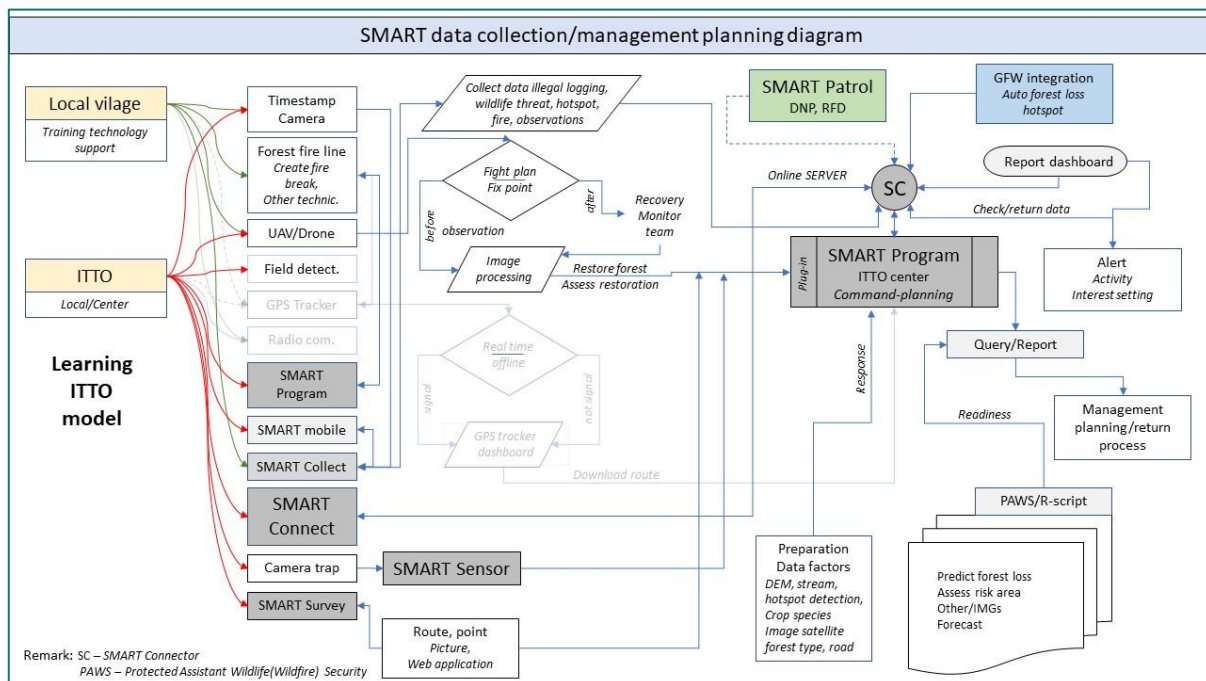
For, SMART Connect website is:

<https://itto-forestloss.org:8443/server/connect/home>

Install SMART Connect and develop SMART Mobile to suit specific needs and contexts and connect to personal devices – mobile phone application (e.g., via the App or Play Stores) to assist local authorities, community groups and youth in community forest loss and degradation.

## *SMART Connect is an advanced data-sharing and communication feature integrated into the SMART System.*

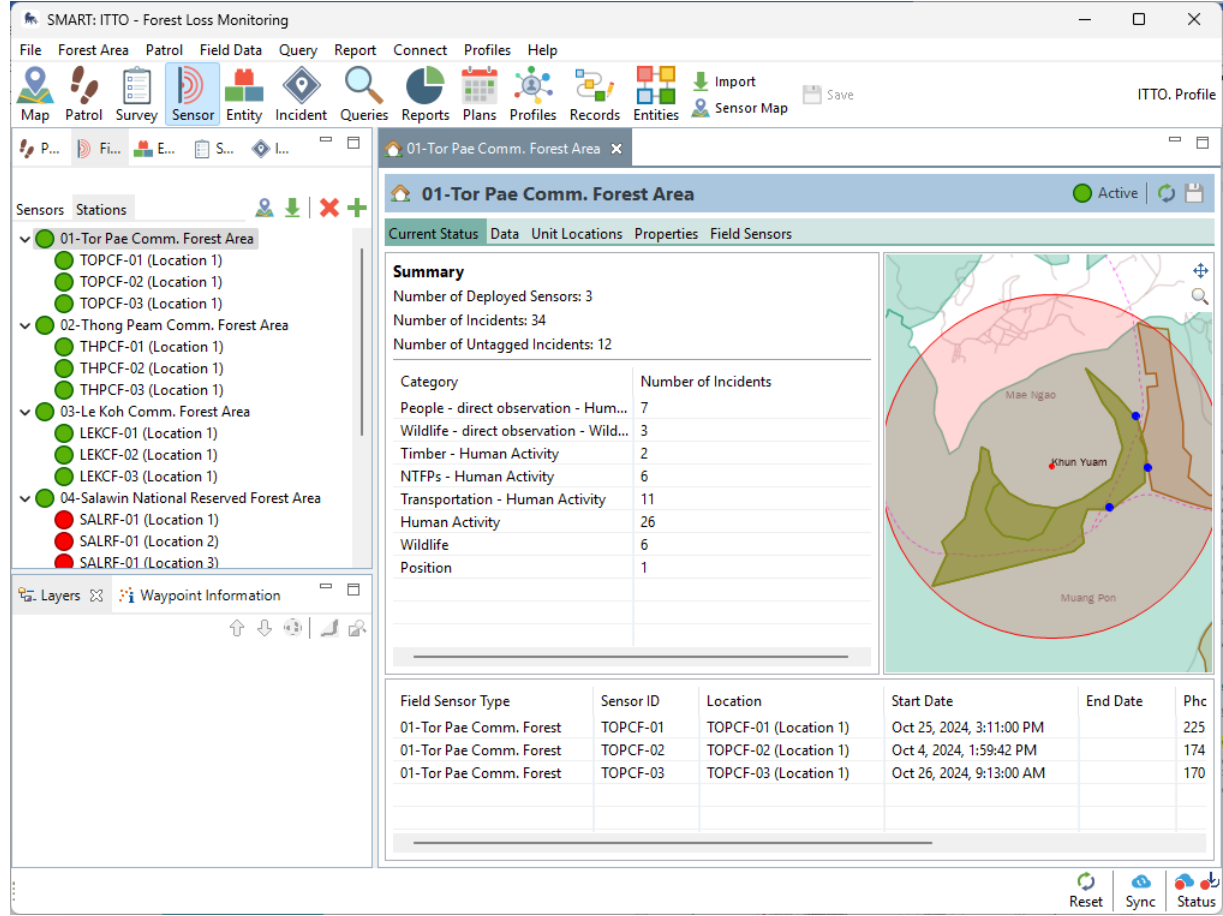
Connecting data NCAP cameras and sharing data with SMART Mobile, SMART PATROL program (SMART Desktop) and reporting on SMART Connect.



Over all of SMART design data collection and management planning diagram.



SMART Plugin Option, in this picture, shows the SMART Sensor to collect from the camera trap including; (1) camera locations, (2) mapping location, (3) video, photo, and date time of record in the camera pictures.



# SMART Plugin Option

**SMART Sensor** is an advanced component of the SMART System, designed to enhance surveillance and monitoring through the integration of automated technologies. It includes various sensor-based tools such as camera traps, drones, and GPS trackers to collect real-time environmental data and detect illegal activities more efficiently.

Key Features of SMART Sensor:

- ❖ Camera Traps: Automatically capture images and videos of wildlife and human activity for evidence collection.
- ❖ Drones for Aerial Surveillance: Provide real-time monitoring of remote and inaccessible areas, improving detection of illegal activities.
- ❖ GPS Trackers: Help monitor the movement of patrol teams and track potential threats in conservation areas.
- ❖ Automated Alerts and Data Transmission: Instantly notify authorities of unusual activities, enabling rapid response.
- ❖ Integration with SMART Connect: Ensures seamless data sharing with law enforcement and conservation teams.

In Mae Hong Son Province, SMART Sensor technology plays a crucial role in strengthening patrol efforts, reducing illegal logging, and supporting community-led conservation initiatives. By integrating these tools, authorities and local communities can enhance their ability to monitor and protect natural resources effectively.

Task:

Setup SMART Sensor on SMART Desktop to support NCAPs  
(Spartan GoCam 4G/LTE camera trap)



SMART Field Sensor

**SMART Profile** is a customized user interface within the SMART System that allows conservation managers, rangers, and law enforcement agencies to tailor the platform to their specific needs. It enables users to set up monitoring parameters, track patrol performance, and analyze data more efficiently.

#### Key Features of SMART Profile:

- ❖ **User-Specific Customization:** Allows users to configure data fields, reporting formats, and dashboards based on their monitoring requirements.
- ❖ **Performance Tracking:** Enables conservation teams to monitor ranger patrol efforts, identify high-risk areas, and assess the effectiveness of enforcement actions.
- ❖ **Integrated Analytics:** Provides detailed insights into illegal activities, habitat changes, and conservation outcomes using geospatial and statistical analysis.
- ❖ **Secure Access and Data Management:** Ensures that only authorized users can access and modify sensitive conservation data.
- ❖ **Seamless Integration with SMART Connect and SMART Sensor:** Works with real-time data sources such as camera traps, drones, and GPS trackers for enhanced monitoring.

In the Mae Hong Son initiative, SMART Profile plays a critical role in helping authorities and community members organize and analyze conservation data, ensuring a more targeted and effective response to environmental threats.

#### Task:

Setup SMART Profile to support illegal activity and link target data (the SMART Profile same with i2BASE)

The screenshot shows the SMART: ITTO - Forest Loss Monitoring application. The interface includes a menu bar (File, Forest Area, Patrol, Field Data, Query, Report, Connect, Profiles, Help), a toolbar with icons for Map, Patrol, Survey, Sensor, Entity, Incident, Queries, Reports, Plans, Profiles, Records, Entities, and New Query. The main workspace displays a tree diagram with nodes representing different types of data and their relationships. The right sidebar shows a list of entities with details like 'Person', 'Activity', 'Vehicle', and 'Location'. The bottom right shows a 'Working Set' for 'SALRF-01\_12112567\_Logging\_BanHualNamKad'.

SMART Plugin Option, in this picture, shows the SMART Profile to collect illegal, and link with activities. The picture shows the arrest of forestry offenders by arresting suspects for illegally cutting teak in a National Forest Reserve and activities related to the offense, including the equipment used in the offense to further connect to the perpetrators.



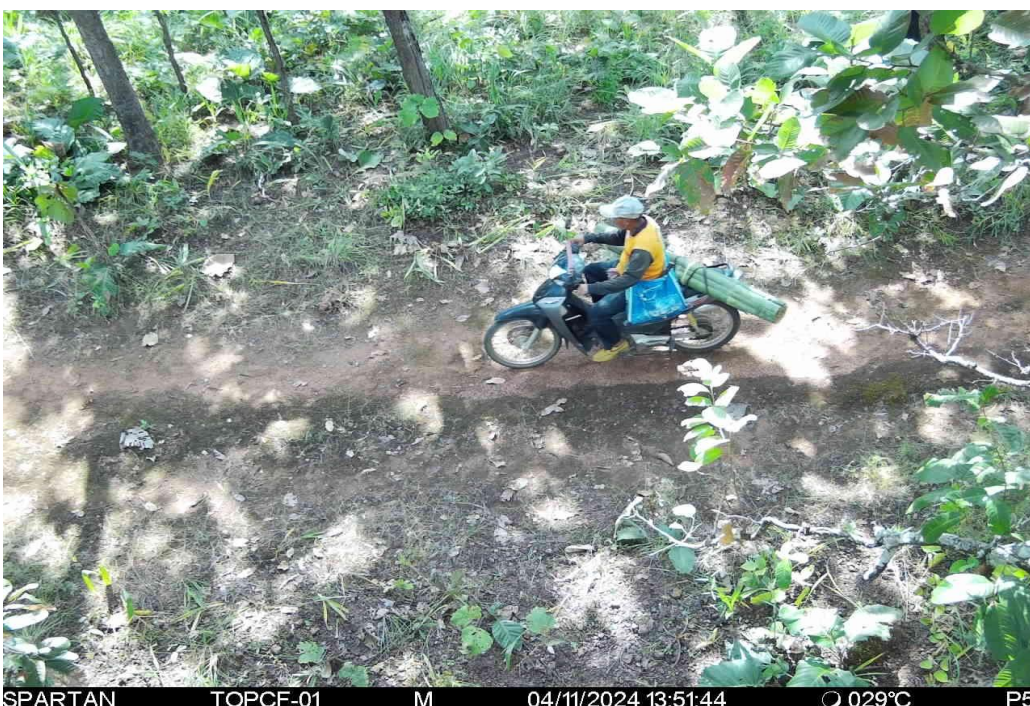
# Result

## SMART System Design:

- ❖ One data model database design for SMART Desktop to support four Community Forests and National Reserve Forests.
- ❖ Two language support: Thai/English on SMART Desktop, SMART Mobile, and SMART Connect.
- ❖ Three program software and two plugins: (1) SMART Desktop, (2) SMART Mobile, (3) SMART Connect, and two plugins including the sensor and profile.
- ❖ Six documents and manuals: (1) Using NCAPs and GPS Tracker, (2) SMART Desktop Manual, (3) SMART Connect Manual, (4) SMART Mobile Manual, (5) SMART Sensor Manual, and (6) SMART Profile Manual for community and officer operations of RFD.
- ❖ Query and report automatic design: 34 queries and 6 reports were created.
- ❖ SMART online website database:
  - ITTO website; <https://itto-forestloss.org>, and
  - SMART Connect; <https://itto-forestloss.org:8443/server>

## NCAPs:

- ❖ Data model structure for SMART Sensor on SMART Desktop for collecting and linking NCAPs camera trap data.
- ❖ The summary report, based on pictures captured from 25 October 2024 to 28 February 2025 (126 days), shows the following results:
  - Found **4 types of domestic animals**: goats (n=10/time), dogs (n=6/time), buffaloes (n=8/time), and cows (n=9/time) in the target areas.
  - Found **5 types of wildlife**: barking deer, leopard cats, birds, foxes, and wild boars.
  - **Four types of vehicles** observed: motorcycles, tractors, trucks, and cars.
  - **Seven types of non-timber forest products (NTFPs)** such as bamboo, logs or wood, bananas, vegetables, herbs, bamboo shoots, and unclassified.
  - **Six types of equipment** found: lawnmowers, saws, hoes, harpoons, knives, and guns.
  - One time of **poacher** involving a wild boar.

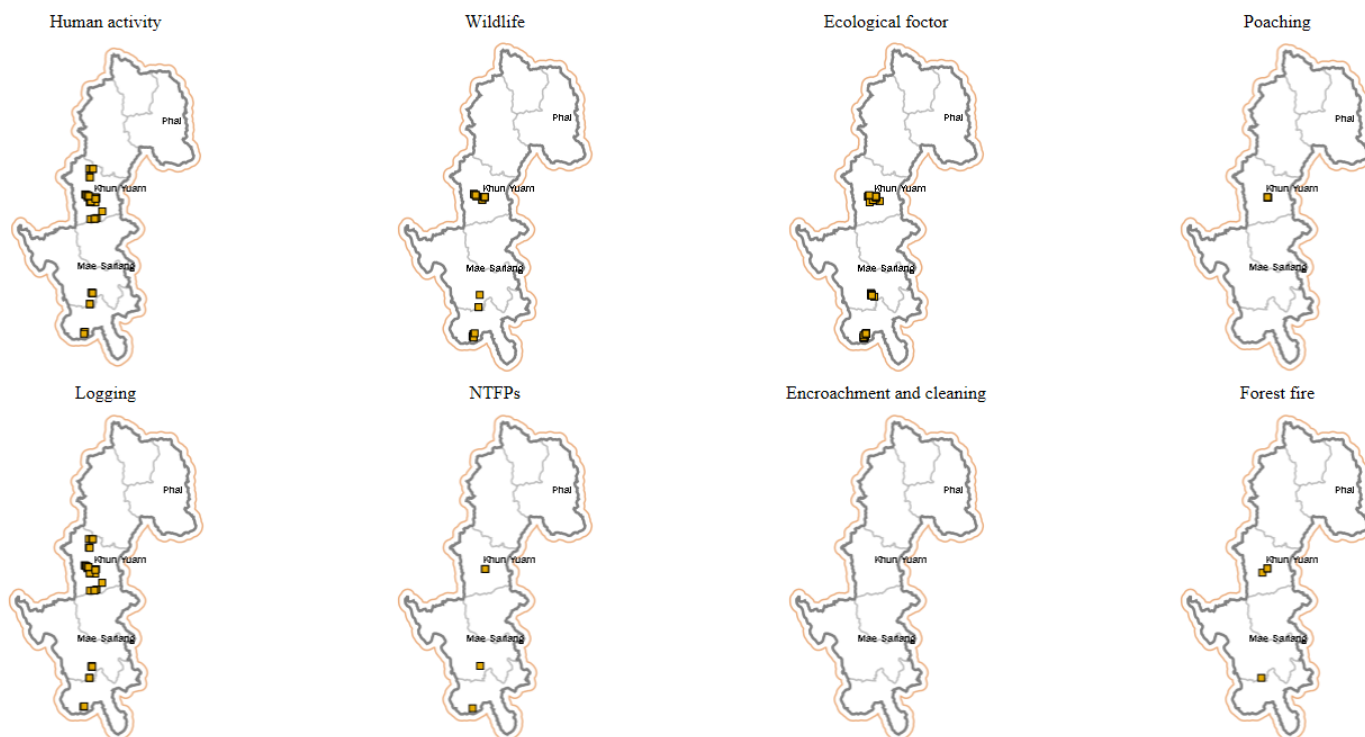


Photos taken by NCAPs using the Spartan GoCam 4G/LTE camera trap that describe activities captured in the images. This photo shows the community's use of non-timber forest products (NTFPs), such as bamboo, in the Ban Tor Pae Community Forest.



## จุดสังเกตการณ์

ระหว่างวันที่ 29 September 2024 ถึง 28 February 2025



Created on: Mar 16, 2025 12:31 AM

Summary of Types of Patrol Observations (8 Types Displayed on the Map).

### SMART Patrol and SMART Mobile:

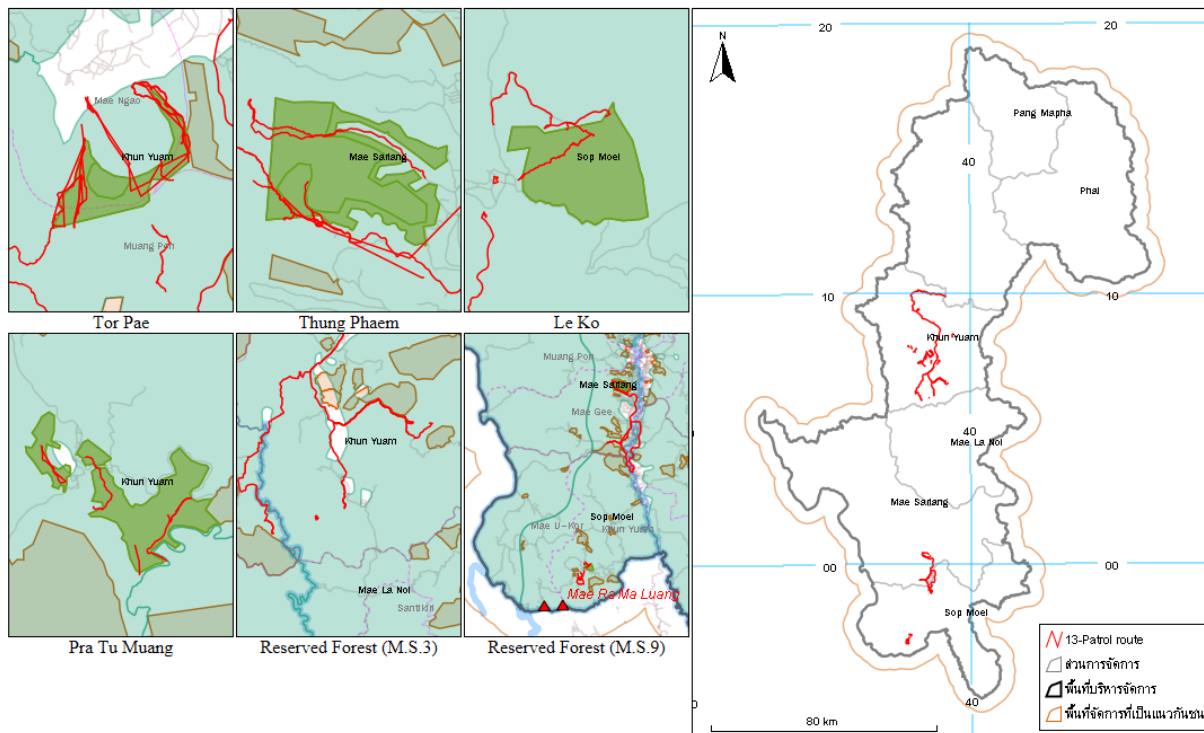
- ❖ Two-time survey and check signal location for NCAPs and SMART Mobile application test at the Community Forest.
- ❖ Six SMART Mobile devices were used to collect data in each target area.
- ❖ Real-time data was sent to the SMART Connect website.
- ❖ Four Community Forests and two National Reserve Forests (Forest Protection Unit Officers, M.S. 3 and 9) set up SMART Patrol planning for 4-6 patrols per day/month. The data summary results from January to February 2025 are shown in the table below.

	01/2025	01/2025	01/2025	01/2025	02/2025	02/2025	02/2025	02/2025
	Number of Patrols	Distance (km)	Number of Patrol Hours (All)	Count Observations	Number of Patrols	Distance (km)	Number of Patrol Hours (All)	Count Observations
Le Koh								
M.S.3	6.0	81.16636657714844	14.47055555549	15.0	3.0	18.00757598876953	15.87055555553	35.0
M.S.9	1.0	27.641624450683594	1.66	1.0	1.0	99.21823120117188	15.60694444439	5.0
Pra Tu Mueang	5.0	7.138610363006592	13.36249999998	14.0		0.06603509187698364	0.42916666666	4.0
Thung Paem					3.0	18.1551456451416	11.08027777776	8.0
Tor Pae	4.0	25.405553817749023	20.83138888887	14.0				

- ❖ Animal in the area, 12 species found from SMART Patrol including; Barking Deer (แก้ง, *Muntiacus muntjak*), Asiatic Brush-tailed Porcupine (มันหางพวง, *Atherurus macrourus*), Red junglefowl (ไก่ป่า, *Gallus gallus*), Bear sp. (หมี), Barn swallow (นกนางแอ่นบ้าน, *Hirundo rustica*), Chinese edible frog (กบนา, *Hoplobatrachus rugulosus*), Brown boobook (นกเค้าเหยี่ยว, *Ninox scutulata*), Banded palm civet (อีเห็นลายเสือโคร่ง, *Hemigalus derbyanus*), Brahminy kite (เหยี่ยวแดง, *Haliastur Indus*), Canis aureus (หมาจิ้งจอก, Asiatic Jackal), Banded Linsang (ชะมด, *Prionodon linsang*), and *Cannomys badius* (คูน หรือ อ้นเล็ก, Lesser bamboo rat).
- ❖ Patrol route, 35 trails were recording on automatic sent data from SMART Mobile to SMART Connect, and link with SMART Desktop (January to February 2025).

## เส้นทางลาดตระเวน

ระหว่างวันที่ 29 September 2024 ถึง 28 February 2025



Created on: Mar 16, 2025 12:35 AM

Summary of patrol route, six target areas show in the report query map.

### Illegal activity:

- ❖ One time, the Forest Protection Unit Officers, M.S.3 team, and ITTO field staff successfully arrested one perpetrator involved in illegal teak logging (6 pieces of teak).
- ❖ Three cases of land clearing were observed.
- ❖ Multiple observed locations where tree cutting resulted in trees dying while still standing in the National Reserve Forests.



The picture shows teak boards seized during the arrest of the perpetrators.



Detection of processed timber during smart patrol from report Forest Protection Unit Officers, M.S. 3.



*SMART patrols are crucial in preventing illegal activities and encroachments by enabling real-time detection, apprehension, and legal action against offenders. By strengthening surveillance and enforcement, patrols act as a deterrent, ensuring better protection of forested areas and natural resources.*



The nature of the encroachment or land clearing on the National Reserve Forests, obtained from the patrol survey, provides information that can be used to track down the offenders.





The tree cutting makes the tree die as a standing tree.

#### Training Participants:

❖ Two staff members were trained:

- SMART Desktop Program Training for ITTO field staff and one officer from the Forest Protection Unit, M.S. 3 and M.S. 9, Royal Forest Department (RFD), Mae Hong Son Province.
- SMART Mobile – training on how to create and modify the platform design and upload to use on mobile devices.
- SMART Connect Administrator training.

# Conclusion and Recommendations

## Strengthening SMART technologies and Its Integration with SMART and NCAP Surveillance Systems

Illegal activities such as logging, poaching, and land encroachment continue to threaten forests in Mae Hong Son. The integration of SMART Mobile with the SMART and NCAP Surveillance Systems enhances real-time monitoring, enforcement, and community engagement, leading to improved forest management and protection.

- ❖ Strengthen the effectiveness of surveillance and monitoring through mobile-based real-time reporting.
- ❖ Improve collaboration between rangers, law enforcement, and local communities in preventing illegal activities.
- ❖ Optimize the use of AI-driven analytics and automated alerts from camera traps for rapid response.
- ❖ The deployment of SMART technologies such as SMART Mobile in project area increased efficiency in patrol reporting, and reducing response time to illegal activities.
- ❖ NCAP camera traps have provided crucial evidence for prosecutions, strengthening legal action against offenders.
- ❖ Community engagement in SMART reporting has resulted in a higher detection rate of unauthorized forest activities.
- ❖ Institutionalize SMART technologies as a core tool in Thailand's conservation policies.
- ❖ Strengthen legal frameworks to support the use of SMART and NCAP data in environmental law enforcement.
- ❖ Provide training programs for local communities and law enforcement.
- ❖ Secure sustainable funding for system maintenance, expansion, and technological upgrades.
- ❖ Expand real-time surveillance systems, integrating drones, AI-powered analytics, and remote sensing technologies.





*By fostering continuous innovation, supporting policies, and facilitating collaboration across different sectors, both SMART and NCAP have the potential to be key instruments in protecting biodiversity, preserving ecosystems, and ensuring a sustainable future for both people and nature.*

The advancement of the SMART and NCAP Surveillance and Monitoring System in Mae Hong Son Province is a pioneering move in combining technology, community involvement, and conservation efforts to address illegal activities and safeguard natural resources. With the integration of real-time data collection, citizen science, and strategic partnerships, this initiative has bolstered enforcement capabilities, empowered local communities, and encouraged a more sustainable approach to forest and wildlife preservation.

## *DEVELOP SMART PATROL AND SMART SYSTEM (SMART MOBILE SYSTEM) ITTO Project PD-A/60-369*

Address: ITTO-FOREST LOSS MONITORING PROJECT

50 Ngamwongwan Road, Lat Yao Subdistrict,  
Chatuchak District, Bangkok 10900

