





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:

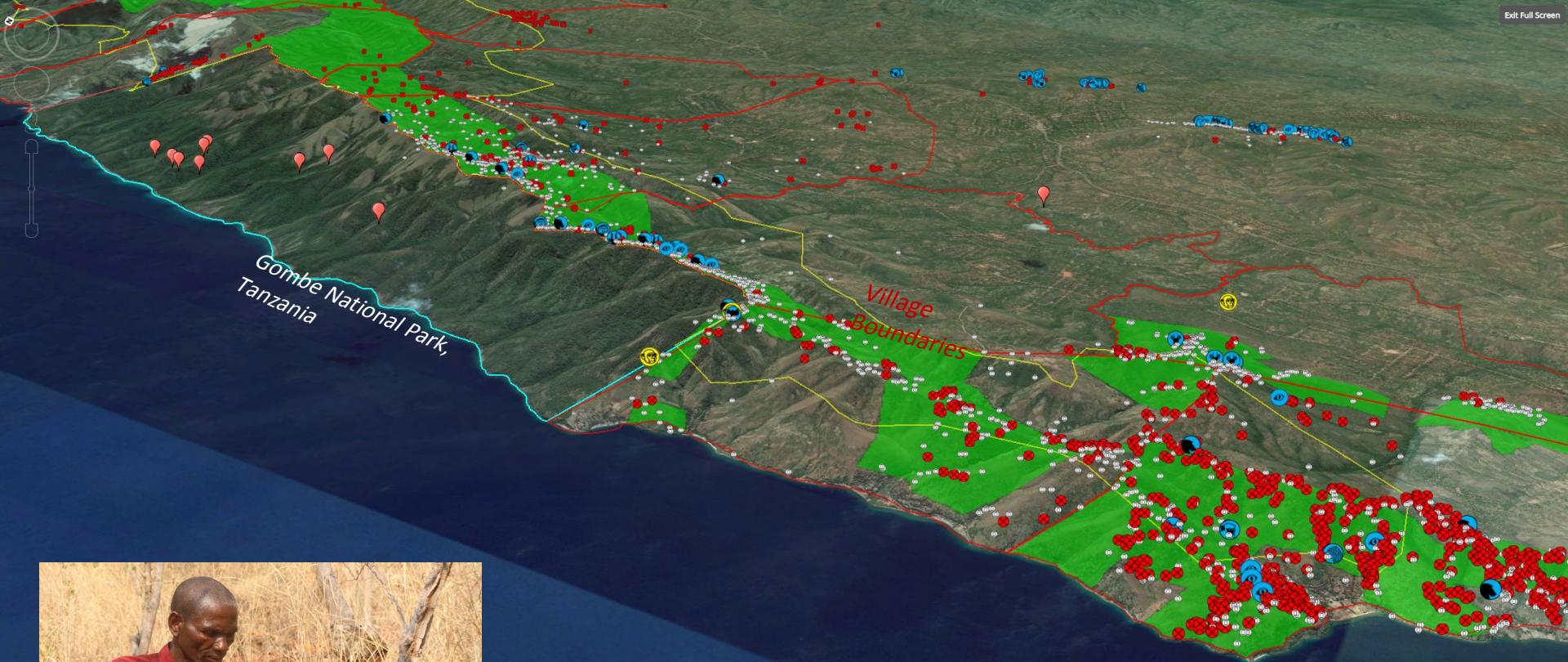
- build a data collection form or survey,
- collect data in the field on an Android mobile device, smartphone or tablet,
- aggregate the collected data on a local server or in the cloud,
- extract it in useful formats for analysis and visualization







Gombe National Park,
Tanzania



June, 2005



Kigalye Village Forest Reserve

An aerial photograph of a forested hillside. The terrain is rugged with numerous small ridges and valleys. The vegetation is a mix of dark green forests and lighter green, more open areas, likely shrubs or grasses. The lighting suggests a bright day with shadows cast by the hills.

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

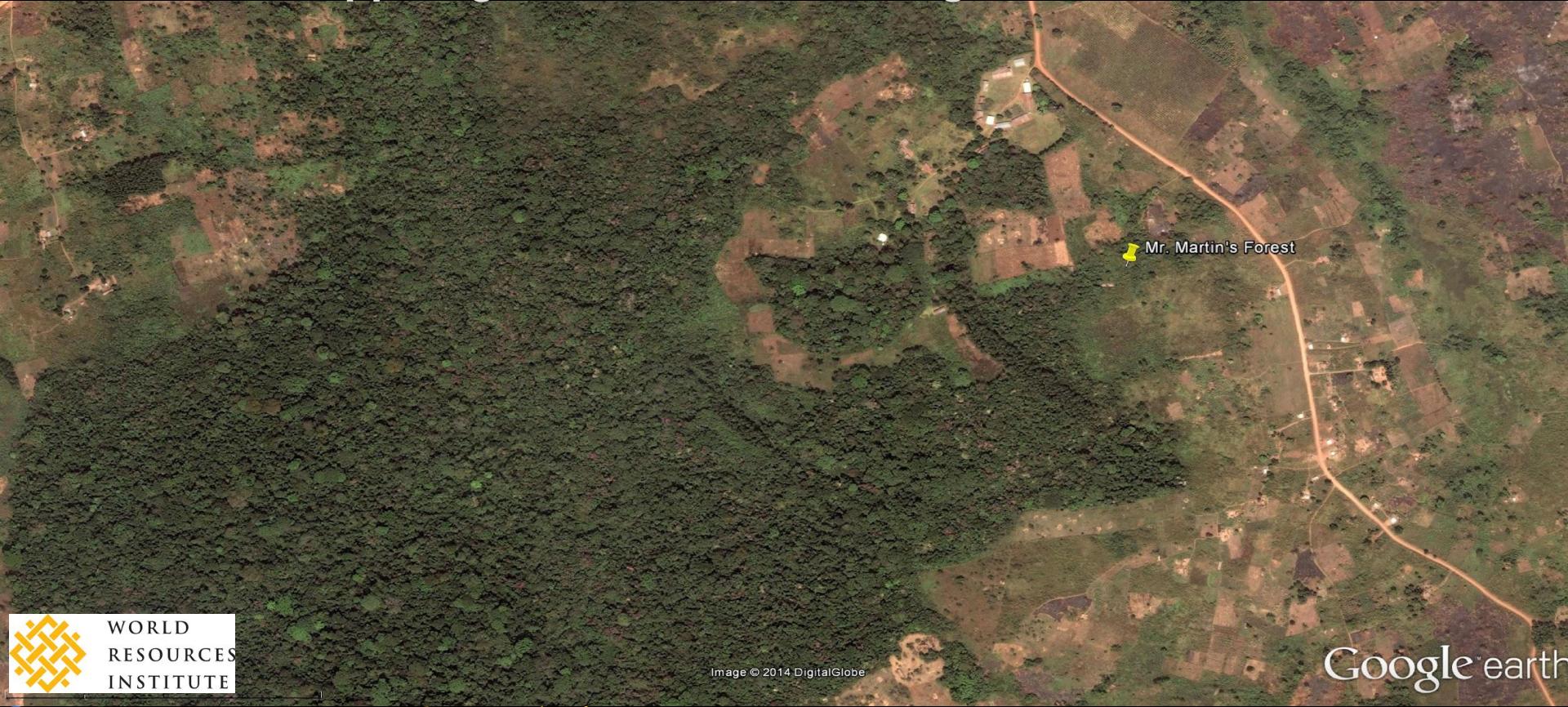


Image © 2014 DigitalGlobe

Google earth

Google Earth Outreach



the Jane Goodall Institute



GLOBAL FOREST WATCH

FOREST CHANGE FOREST COVER FOREST USE CONSERVATION PEOPLE STORIES

SEARCH Roads

FEEDBACK

+

-

FOREST CHANGE

• FORMA alerts

Geographic coverage

Lake Albert

Democratic Republic of the Congo

Uganda

Democratic Republic of the Congo

Uganda

Democratic Republic of the Congo

Uganda

Nyamejita

Masindi

Iluugu

Kafu River

Bulindi

Hoima

Buhimbwa

Kyamwendo

Kakonda

Nyamusoko

Kidekulu

Ntunda

Kimba

Maaro

Pakuukemajja

Karo

Kamukyope

Kachwewangi

Katanaabira

Kyankwanzi

Bulwiri

Dyerma

Naherero

Kakindu

Kibuye

Kitebe

Buhimbwa

Kibuye

Kitebe

Naherero

Kakindu

FORMA alerts

2006 2007 2008 2009 2010 2011 2012 2013 2014

USER DEFINED AREA
2000, Jan to 2011, Dec

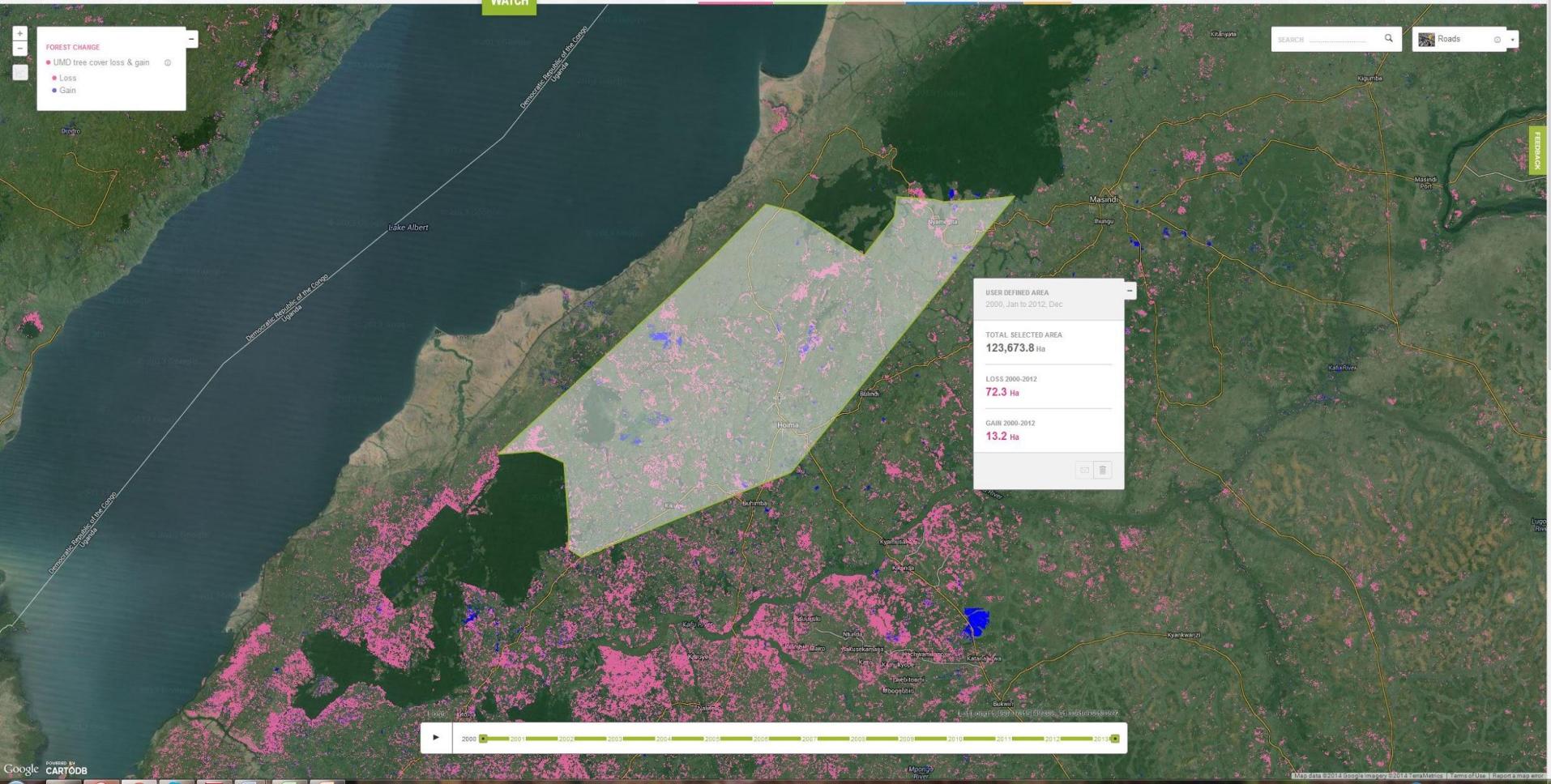
TOTAL SELECTED AREA
123,673.8 Ha

TOTAL ALERTS
122 alerts [download](#)

Map data ©2014 Google Images ©2014 TerraMetrics Terms of Use Report a map error

GLOBAL
FOREST
WATCH

FOREST CHANGE FOREST COVER FOREST USE CONSERVATION PEOPLE S



Ground-truth deforestation alerts from [GFW](#) using Android mobile devices

1/24/2013
QuickBird
satellite image

Private Forest Owners database in Google cloud

fam_name
first_name
year_birth
month_birth
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 1.51943
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.

4/9/2014 ODK validation

4/9/2014 ODK validation

Image © 2014 DigitalGlobe
lat 1.503350° lon 31.328488° elev 1136 m

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

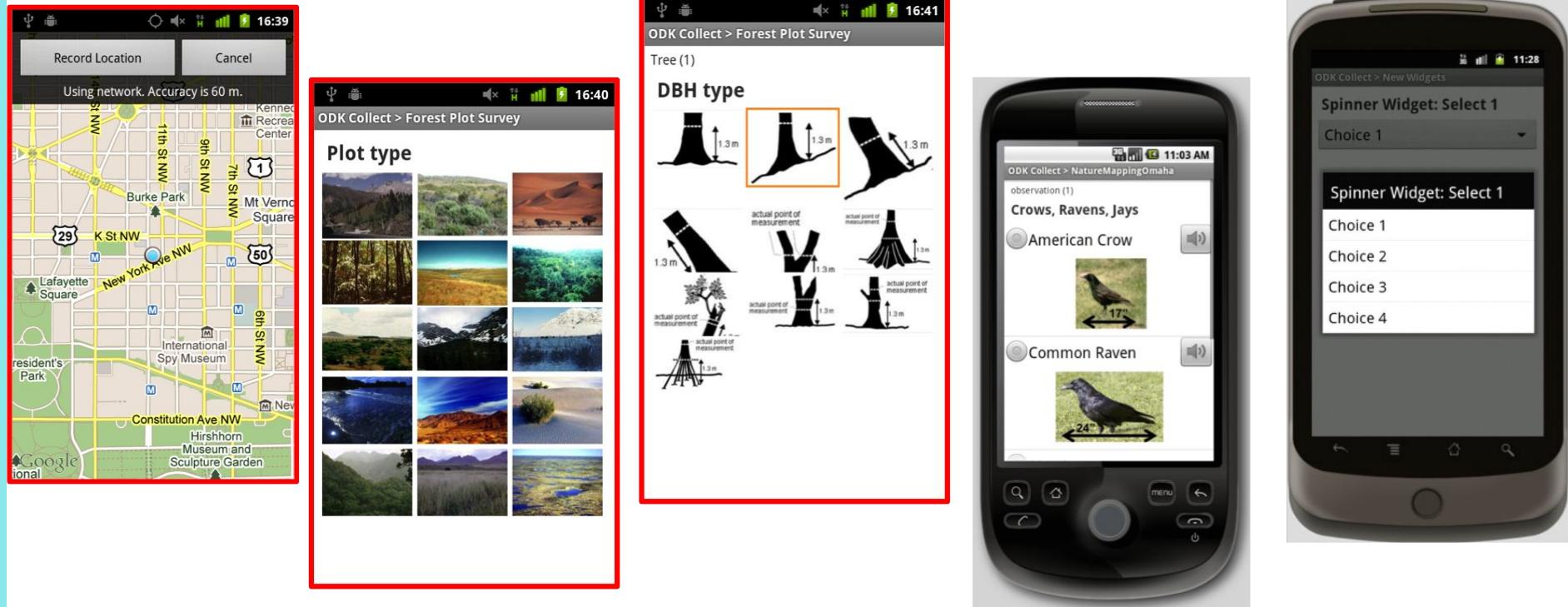
Collecting Data in the Field

Training Materials: bit.ly/g4g19-fielddata2EE

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



Open Data Kit -- ODK Collect Survey Forms



#GeoForGood19

ODK 101: Creating Forms

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

G4G19 – Landcover Classification [rename](#)

File Edit View Signed in as tanyak@gmail.com. Sign out.

Properties

Data Name
landcover

Label
English
What is the land cover associated with this location

Hint
English

Information: Options

The options the person filling the form may select from.
If you have many options or reuse options frequently, use Bulk Edit.

The Underlying Value is the value saved to the exported data.

+

Text Numeric Date/Time Time Location Media Barcode Choose One

Select Multiple Metadata Group

What is the land cover associated with this

#GeoForGood19

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.

The screenshot shows the ODK build interface. At the top, the URL is build.opendatakit.org. The title of the form is "G4G19 – Landcover Classification". The form contains three fields:

- A text input field labeled "Enter your name" with a placeholder "name".
- A date/time input field labeled "Specify the date and time." with a placeholder "datetime".
- A location input field labeled "Record your location" with a placeholder "location".

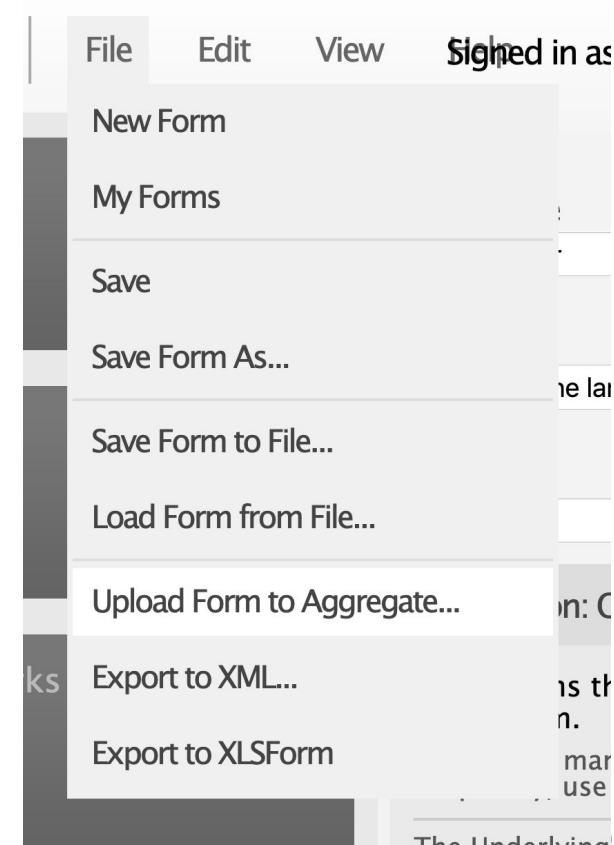
On the right side, there is a sidebar with the following sections:

- Properties**: Data Name is set to "landcover".
- Label**: English label is "What is the land cover associated with this location".
- Hint**: English hint is "English".
- Information: Options**: Describes the options available to the form填报者. It says: "The options the person filling the form may select from. If you have many options or reuse options frequently, use Bulk Edit." It also notes: "The Underlying Value is the value saved to the exported data."
- Select Multiple**, **Metadata**, and **Group** buttons are at the bottom.

At the bottom of the form area, there is a toolbar with buttons for adding fields: +, Text, Numeric, Date/Time, Time, Location, Media, Barcode, and Choose One.

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.



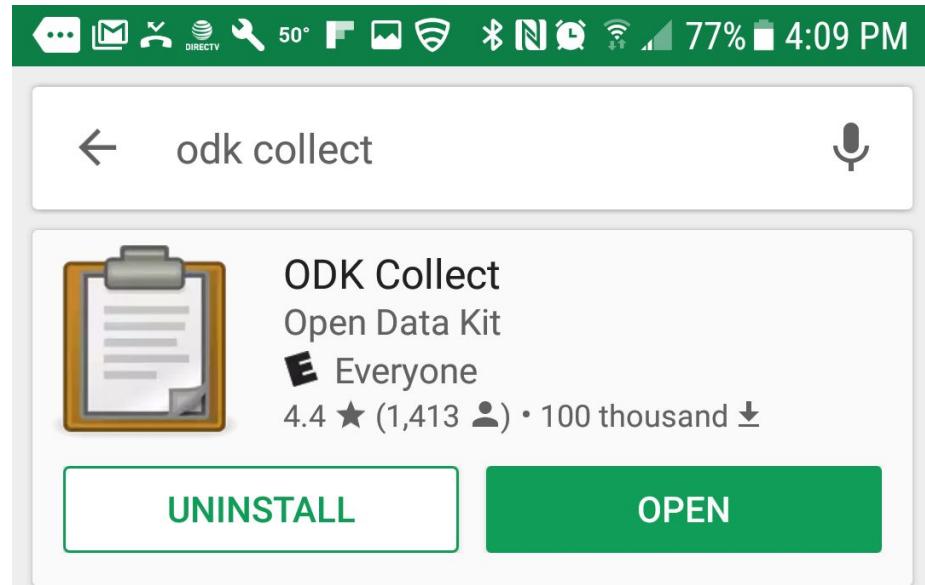
ODK 101: Configuring your device

- 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

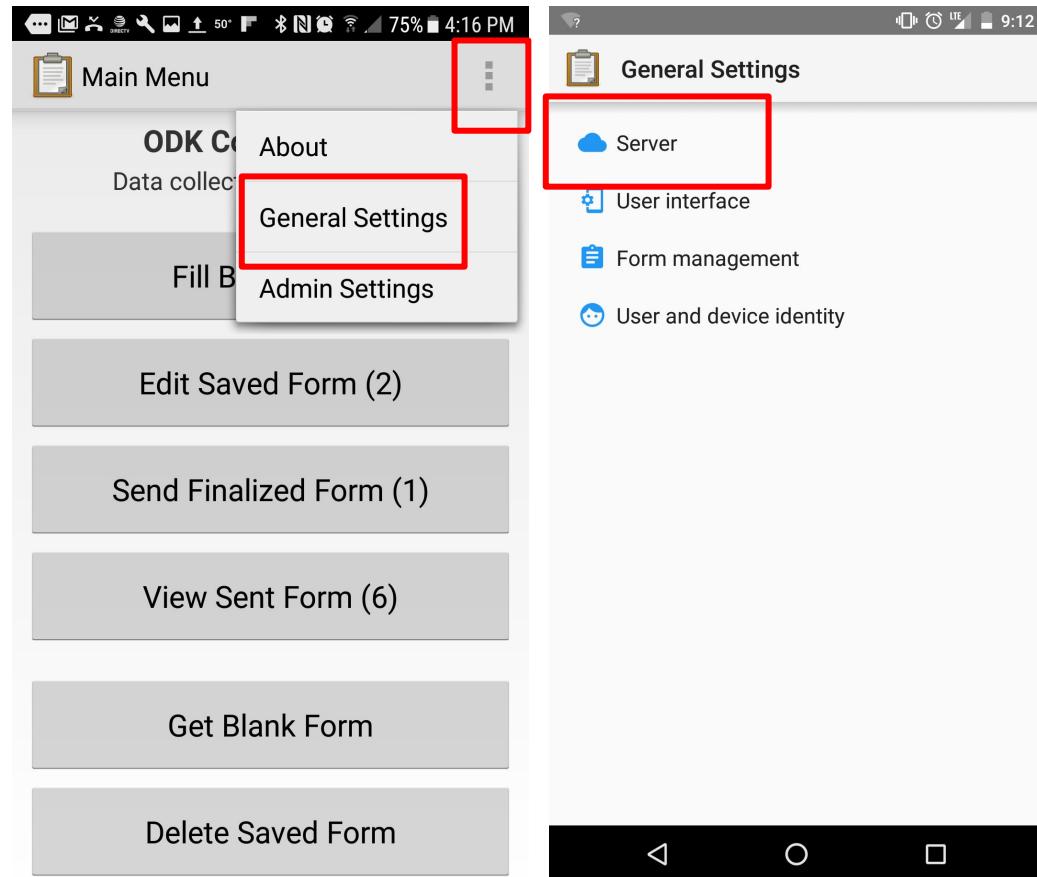


Configure your account

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

Click on General Settings

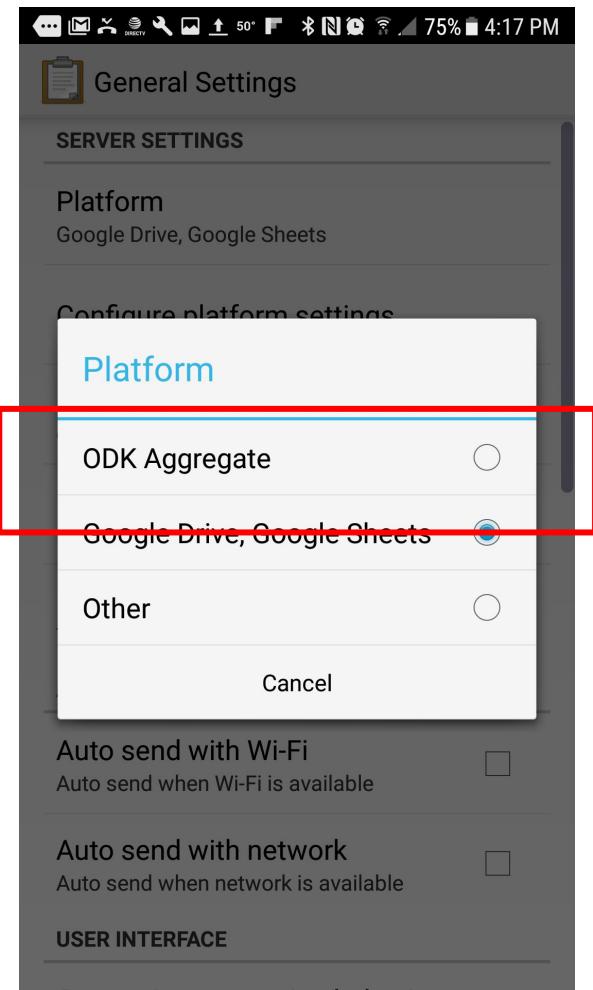
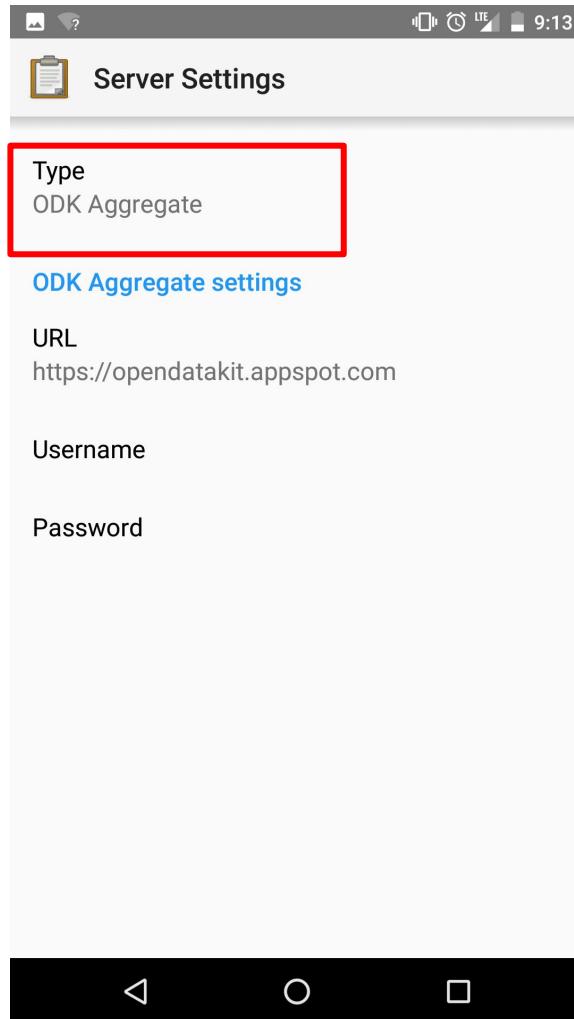
Click on Server



Choose Google Drive,
Google Sheets as your
platform

For URL, enter:

odkcloud.appspot.com



ODK 101: Configuring your device

- Go to odkcloud.appspot.com

This server and its data are not secure! Please change the super-user's password!

Log Out admin ?  

Submissions Form Management Site Admin

Filter Submissions Exported Submissions

Form Landcover Classification Form for Google Earth Engine Filter none

Save Save As Delete Submissions per page 100

Filters Applied  Display Metadata

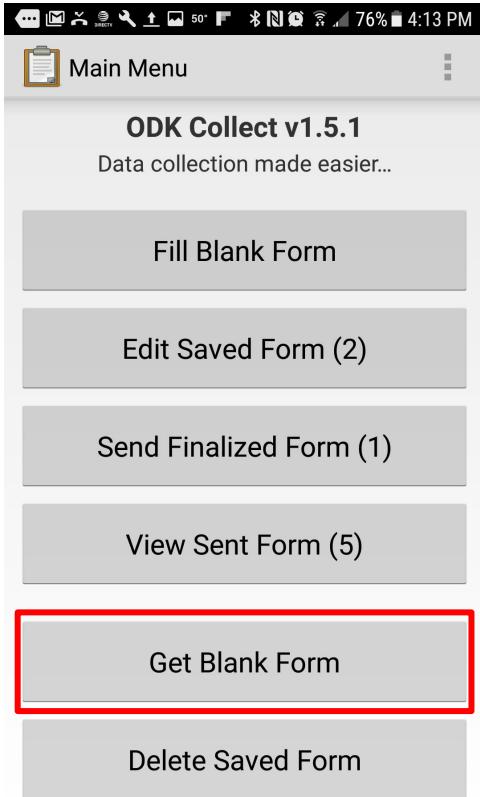
	intro	name	dateTime	specify_landcover_type	location	location	location	location	photo	thank_you	meta
			dateTime	landcover	Latitude	Longitude	Altitude	Accuracy	photo	my_acknowledge	instanceID
	Ameerandrobert		Tue Jun 30 17:41:00 UTC 2015	2	37.41696405	-122.0816658	-25.0	5.0		OK	uuid:9fc0c04c-11be-4466-b904-f46caecca872
	Ameerandrobert		Tue Jun 30 17:50:00 UTC 2015	1	37.41723831	-122.08223675	-45.0	5.0		OK	uuid:da2d2b8c-3d62-4f11-9914-507c58106e62
	Louisville		Tue Jun 30 17:36:00 UTC 2015	1	37.41845014	-122.08120589	-11.0	5.0		OK	uuid:fccac57a-f914-4617-a21a-970258c1667d
	Louisville		Tue Jun 30 17:51:00 UTC 2015	2	37.4178535	-122.08072131	-38.0	5.0		OK	uuid:935ab47f-4c4c-48f3-a674-1aa041727a6f
	Aaaa		Tue Jun 30 17:37:00 UTC 2015	2	37.41703098	-122.08173433	-39.0	5.0		OK	uuid:d5bd36d1-1235-4602-9529-18112d20bc54
	Kim		Tue Jun 30 17:37:00 UTC 2015	2	37.41779664	-122.08283914	-15.0	8.0		OK	uuid:bcb33d0cc-d324-41e6-93de-1912d07d267c
	Bbbbb		Tue Jun 30 17:46:00 UTC 2015	2	37.41700152	-122.08173387	-39.0	6.0		OK	uuid:0d6705b6-fdfb-4944-a40-82be934815cb

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

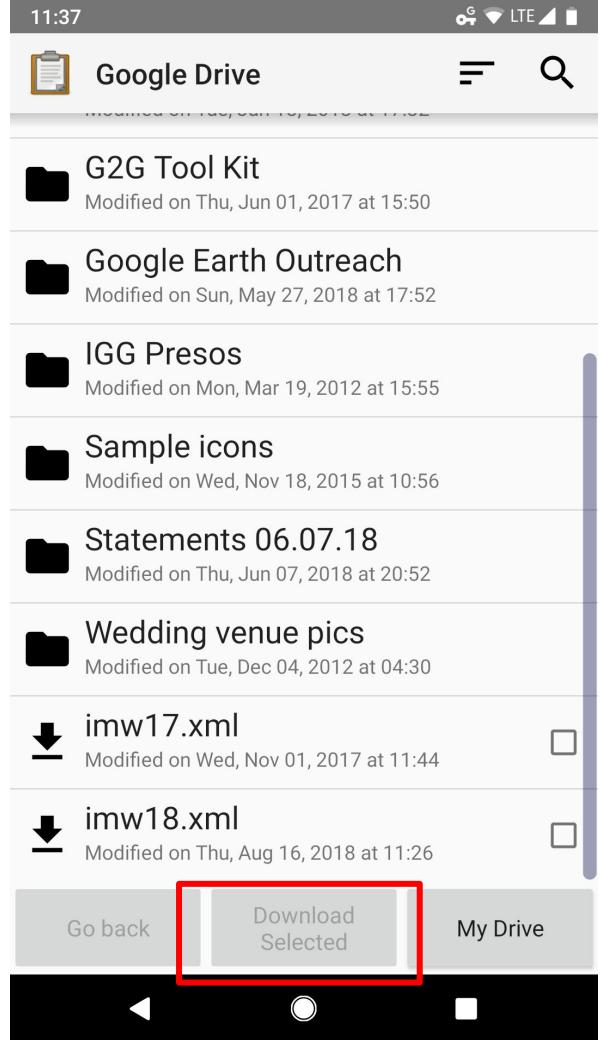
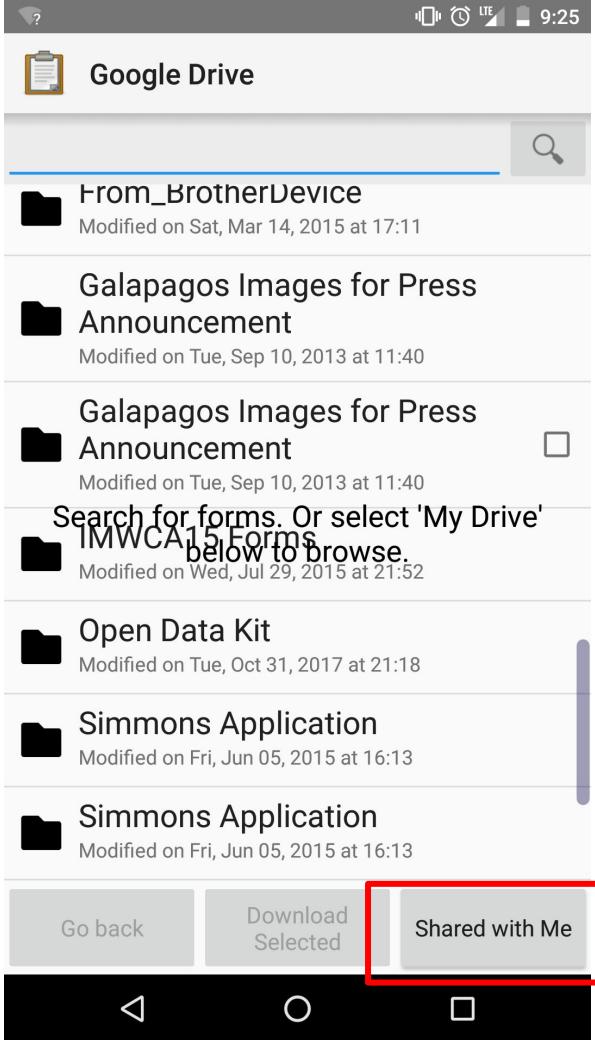
Click Get Blank Form



Get Blank Form

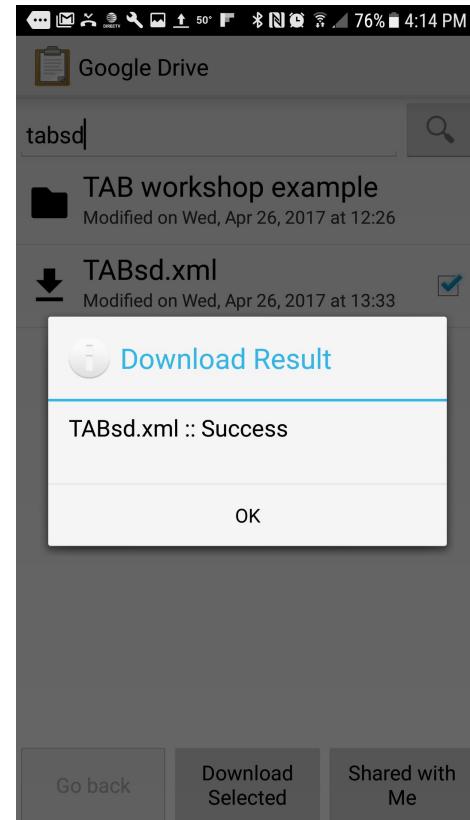
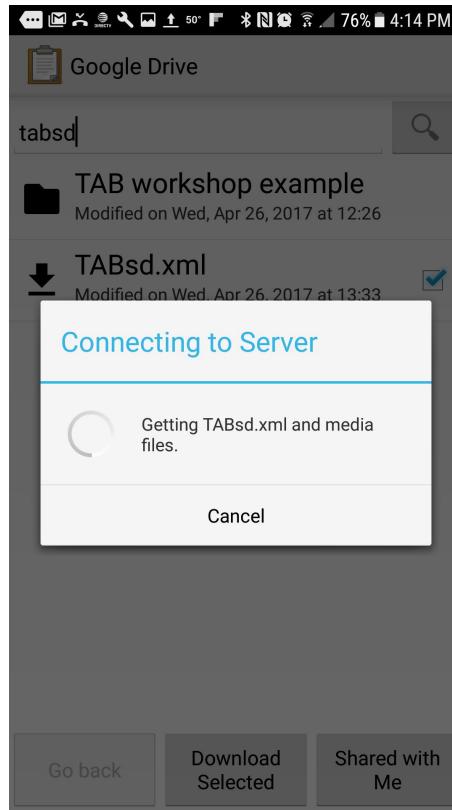
Search for your XML file in shared files and select your file, or G4G Landcover Classification

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

Main Menu

ODK Collect v1.5.1
Data collection made easier...

Fill Blank Form

Edit Saved Form (2)

Send Finalized Form (1)

View Sent Form (5)

Get Blank Form

Delete Saved Form

Fill Blank Form

A^Z Q

Finished scanning. All forms loaded.

IMW Canada 2016 Example
Version: vPnP..., Added on Thu, Oct 20, 2016 at 13:02

IMW Canada 2016 Form Example
Version: vgGj..., Added on Mon, Nov 07, 2016 at 14:25

Language form -1
Version: 1497342
Added on Wed, Jun 08, 2016 at 15:27

NW AILDI Workshop Example
Version: vrrCdx..., Added on Tue, Feb 21, 2017 at 13:33

Riparian Inventory (RI)
Version: 1374292
Added on Wed, Jun 08, 2016 at 12:00

SVAP2 modified w/images
Version: 1382137
Added on Wed, Jun 08, 2016 at 12:03

TABsouthdakota
Added on Wed, Apr 26, 2017 at 16:14

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

ODK's mapping features

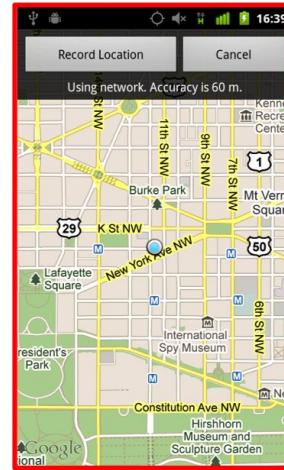
- If you have a geotiff you can view it in a ODK form
- New [Mapbox Maps](#)

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



#GeoForGood19

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 Visualization, 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

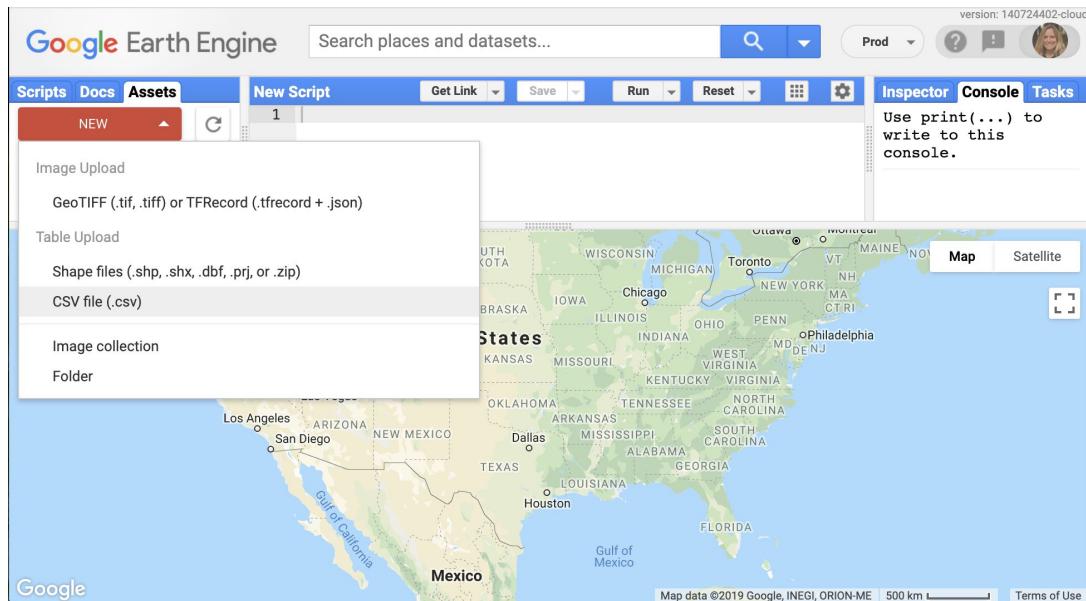
<http://earthengine.google.com> > Platform > Code Editor

<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.

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



Lorem ipsum dolor sit
amet, consectetur
adipiscing elit.



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