LACO-Wiki Mobile: An Open Source Application for In-situ Data Collection and Land Cover Validation

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LACO-Wiki Online Validation Tool

LACO-Wiki is an online land cover validation tool available at:

https://laco-wiki.net

You can upload your own land cover map, generate a sample, validate the sample using very high resolution imagery and generate an accuracy assessment. These four main steps comprise the LACO-Wiki workflow, shown in Figure 1.

Figure 2 shows an example of a validation session where the user visually interprets the very high resolution image, choosing a land cover type for the area shown in the pixel.
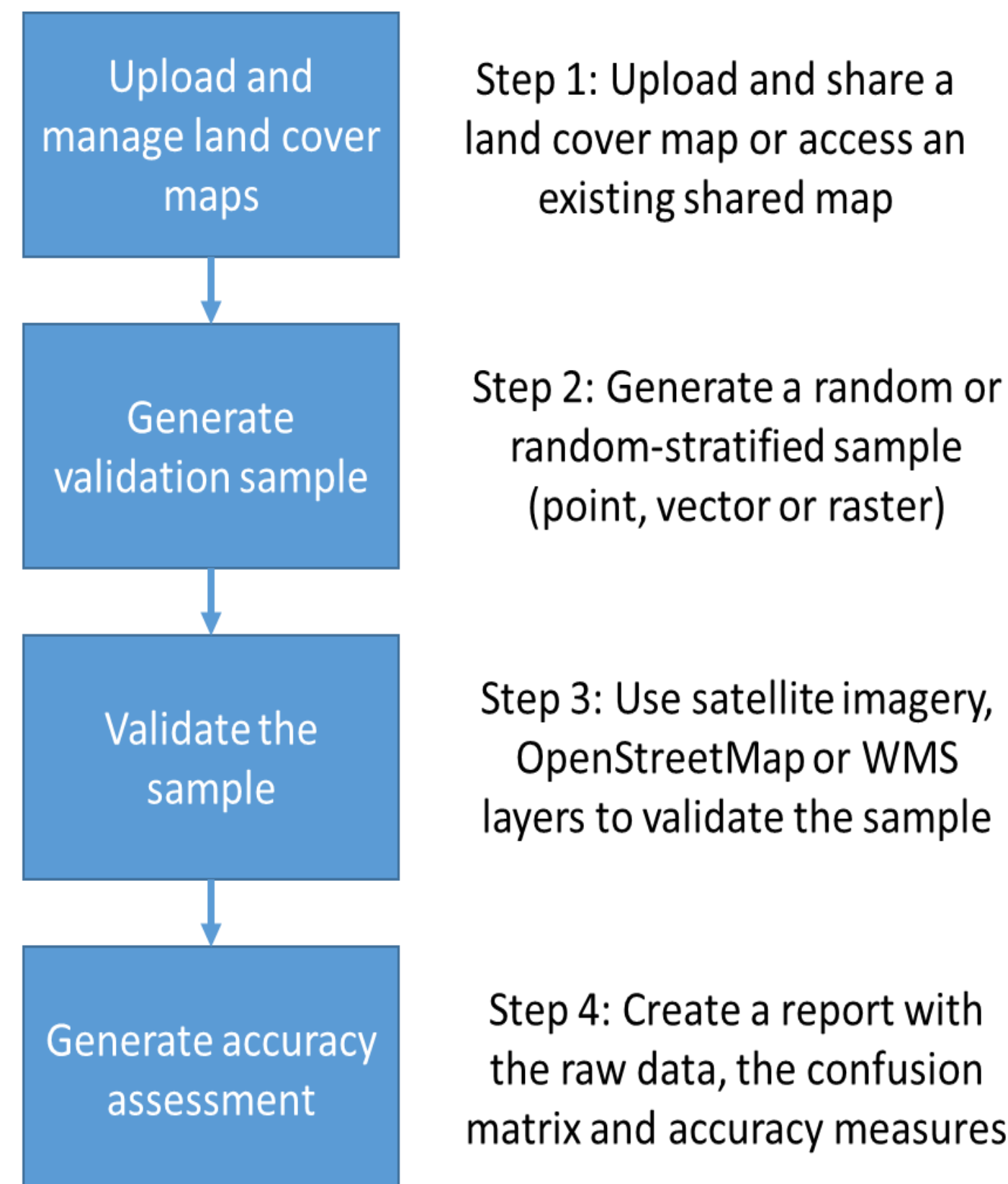
Upload and manage land cover maps	Step 1: Upload and share a land cover map or access an existing shared map
Generate validation sample	Step 2: Generate a random or random-stratified sample (point, vector or raster)
Validate the sample	Step 3: Use satellite imagery, OpenStreetMap or WMS layers to validate the sample
Generate accuracy assessment	Step 4: Create a report with the raw data, the confusion matrix and accuracy measures

Figure 1: LACO-Wiki 4 step workflow

Figure 2: Example of a validation session in LACO-Wiki

LACO-Wiki Mobile

LACO-Wiki Mobile is currently being developed through the ESA-funded CrowdVal project. When generating a sample, the points can be transferred to LACO-Wiki Mobile for in-situ data collection. The app will show the user what their current validation sessions are (Figure 3a). By clicking on a validation session, details about that session are shown, along with how much progress has been made in the data collection (Figure 3b).
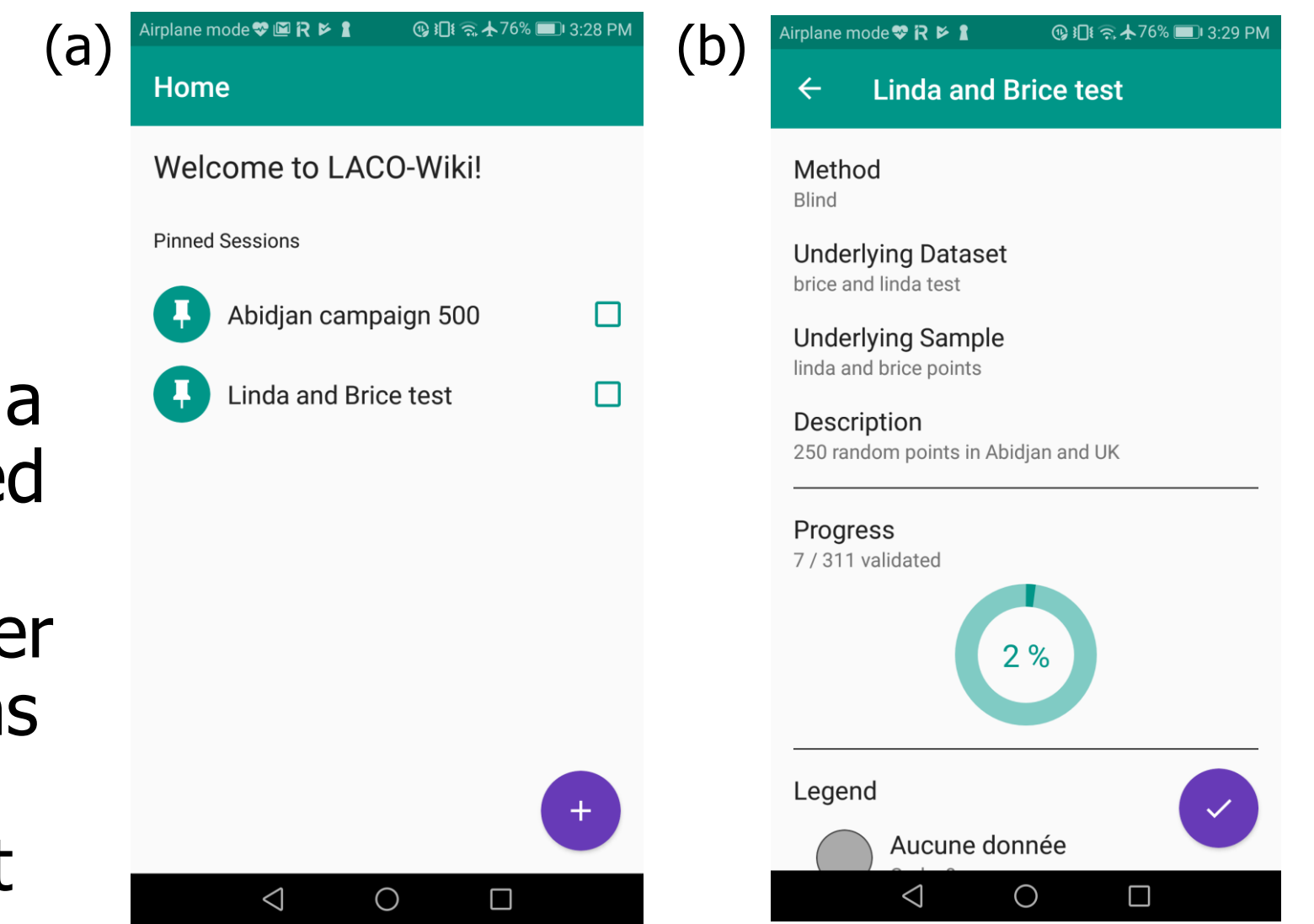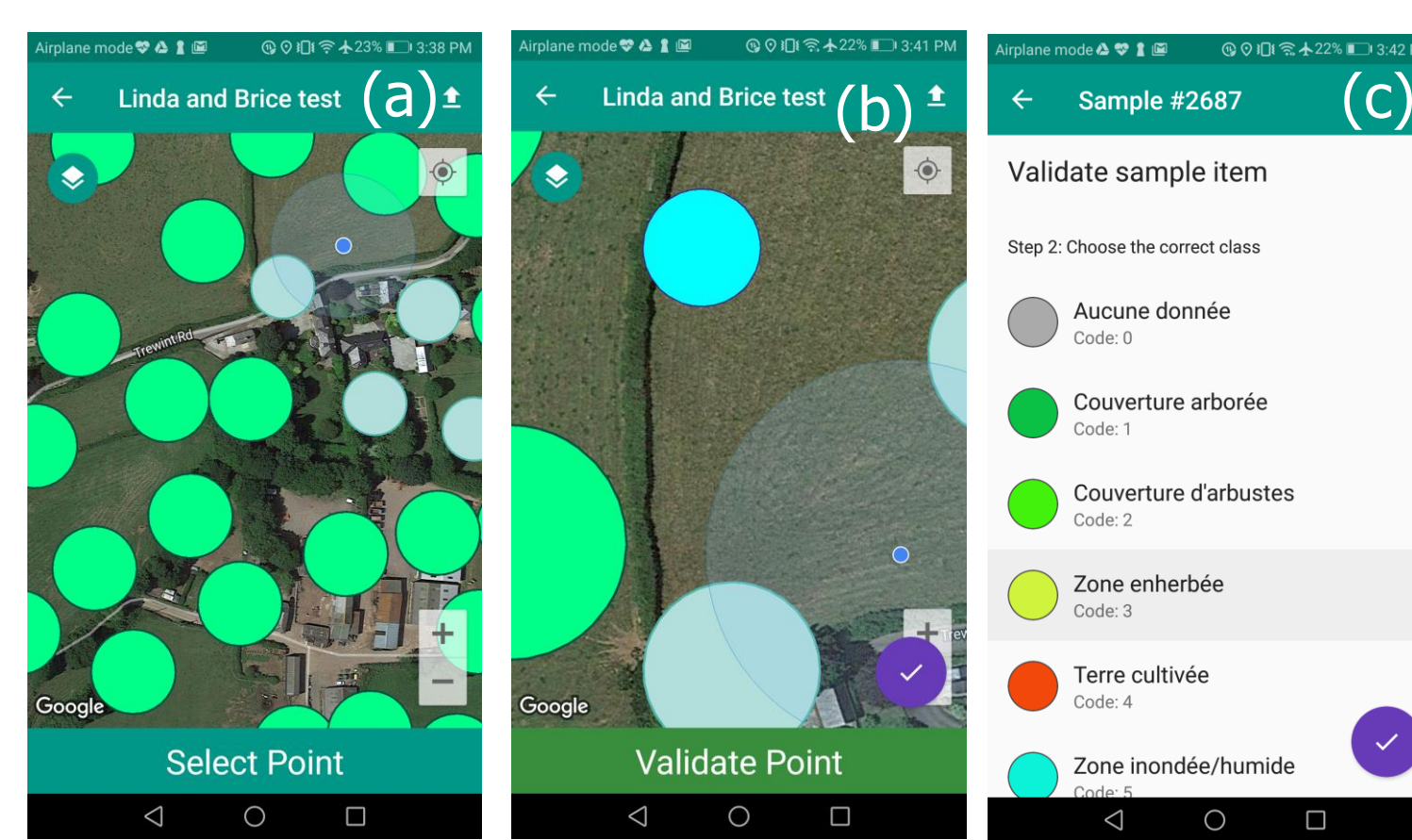
Figure 3: (a) Validation sessions (b) Session details

Figure 4: (a) Select point (b) Validate point (c) Choose land cover type

The locations of the points to validate are shown on the map (Figure 4a). The user clicks on a point to select it once the user is within a certain distance. The user can then validate the point by clicking on the purple arrow (Figure 4b). Finally, the user chooses the land cover type from the list shown. Users can then validate more points in the field or, at any point, upload points to the server.

Examples of in-situ data collection in Kenya

The mobile app was used in Kenya to collect data in-situ. Examples of four different geotagged photographs, labelled with the ESA-CCI land cover type, are shown in Figure 5.
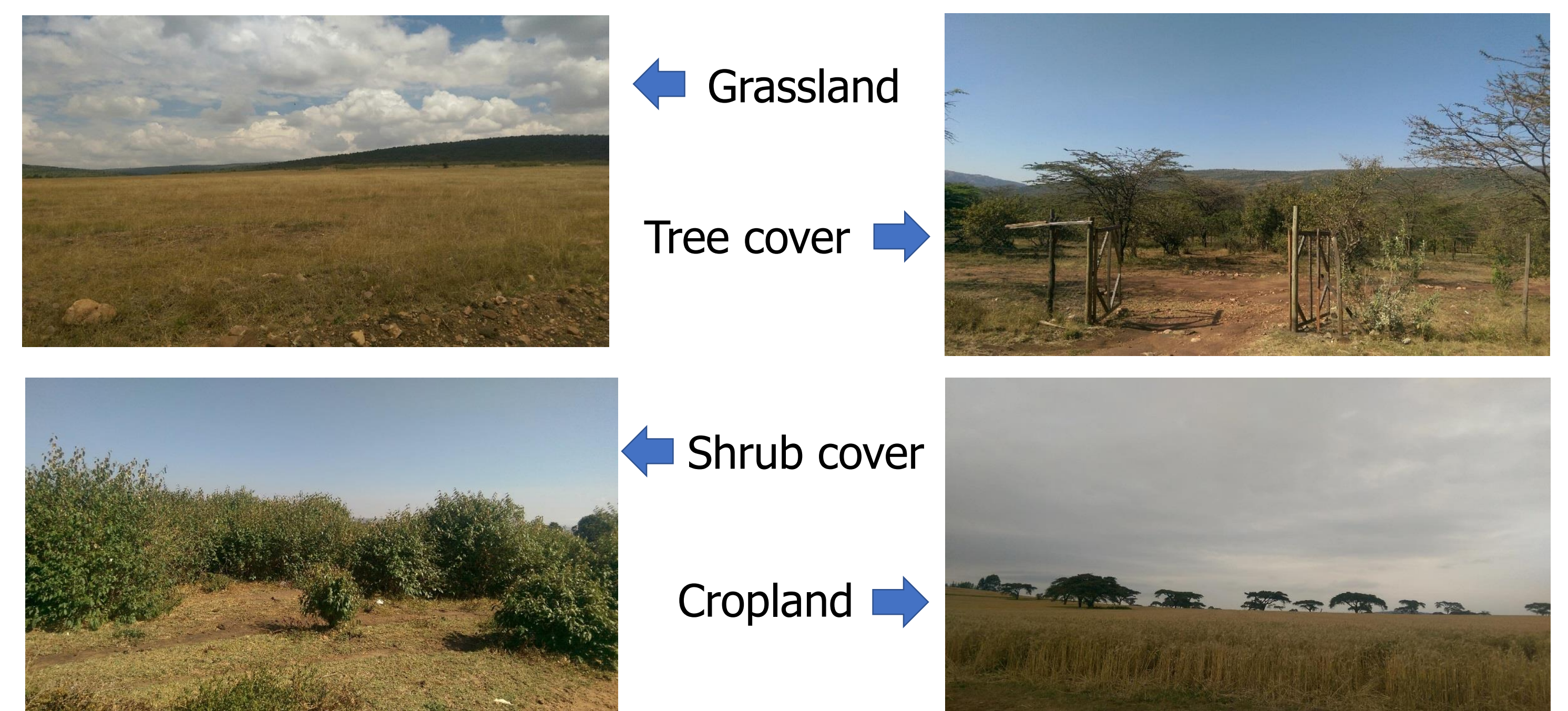
Grassland

Tree cover

Shrub cover

Cropland

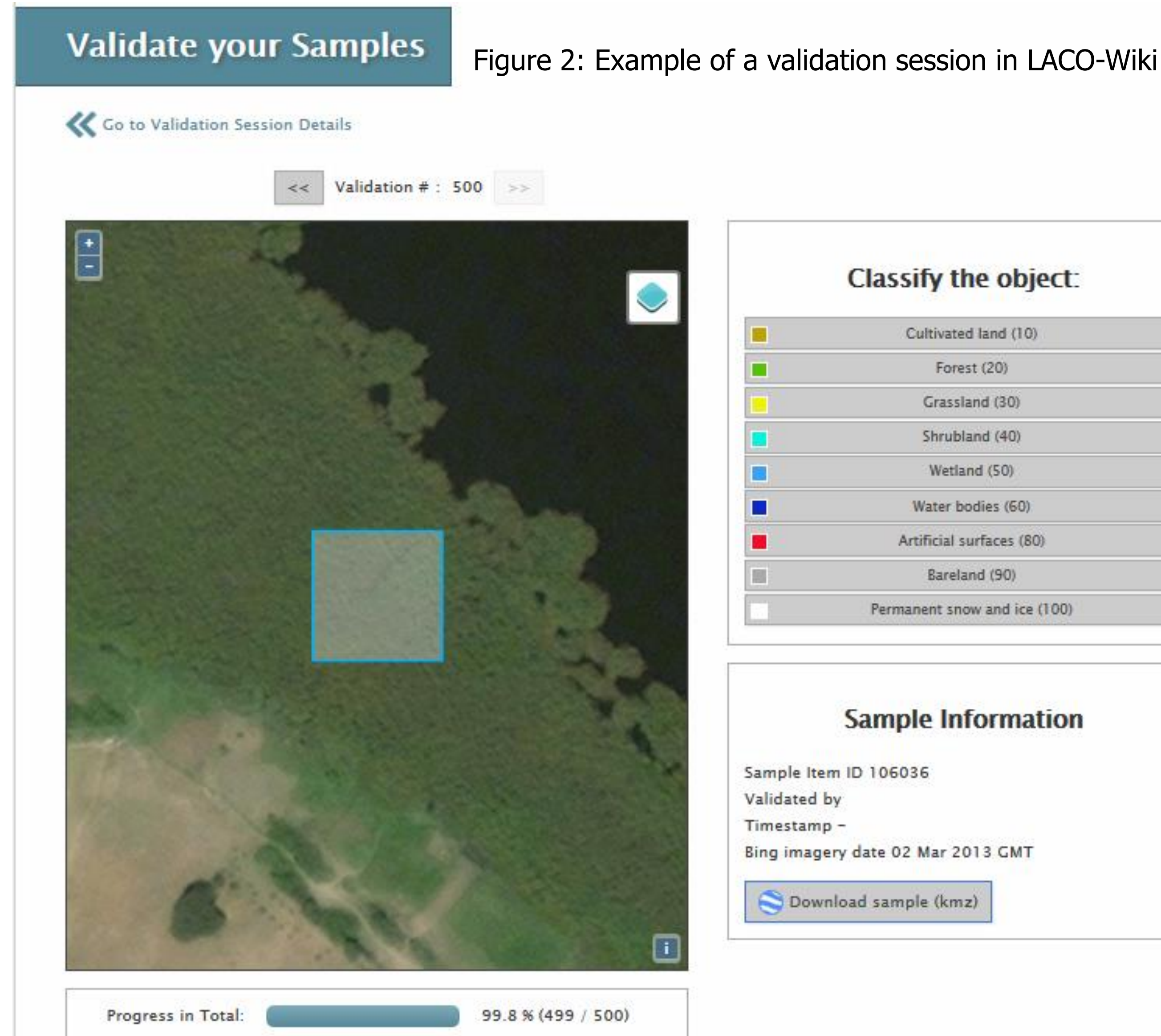Figure 5: Geotagged photos (with land cover) taken in-situ with the mobile app in Kenya during the training session

Training and data collection

Three different training and data collection exercises were held, including both visual interpretation using LACO-Wiki and in-situ data collection using LACO-Wiki Mobile. Participants were first trained in the use of LACO-Wiki and then they interpreted a systematic sample of points (Table 1). Workshops were held in Gabon, Ivory Coast and Kenya.

Table 1: Points visually interpreted and collected in-situ

Country	Points validated with visual interpretation	Points collected in-situ
Gabon	~2,000	~220
Ivory Coast	~2,500	180 but more coming in
Kenya	~9,500	~650

Participants were then taken out into the field and shown how to use LACO-Wiki Mobile. Table 1 shows the number of points collected in the field. The in-situ data collection exercise in Ivory Coast is ongoing.

Output from data collection: Spatial accuracy of land cover

The visual interpretations done using LACO-Wiki for Kenya (based on a systematic sample) were then used to validate the ESA CCI 20m 2016 land cover map (Figure 6a). The spatial accuracy of the map is shown in Figure 6b.

CCI LC 20m 2016 (prototype)
- trees
- shrubs
- grassland
- cropland
- wetland
- sparse vegetation
- bare
- urban
- water

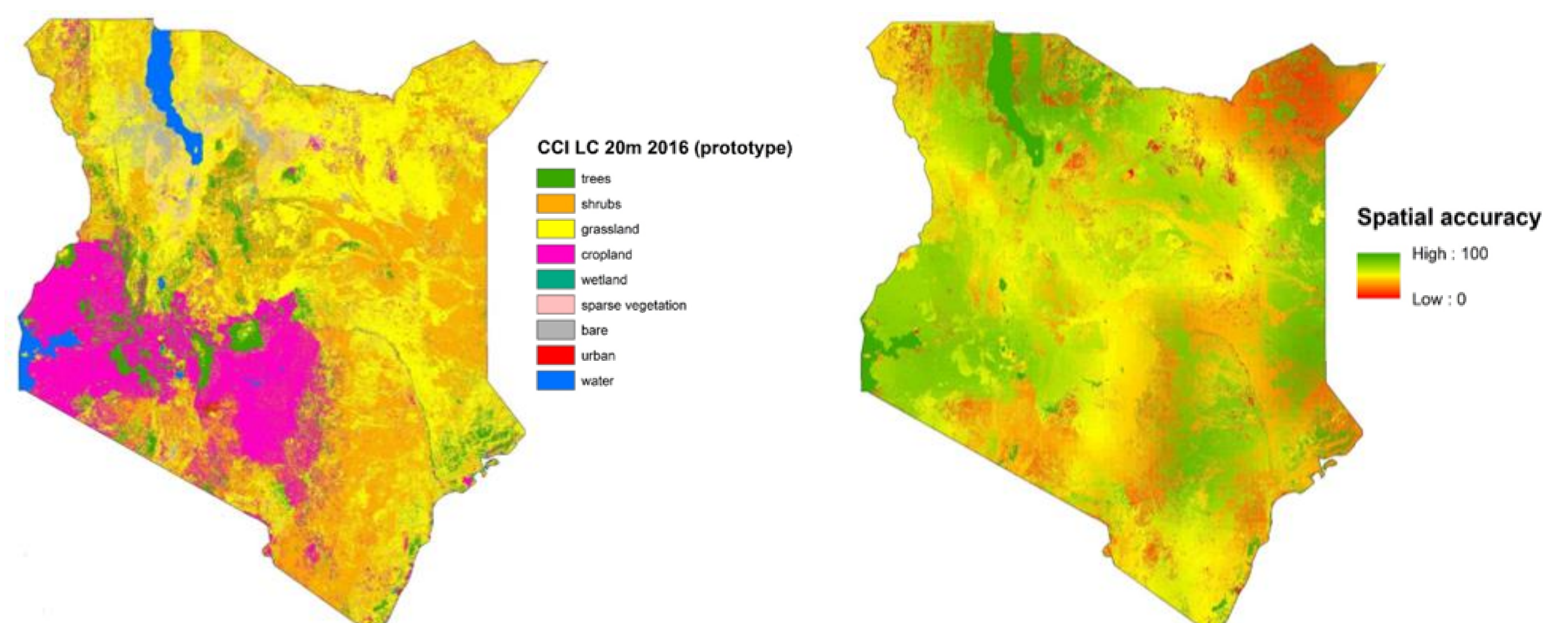Spatial accuracy
High : 100
Low : 0

Figure 6: (a) The ESA-CCI 20m land cover map for Kenya (b) The spatial accuracy based on visual interpretation with LACO-Wiki

LACO-Wiki Mobile can be downloaded from the Google Playstore.

The code is available from github at:

https://github.com/iiasa/LACO-Wiki_mobile