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Utilizing digital technology to broaden the scope of forest conservation efforts in Lao PDR.

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Lao PDR Resident Mission (LRM) – Asian Development Bank (ADB)

Outline

I. Background

II. Methodology Development

III. Implementation
- Equipment and Tools Used
- The Core Components of OLDM
- Compile and Enter Data into the GCP form

V. Results & Summary

I. BACKGROUND

1. From 2018 onwards the “Operational Logging and Degradation Monitoring System” (OLDMs) has been used in National Protected Areas (NPAs) by the government and development partners:
    i. ADB-Biodiversity Conservation Corridors (BCC)
    ii. Kfw-Integrated Conservation of Biodiversity and Forests (ICBF)
    iii. GIZ-Protection and Sustainable Use of Forest Ecosystems and Biodiversity (ProFEB)
    iv. GIZ-Forest Law Enforcement, Governance, and Trade - Voluntary Partnership Agreements (FLEGT-VPA)

1. OLDMS is a flexible system for timely monitoring and response to logging and degradation events for a range of forestry, infrastructure, disaster management and land management activities, which is integrated into the Government of Lao PDR (GOL) management systems, with government staff, infrastructure, and capacity to do the work.

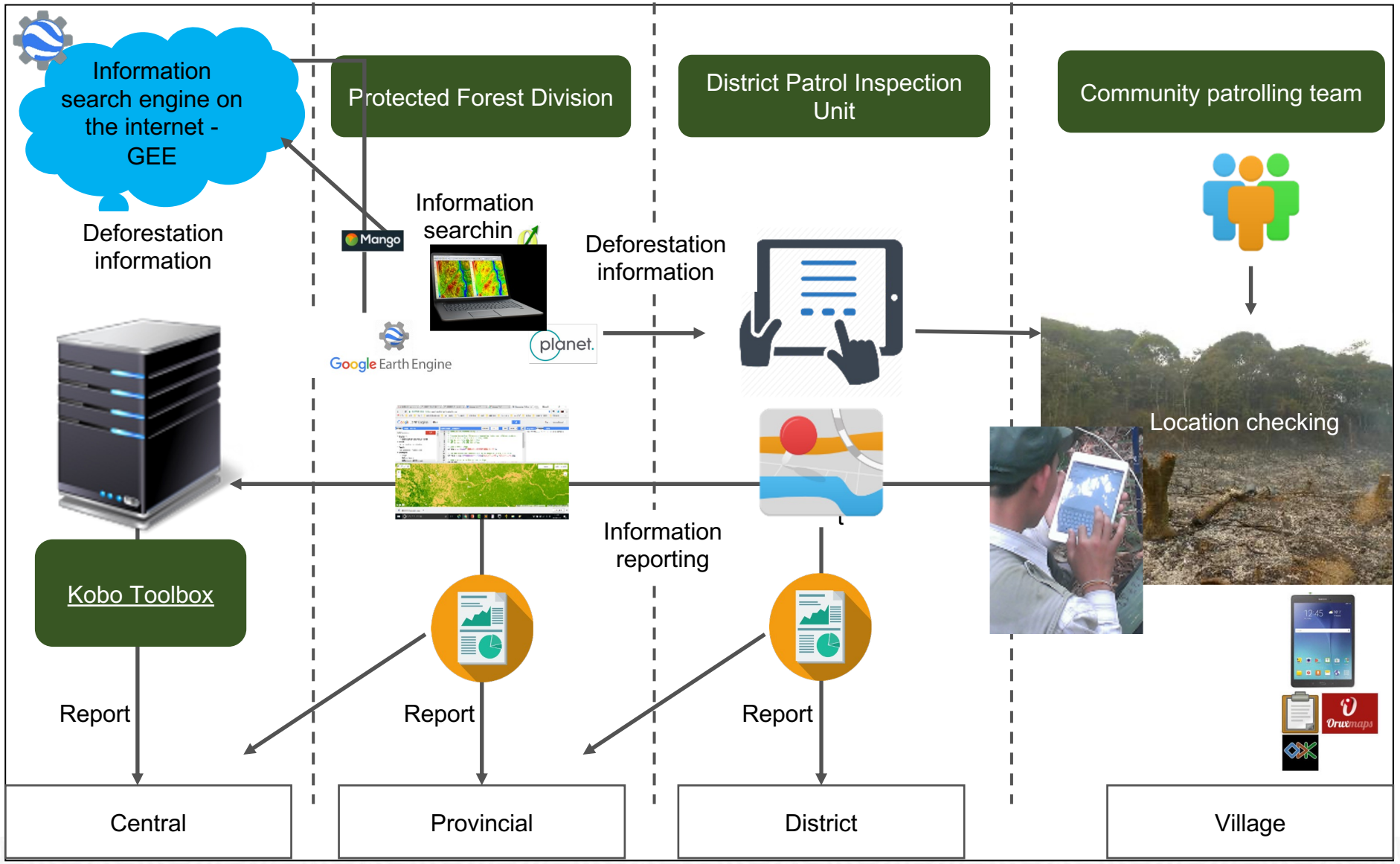
II. A Methodology Development

OLDMS Components 1 to 5

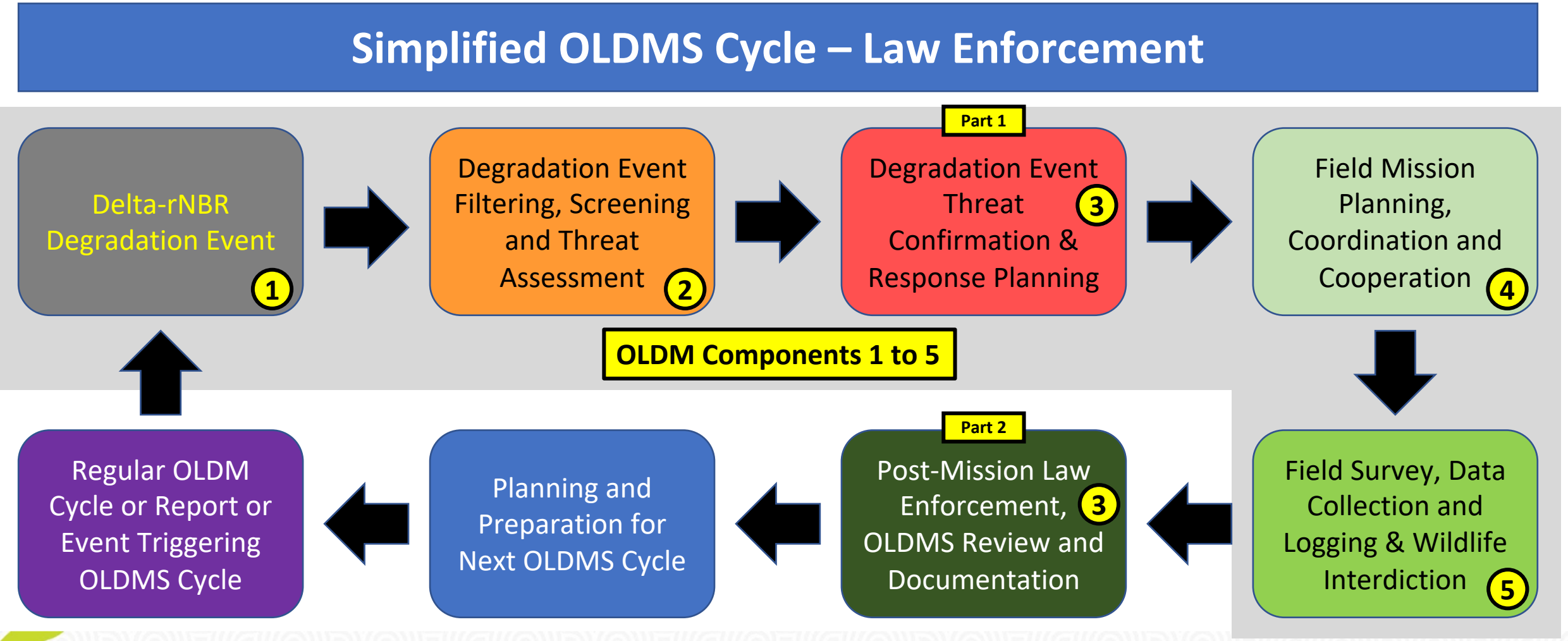
OLDMS – Main Component Tools

Component	Description	
1	**Google Earth Engine** running **Delta-rNBR Algorithm** Use Landsat-8 and Sentinel-2 satellite imagery in the Cloud to identify potential degradation locations	Google Earth Engine; European Commission EU SCIENCE HUB
2	**ArcGIS**/**QGIS** and **Planet Explorer** To assess degradation with GIS and by comparing and downloading **RapidEye** and **PlanetScope** imagery to confirm locations of degradation/logging	ArcGIS; QGIS; P | EXPLORER
3	**ArcGIS**/**QGIS** To process satellite imagery, interpret imagery, prepare GIS datasets	ArcGIS; QGIS; P | EXPLORER
4	**MangoMap** and **MAPC2MAPC64** Web-based mapping to share data for collaboration with Provincial Teams and FLUP data with other projects and Android Data Conversion Software	Mango
5	**Android Tablets/Smartphones** with **ODK Collect**, **KoBo Toolbox** and **Oruxmaps** Field data collection forms and GIS for field navigation and backup	ODK Open Data Kit; KoBoToolbox; Orux

B. OLDMS supports forest degradation monitoring in a timely manner at all levels



III. Simplified OLDMS Cycle – Law Enforcement



Example of a Delta-rNBR Degradation Event

Operational Logging and Degradation Monitoring System – OLDM

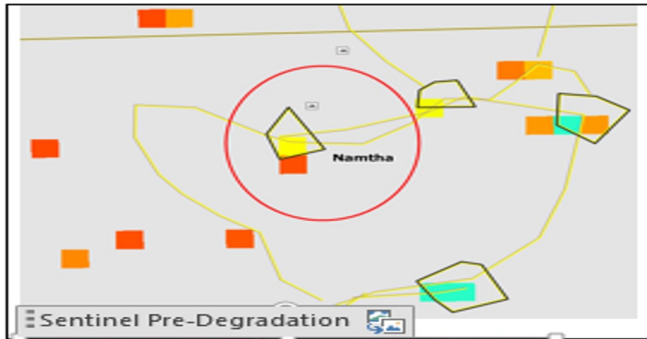
Field Survey Data Form

Interpreter:	Jeffrey Himel	Date:	4/8/2019
Check:	Click here to enter text.	Date:	Click here to enter a date.

Province: Luang Namtha Survey Date: 4/4/2019

UTM Zone: 47

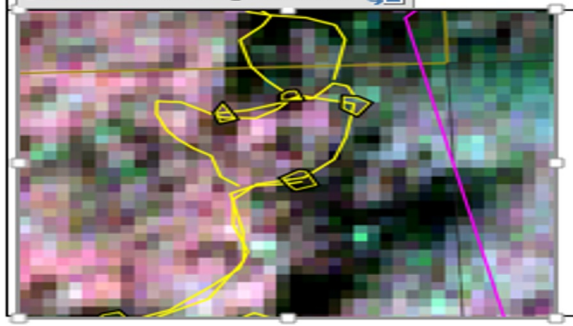
UTM X: 749408 UTM Y 2346652



Delta-rNBR Analysis Image Date
Click here to enter a date.
Legend
Delta_rNBR...
-2000
0
49
50
75
100
200
1000

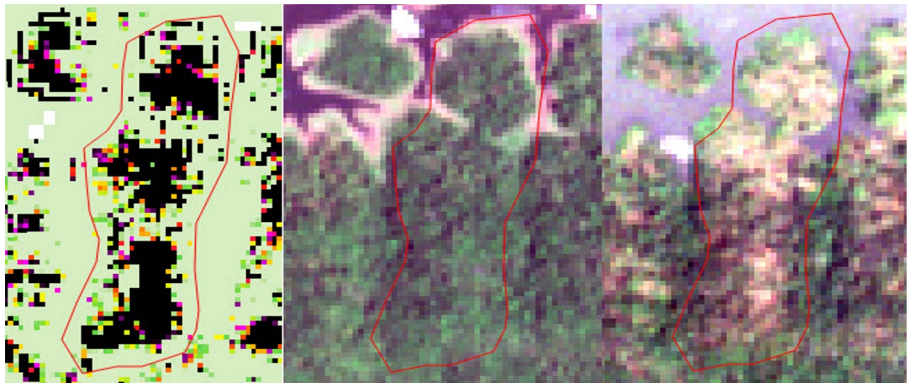
Enter Delta-rNBR Value for this Point: 0.065

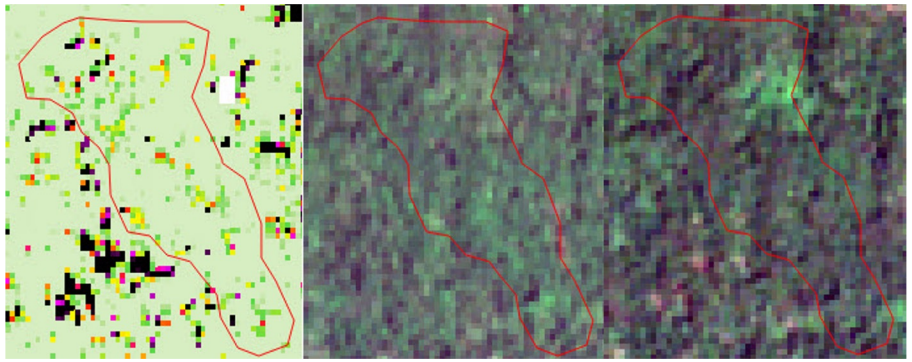
Sentinel Pre-Degradation



Sentinel-2 Image Date
Click here to enter a date.
Choose an Image Date of the Sentinel Data before Degradation Occurred

Select Closest Land Cover.
Choose an item.

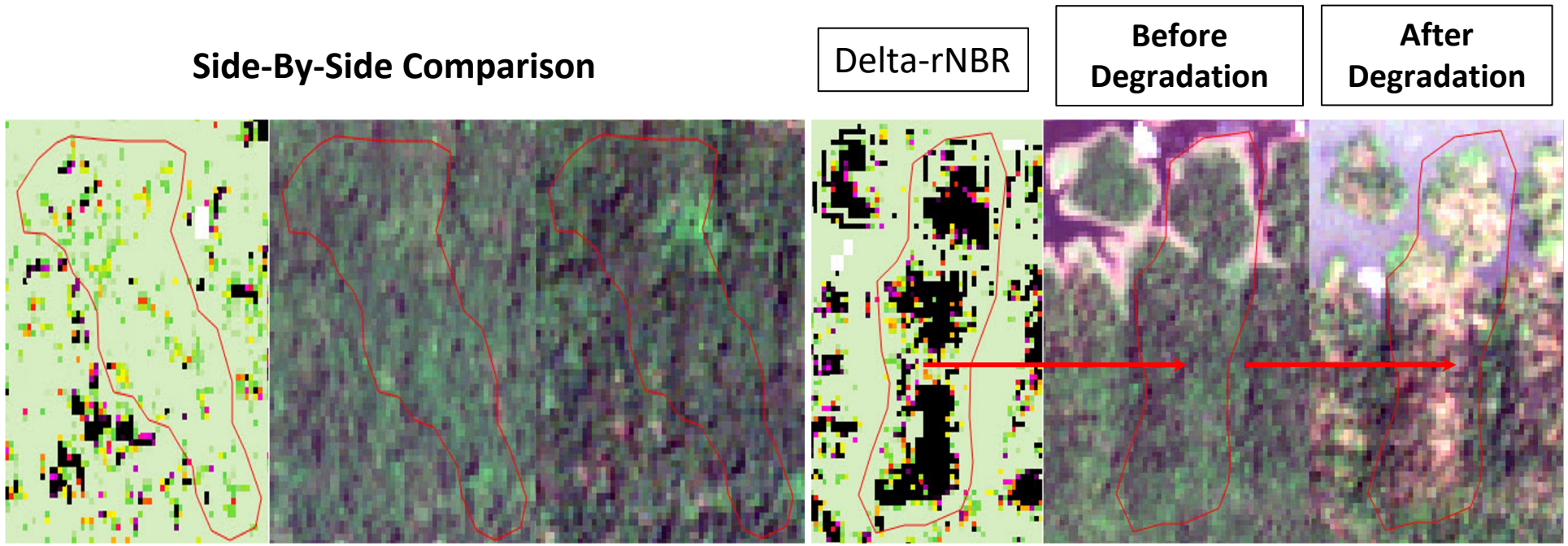


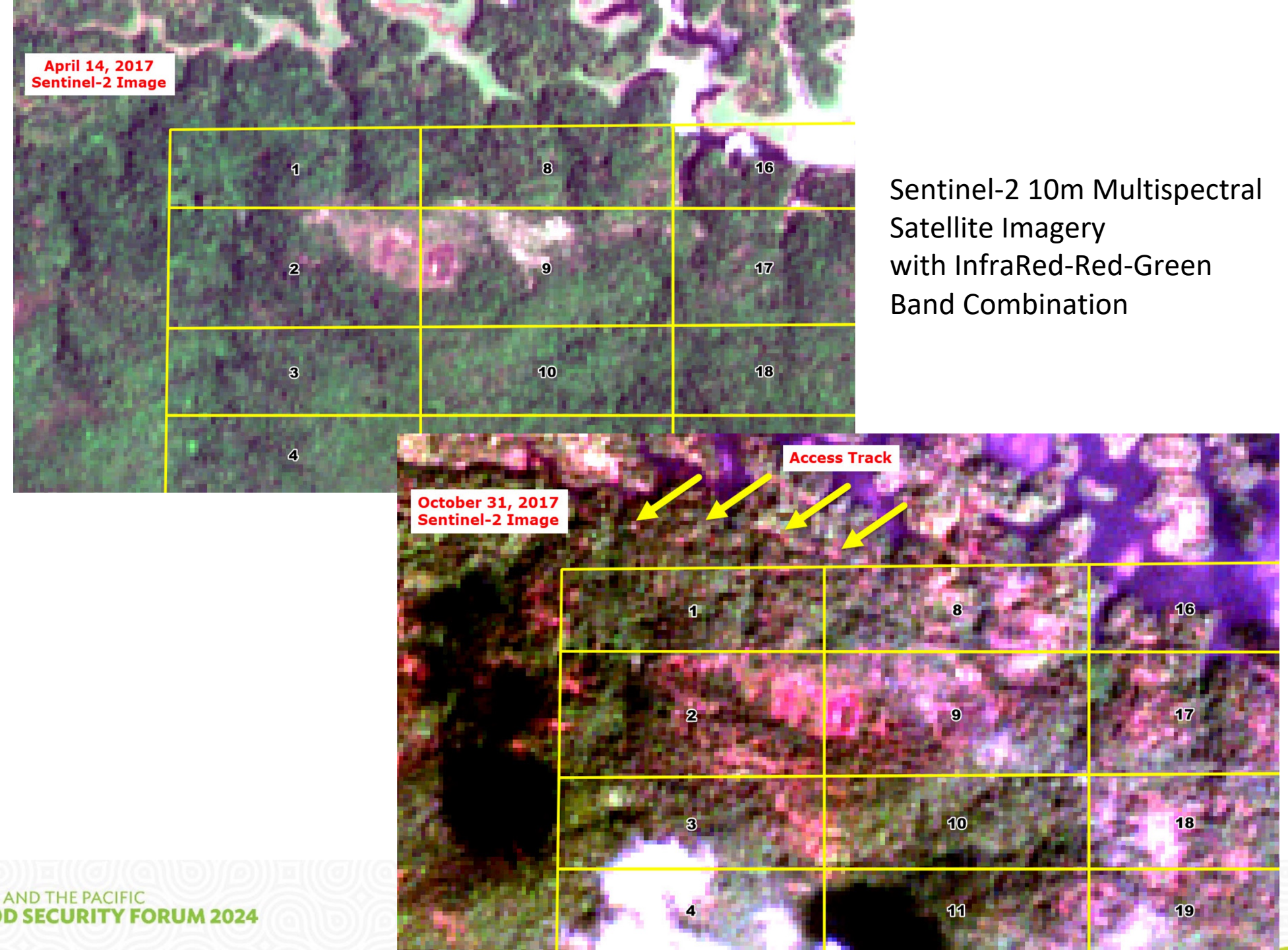


Example of 3-D Views for Analysis and Access

Use 3-D Views, PlanetScope and Very High-Resolution Imagery within GIS to Review Potential Field Locations and Plot Tracks to Access

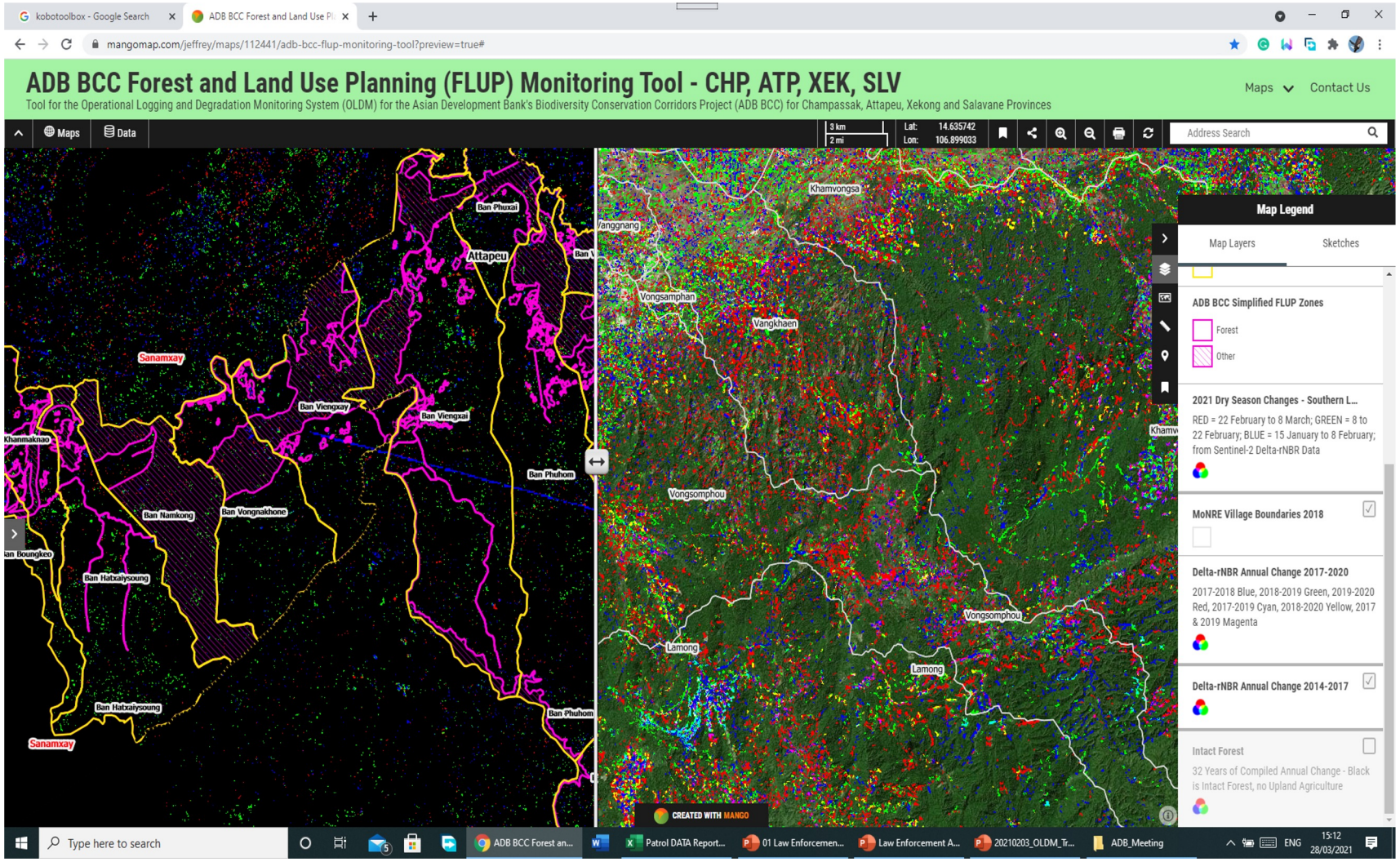
Comparing satellite image data with Planetscop and Delta-rNBR





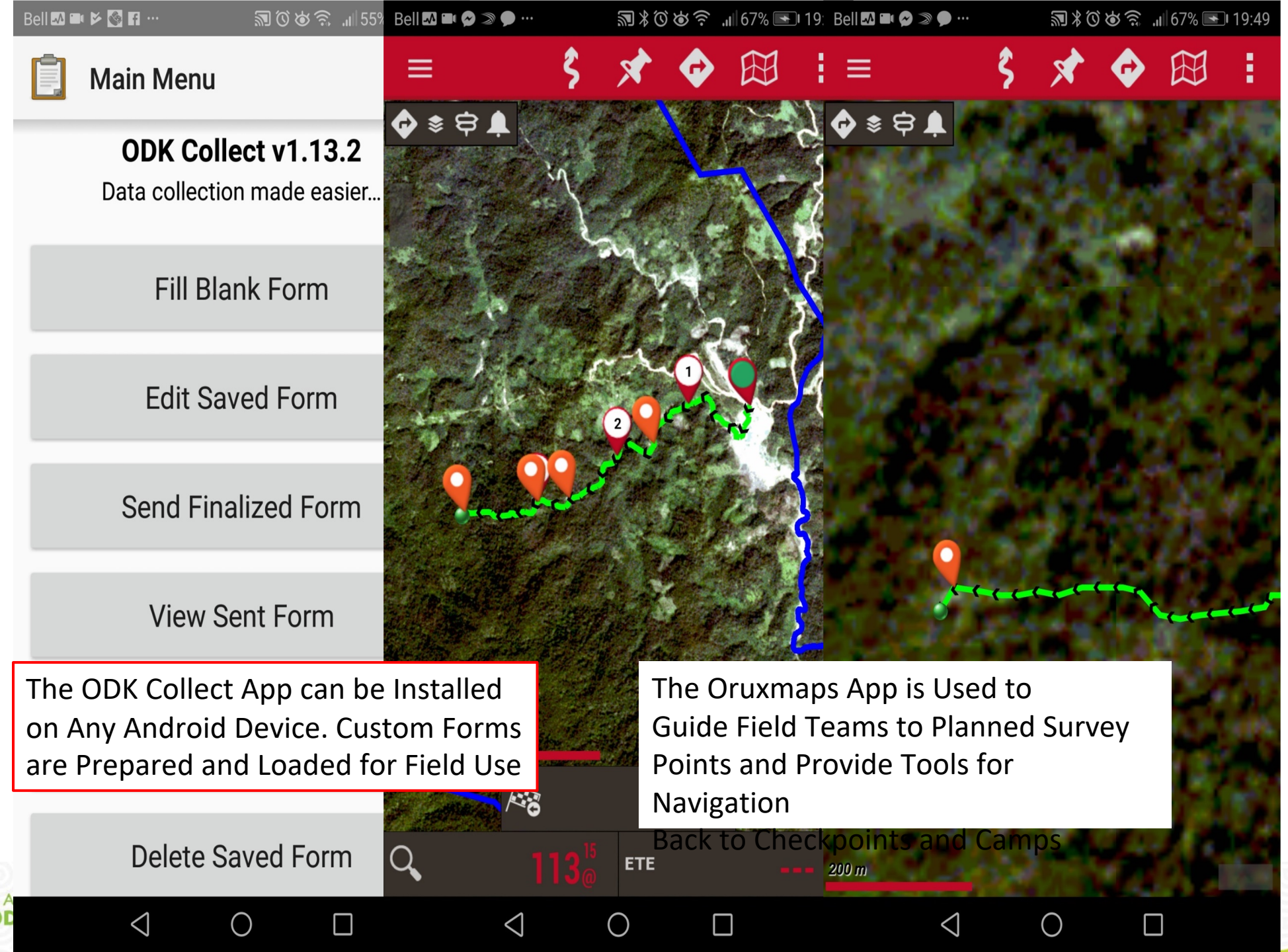
Sentinel-2 10m Multispectral Satellite Imagery with InfraRed-Red-Green Band Combination

Filter retrieves data and shows areas of deforestation



Reference picture (picture taken in the previous period)

Target Image (Later Image) + Deforestation Spot (Red)



The ODK Collect App can be Installed on Any Android Device. Custom Forms are Prepared and Loaded for Field Use

The Oruxmaps App is Used to Guide Field Teams to Planned Survey Points and Provide Tools for Navigation

Back to Checkpoints and Camps

The OLDMS Group identifies threats causing degradation using Delta-rNBR and assess them to determine possible action

The OLDMS Group divides into Teams to analyze the point locations and plan missions for the fieldwork

Field Survey and Logging Interdiction

The OLDMS Joint Central and Provincial Teams go to the Field for Logging Survey to Verify Degradation Event and Document the Location and Details for Future Action (Hold, Seize, Court-Order, Confiscate, Register, Auction, De-Register, Release, Enters Supply Chain)

Field Survey Forms

ລະບົບການຕິດຕາມກວດກາການຕັດຕົ້ນໄມ້ ແລະ ການເຊື່ອມໂຊມຂອງປ່າໄມ້

Operational Logging and Degradation Monitoring System – OLDM

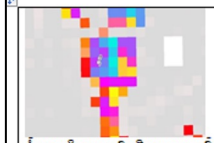
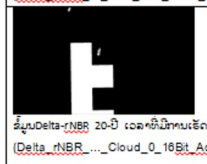
ຟອມຂໍ້ມູນການສຳຫຼວດພາສະໜາມ

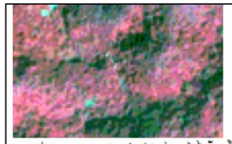
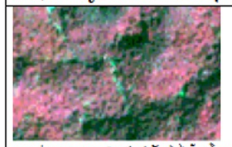
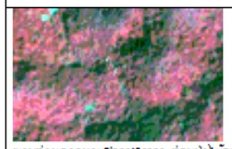
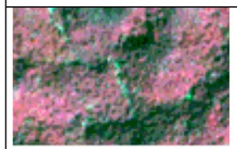
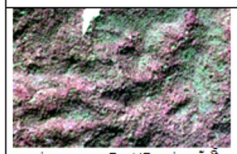
ຜູ້ແປ:Khampaseuth	ວັນທີເດືອນປີ:4/19/2020
ຜູ້ກວດ: Click here to enter text.	ວັນທີເດືອນປີ:Click here to enter a date.

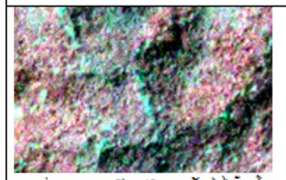
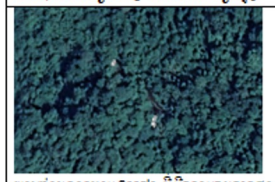
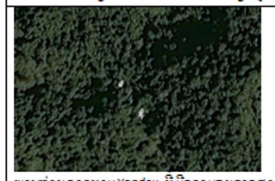
ແຂວງ:Luang Namtha ວັນທີເດືອນປີສຳຫຼວດ: 4/2/2019

ການແບ່ງເຂດUTM Zone:47

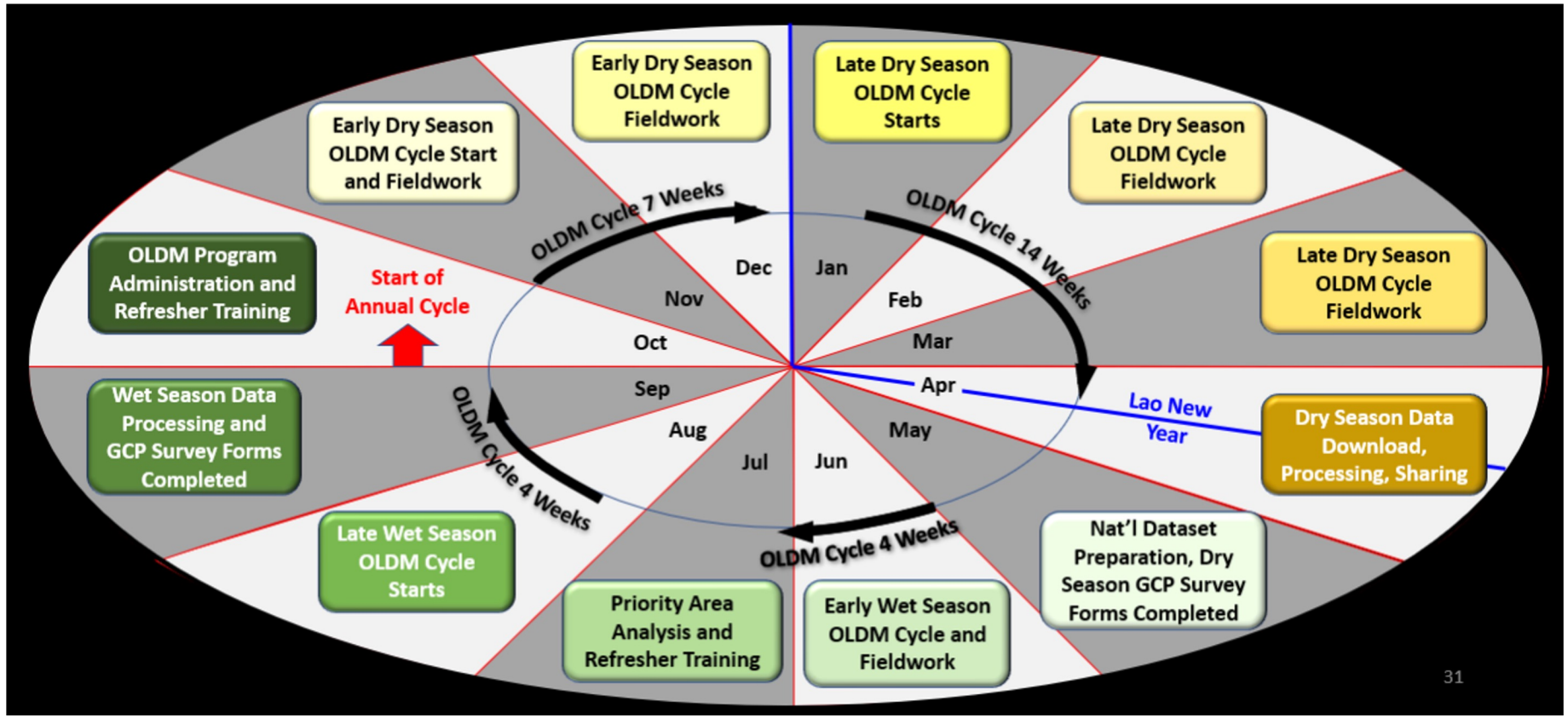
ເສັ້ນລະຫວ່ານ UTM X: 751037 ເສັ້ນແວ່ງ UTM Y 2344403

 ຂໍ້ມູນການວິເຄາະລະບົບເຂົ້ອນຍອດຂອງຕົ້ນໄມ້Delta-rNBR image	ວັນທີເດືອນປີ:ການວິເຄາະລະບົບການປ່ຽນແປງເຂົ້ອນຍອດຂອງຕົ້ນໄມ້ 4/3/2019 ເຄື່ອງໝາຍ  ຄ່າDelta-rNBR ຈຸດນີ້:0.1
 ຂໍ້ມູນDelta-rNBR 20-ປີຂອງການບຸກໂຄ່ນໄມ້ທຳ (Delta_rNBR_..._THR_500_Sieve_5_8Bit_Add)	ຕົວຊີ້ບອກເວລາ1 ຂອງຂໍ້ມູນ Delta-rNBR ກ່ຽວກັບປະເພດການບຸກໂຄ່ນໄມ້ທີ່ດິນ ປ້ອນປະເພດຕົວຊີ້ວັດການປົກຫຸ້ມ (ຖ້າເປັນສີດຳແມ່ນປ່າ, ສີຂາວບໍ່ແມ່ນປ່າ): Forest (Black)
 ຂໍ້ມູນDelta-rNBR 20-ປີ ເວລາທີ່ມີການເຮັດຊ້ຳພື້ນທີ່ເກົ່າ (Delta_rNBR_..._Cloud_0_16Bit_Add_Avg_THR_125_Sieve_10_8Bit)	ຕົວຊີ້ບອກເວລາ2 ຂອງຂໍ້ມູນ Delta-rNBR ກ່ຽວກັບປະເພດການບຸກໂຄ່ນໄມ້ທີ່ດິນ ປ້ອນປະເພດຕົວຊີ້ວັດການປົກຫຸ້ມ(ຖ້າເປັນສີດຳແມ່ນປ່າ,ສີຂາວບໍ່ແມ່ນປ່າ): Forest (Black)

 ພາບຖ່າຍດາວທຽມ Sentinel-2 ກ່ອນປ່າໄມ້ຖຸດໂຊມ	ວັນທີເດືອນປີ:ພາບຖ່າຍດາວທຽມSentinel-2 2/19/2018 ການເລືອກພາບຖ່າຍດາວທຽມ Sentinel ກ່ອນປ່າໄມ້ຖຸດໂຊມ ເລືອກປະເພດການປົກຫຸ້ມ Primary Forest
 ພາບຖ່າຍດາວທຽມ Sentinel ຫຼັງປ່າໄມ້ຖຸດໂຊມ	ວັນທີເດືອນປີ:ພາບຖ່າຍດາວທຽມSentinel-2 2/19/2019 ການເລືອກພາບຖ່າຍດາວທຽມທີ່ຫັນການວິເຄາະ Delta-rNBR ຈາກການປ່ຽນແປງສ້ຳເກດເຫັນປ່າໄມ້ມີການປ່ຽນແປງບໍ່? Yes
 ພາບຖ່າຍດາວທຽມPlanetScope ກ່ອນປ່າໄມ້ຖຸດໂຊມ	ວັນທີເດືອນປີພາບຖ່າຍດາວທຽມ PlanetScope 11/5/2017 ການເລືອກພາບຖ່າຍດາວທຽມ PlanetScopeທີ່ແຈ້ງແລະໄຮ່ ໃນຊ່ວງລະດູແລ້ງ ຫຼືລະດູຝົນ ເລືອກປະເພດການປົກຫຸ້ມ Primary Forest
 ພາບຖ່າຍດາວທຽມPlanetScopeໃນຊ່ວງລະດູແລ້ງ	ວັນທີເດືອນປີພາບຖ່າຍດາວທຽມ PlanetScope 3/5/2019 ເລືອກວັນທີເດືອນປີພາບຖ່າຍດາວທຽມທີ່ມີສີແລະເວລາທີ່ໃກ້ຄຽງກັນ ເລືອກປະເພດການປົກຫຸ້ມ Degraded Forest
 ພາບຖ່າຍດາວທຽມ RapidEye ກ່ອນໜ້ານີ້	ວັນທີເດືອນປີ: ພາບຖ່າຍດາວທຽມ RapidEye 11/1/2014 ເລືອກວັນທີ່ເດືອນປີ:ພາບຖ່າຍດາວທຽມໃນຊ່ວງເວລາທີ່ໃກ້ຄຽງກັບເວລາຂອງການວິເຄາະການປ່ຽນແປງ Delta-rNBR

	ເລືອກປະເພດການປົກຫຸ້ມ Primary Forest
 ພາບຖ່າຍດາວທຽມPlanetScope ຫຼັງປ່າໄມ້ຖຸດໂຊມ	ວັນທີເດືອນປີພາບຖ່າຍ PlanetScope 3/5/2019 ເລືອກວັນທີ່ເດືອນປີພາບຖ່າຍ PlanetScopeຫຼັງຈາກການວິເຄາະທີ່ສຸດຄວາມຄາດເຄລື່ອນທີ່ດີທີ່ສຸດ ເລືອກປະເພດການປົກຫຸ້ມ Degraded Forest
 ພາບຖ່າຍດາວທຽມ Bing ທີ່ມີຄວາມລະອຽດສູງ	ວັນທີເດືອນປີພາບຖ່າຍ Bing 3/8/2012 ເລືອກປະເພດການປົກຫຸ້ມ Primary Forest
 ພາບຖ່າຍດາວທຽມ Google ທີ່ມີຄວາມລະອຽດສູງ	ວັນທີເດືອນປີພາບຖ່າຍ Google 2/24/2007 ເລືອກປະເພດການປົກຫຸ້ມ Primary Forest
 ພາບຖ່າຍດາວທຽມ Yandex ທີ່ມີຄວາມລະອຽດສູງ	ວັນທີເດືອນປີພາບຖ່າຍ Yandex 10/21/2013 ເລືອກປະເພດການປົກຫຸ້ມ Primary Forest

OLDMS for Law Enforcement: – Annual OLDMS Cycle



IV. Results & Summary

OLDMS for Protected Areas Management

1. Involved Staff from DoFI, DOF and the Provinces who participated in the OLDMS Training and Fieldwork were able to successfully implement the methodology and achieve a successful result.
2. Delta_rNBR is able to be an accurate and highly useful tool for early detection of forest degradation and logging.
3. The OLDMS Methodology can also easily and accurately detect Shifting Cultivation and any Changes of 0.5 Hectares or Larger, so is an appropriate and highly useful tool.

Thank you!

ADB Food Security Forum

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