

# Review on Community-based forest monitoring

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# Approach

Plan review

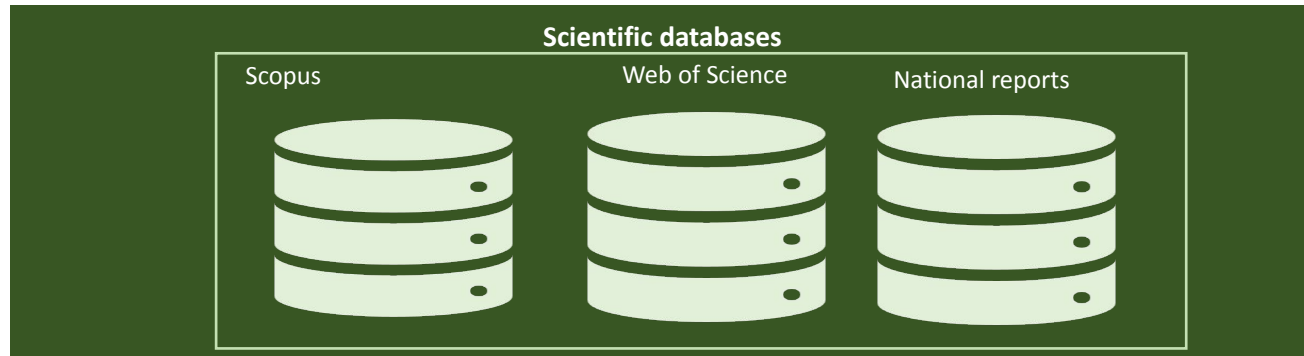
Step 1

## Systematic Literature research

Search string ( 'CBM', 'locally-based monitoring', 'participatory monitoring', 'community-based , 'citizen 'capacity building' and 'community capacity', combined with 'REDD+' or 'MRV REDD+'. AND forest AND monitoring')

Conduct review

Step 2



Documents

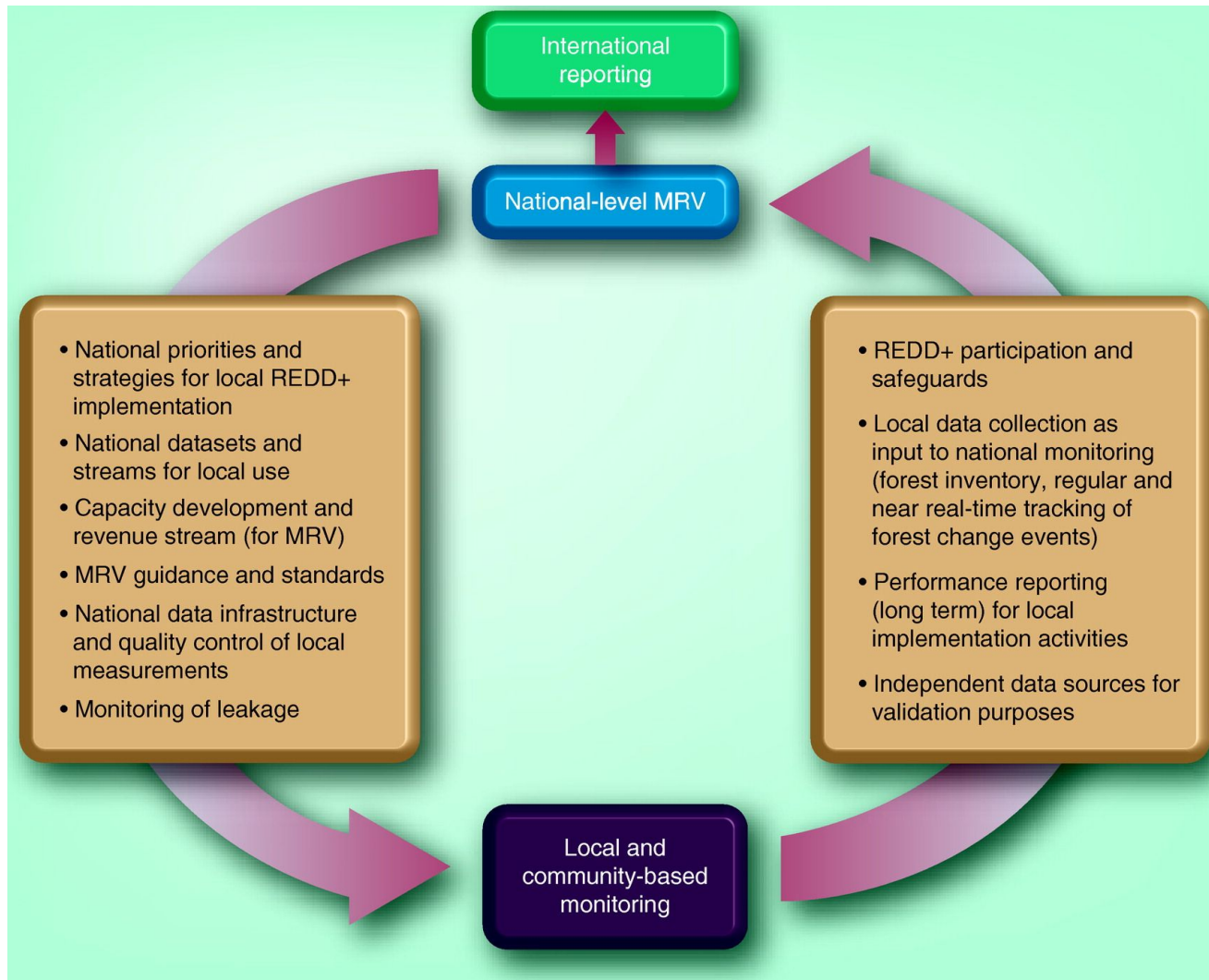
Step 3

Data analysis, Publications and Presentations

# Literature research in Scopus

- Looking for key words 'community-based AND monitoring AND redd+ '
  - 33 results predominantly tropical forest monitoring
- 'citizen AND science AND forest AND monitoring '
  - 121 results overlapping with other research
- More papers publish but no consensus on terminology:
  - CBM
  - Citizen Science
  - Community involvement
  - etc

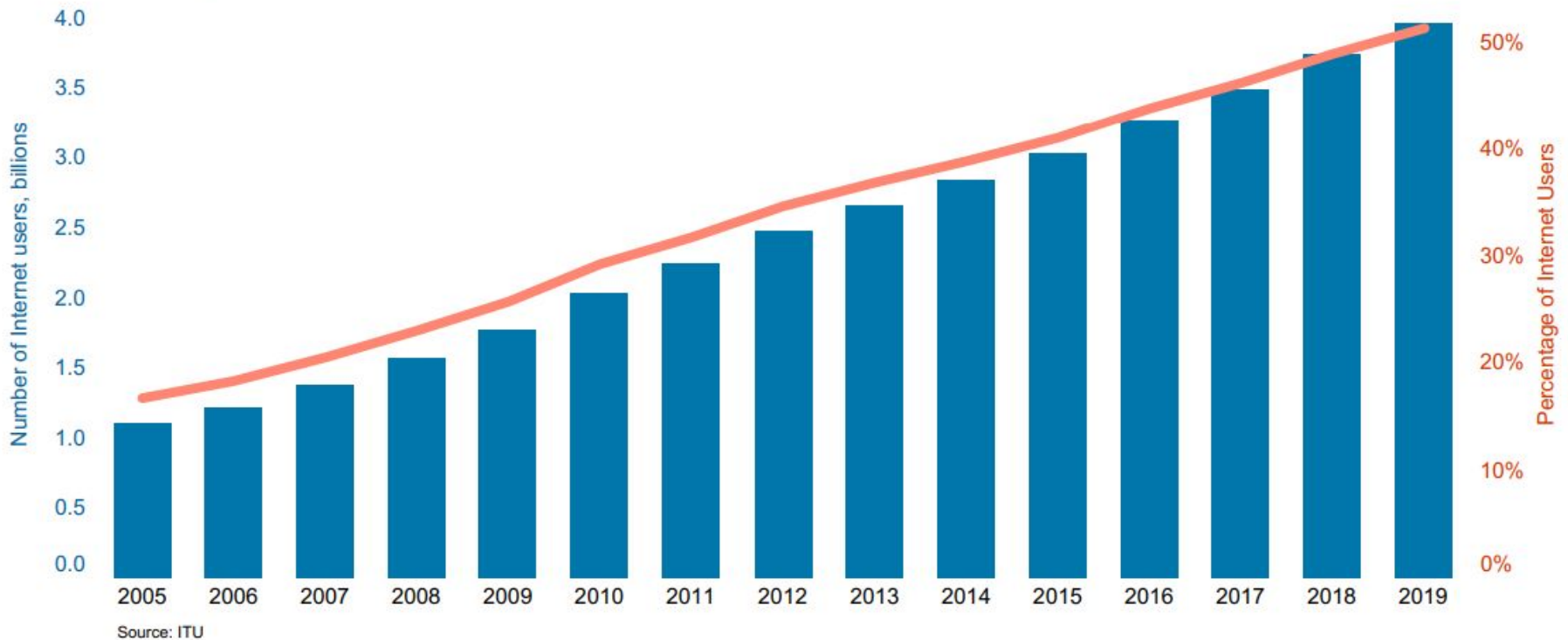
# Approach
































# Mobile users

- Majority of young persons are using the Internet.



# Mobile data collector

## Apps

 <p>Mobile Data Collect GIS Cloud</p> <p>★★★★★</p>	 <p>Data Collection Scanscape</p> <p>★★★★★</p>	 <p>Mobile Data Collect Axonator Inc</p> <p>★★★★★</p>	 <p>Collect - Data Colle Atlan</p> <p>★★★★★</p>	 <p>Mobile Data Collect TEC-IT</p> <p>★★★★★</p>	 <p>Epicollect5 Data Co Oxford University, CGPS</p> <p>★★★★★</p>	 <p>Teamscope - Data Teamscope B.V.</p> <p>★★★★★</p>	 <p>insyt - Mobile Data Esoko</p> <p>★★★★★</p>	 <p>Asset Data Collect Linq Americas</p> <p>★★★★★</p>
 <p>M&amp;E Data Collect ABI Technologies</p> <p>★★★★★</p>	 <p>ODK Collect ODK</p> <p>★★★★★</p>	 <p>Data Collection Ma Tellspec LTD.</p> <p>★★★★★</p>	 <p>Viewworld - Data C Viewworld</p> <p>★★★★★</p>	 <p>Mobile Data Collect Global Patron Pty Ltd</p> <p>★★★★★</p>	 <p>Field Book PhenoApps</p> <p>★★★★★</p>	 <p>KoBoCollect KoboToolBox</p> <p>★★★★★</p>	 <p>SurveyCTO Collect Dobility, Inc.</p> <p>★★★★★</p>	 <p>Regreening Africa - ICRAF</p> <p>★★★★★</p>
 <p>Data Monitor: Simple KF Software House</p> <p>★★★★★</p>	 <p>RMS Data Collect Techno Brain</p> <p>★★★★★</p>	 <p>WVS Data Collect Mission Rabies</p> <p>★★★★★</p>	 <p>VisibleImpact Data Visible Solutions AG</p> <p>★★★★★</p>	 <p>GoSurvey - Offline S Techgrains Technologie</p> <p>★★★★★</p>	 <p>Mappt: GIS Data Co Takor Group</p> <p>★★★★★</p>	 <p>Surveykshan Collect Fynzo</p> <p>★★★★★</p>	 <p>Data Table - Survey Technoob-Games</p> <p>★★★★★</p>	 <p>EasyODK - Mobile D velsof</p> <p>★★★★★</p>

# Operational forest monitoring systems

## Global Forest watch



## National Scale

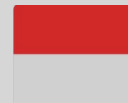
Peru



Brazil



Indonesia



India



Mexico



# Community-based monitoring approaches

- Countries have different approaches to forest monitoring and protection
- CBM programs:
  - Governmental driven on national or local level
  - NGO driven
  - Community driven (often supported by NGO's)
- Satellite derived NRT data:
  - Fire alerts
  - Deforestation alerts

Musinsky, J., et al. (2018). "Conservation impacts of a near real-time forest monitoring and alert system for the tropics." [Remote Sensing in Ecology and Conservation](#) 4(3): 189-196.



# Peru

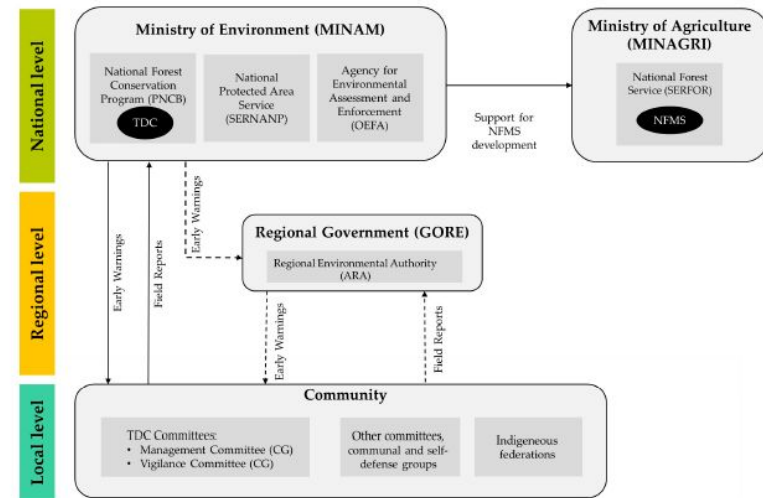
**Initiative:** Governmental driven

**Tools:** Papers & Smartphones based alert-driven monitoring

**Data:** In-situ data with GPS, ground photo

**Incentive scheme:** communities compensated for monitoring effort per hectare protected forest

**Sustainability :** mid- to long term since compensation depends on government



Blackman A, Corral L, Lima ES, Asner GP. Titling indigenous communities protects forests in the Peruvian Amazon. Proceedings of the National Academy of Sciences of the United States of America. 2017;114(16):4123-8. doi: 10.1073/pnas.1603290114.

Kowler LF, Pratihast AK, del Arco APO, Larson AM, Braun C, Herold M. Aiming for sustainability and scalability: Community engagement in forest payment schemes. Forests. 2020;11(4). doi: 10.3390/F11040444  
<http://geo.sernanp.gob.pe/visorsernanp/>

# Ethiopia

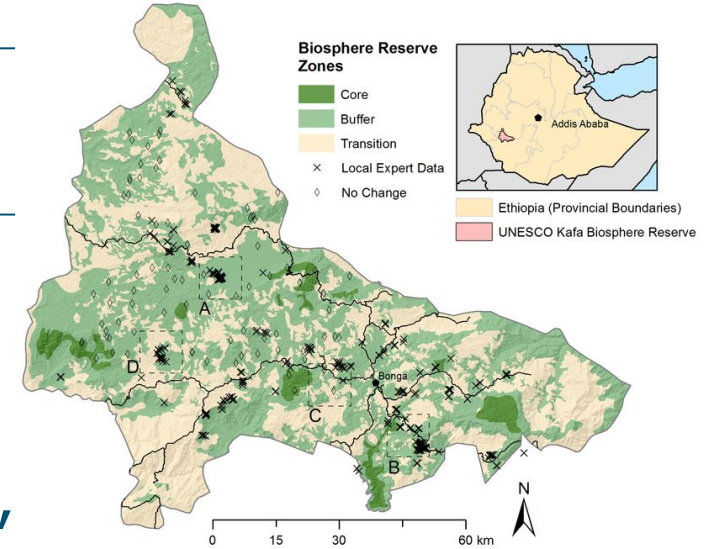
**Initiative:** NGO/institutionally driven (NABU)

**Tools:** Field survey, Mobile Phones, GIS

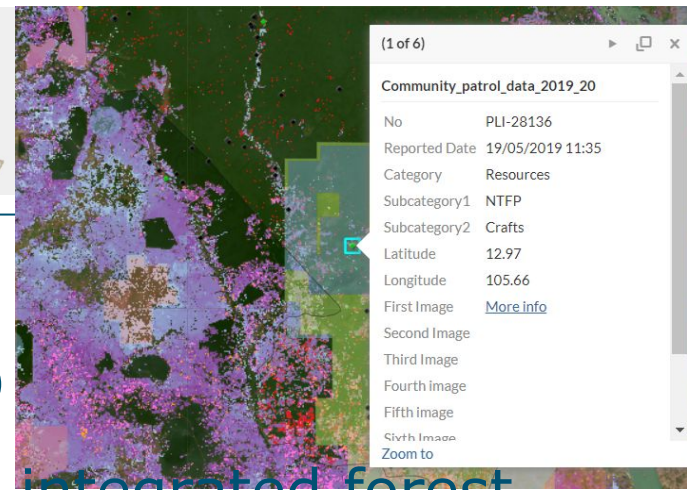
**Data:** Forest disturbance, drivers of deforestation, images

**Incentive:** Part of job

**Sustainability** : short term, only ongoing for research period.



# Cambodia



**Initiative:** Autonomous monitoring led by community, supported by NGO

**Tools:** mobile phone data collection, integrated forest monitoring system, online resources

**Data:** GLAAD alerts, ground data: logging, wildlife, poaching

**Incentive scheme:** safe community property and forests

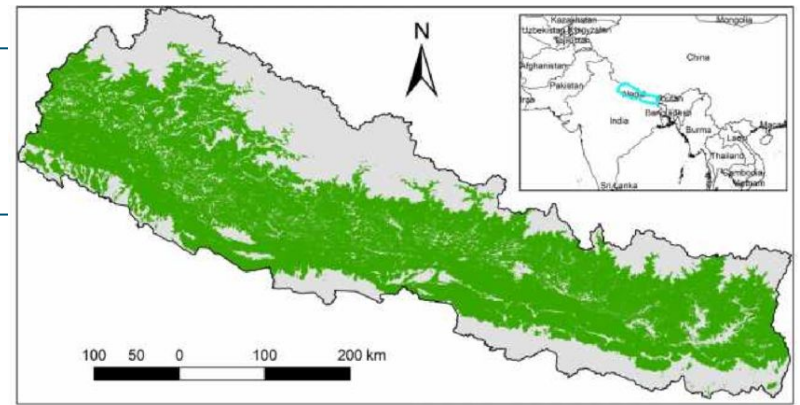
**Sustainability :** long term

Turreira-García, N., et al. (2018). "Who Wants to Save the Forest? Characterizing Community-Led Monitoring in Prey Lang, Cambodia." [Environmental Management](#) 61(6): 1019-1030.

<https://preylang.net/>

<https://plcn.maps.arcgis.com/apps/PublicInformation/index.html?appid=d6236217236c48aa92e7e3255fb41050>

# Nepal



**Initiative:** Governmental effort

Forests are community owned and managed largely protected to sustain livelihoods

**Tools:** resource inventories, transect walks

**Data:** biodiversity, land use change, fires, infrastructure, ecosystem health

**Incentive:** Social response, improve local livelihood

**Sustainability :** long term, started 1970, manifested in 1990s

Charmakar, S., et al. (2018). [Participatory Biodiversity Monitoring in Community Forests: An experience from Nepal.](#)

Luintel H, Bluffstone RA, Scheller RM (2018) The effects of the Nepal community forestry program on biodiversity conservation and carbon storage. PLoS ONE 13(6): e0199526. <https://doi.org/10.1371/journal.pone.0199526>

# Nicaragua

**Initiative:** Community driven,  
financial and scientific support of NGO's

**Tools:** manual pen-paper approach, GPS,  
occasionally NRT alerts

**Data:** deforestation, drivers of def., proprietary  
information, biodiversity, resources, land invasion

**Incentive scheme:** communities' motivation to protect  
own land, low compensation by partnering NGO's

**Sustainability:** long term due to communities engagement



Klein, P., et al. (2018). [Nicaragua: Forest protection and deforestation](#). Public Recreation and Landscape Protection - With Nature Hand in Hand? Conference Proceeding

2018.Jordan, C. A., et al. (2016). "Terrestrial mammal occupancy in the context of widespread forest loss and a proposed interoceanic canal in Nicaragua's decreasingly remote south Caribbean region." [PLoS ONE](#) 11(3).










# CBM E-library, Apps, and Tools

# E-Library

Shared with me > CBM - Community Based Monitoring of deforestation ▾ 👤



Name ↓	Owner	Last modified	File size
 News articles about CBM for forests	Etelle Higonnet	8 Jul 2021 Etelle Higonnet	—
 Mobile Apps for CBM, guides, instructions	me	5 Jul 2021 Etelle Higonnet	—
 Metastudies summarizing most forest CBM literature	Etelle Higonnet	8 Jul 2021 Etelle Higonnet	—
 Case studies: scientific articles on specific apps or countries	Etelle Higonnet	8 Jul 2021 Etelle Higonnet	—
 Master List_Forest CBM Literature.docx 👤	me	15 Jul 2021 me	35 KB
 IKI_CBM_Review.pptx 👤	Etelle Higonnet	11:57 me	5.9 MB
 ELibrary_Matrix.xlsx 👤	me	15 Jul 2021 me	17 KB

# App Infographic w/ Clickable Download Links

## COMMUNITY-BASED FOREST MONITORING MOBILE APPLICATIONS

A download guide

Click the icons below for a download link:

### The IKI project



**GEO WIKI**  
Forest Geo-Wiki is designed to present and validate spatial information related to forest. The applications include forest cover, monitoring of forest cover change, forest management, forest certification, etc.



**INATURALIST**  
This app is useful for community-based monitoring in REDD+ projects as it allows community members to set up surveys, record data offline, and analyse data online.



### DATA COLLECTION MANAGEMENT 2

Near Infrared spectroscopy is used to analyse a wide variety of materials, from foods to soils. Before this, the instruments needed have been large, expensive, and complex to operate. With this app and the handheld Telespec Enterprise Scanner you can quickly and easily collect NIR spectra anywhere, without needing access to the Internet.



### MOBILE DATA COLLECTOR

The mobile app enables you to accurately record data, online or offline. By filling in digital custom survey forms, you can create an unlimited number of your own unique forms in the user-friendly form builder, in the connected web app (Mobile Data Collection Portal).

### OPEN DATA KIT (ODK) COLLECT

ODK lets you build powerful offline forms to collect the data you need wherever it is.



### GEO ODK COLLECT

GeoODK provides a way to collect survey based information and geo-referenced information, along with a suite of tools to visualize, analyze and manipulate ground data for specific needs. It enables an understanding of the data for decision-making, research, business, disaster management, agriculture and more.



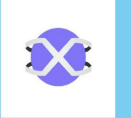
### MOBILE DATA COLLECTION

The forms themselves are built by you, at www.globastron.com, then once you have built them, open the app and download them locally so you can collect data wherever you are, even without an internet connection. Then when internet is available again, the form submissions you have collected get pushed to the server.



### MOBILE DATA COLLECTION APP - AXONATOR

Easily build mobile forms using drag and drop. Send PDF reports where you want, from anywhere. Convert your inspections, audits, work orders and any paper forms into mobile apps. A data collection app which will help you to build mobile forms and automate your field by converting paper forms into mobile and tablet apps on iOS and Android.



### FOREST WATCHER

An online forest monitoring and alert systems from Global Forest Watch. It allows communities to monitor areas of interest, view deforestation and fire alerts, navigate to a point to investigate, and collect information, regardless of connectivity.



### IT'S OUR FOREST TOO: PREY LANG APP (PLA)

This forest monitoring tool is created with the collaboration of Prey Lang Community Network (PLCN) members in Cambodia. This smartphone app allows the PLCN to geo-reference, document, and immediately upload information about forest health, illegal logging and wildlife poaching to a centralised database that can be accessed anywhere in the world.



### COLLECT

Collect is a mobile data collection app and web dashboard that helps you build mobile forms and collect high-quality data in different ways (logging from simple text, and numeric data to audio, video, and location data). The Collect app works offline, letting you easily collect data in places without internet or electricity. Collect's web dashboard allows you to create and publish extensive forms, manage your teams, and view the incoming data in real-time.



### FIELD BOOK

Field Book is a simple app for taking phenotypic notes. Collecting data in the field has traditionally been a laborious process: recording writing notes by hand followed by transcription. Field Book was created to replace paper field books and to enable increased collection speed with greater data integrity.



### "OPEN STREET MAP" - MOABI DRC

The platform is built on a customized version of OpenStreetMap. OSM is an open source alternative to proprietary geographic data platforms, with voluntary contributions sourced from the crowd. It allows data to be shared between OSM and Moabi, ensuring that data common to both is up-to-date. Moreover, it allows for easy read/write access to data from different sources, whether it relates to land use concessions, transportation networks, forest cover, or community reporting.



### COLLECT MOBILE - OPEN FORIS

A data collection tool for field-based surveys. This Android app allows the completion of complex data structures, such as biophysical, socio-economic or biodiversity surveys.

### SAPPELLI COLLECTOR

Sapelli Collector uses the GPS, computing and programming abilities of all smartphones to make it easier for communities to gather data themselves for issues they agree among themselves are important.



### FOREST LINK

Using the ForestLink system, forest communities can send alerts and evidence of a number of threats to the forest, even in remote areas with no mobile connectivity. It can be used to address a wide range of threats, including illegal logging, illegal mining and oil spills.



### REGREENING AFRICA

Regreening Africa App is a mobile-based android application that helps users to collect information on how farmers are managing and protecting trees on their farms. This application was developed under the Regreening Africa project, a project that targets to reverse land degradation in Africa by scaling up evergreen agriculture.



### EASY ODK

EasyODK is based on Open Source ODK (Open Data Kit) Collect Application. It helps you Digitize the Paper Forms and start collecting data from the field. It supports all types of fields like - Text, Numeric, Date, Time, Latitude/Longitude, Audio, Video, Pictures and much more. It also supports the Question Skip logic, real-time Data Validation, thus ensuring quality data collection for Analysis.



### GLOBE OBSERVER

GLOBE Observer allows you to make environmental observations that complement NASA satellite observations to help scientists studying Earth and the global environment. Those in the 120+ GLOBE countries can download and use the app.



### CYBERTRACKER

This app is used for mapping community and forest boundaries, and forest strata in the field. It also provides menus and screen templates to ease the process of data acquisition on the sample plots, carbon pools and on the community forest management systems and types and sources of degradation, which are essential to the Reduced Emissions from Deforestation and Degradation in Developing Countries (REDD) approach.



### TEAMSCOPE

Teamscope is a mobile data collection app for clinical and field research. Create powerful mobile forms, collect data offline and visualize it with a few clicks.



### VISIBLEIMPACT

VisibleImpact is an impact tracking platform for social organizations. This app enables organisations to collect impact data and field status reports without the need of a constant network connection.



### EPICOLLECTS

A data collection app, which can be tailored to different projects. Data can be collected in the field offline, and then uploaded when an internet connection is available.



### ISEXCHANGE TRACKER

This app allows you to share your experiences and collect data to investigate the environment and help communities change. Available at the Apple and Google Play Stores.

### C7-LDFN

C7-LDFN is an application that can be used to survey native forests. The app is no longer available to download. Previously it enabled the recording of native species, projects and surveys for forestry inventory and natural regeneration. It is, however, limited to data for forest inventories and was not used to collect additional biodiversity or social information.



### INSYT

Insyt is a mobile and web-based platform helping businesses and organizations convert from paper-based systems. Reduce cost, save time and eliminate data errors while gaining real-time visibility and insights into your operations.



### MAPPT GIS DATA COLLECTION

Mappt™ is a powerful GIS (Geographic Information System) data collection app that allows users to create, edit, store and share location-based data with one light, compact device. It is used in industries spanning from environmental and agriculture, to mining and local government in over 120 countries worldwide. It integrates with popular desktop GIS including ArcGIS and QGIS.



### XFORMS

Using the ForestLink system, forest communities can send alerts and evidence on a number of threats to the forest, even in remote areas with no mobile connectivity. It can be used to address a wide range of threats, including illegal logging, illegal mining and oil spills.



# Summary

- Countries are recognizing the role of local communities in forest monitoring
- Data acquired by local communities constitutes an independent data stream for national level monitoring.
- CBM data is most important for small-scale forest disturbance activities (i.e., degradation) that are more complicated to observe from other data sources such as remote sensing and professional forest inventory
- The linkage between local CBM and national-level efforts requires careful consideration of issues such as exchange of data, data infrastructures, standards and guidelines, capacity development and flow of resources