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Getting Field Data in to Google Earth Engine

Geo for Good 2019

Tanya Birch
September 17, 2019

Agenda

- Example of a use case for data from EE to the ground
- Collecting Data and Viewing Maps Offline in the Field
- ODK Collect to ODK Aggregate (optional field exercise)
- Importing CSVs into Earth Engine

Collecting Data in the Field -- Use Cases

In order to save chimpanzees, you have to eliminate threats to their home: poverty and habitat loss.

JGI empowers local communities to collect data about their forests to inform local stakeholders.

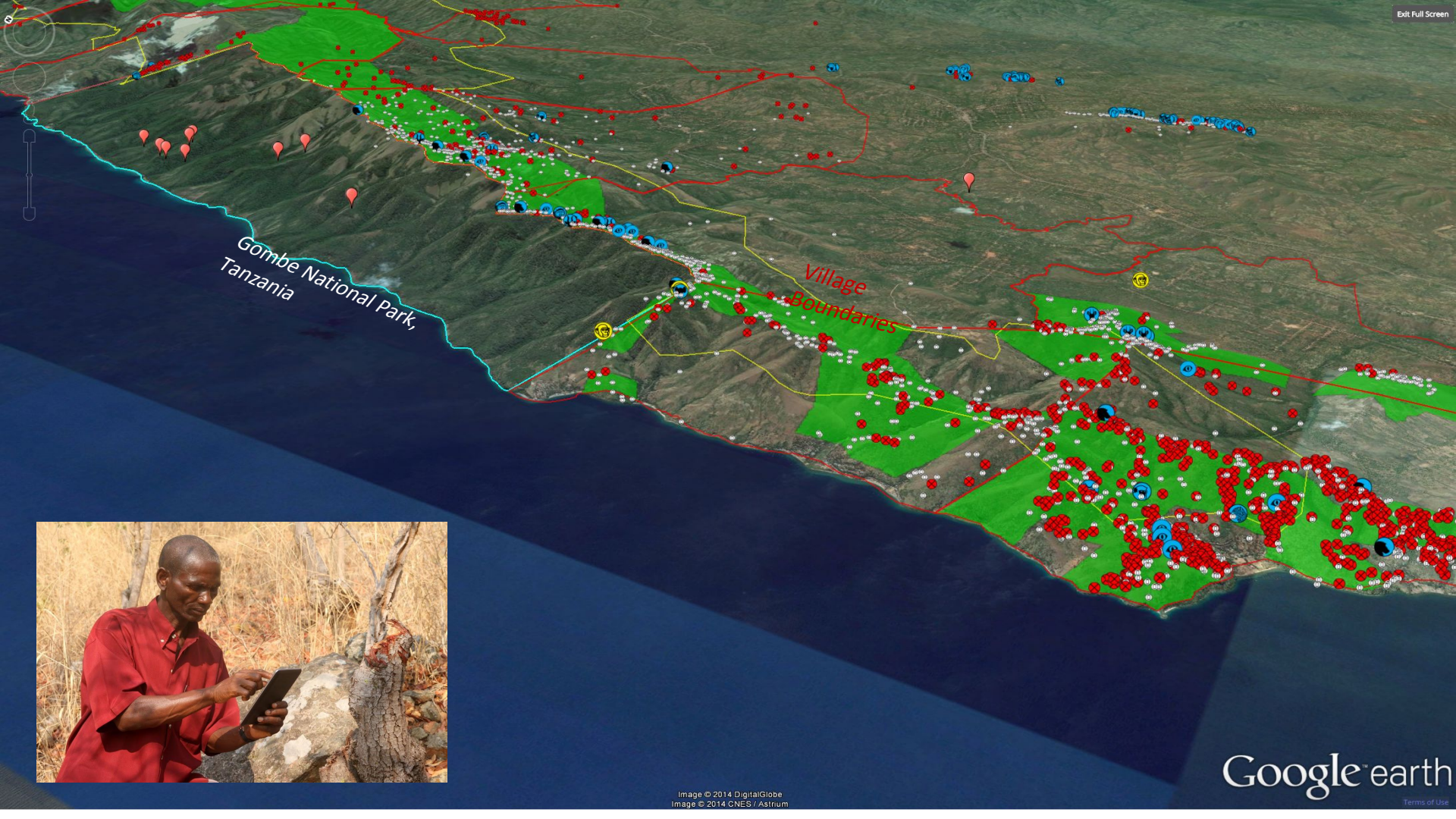
-- Dr. Lilian Pintea, VP Conservation Science

the Jane Goodall Institute

Collecting Data in the Field -- Open Data Kit

ODK is a free, out-of-the-box solution to:

- build a data collection form or survey,
- collect data in the field on an Android mobile device, smartphone or tablet,
- aggregate the collected data on a local server or in the cloud,
- extract it in useful formats for analysis and visualization


Exit Full Screen
Gombe National Park, Tanzania
Village Boundaries
Image © 2014 DigitalGlobe
Image © 2014 CNES / Astrium
Google earth
Terms of Use


June, 2005
Kigalye Village Forest Reserve


June, 2013
Kigalye Village Forest Reserve


May 2005
Kagongo Village Forest Reserve

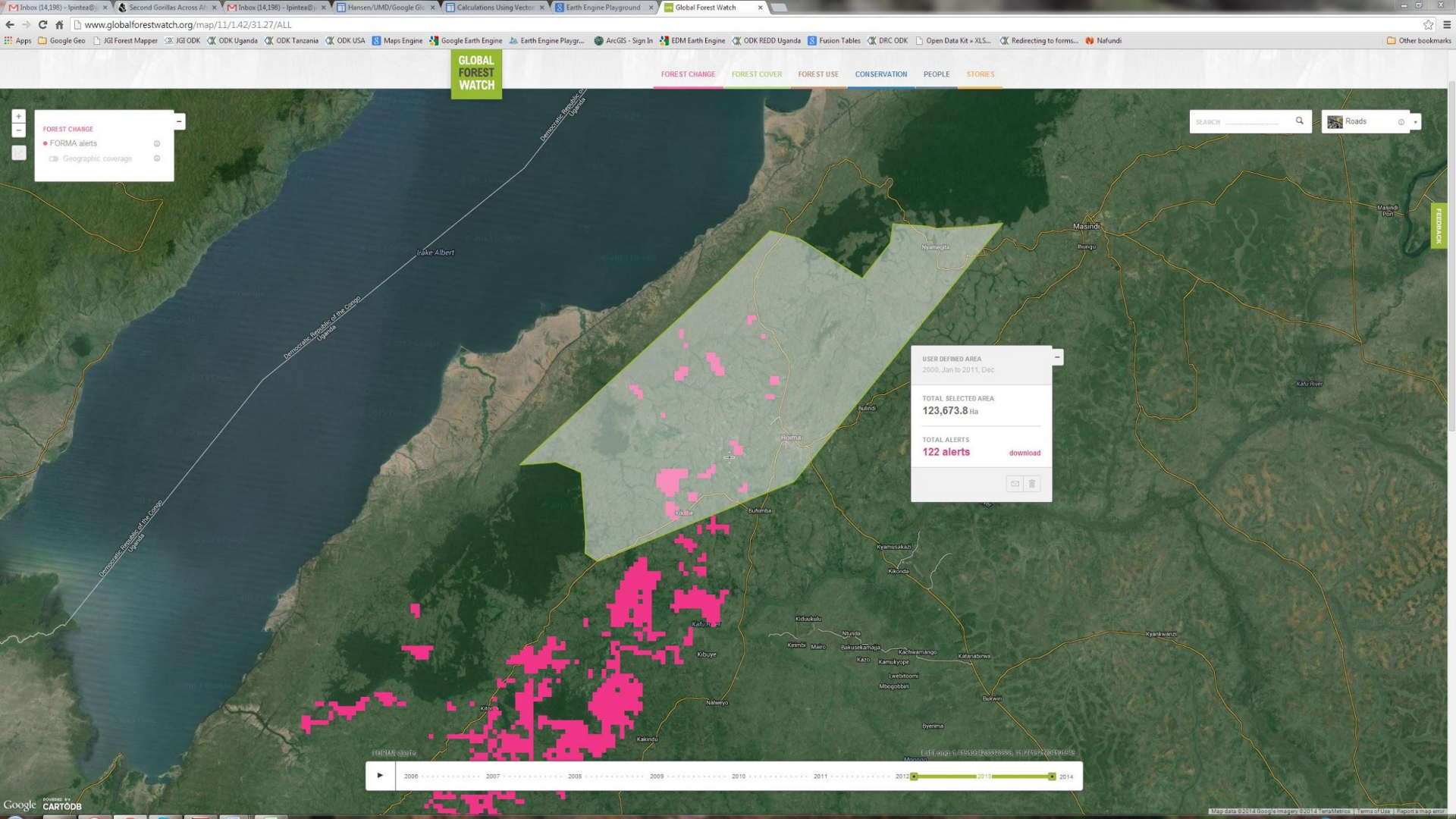

June 2013
Kagongo Village Forest Reserve

Forest Watcher Mobile App:
a new tool to support global forest monitoring

WORLD RESOURCES INSTITUTE

Google Earth Outreach

the Jane Goodall Institute


GLOBAL FOREST WATCH
FOREST CHANGE
FOREST COVER
FOREST USE
CONSERVATION
PEOPLE
STORIES
FORMA alerts
Geographic coverage
SEARCH
Roads
USER DEFINED AREA
2000, Jan to 2011, Dec
TOTAL SELECTED AREA
123,673.8 Ha
TOTAL ALERTS
122 alerts
download
FEEDBACK
Lake Albert
Democratic Republic of the Congo
Uganda
Masindi
Nyamegita
Ihungu
Kafu River
Hoima
Buhimba
Kyamusukazi
Kikonda
Kibuye
Nalweyo
Kakindu
Byenima
Bukwiri
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2006
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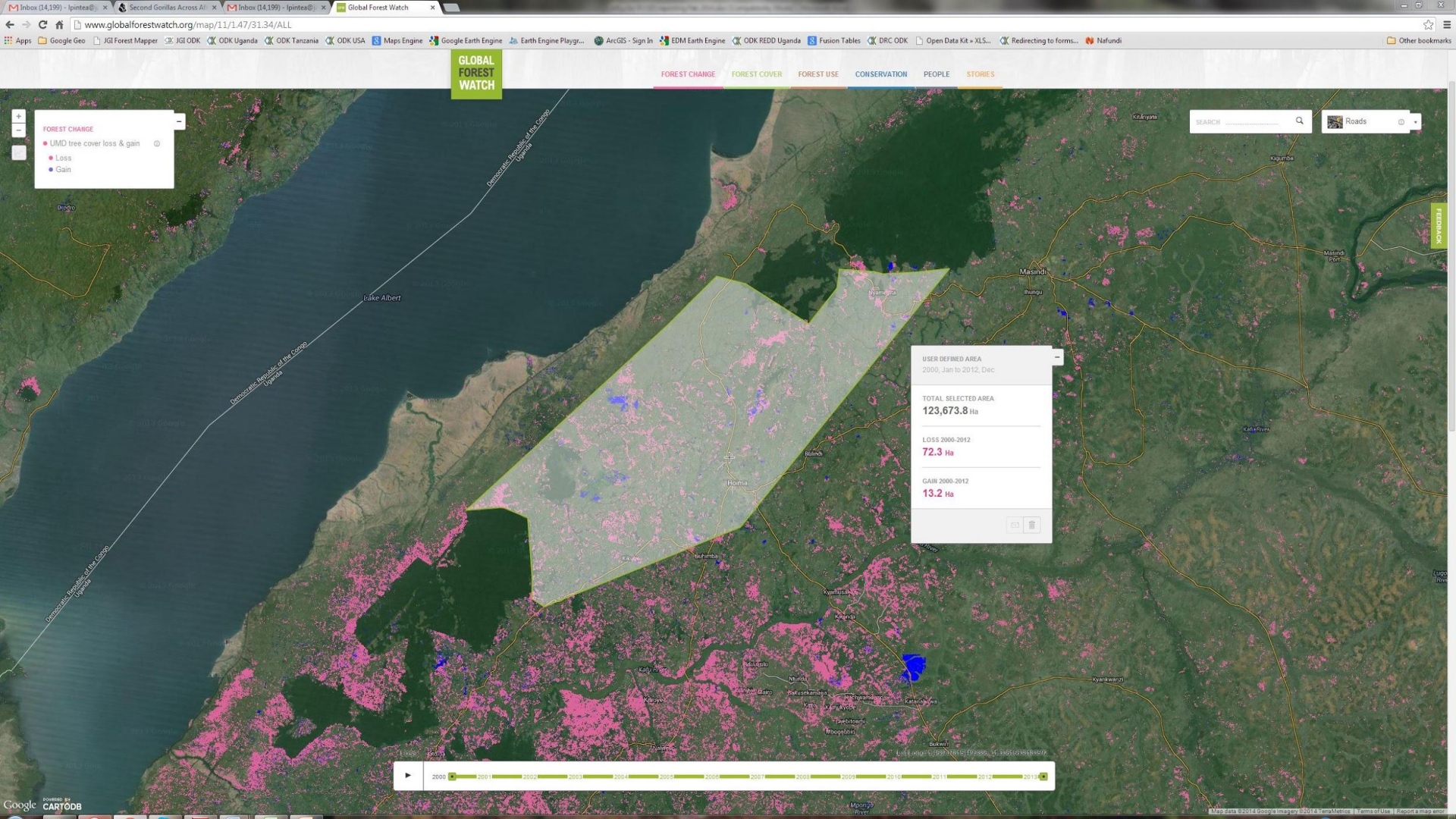
CARTODB


GLOBAL FOREST WATCH
FOREST CHANGE
FOREST COVER
FOREST USE
CONSERVATION
PEOPLE
STORIES
FOREST CHANGE
UMD tree cover loss & gain
Loss
Gain
SEARCH
Roads
USER DEFINED AREA
2000, Jan to 2012, Dec
TOTAL SELECTED AREA
123,673.8 Ha
LOSS 2000-2012
72.3 Ha
GAIN 2000-2012
13.2 Ha
Lake Albert
Democratic Republic of the Congo
Uganda
Masindi
Hoima
Kagumba
FEEDBACK
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
Google
CARTODB

Ground-truth deforestation alerts from GFW using Android mobile devices

1/24/2013
QuickBird
satellite image

FORMA

fam_name	
first_name	
year_birth	
month_birt	
day_birth	
sex	
tel_no	null
Latitude	1.50255
Longitude	31.3321
Altitude	1032
Accuracy	5
parish	Kiragura
land_ha	10.1215
land_acres	25
ownership	Customary
holding	Family
land_use	Forestry Farming Housing
neighbors	No information
conflict	No
forest_ha	1.61943
forest_acr	4
status	Heavily degraded
riverine	Yes
hunting	None of the above
chimp_sign	Vocalization
chimp_time	This year
chimp_use	Nest Pass through
dogs	No
date_entry	20120710
data_by	Atakwatulire Peter
comments	Forest heavily degraded. Chimps seen this year. Photo taken is of the care taker.

Private Forest Owners database in Google cloud

FORMA

Google

Field Data to Earth Engine Pipeline

Collect Data in the field.

Use ODK Collect to gather field data. Create forms

Upload data to ODK Aggregate

Create an Aggregate instance on App Engine (or ODK Central)

Export as CSV

Export your data as CSV

Import CSV into Google Earth Engine

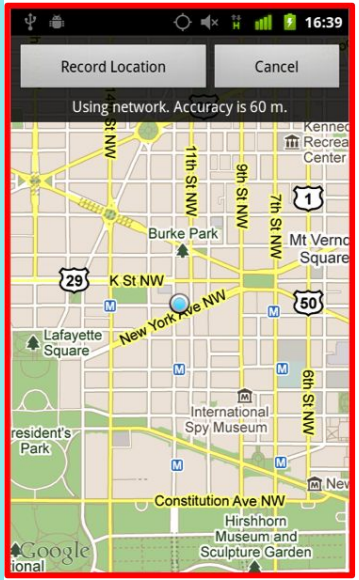
*New! Upload CSVs into Earth Engine for further analysis

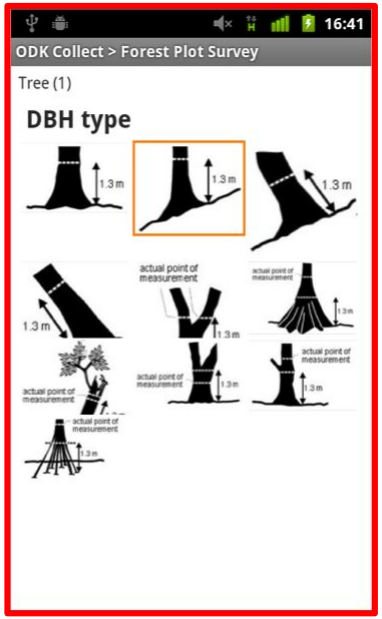
Collecting Data in the Field

Training Materials: bit.ly/g4g19-fielddata2EE

Lots of field data tools out there (open source & paid)

Open Data Kit -- ODK Collect Survey Forms





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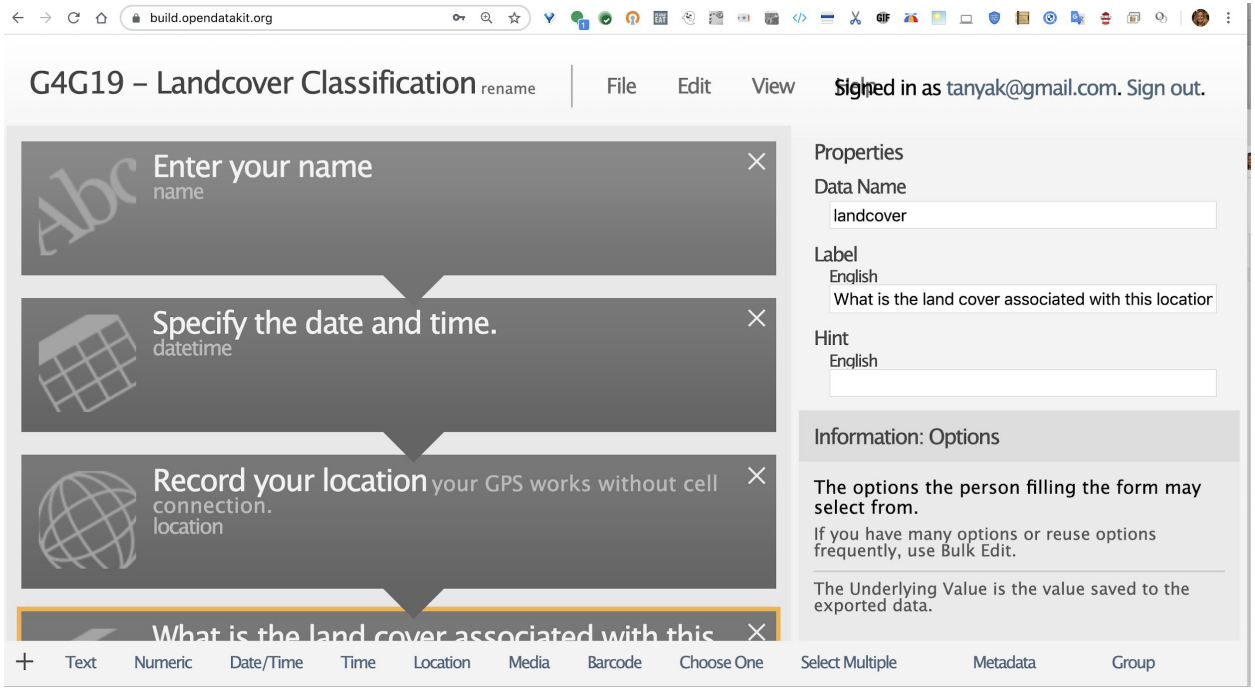
ODK 101: Creating Forms

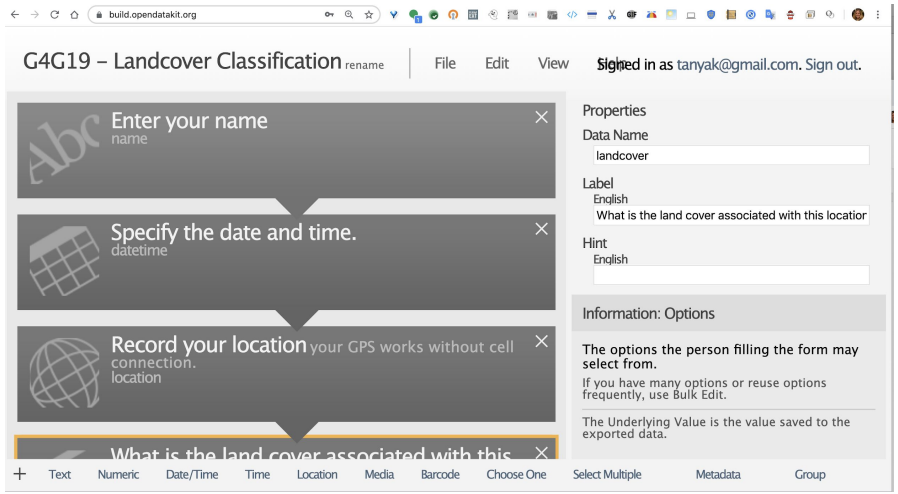
- Use ODK Build for creating basic forms: **build.opendatakit.org**
- Use XLSforms for more customization options: **xlsforms.org**



ODK 101: Creating Forms - Let's try it

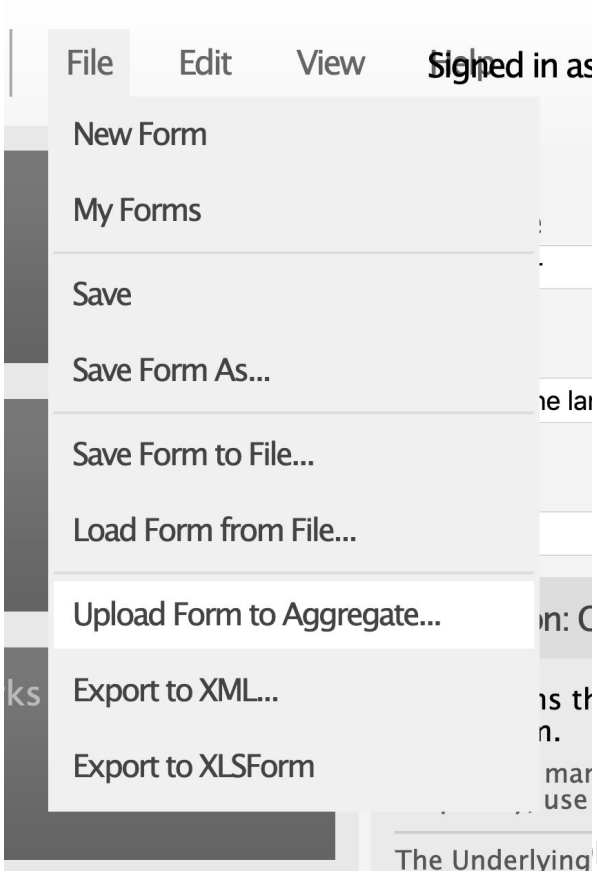
- Go to build.opendatakit.org
- Create a new account or sign in
- Give your form a name, with your name in the title
- Enter in the fields for:
    - Name
    - Data/Time
    - Record Your Location
    - Land Cover Classes: Trees, Shrubland, Built-up Areas, Water,

      Barren land, etc.



ODK 101: Creating Forms - Store your form online

- Go to File > Save to save your work
- Choose File > Upload Form to Aggregate
- For your own project, you would want your own Aggregate instance on App Engine. For now, you can use:
    - Enter Aggregate URL: odkcloud.appspot.com
    - Leave login credentials blank
- Your form will now appear in odkcloud.appspot.com.



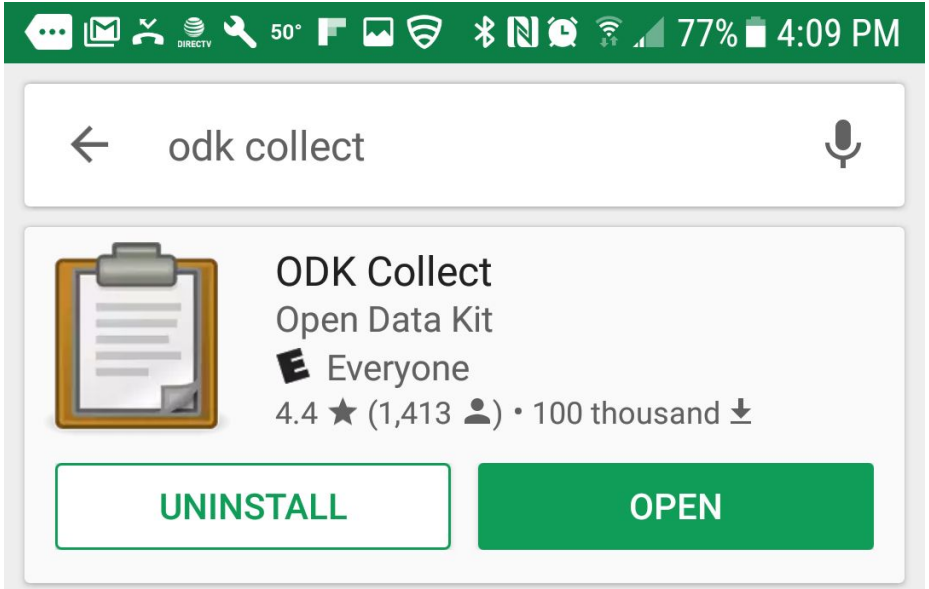
ODK 101: Configuring your device

- Now, configure your device to collect field data
- Download ODK Collect from the Google Play Store if you have not already. .*Note, Android only, sorry iPhone users.
- Select “General Settings”
- Select “Server”
- Select “Type” -- ODK Aggregate
- URL should say “**odkcloud.appspot.com**”. This will allow your phone to pull data from this server.
    - *Note: this server has been set up to allow anonymous form submission and data collection. These are preferences you can set differently if you were doing your own project.
- Now, take a peek at where your data will get sent to….

ODK Collect

Now we're ready to put the survey form on our Android devices

Using your Android phone or tablet, go to the Google Play Store and search for ODK Collect and install it on your device

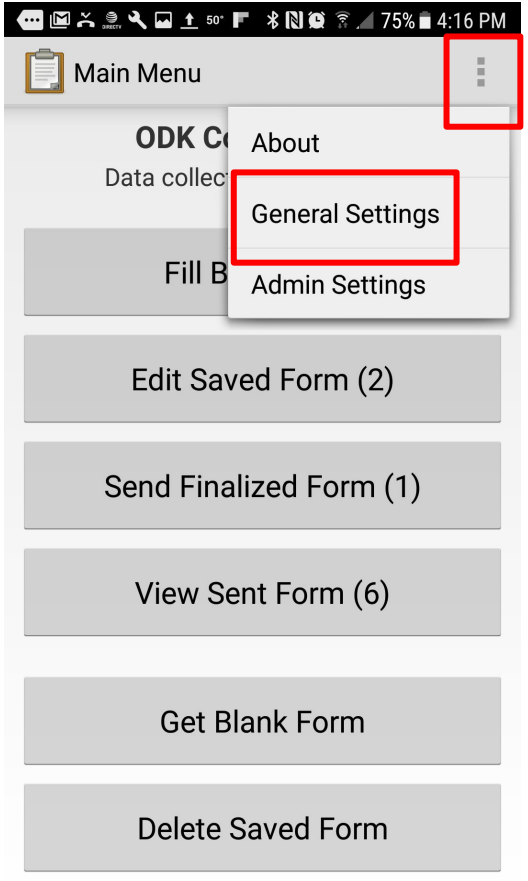


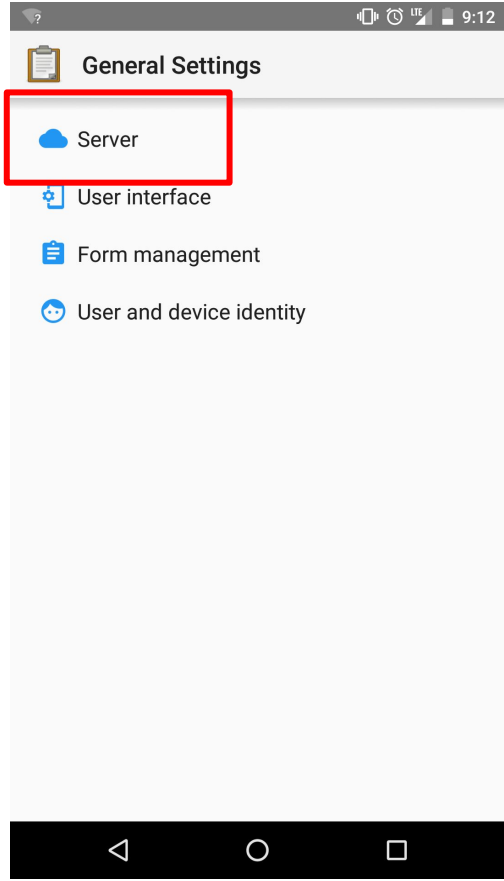
Configure your account

Click on the three dots in the upper right corner to get the menu

Click on General Settings

Click on Server

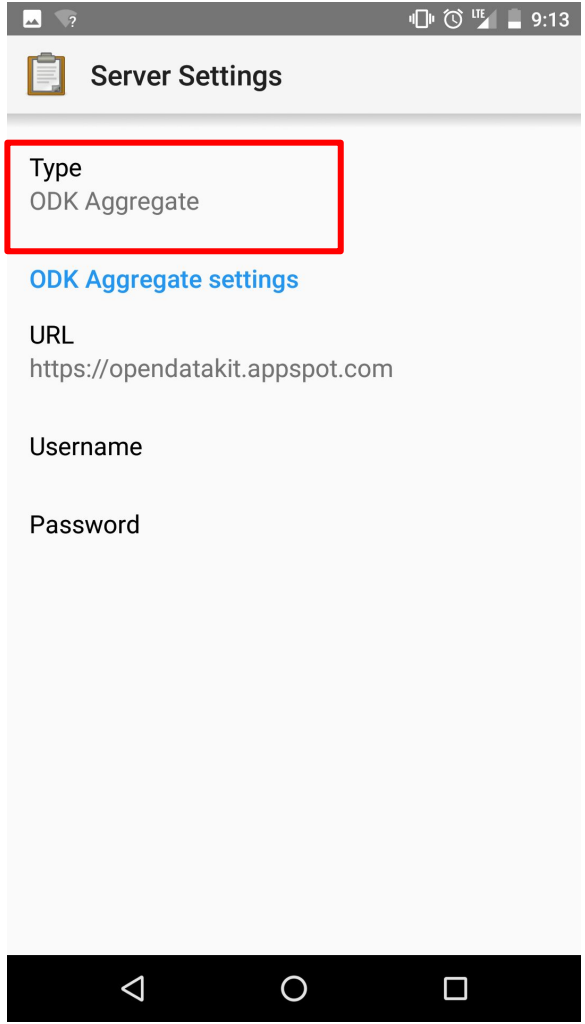


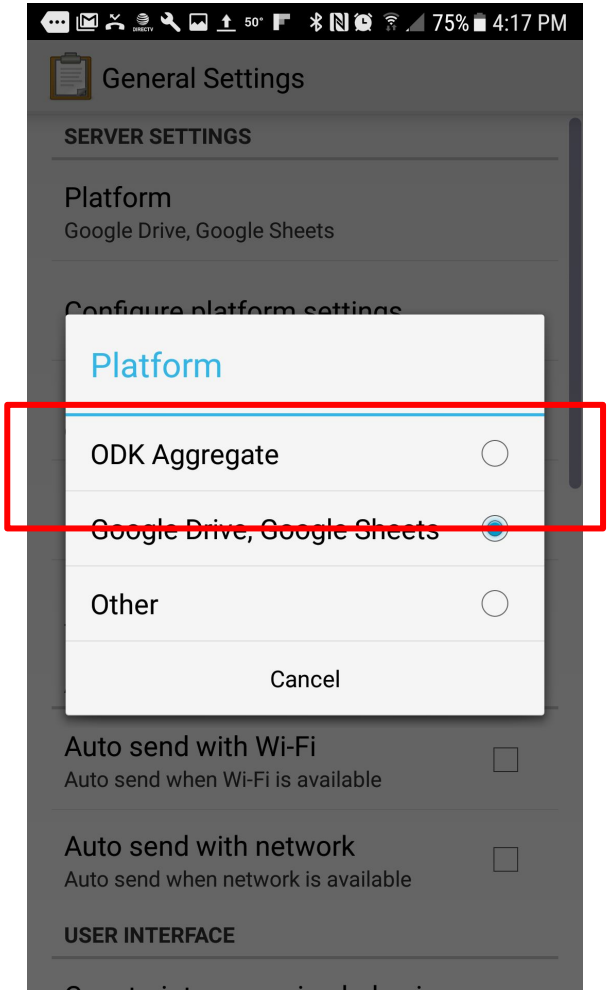


Choose Google Drive, Google Sheets as your platform

For URL, enter:

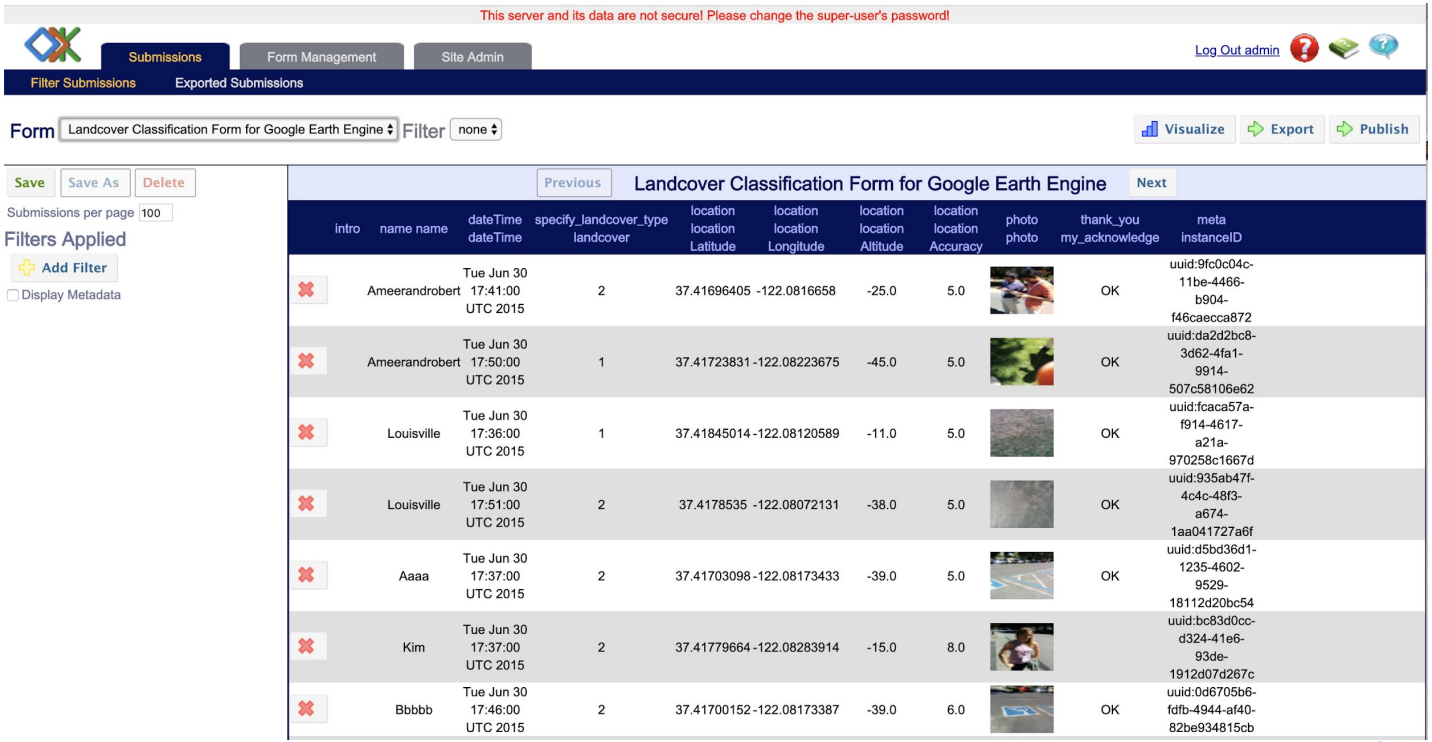
odkcloud.appspot.com





ODK 101: Configuring your device

- Go to **odkcloud.appspot.com**

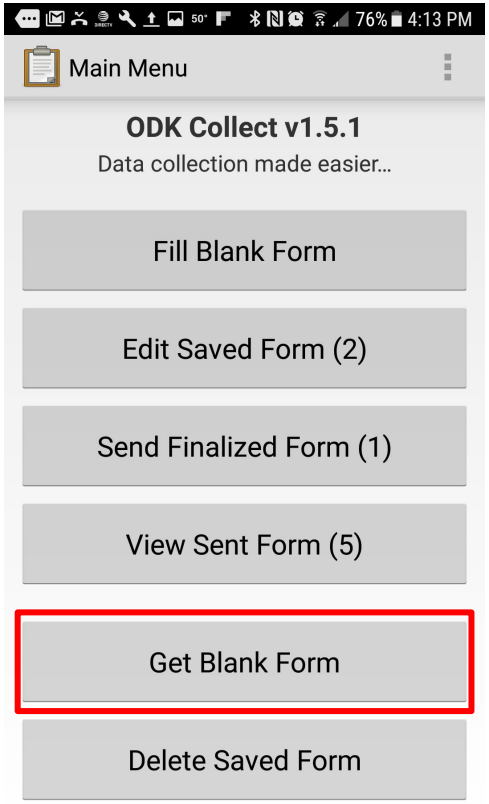


Refresh of ODK 101: Collect some field data

- On your Android device, open ODK Collect and navigate to the Main Menu
- Select “**Get Blank Form**” and your device will connect to the odkcloud.appspot.com server
- Select “**G4G19 Landcover Classification**” (and also your form if you choose) and choose **Get Selected**
- Back on the Main Menu, select “**Fill Blank Form**”
- Select **G4G19 - Landcover Classification**
- Go through the 4 questions every time you want to enter a new land cover class.

Get Blank Form

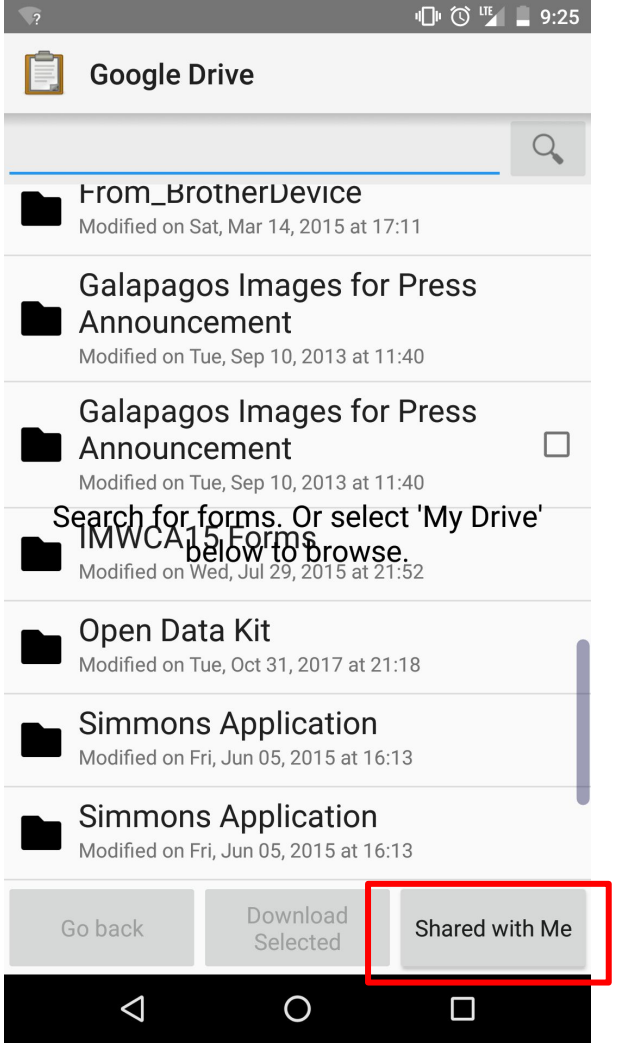
Click Get Blank Form

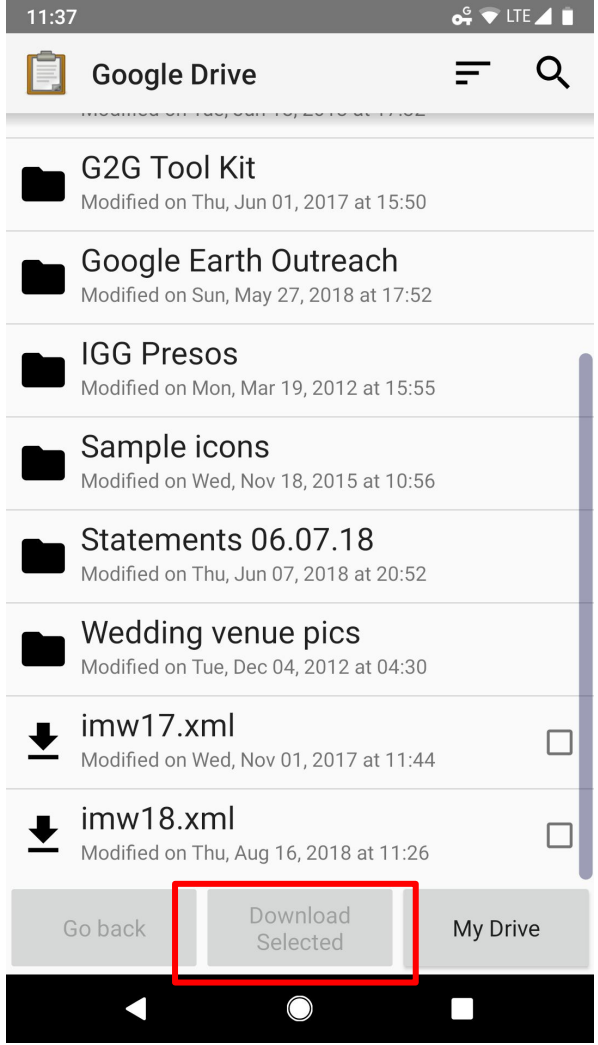


Get Blank Form

Search for your XML file in shared files and select your file, or G4G Landcover Classification

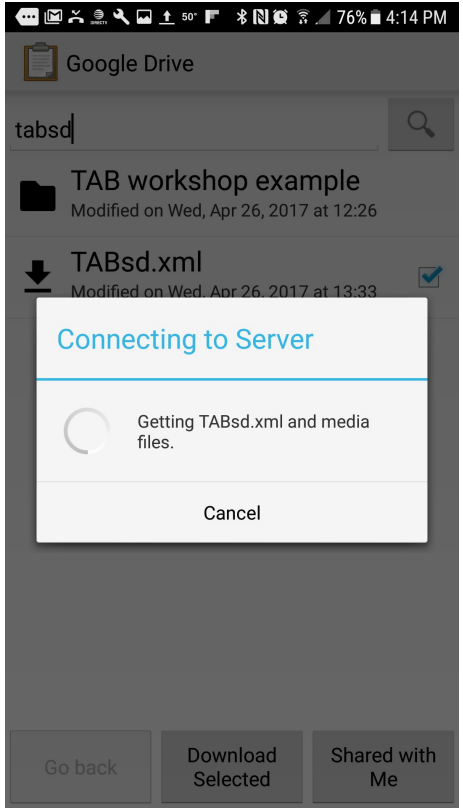
Click Download Selected

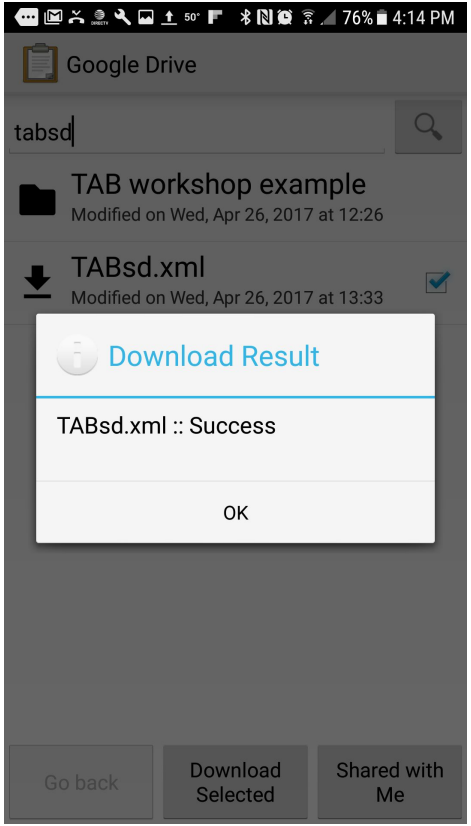




Once your form is downloaded to your phone or tablet you will be able to access it and fill it out offline (out of cell service and away from wifi)

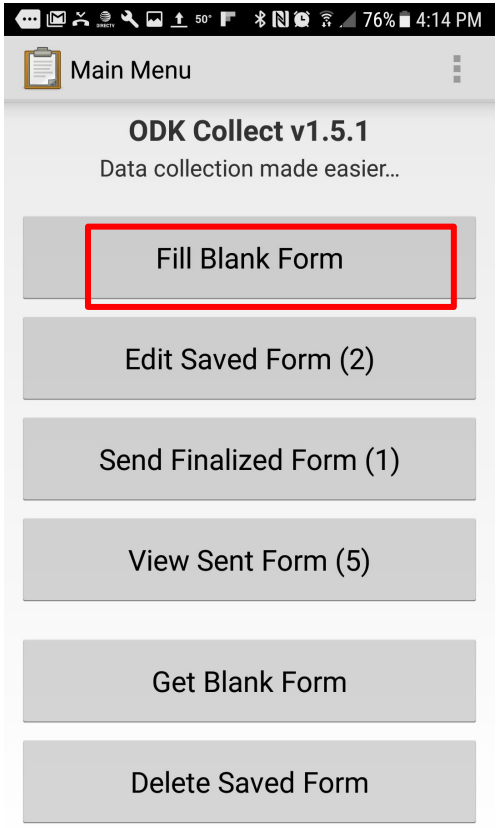
All information will be stored on your phone or tablet until you are back online and can submit the filled out form





Fill Blank Form

Choose your form and begin to fill it in



Ways to look at maps offline in the field (optional)

ODK's mapping features

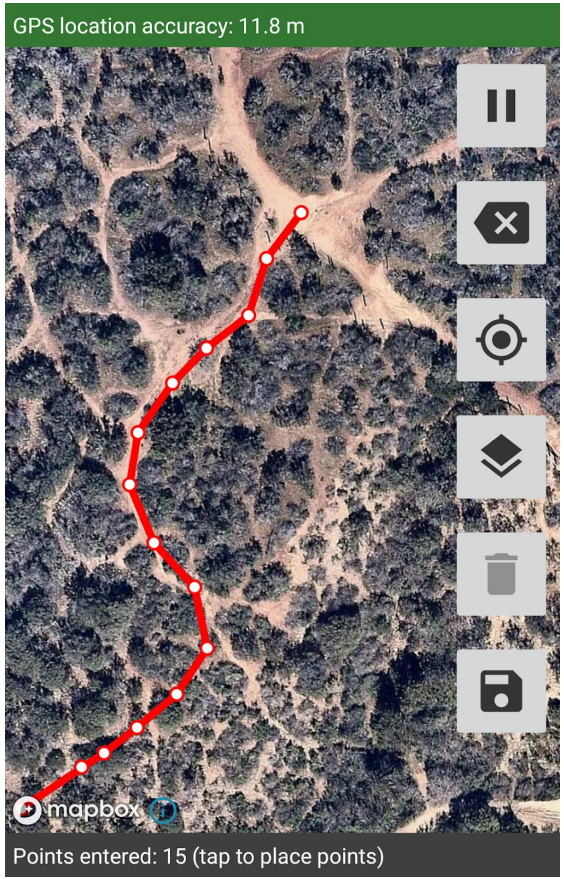
- If you have a geotiff you can view it in a ODK form
- New Mapbox Maps

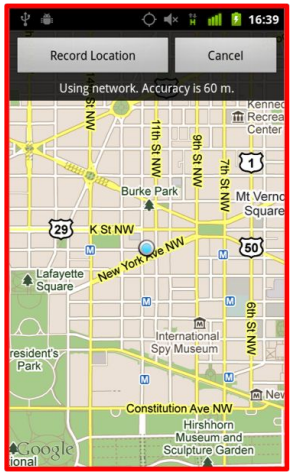
Google Earth

More apps in the Play Store like Orux Maps

Ground

- Take maps offline in the field
- Data collection on the phone or in a webapp





Get classify'n....field time!

Managing your Data in the Cloud: ODK Aggregate

ODK Aggregate

- Go to **odkcloud.appspot.com**.
- Aggregate allows you to Upload Forms, Manage Data, Basic Vizualization, Export Data
    - Runs on Google App Engine (= cloud charges)
    - Alternative in ODK Central or ODK VM
- What we'll use it for is to get a CSV.
    - *Note: while you can send data from ODK Collect to Google Sheets, Sheets does some funky things when exporting as a CSV, and that makes the CSV un-uploadable to EE.

Ingesting Field Data into Google Earth Engine

Go to Google Earth Engine Code Editor

http://earthengine.google.com > Platform > Code Editor

https://code.earthengine.google.com

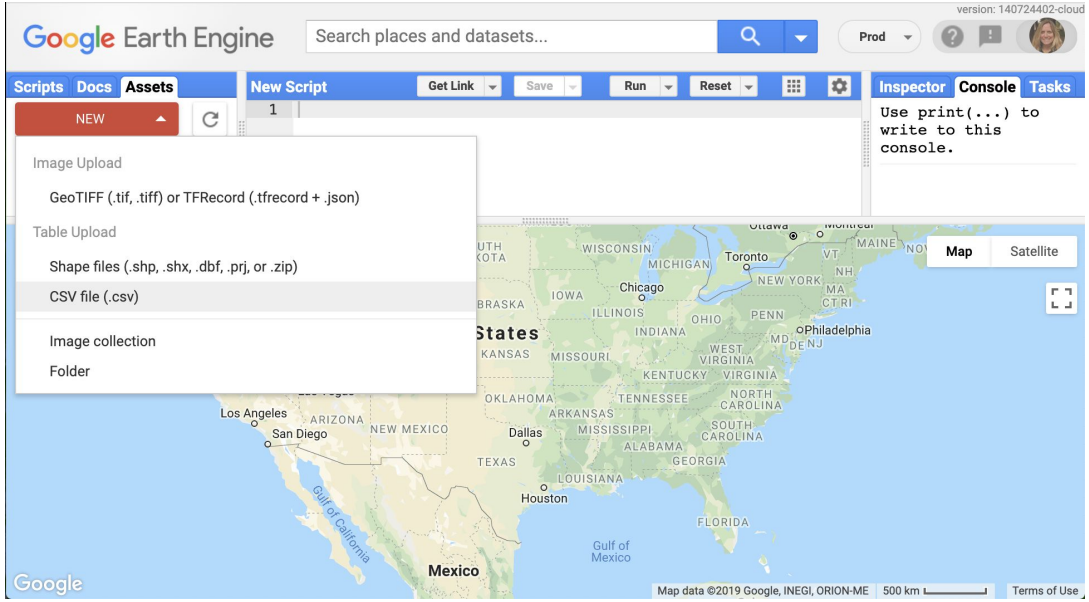
Sample CSV at bit.ly/g4g19-fielddata2EE

*New! Import a CSV

- Go to bit.ly/fielddata2EE
- Download the sample CSV for

  Astraptesfulgerator_landcover.csv
- Go to https://code.earthengine.google.com/

  and Sign In.
- Import the CSV into EE



Ground Demo

Please fill out our short survey (3 questions) at:

bit.ly/ground-survey

Options for Mapping Your Data

Bulleted list

- Lorem ipsum dolor sit amet, consectetur adipiscing elit.
- Lorem ipsum dolor sit amet, consectetur adipiscing elit.
- Lorem ipsum dolor sit amet, consectetur adipiscing elit.
- Lorem ipsum dolor sit amet, consectetur adipiscing elit.

Basic text

Lorem ipsum dolor sit amet, consectetur adipiscing elit.
Lorem ipsum dolor sit amet, consectetur adipiscing elit.
Lorem ipsum dolor sit amet, consectetur adipiscing elit.
Lorem ipsum dolor sit amet, consectetur adipiscing elit.

Next Steps

1. Lorem ipsum dolor sit amet, consectetur adipiscing elit.
2. Lorem ipsum dolor sit amet, consectetur adipiscing elit.
3. Lorem ipsum dolor sit amet, consectetur adipiscing elit.
4. Lorem ipsum dolor sit amet, consectetur adipiscing elit.

Next Steps

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