



## Development of a Regional Land Cover Monitoring System In the Lower Mekong Region a Joint Effort Between SERVIR-Mekong and Partners -

Aekkapol Aekakkararungroj  
SERVIR-Mekong  
Asian Disaster Preparedness Center



# SERVIR

## OBJECTIVES



**Increased  
Capacity**

of analysts and decision makers to use earth observation and geo-spatial information technologies



**Improved  
awareness**

of and access to geo-spatial data, tools, knowledge products and services



**Advancement**

and application of user-tailored geo-spatial data, tools and knowledge products to inform decision making



**Strengthen**

SERVIR-Mekong to become leading regional provider of geospatial data, analysis, and capacity building services



**USAID**  
FROM THE AMERICAN PEOPLE



**SERVIR**  **MEKONG**

# SERVIR – From Space to Village



**SERVIR** 



# SERVIR MEKONG

## SERVICE AREAS



**Food  
Security**



**Weather &  
Climate**



**Water Resources  
& Disasters**

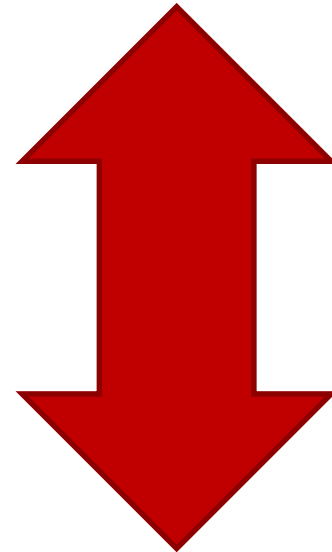


**Land Cover/Use  
& Ecosystems**

# SERVIR-Mekong: Demand Driven Activity

Regional Needs and Outcomes

Request for Technical Assistance

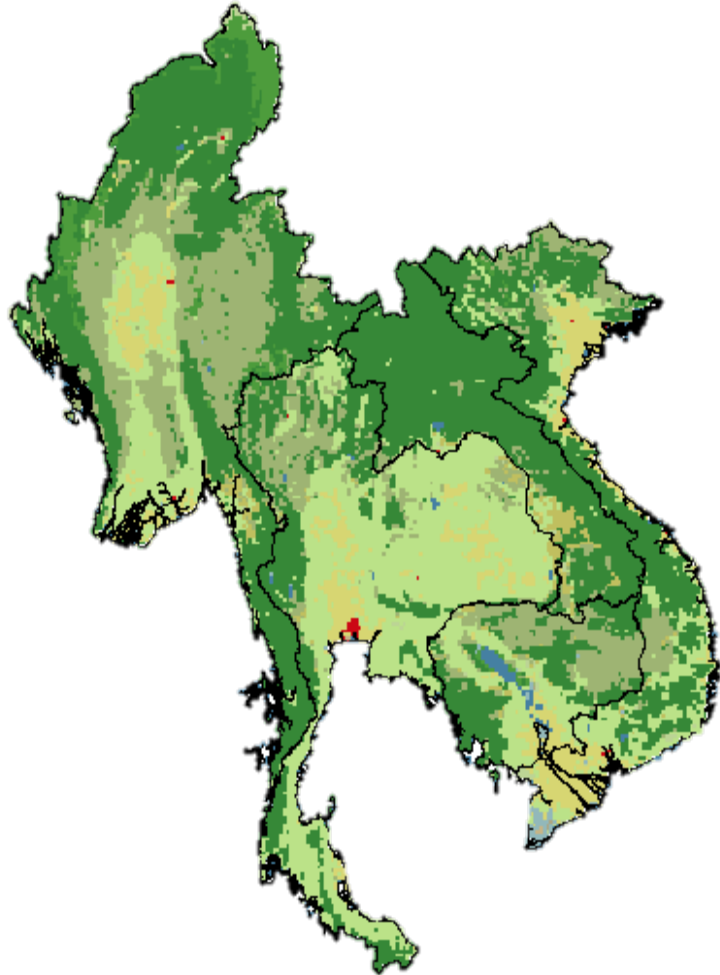


Needs Assessment

National Opportunities

Cambodia, Lao PDR, Burma, Thailand, Vietnam

# Regional Land Cover Monitoring System (RLCMS)



## Objectives

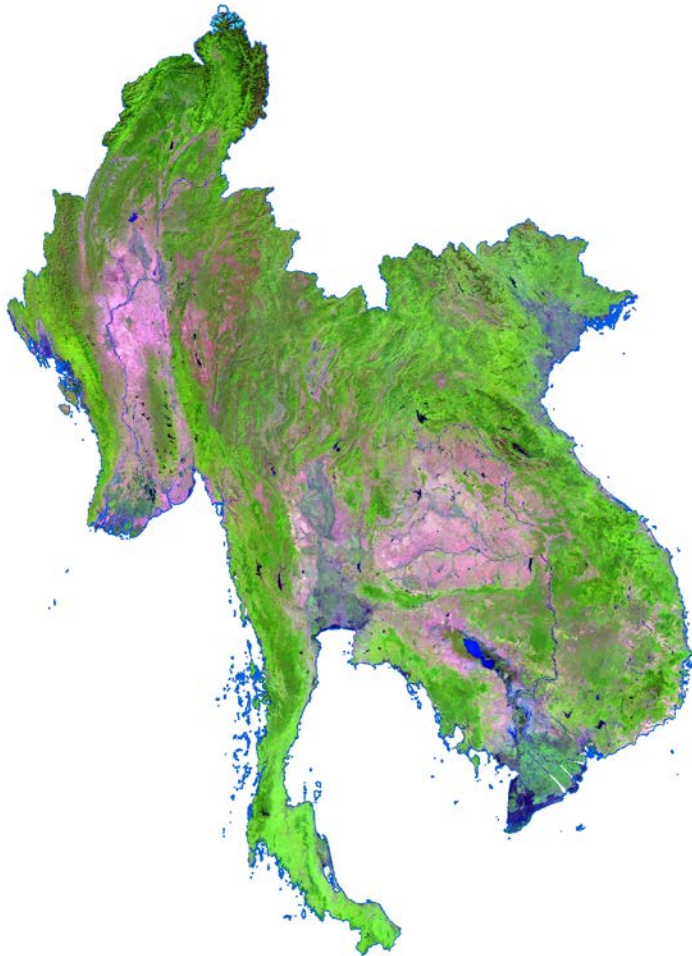
-  To **develop a unified regional** (satellite-based) **land cover monitoring system** to serve user defined objectives
-  To **produce annual land cover maps** of the Lower Mekong Countries: Cambodia, Lao PDR, Myanmar, Thailand, and Vietnam for 2000 to 2015,
-  To **provide an analysis tool** that can easily be used for different time-series.

# Regional Land Cover Monitoring System

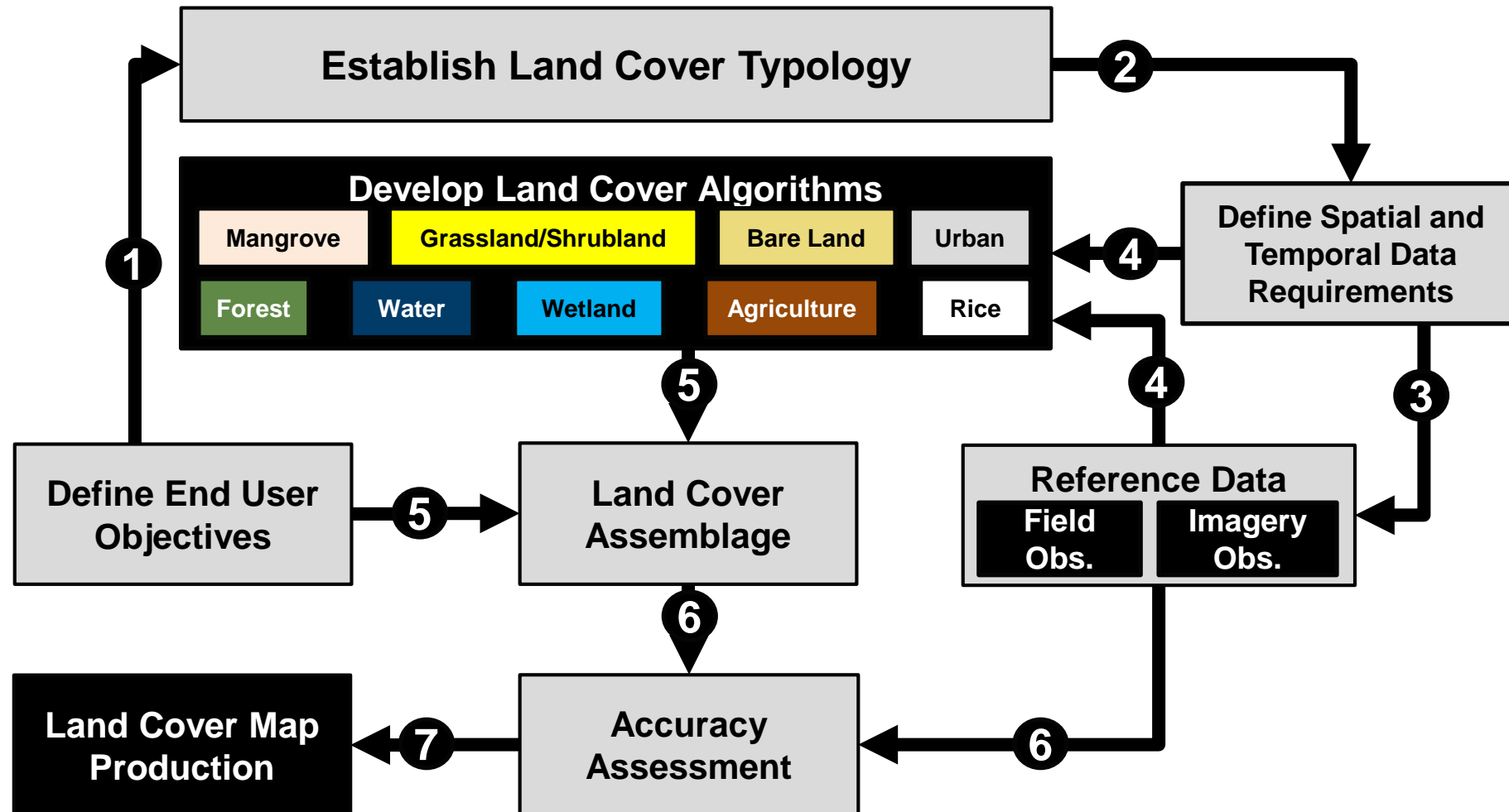
## Approach and Expected outcome

A robust remote sensing cloud- based system that

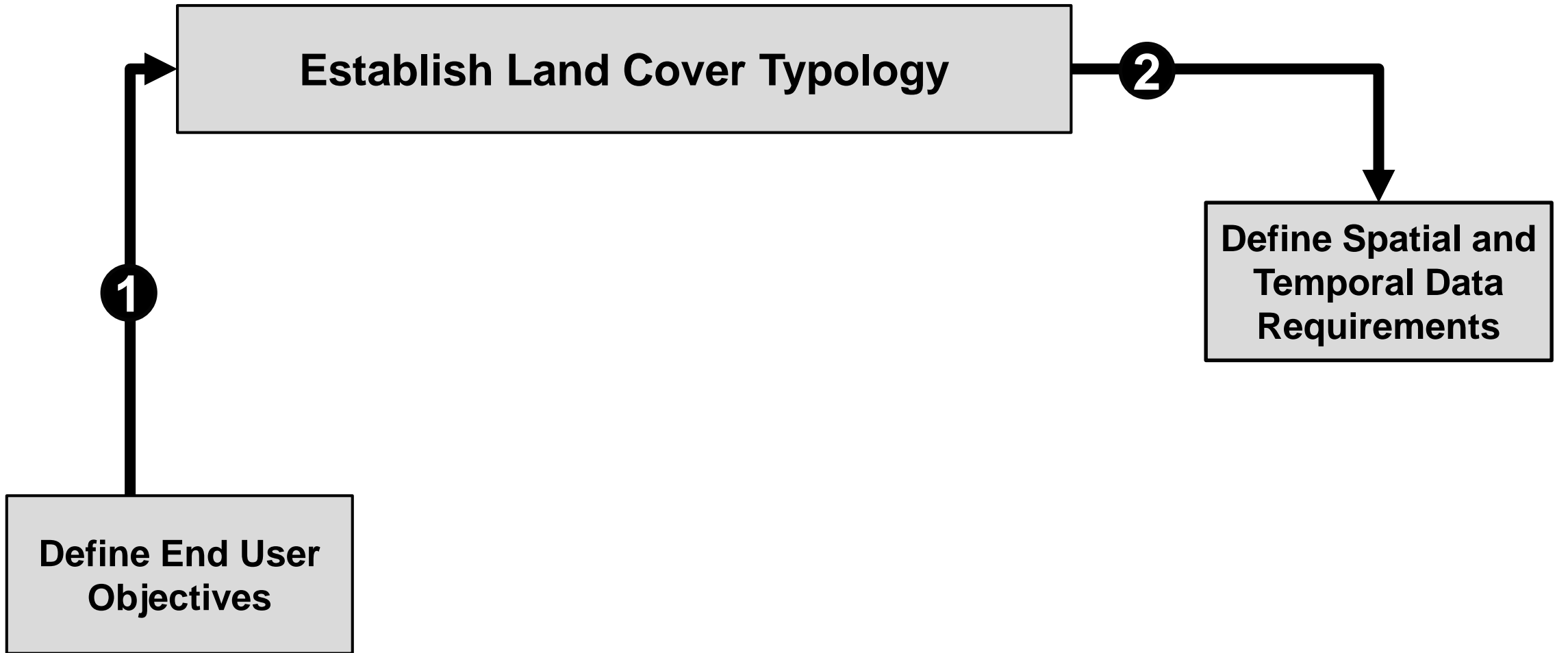
- 🌐 Is developed **collaboratively**
- 🌐 Produces **consistent products** at **regular intervals**
- 🌐 Unified **high-quality land cover maps** that serves the expressed **needs of multiple users** in the region
- 🌐 Uses **transparent**, well documented, **open source** approach
- 🌐 Includes **quality control / quality assurance methodology** that integrates information from multiple sources
- 🌐 Map products improved policy, planning and decision making among a broad range of sub-national, national and regional users.
- 🌐 A system leveraging **collaboration** and **partnership** in **land cover monitoring** in the Lower Mekong Region.

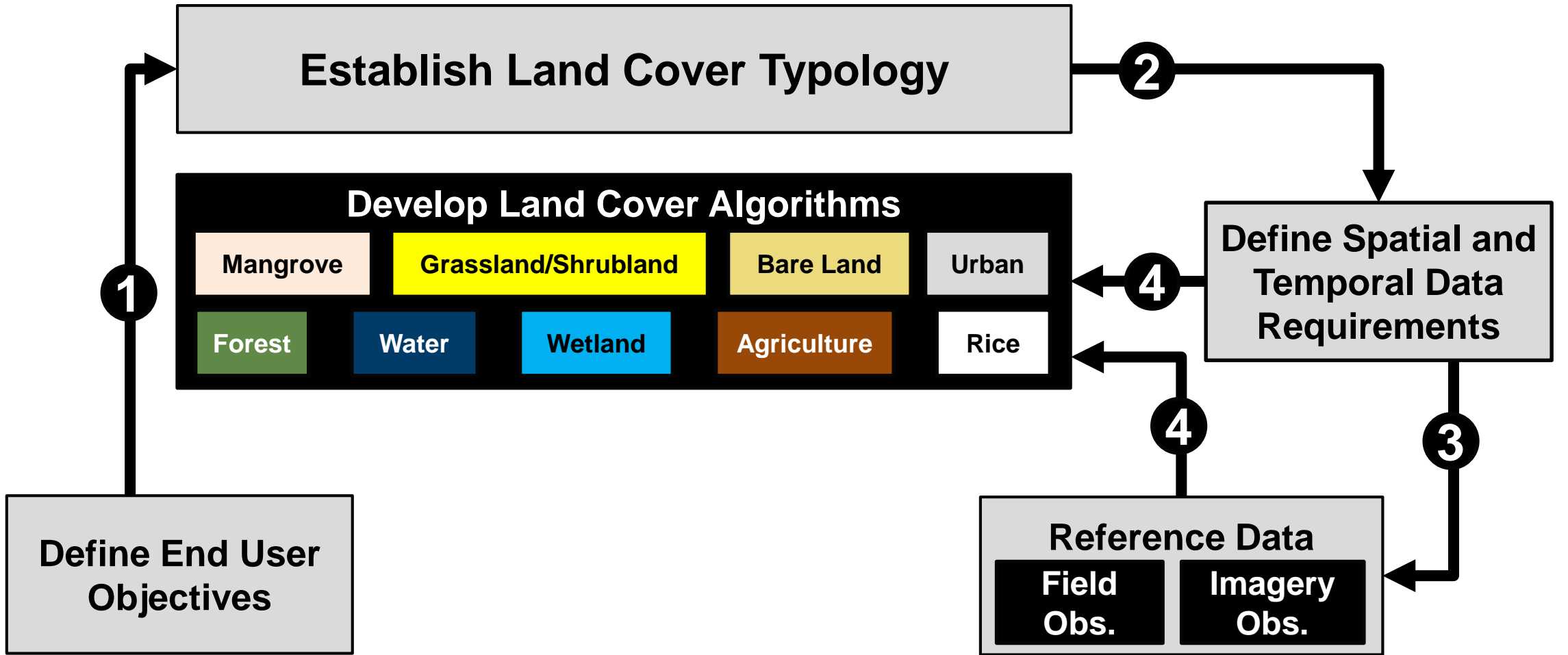


# Production and operational framework of the RLCMS

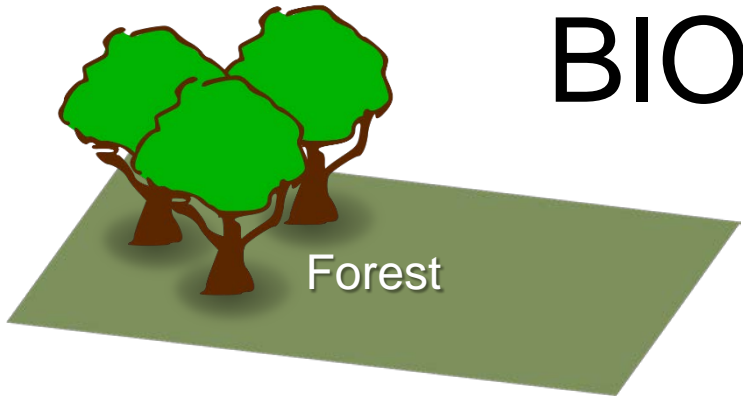








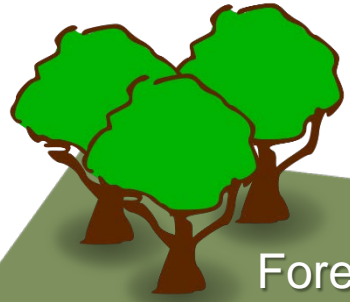




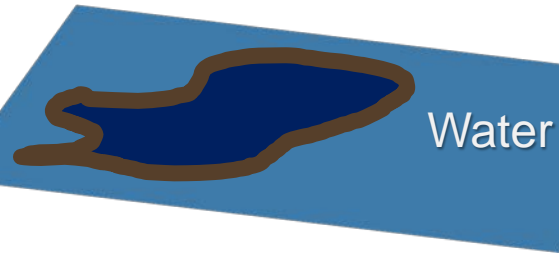
# BIOPHYSICAL Definitions

General Type	IPCC Definitions	Possible Biophysical Attributes	Difficulty
<b>Forest Land (IPCC)</b>	This category includes all land with woody vegetation consistent with thresholds used to define forest land in the national GHG inventory, sub-divided into managed and unmanaged, and also by ecosystem type as specified in the IPCC Guidelines 3 . It also includes systems with vegetation that currently fall below, but are expected to exceed, the threshold of the forest land category.	% Canopy cover	Easy
		Vegetation height class	Hard
		health, vigor	Easy
		Seasonal Greenness	Medium

# BUILD / IMPORT DATA PRIMITIVES



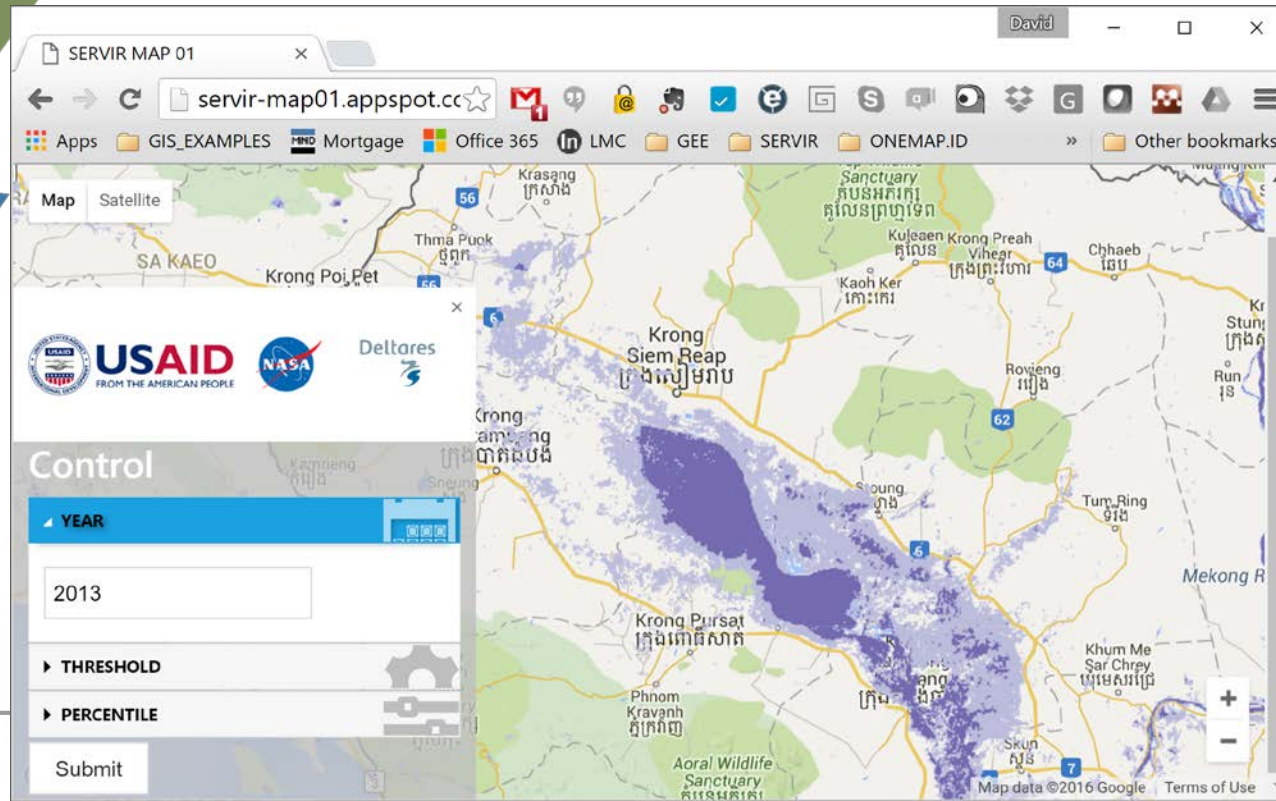
Forest



Water

Canopy Cover

Canopy Height





# Field Reference

1. Build form: A screenshot of a form builder interface showing various input fields like 'First name', 'Please record your location', 'When is your birthday?', and 'Please take a picture of yourself!'. A sidebar on the right lists 'Properties' and 'Add' options.

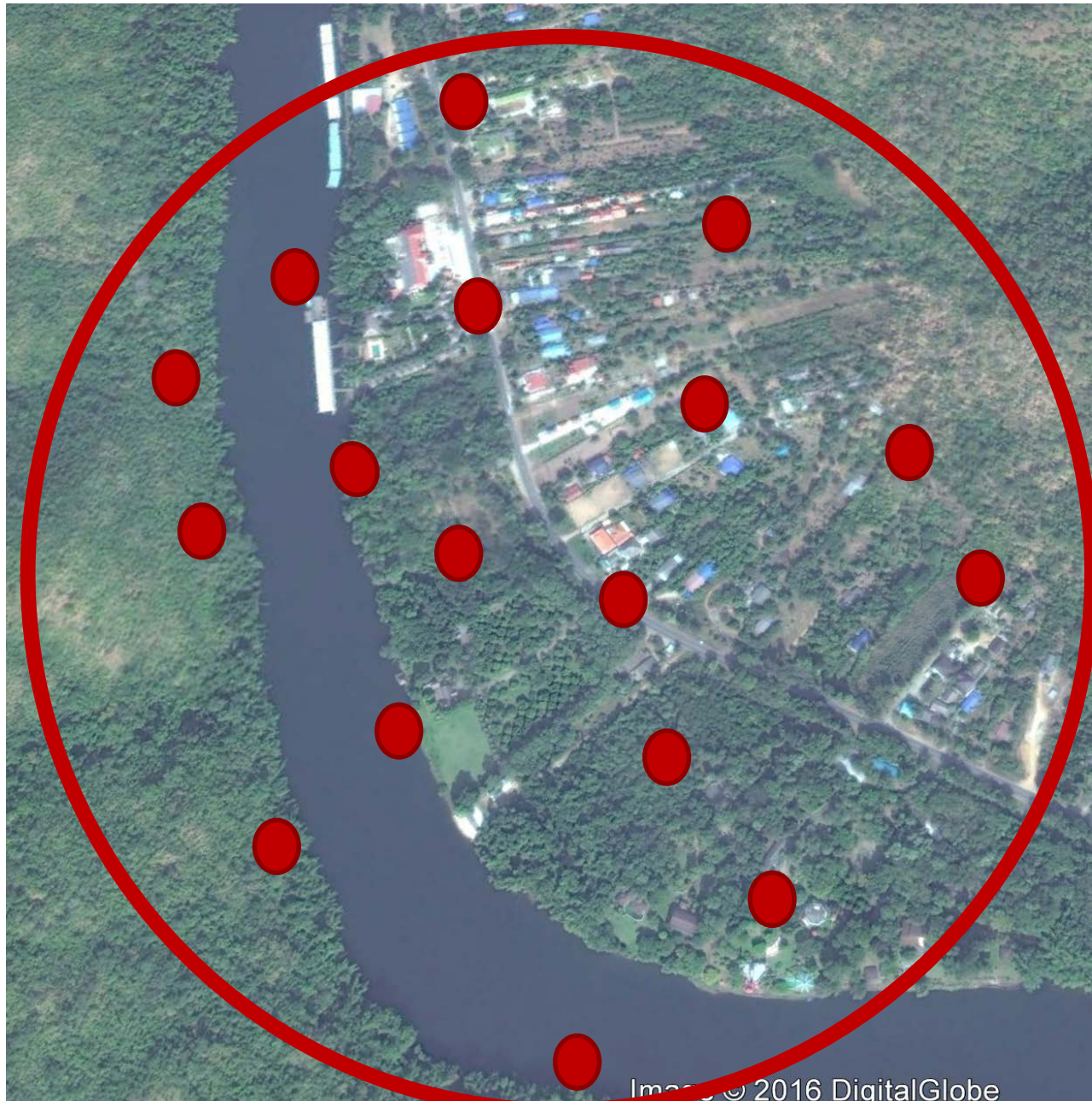
2. Collect data: Three mobile phones displaying the data collection form in a field setting.

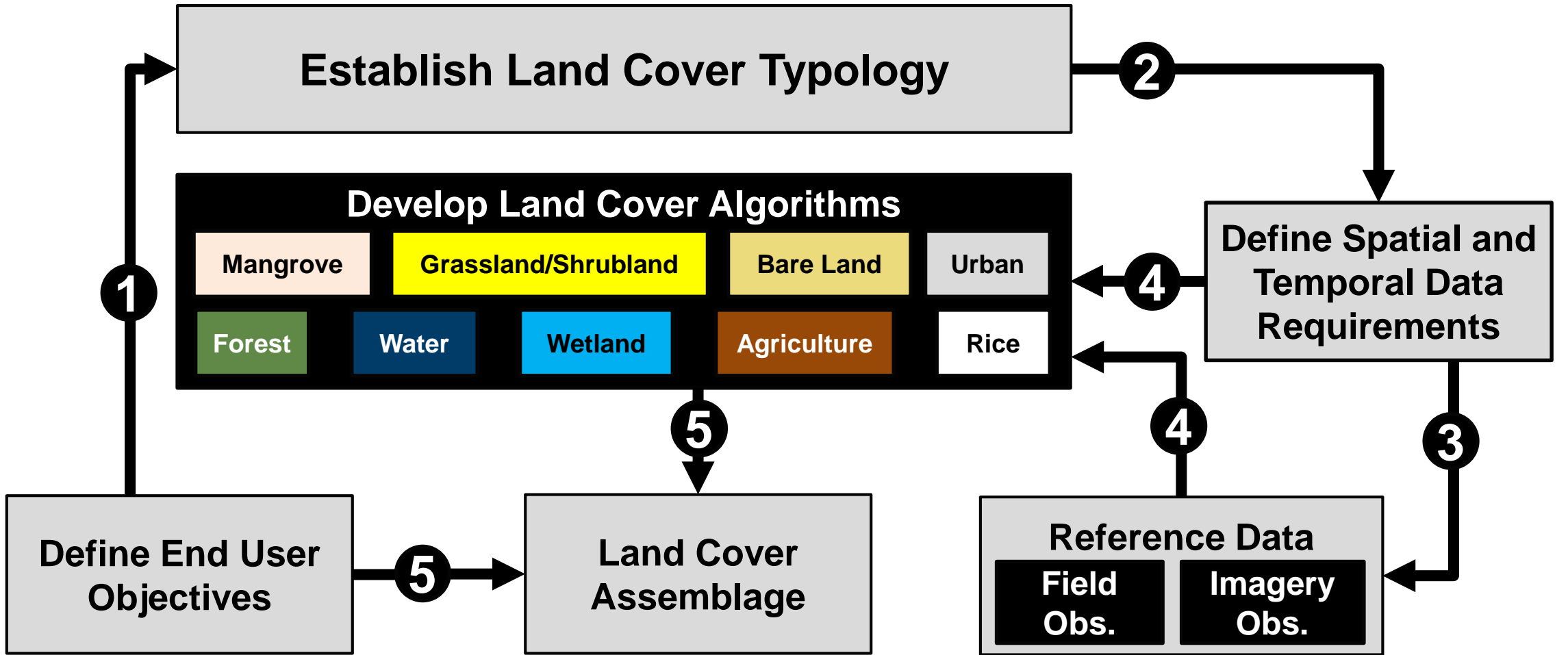
3. Aggregate results: A map showing yellow location markers and a photo of a tree with associated data fields.

ODK Aggregate interface showing a table of data submissions for the 'SERVIR-Landcover' form. The table includes columns for meta instanceID, Location Latitude, Location Longitude, Location Altitude, and Location Accuracy. A red 'X' icon is visible next to the first row.

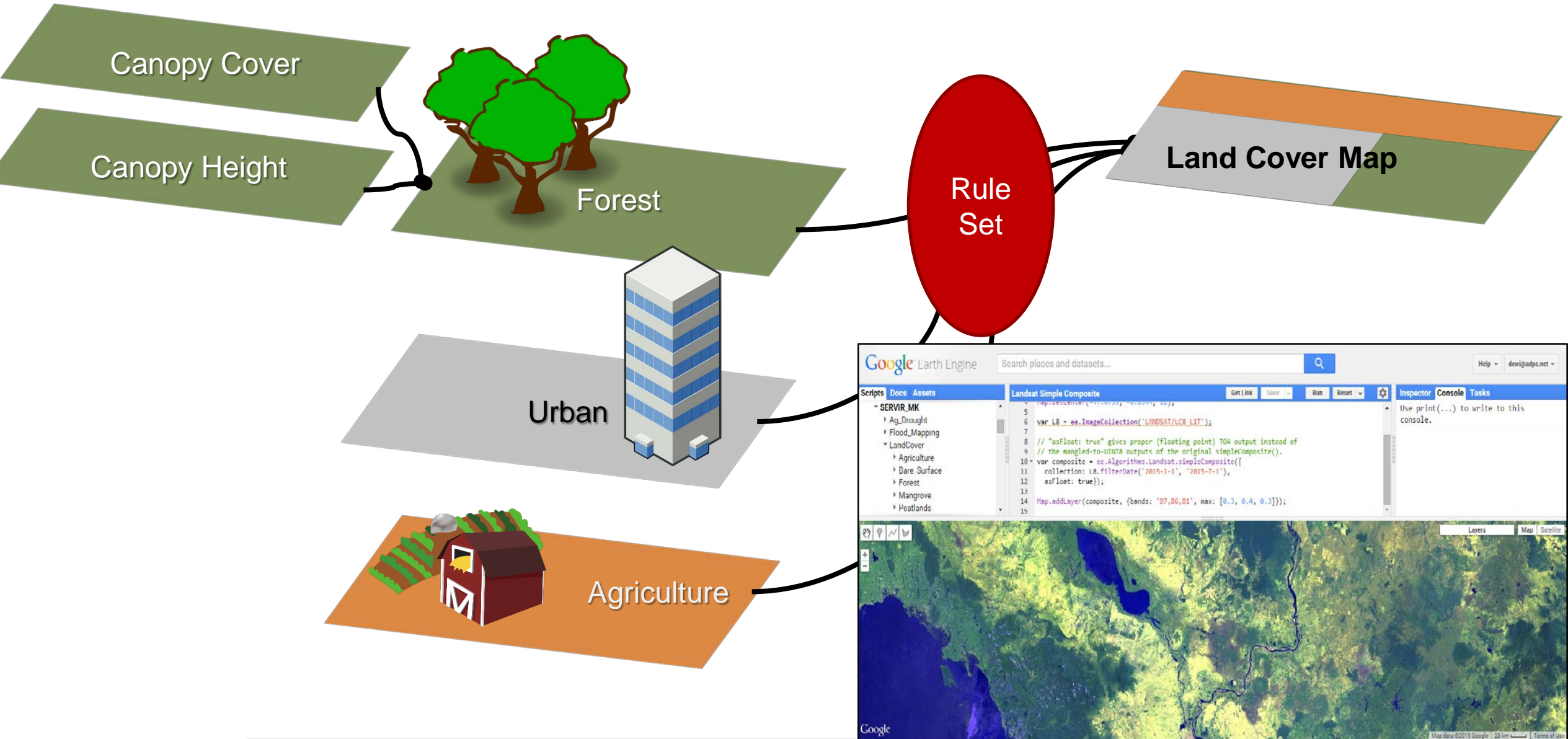
meta instanceID	Location Latitude	Location Longitude	Location Altitude	Location Accuracy
uuid:d0794ea0-7434-4482-abc9-5f9ce5e04506	13.7473133	100.5477161	.0	25.183

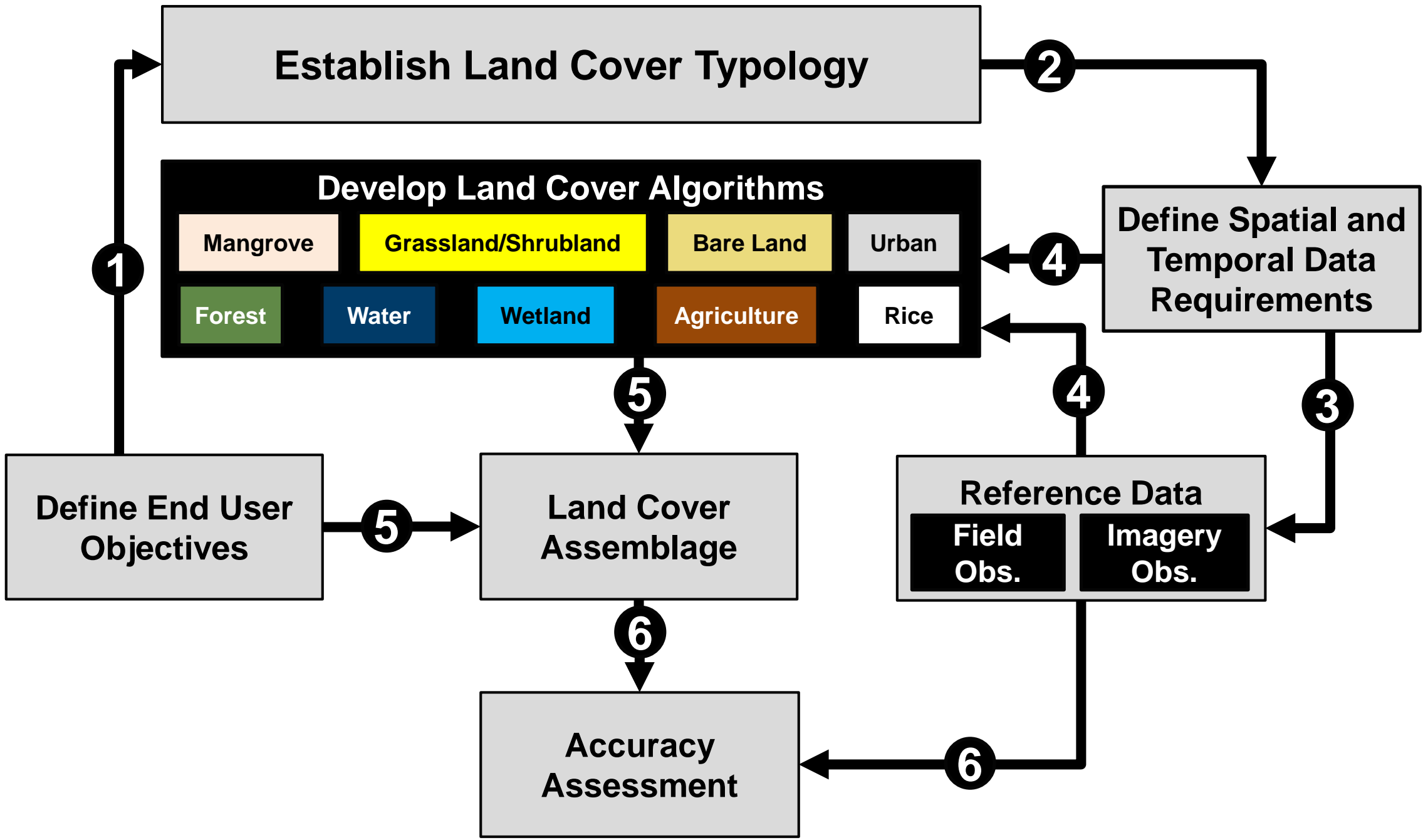
# High Resolution Image Reference



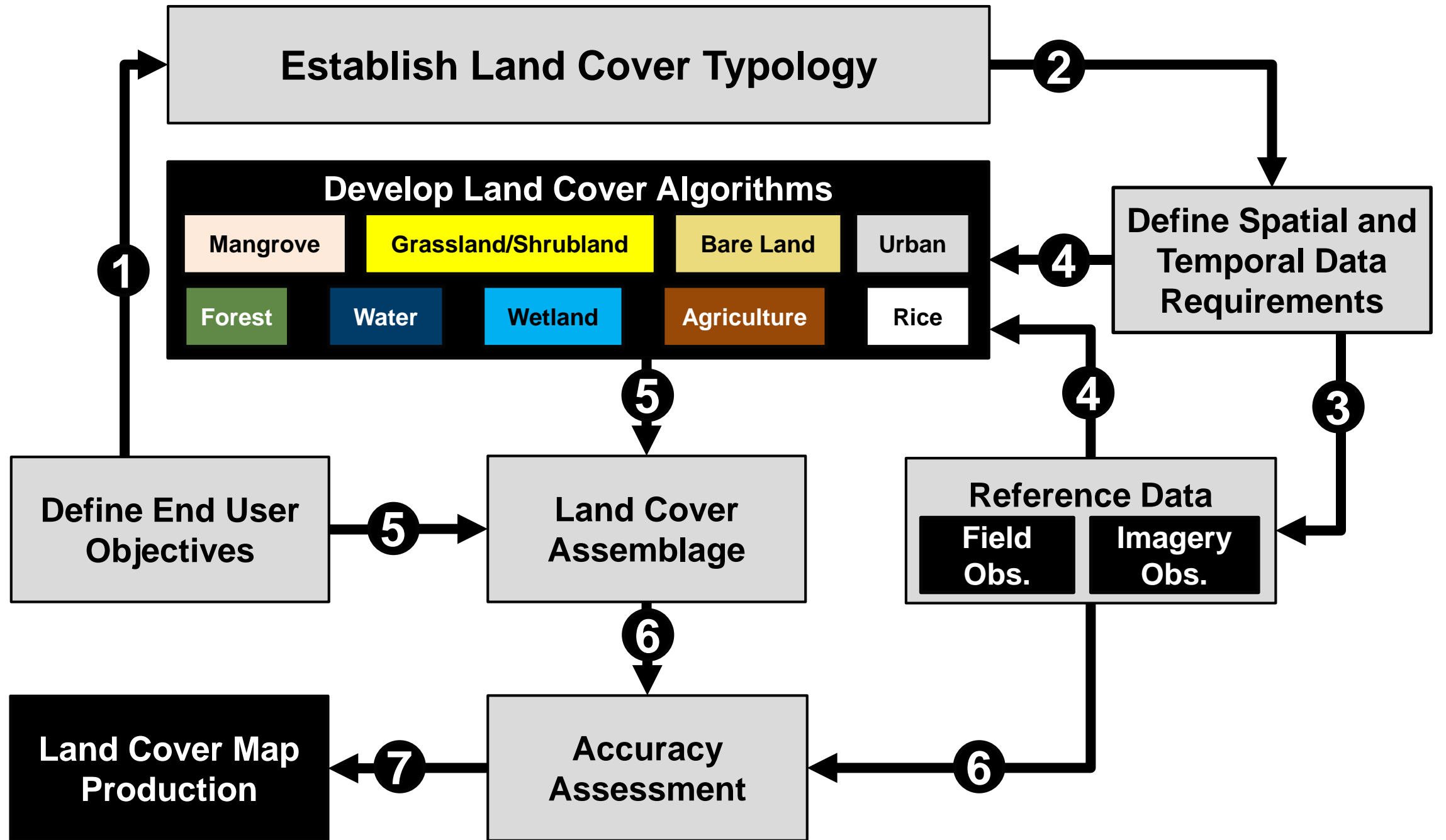




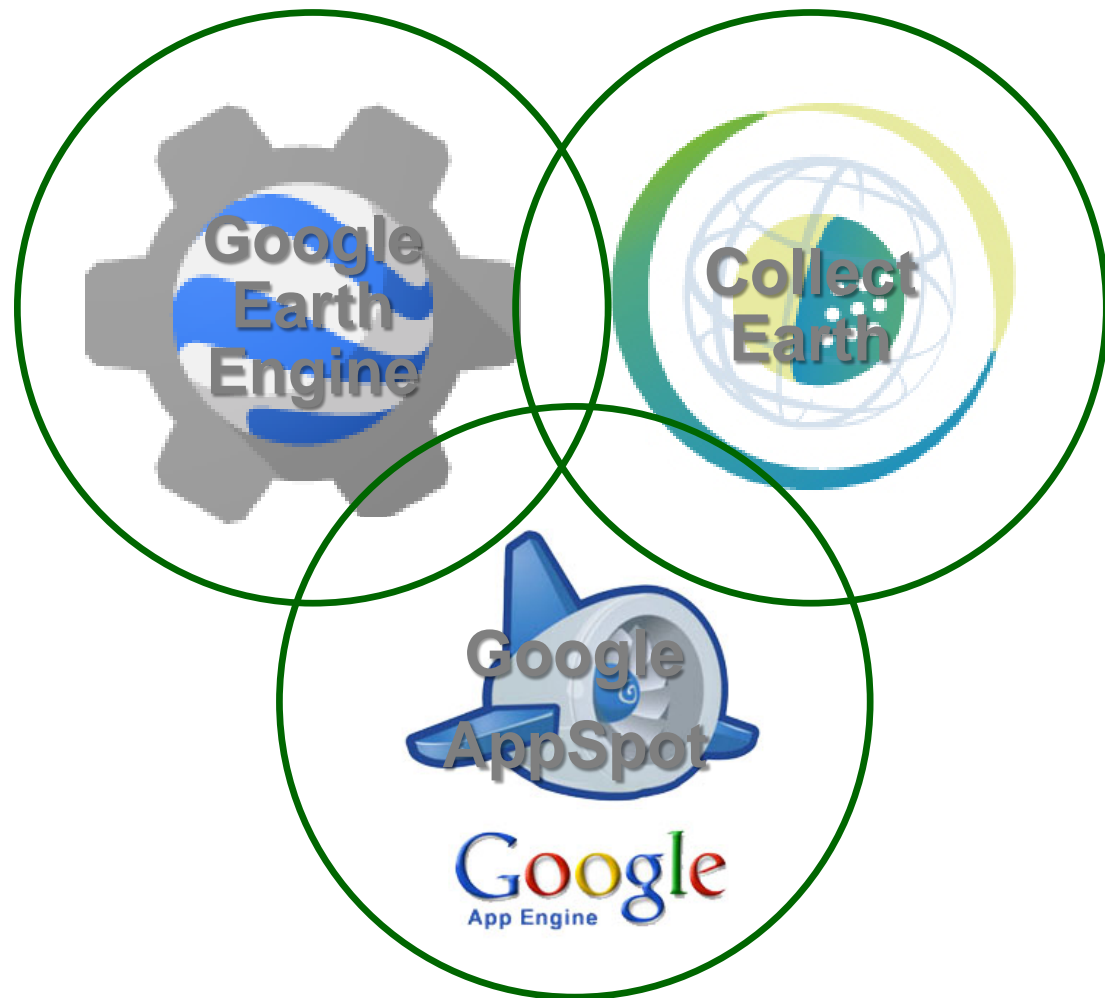











# RLCMS components



-  Google Earth Engine (GEE) performs image analysis based on land cover type algorithm.
-  A user-friendly site/app on Google's appspot exposes the application to users
-  An open-source high resolution image viewing and reference data collection system (MAPCHA/ Collect Earth).

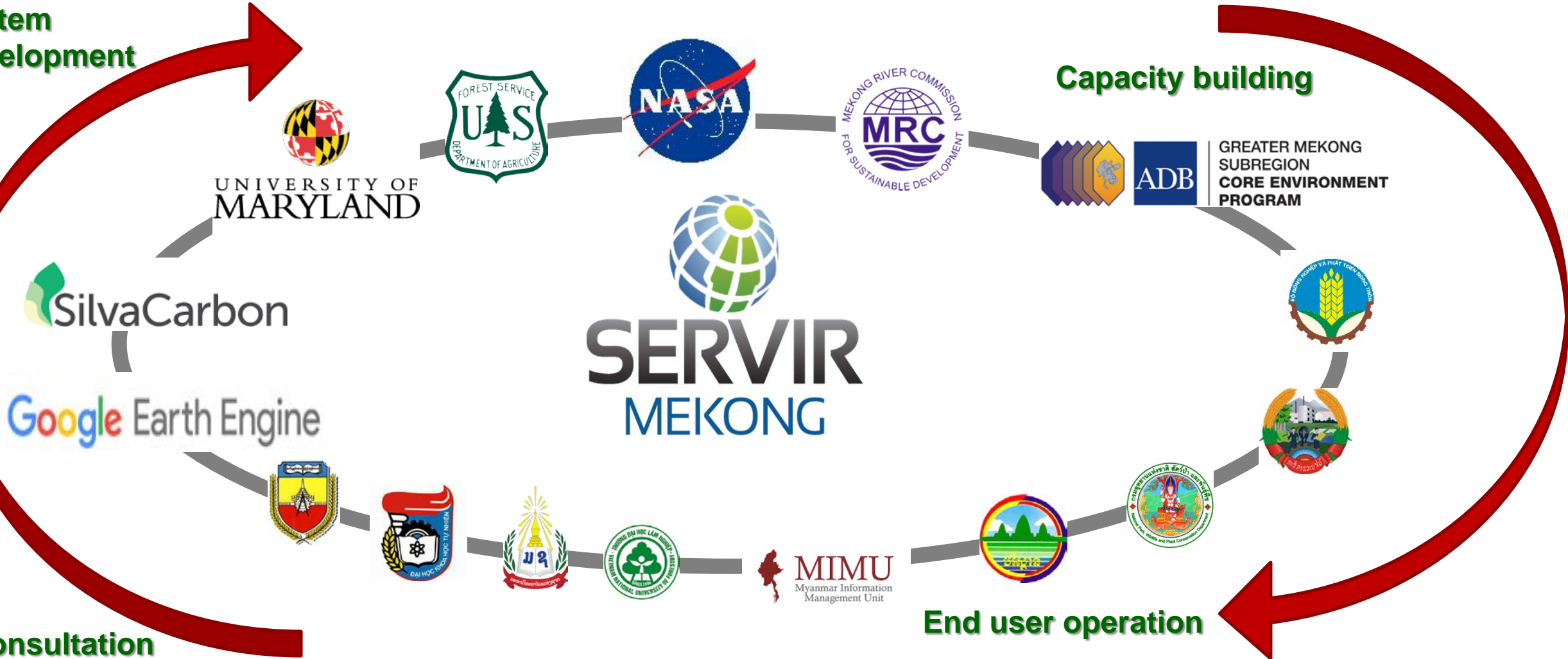
# RLCMS Partnership

**System Development**

**Capacity building**

**End user operation**

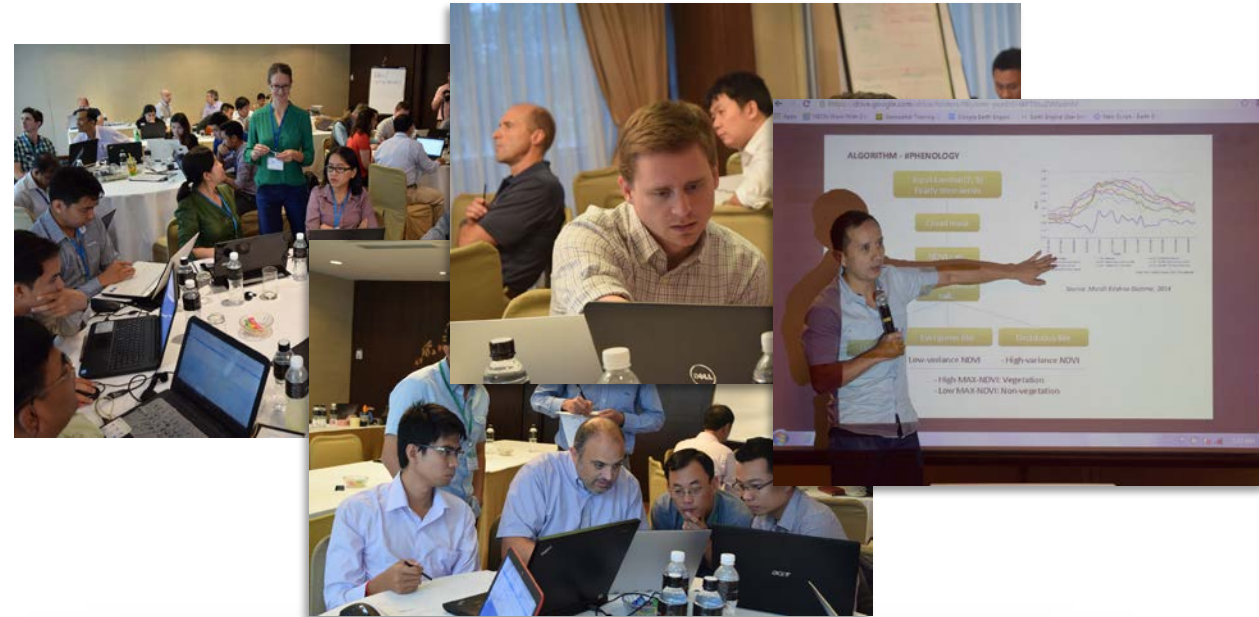
**Consultation**





# RLCMS progress and update

# Capacity building and Collaboration



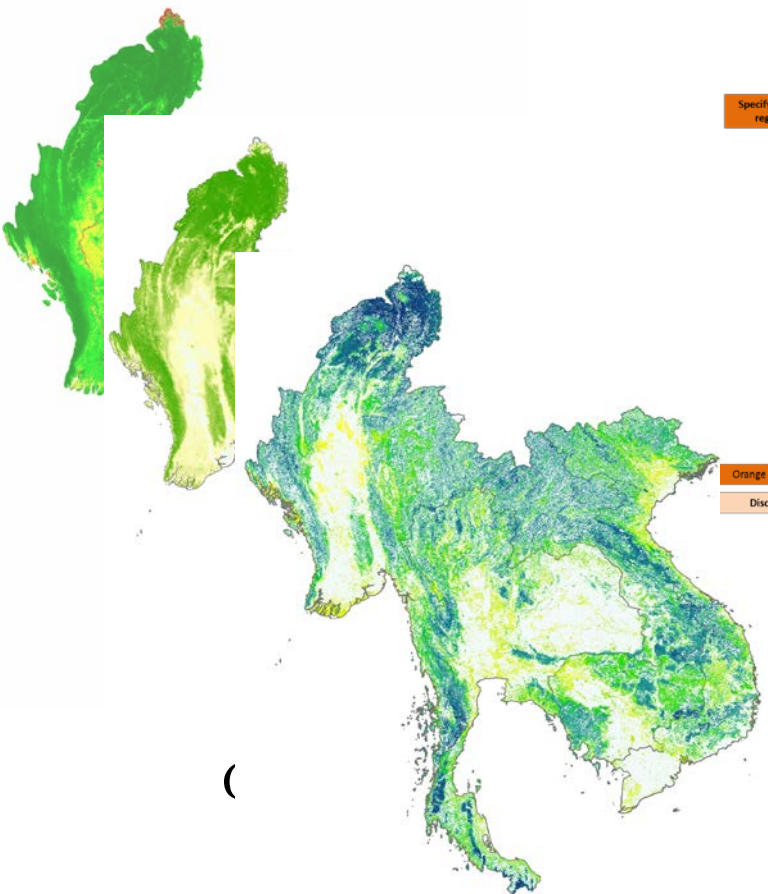
 **Two RCLMS workshops** (>100 participants)

 **Three Google Earth Engine ToT trainings** in Thailand, Cambodia, Viet Nam ( >90 participants; )

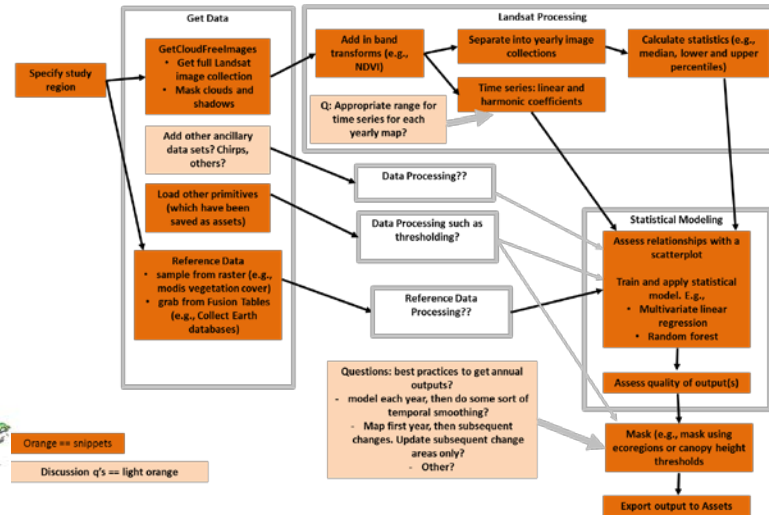
 **Training materials** is developed and translated to national languages







# Collaborative effort in RLCMS System development



Tree Height

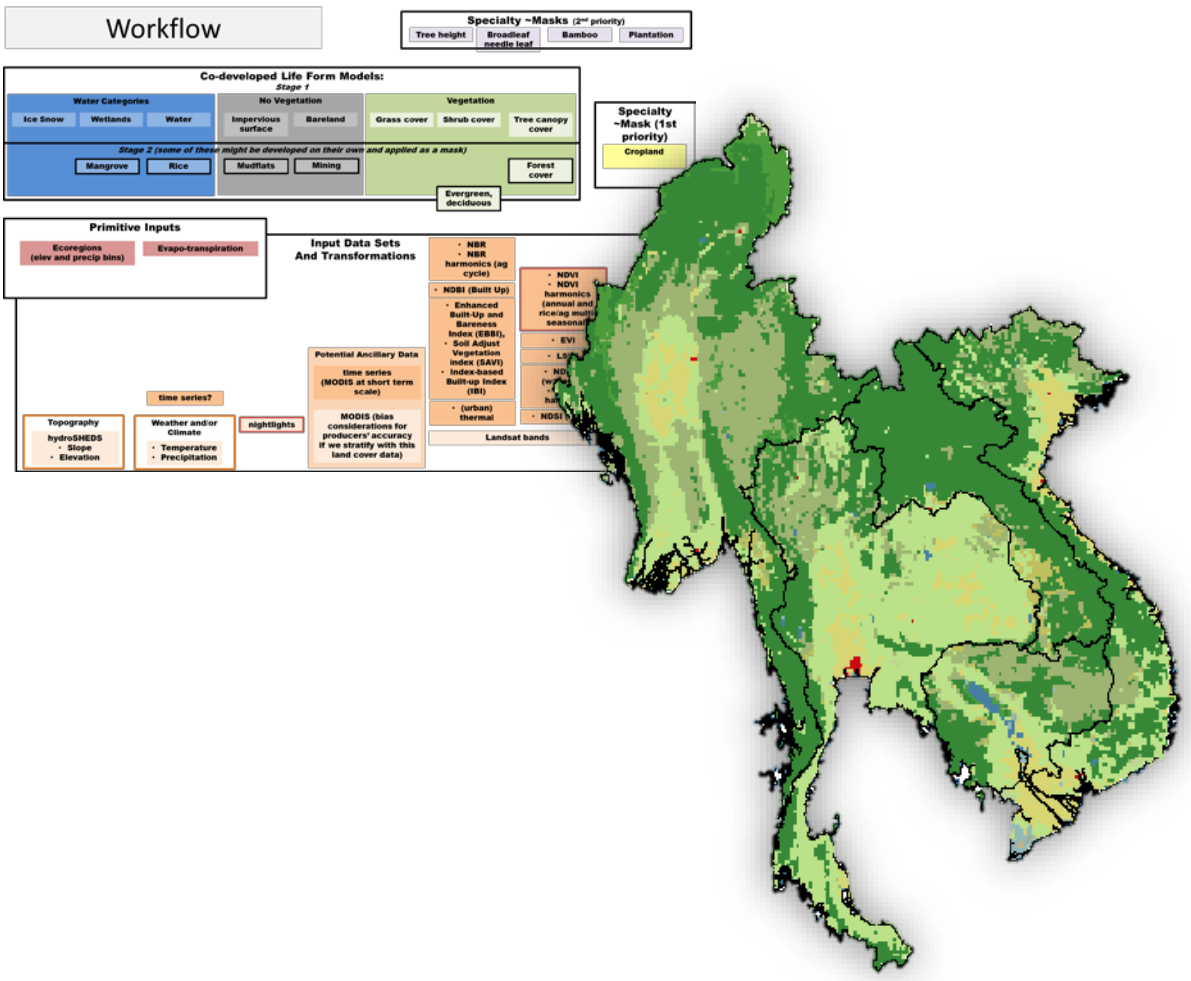







Orange == snippets  
Discussion q's == light orange

-  **Land cover typology development.**
-  **Land cover algorithm developed**
-  **GEE scripts for land cover types (primitives) drafted**
-  **Developing Online reference collection system (MAPCHA/Collect Earth)**



# Next steps



-  **Finalizing land cover primitive classes for assembly into final classes**
-  **Accuracy assessment**
-  **Advance GEE training**
-  **RCLMS workshops to introduce initial result**
-  **Map production dissemination**

**Thank you!**

**<https://servir.adpc.net/>**

**... and let us know if you have  
Request Technical Assistance**



SERVIR MEKONG

Request Technical Assistance