

# DATA DRIVEN HUMANITARIAN RESPONSE

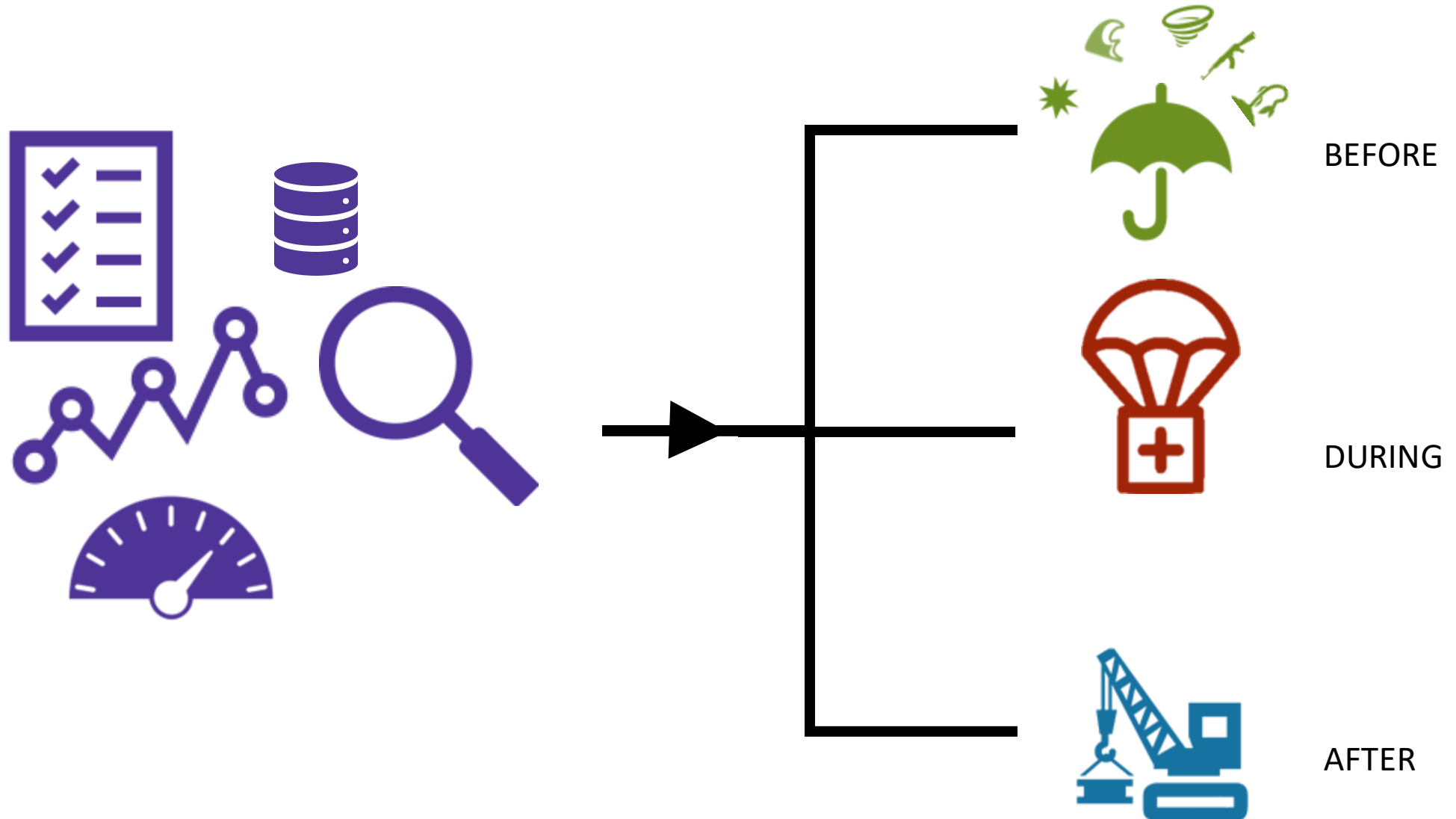
E. Zambrano



**DTM**

THE UN MIGRATION AGENCY

# OBJECTIVE



# DTM Data

**Who?**



## Population

Internally displaced persons  
Returnees  
Migrants

**Where? When?**



## Location

Sites and Camps  
Transit points  
Place of Resettlement

**What? How?**



## Mobility

Internal Flows  
Cross-Border  
Spontaneous or Organized  
Displacement and Returns



## Needs / Vulnerabilities

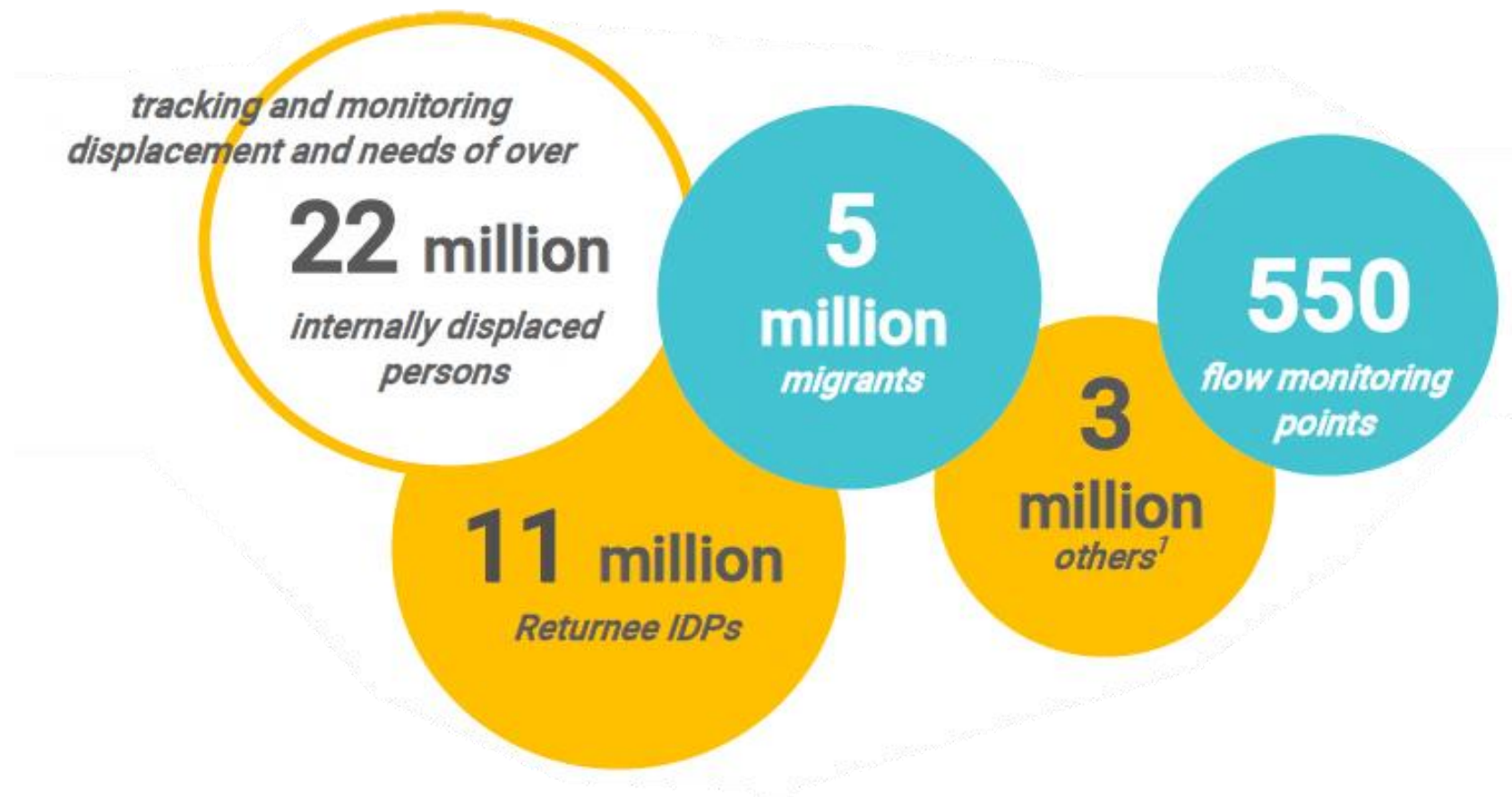
Intersectoral Needs  
GBV and Protection indicators



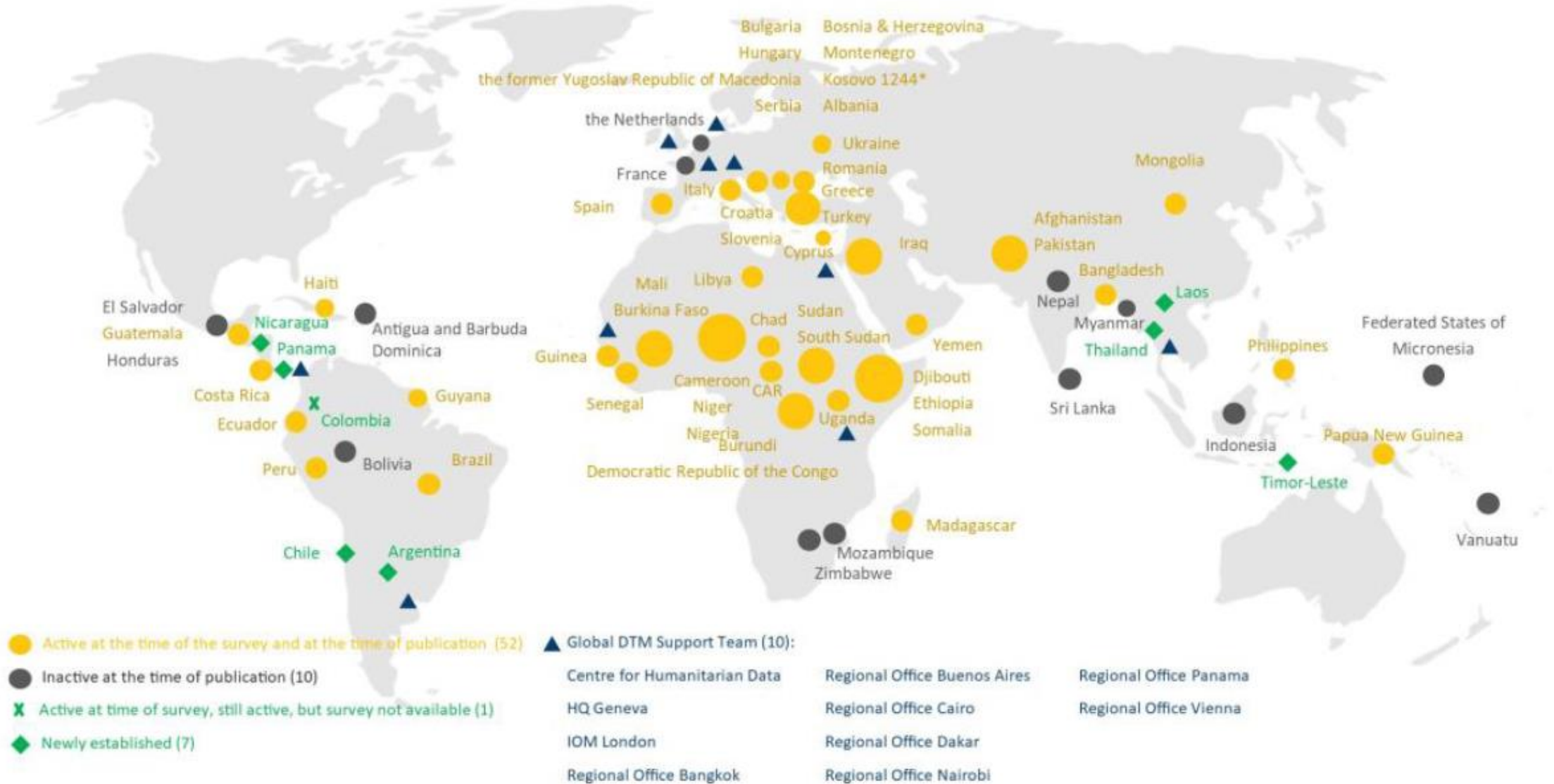
## Conditions

Infrastructure  
Livelihoods

# DTM in numbers



# DTM in numbers





# DTM numbers in 2018

	FIELD	HQ/Regional
Other	04	03
IM	12	10
Reporting	15	07
Analysis	15	03
GIS	19	04
Database	40	04
Coordination	50	05
Operations	85	04

**1,131**

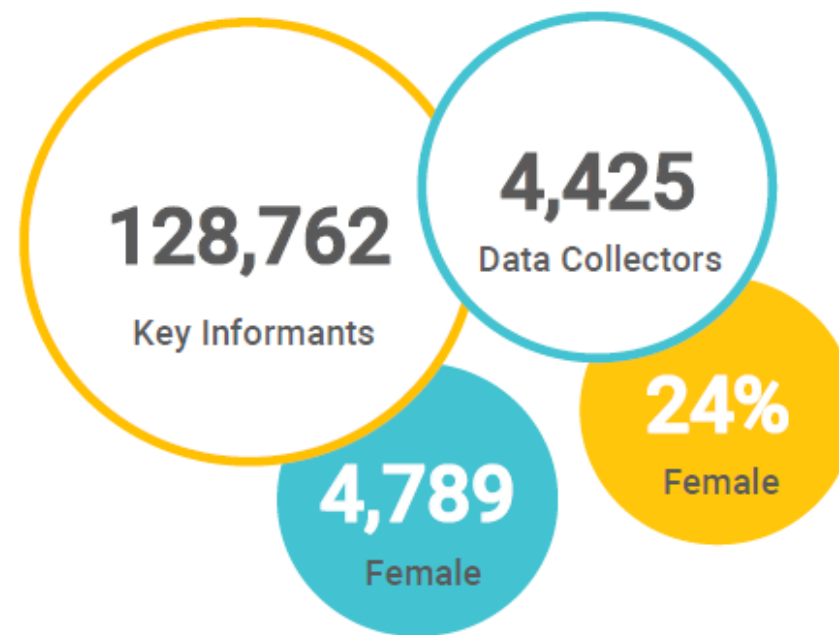


Reports

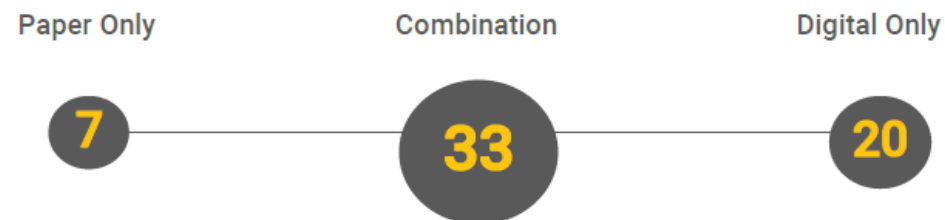
**303**



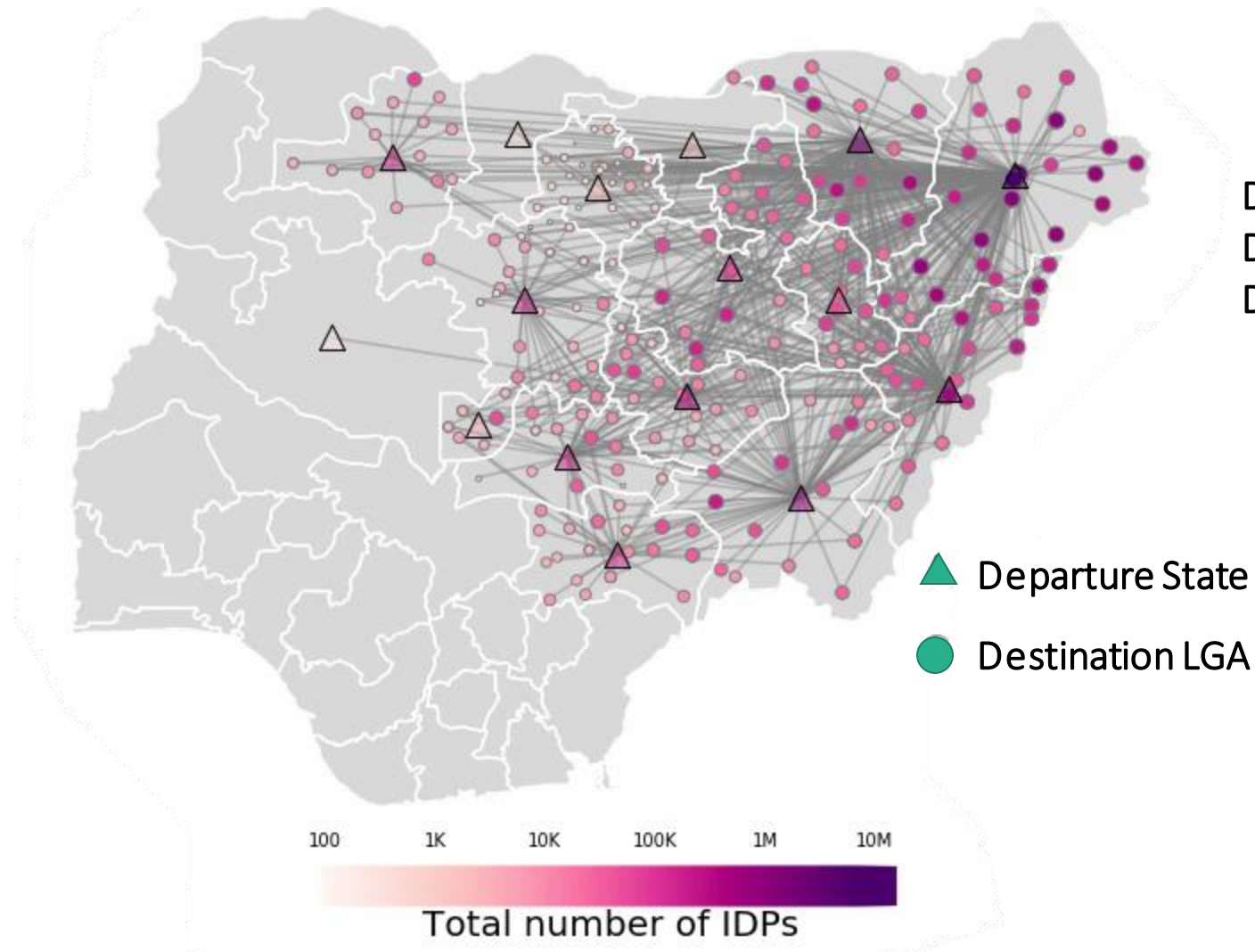
Datasets



## Paper versus Digital Platform for Data Collection\*

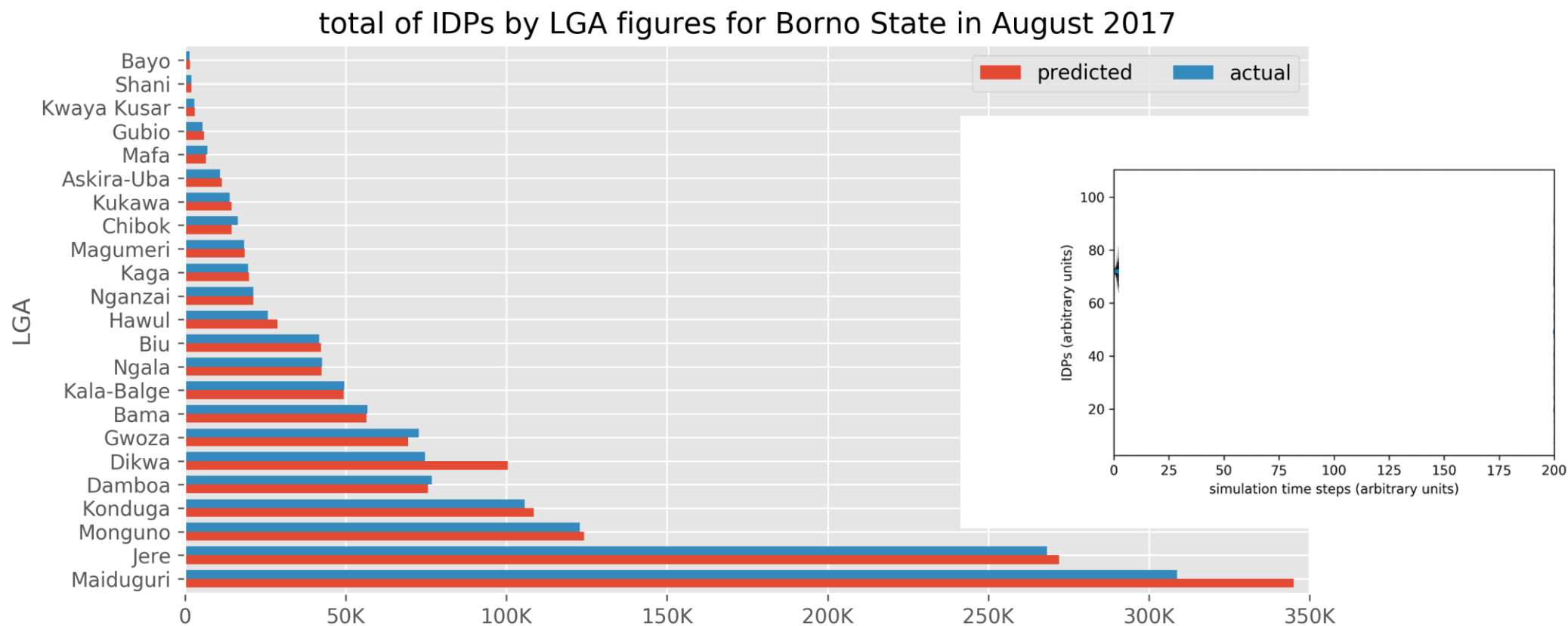


# Nigeria IDP network



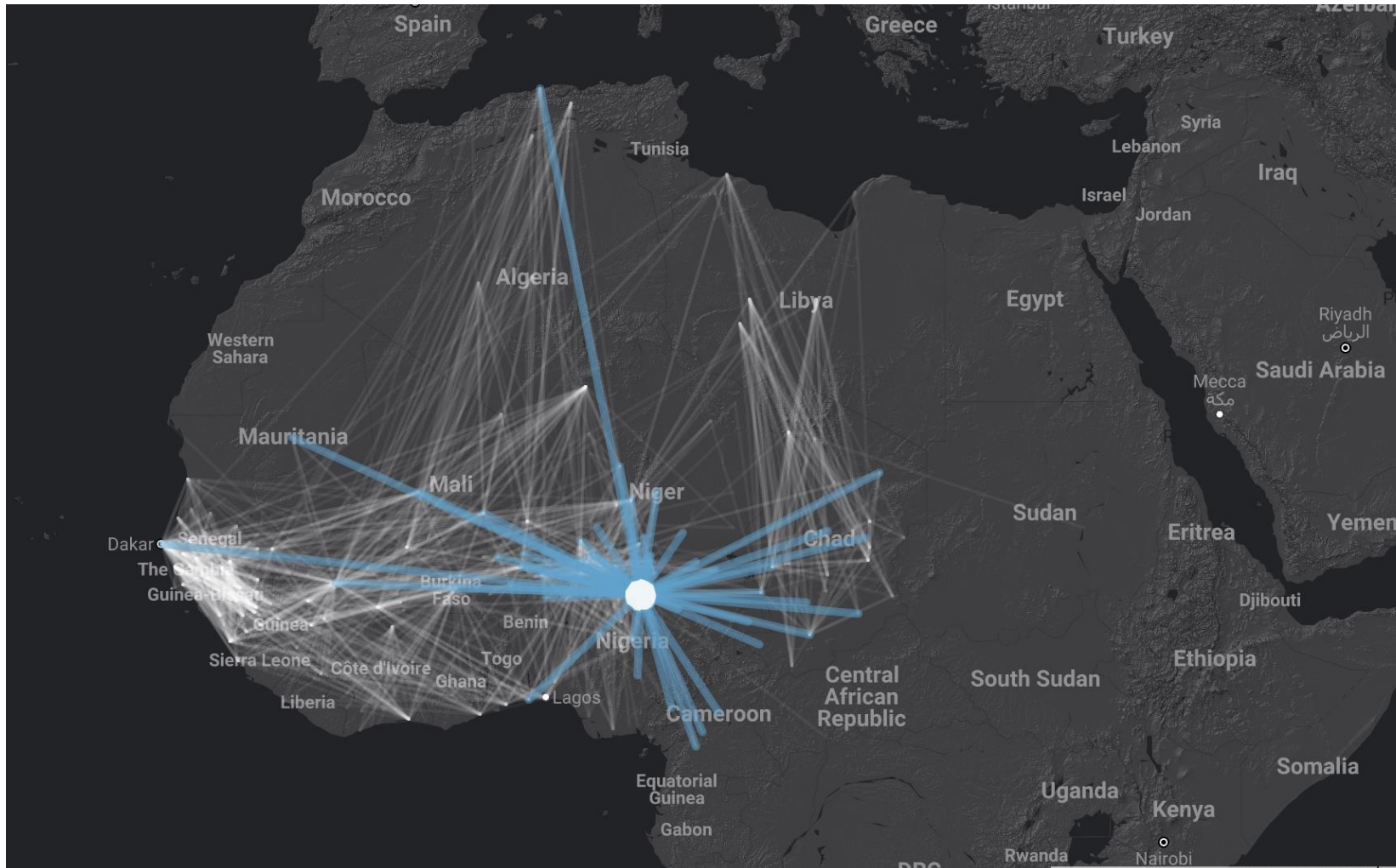
Data since Dec 2014 to present  
Destination places by LGA  
Departure by State

# Nigeria IDP predictions

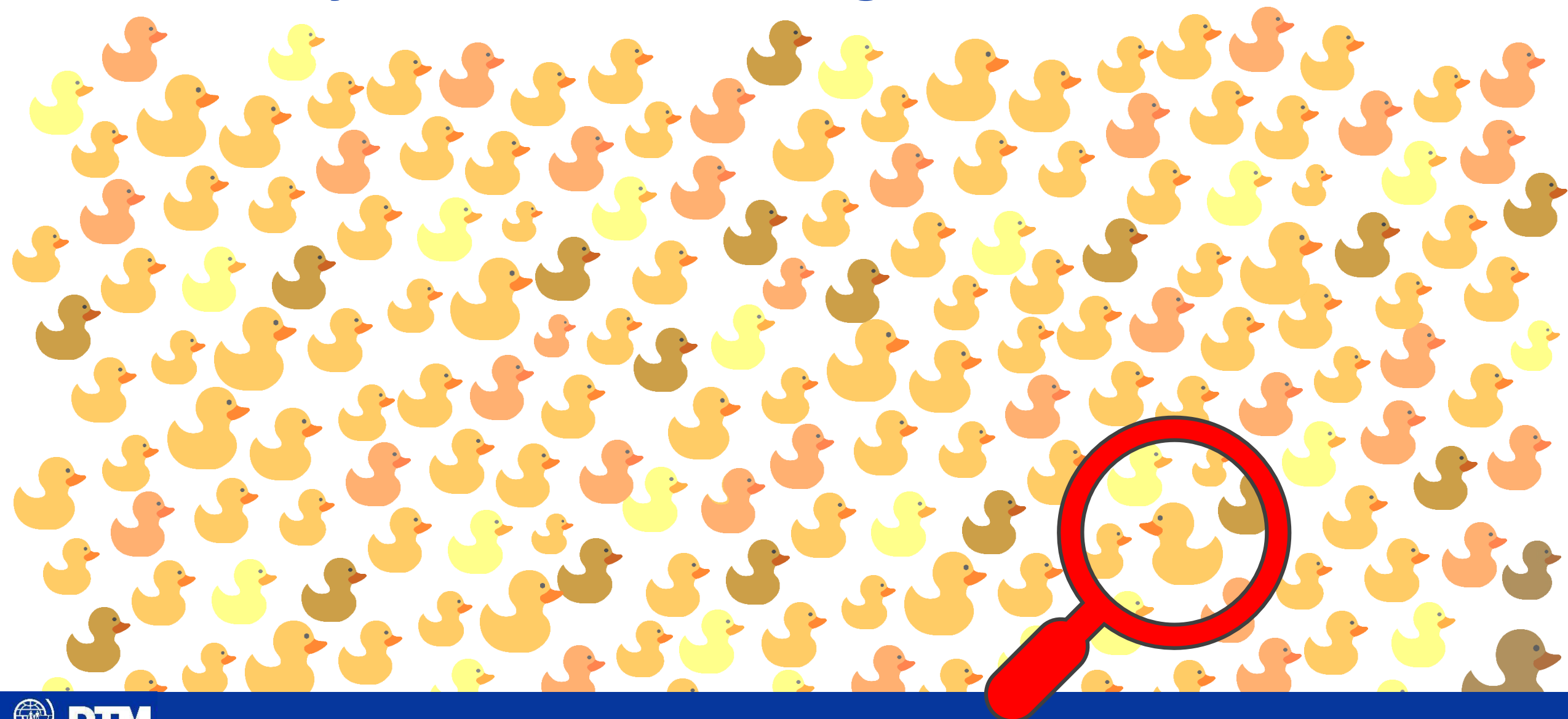




# Migration flows

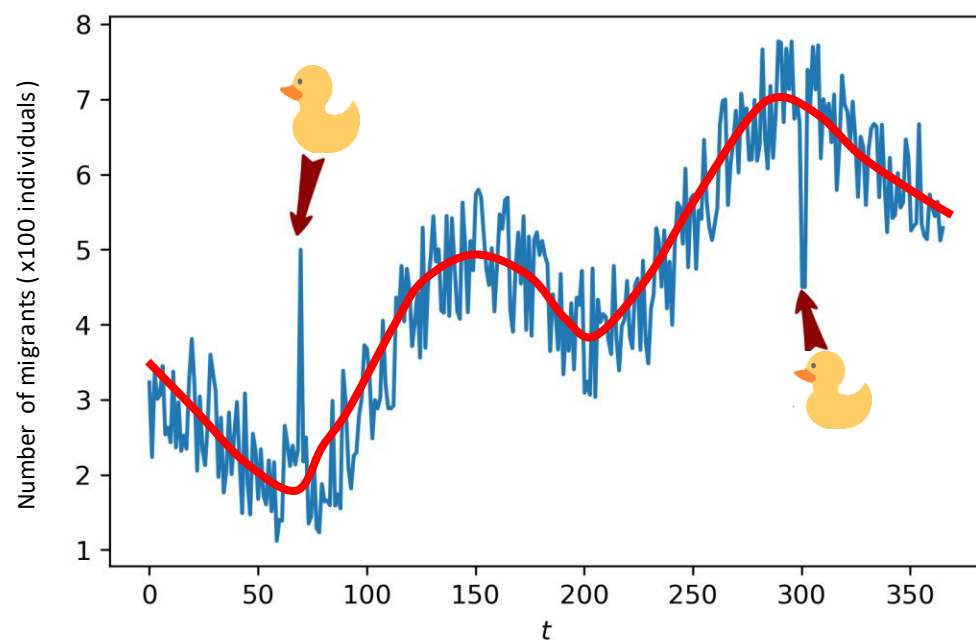


# Anomaly detection for migration flows



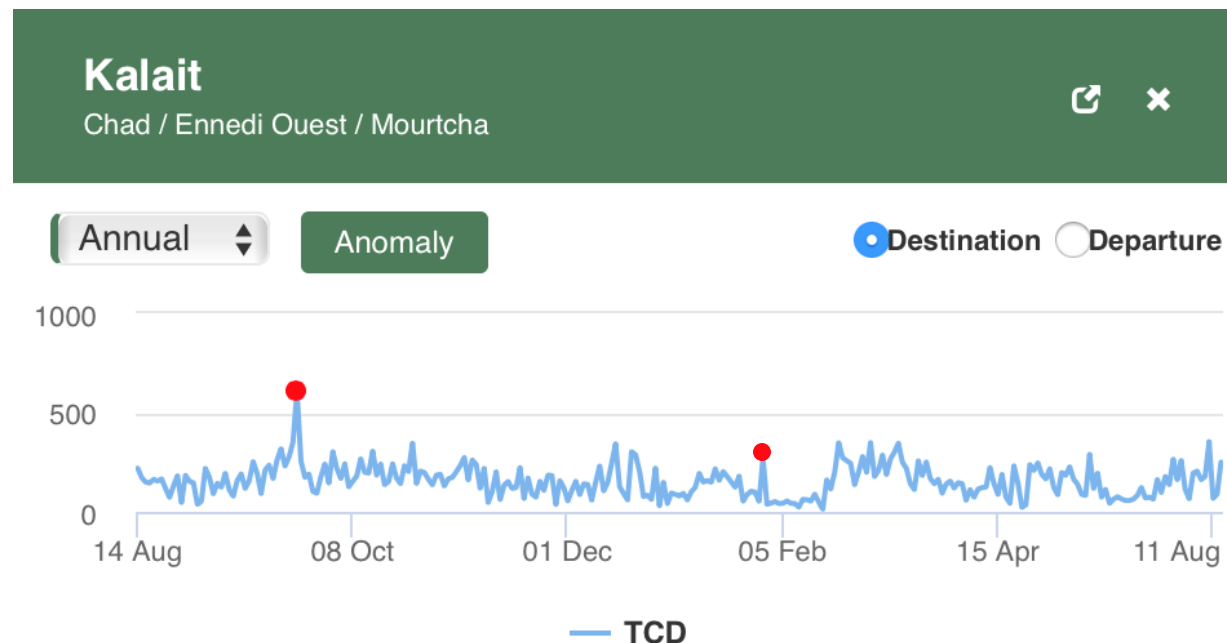
# Anomaly detection for migration flows

## Concept



- Seasonal trends included
- Cross validation with anecdotal information
- Report from WCA anomalies

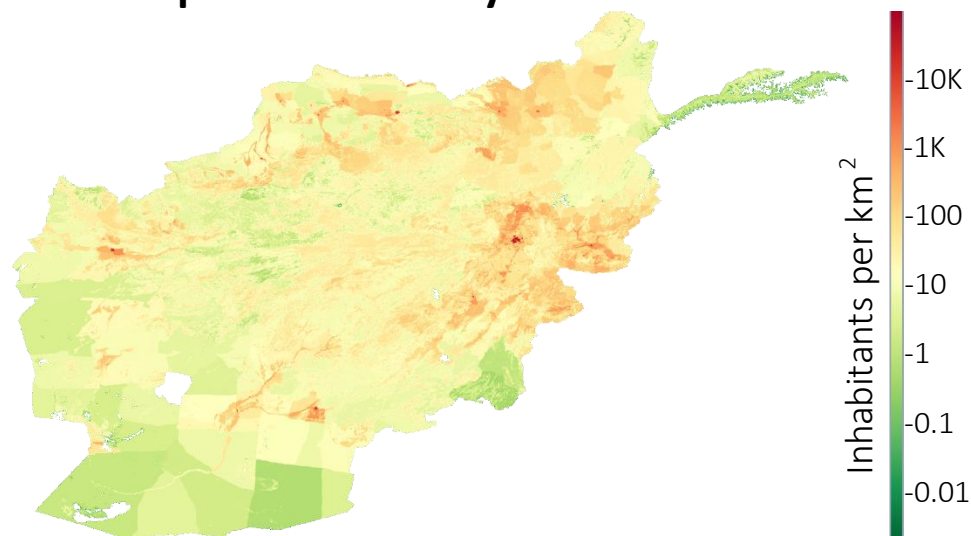
## Actual implementation (migration.iom.int)



- AnomalyDetect App available soon
- **Methods:** BoxPlot, Moving Median, Spectral method, RNN

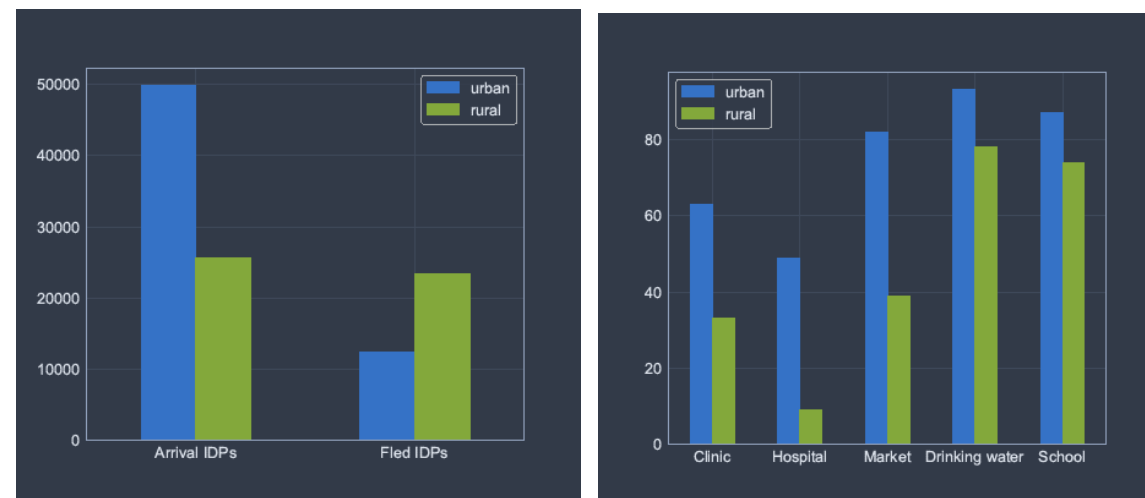
# Displacement: Urban vs Rural

Population Density\*

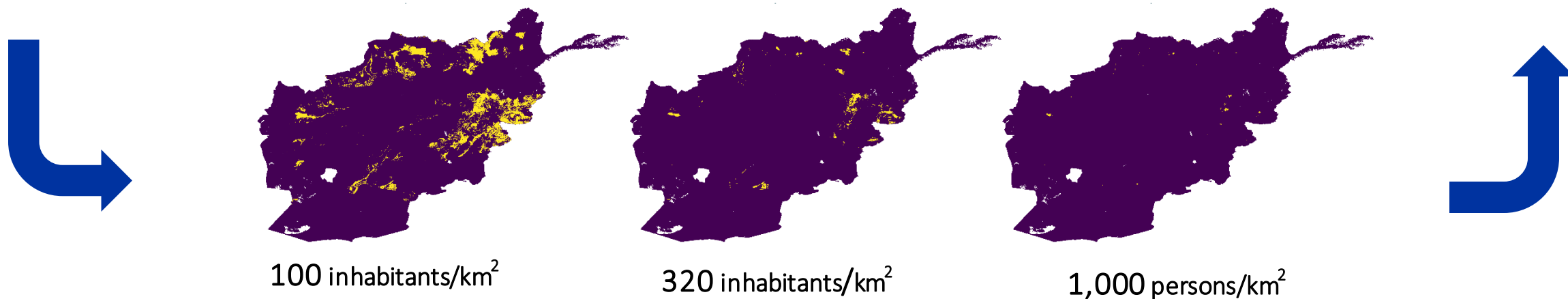


\*Taken from WorldPop

Urban/Rural disaggregation of DTM data

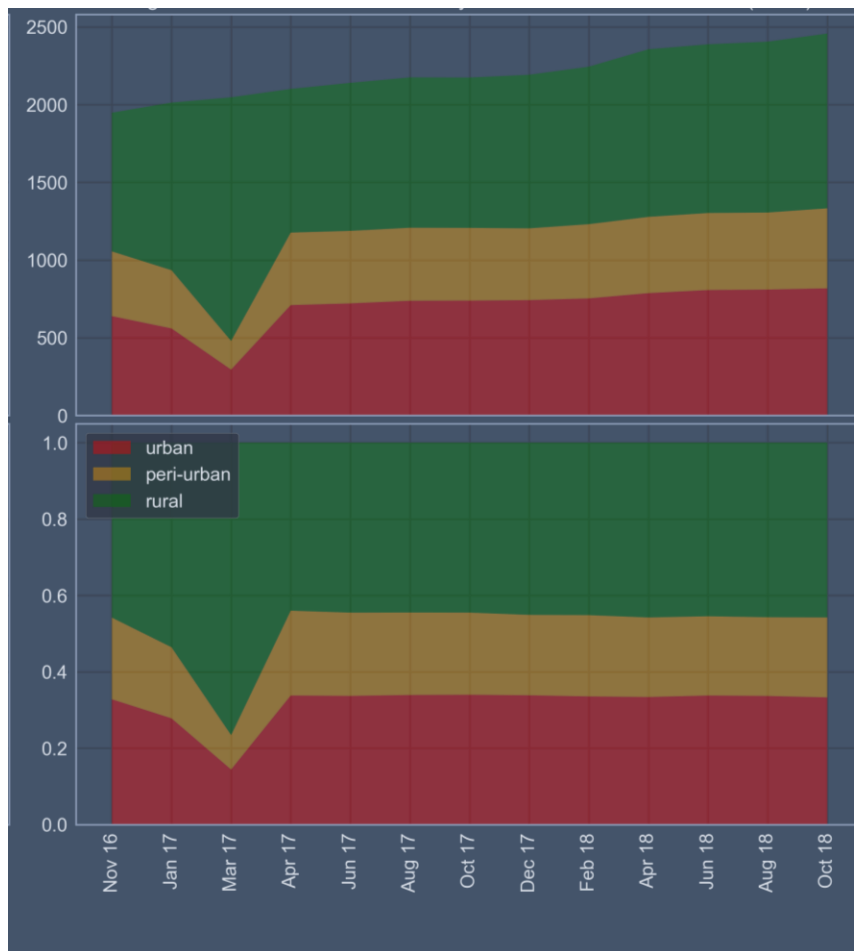


Population Density Thresholds

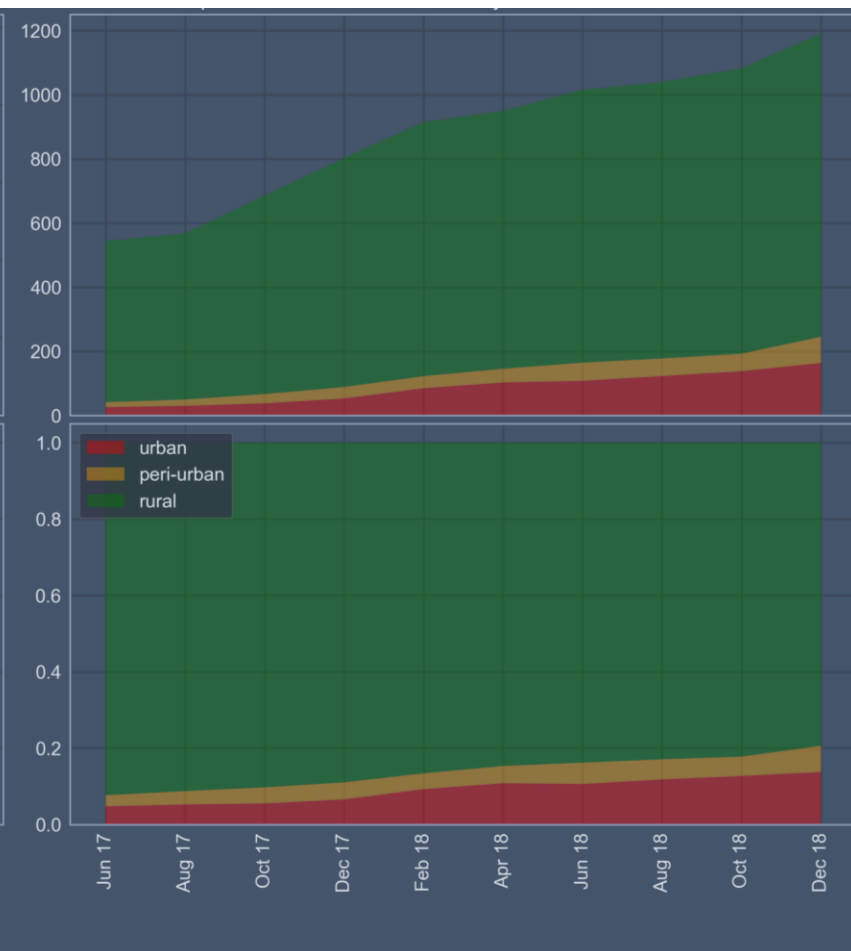


# Displacement: Urban vs Rural

## Nigeria



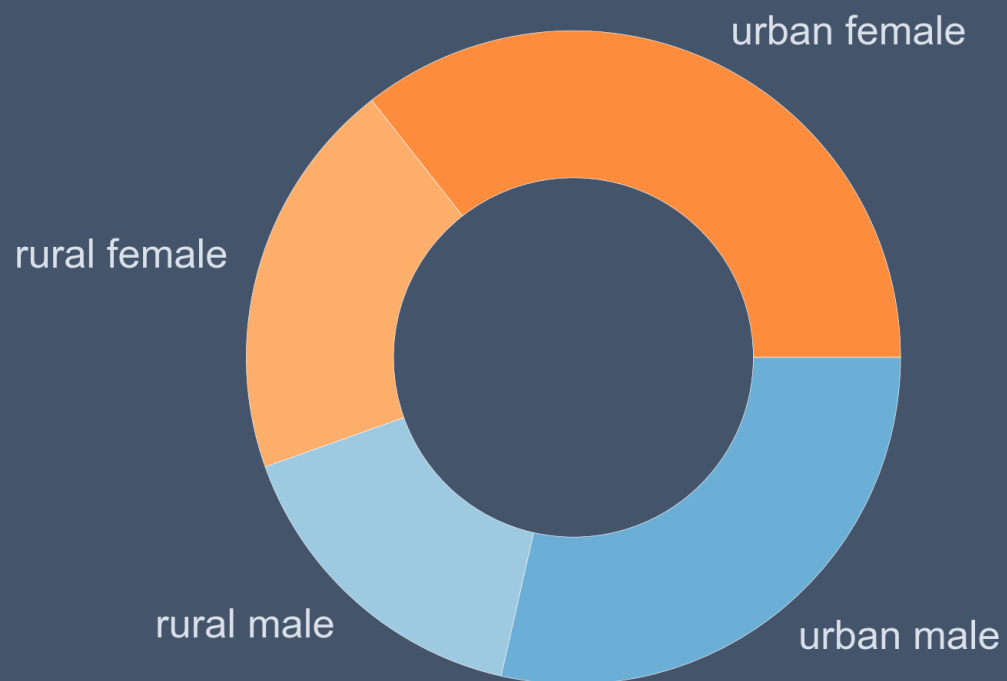
## Ethiopia



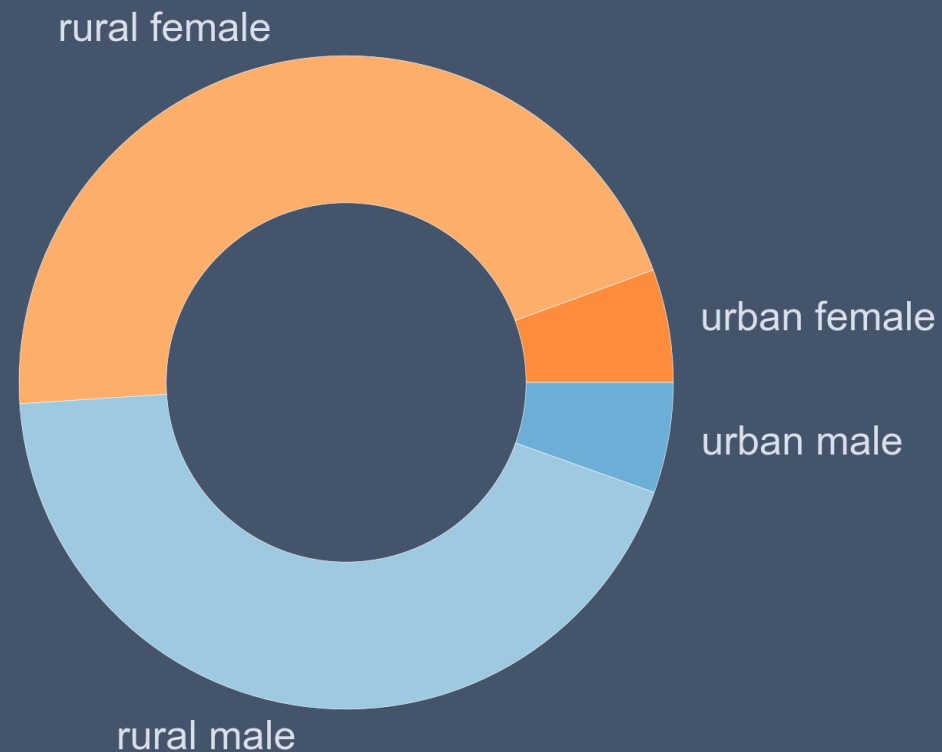


# Displacement: Urban vs Rural

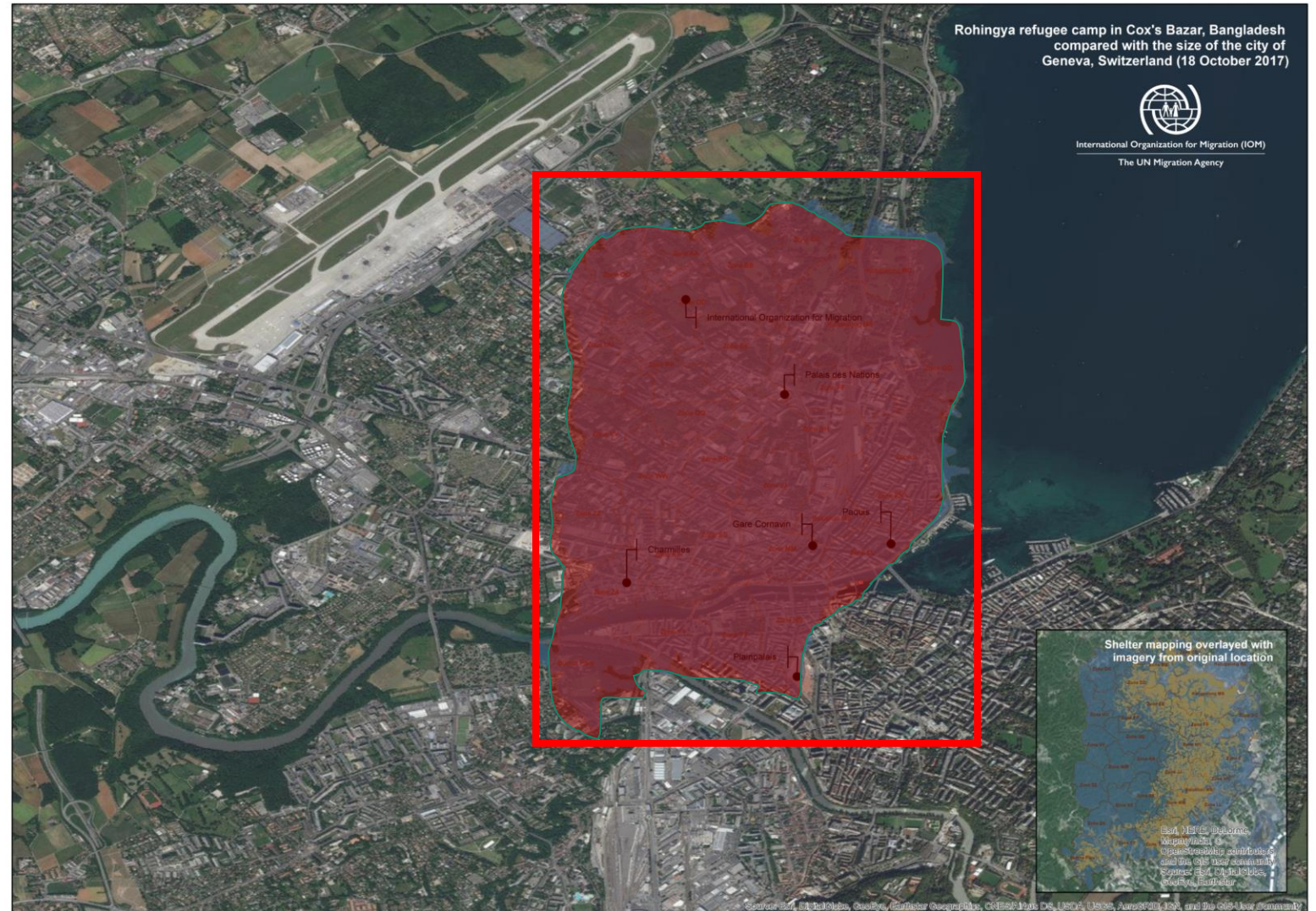
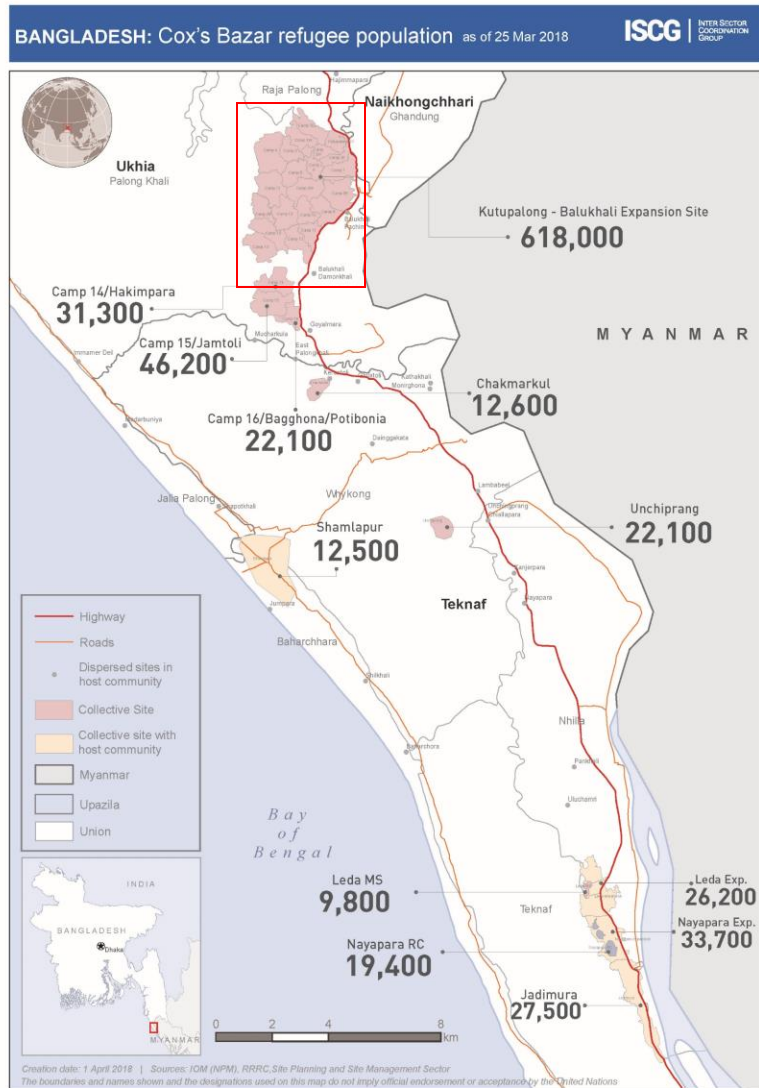
Nigeria IDP Demographics



Ethiopia IDP Demographics

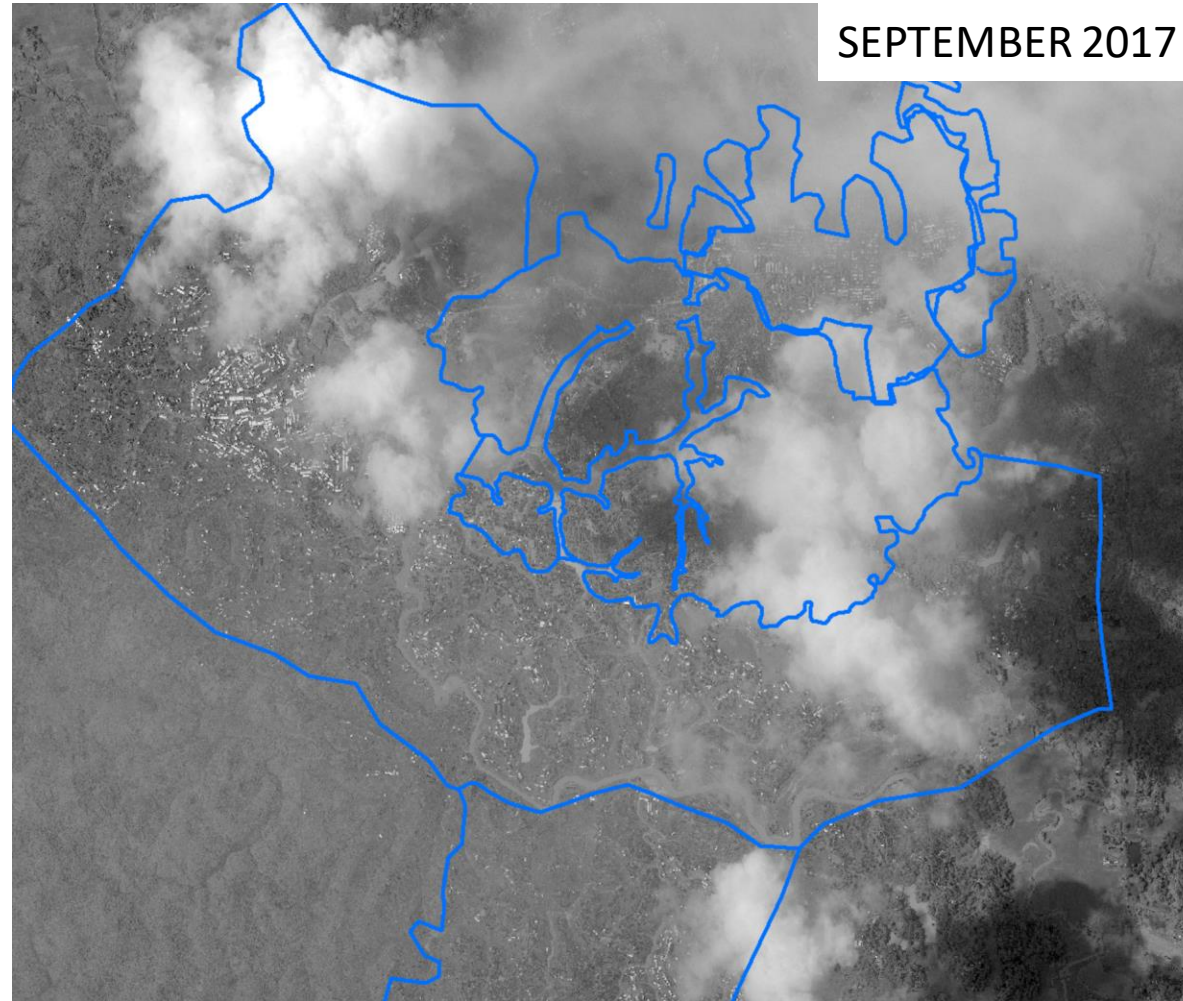


# Drone imagery and GIS





# Drone imagery and GIS



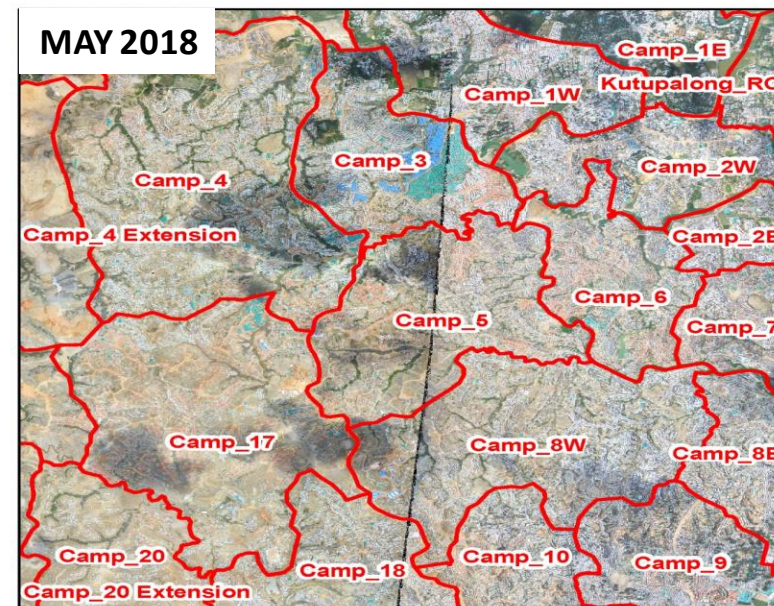
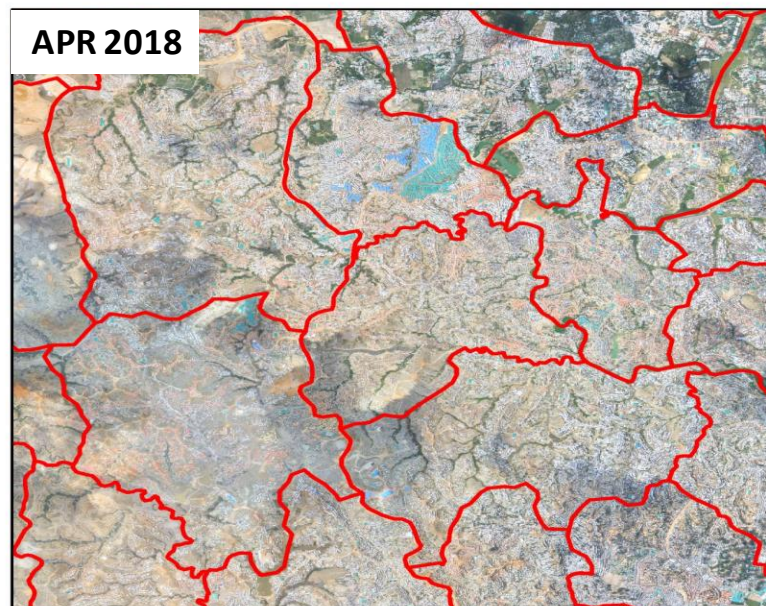
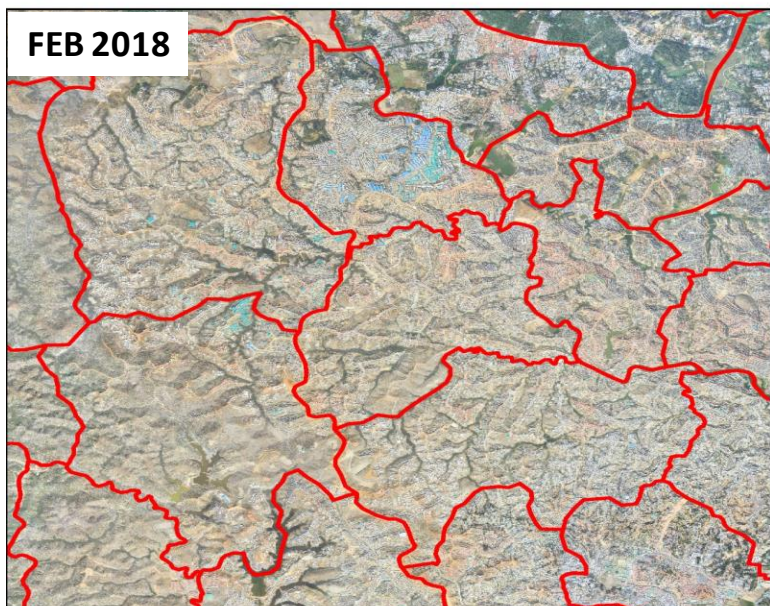
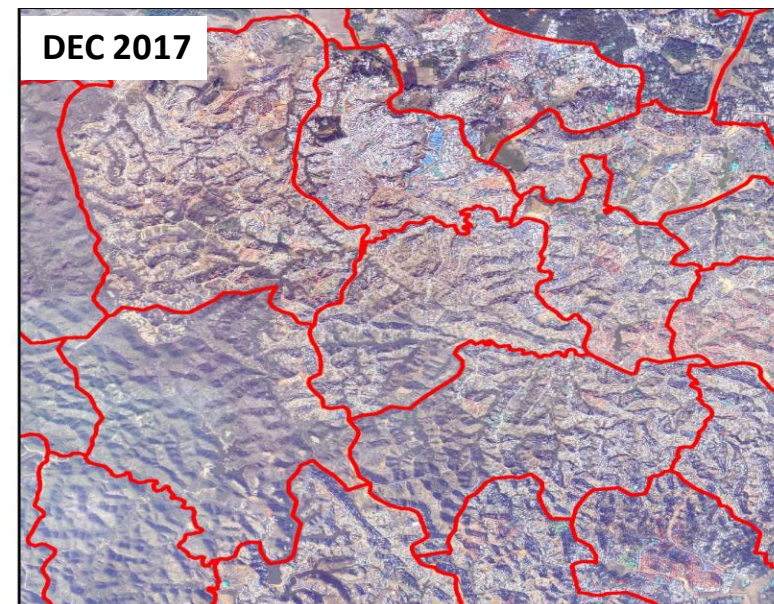
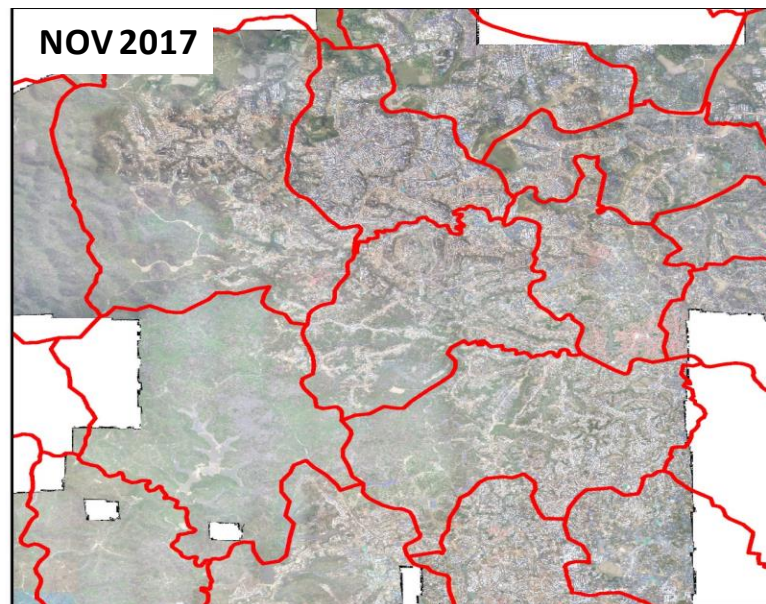
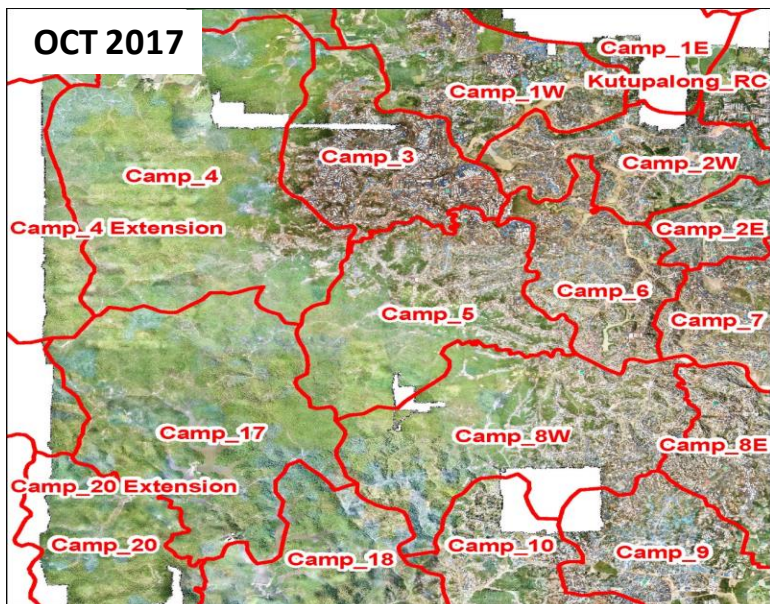
Panchromatic satellite imagery availability







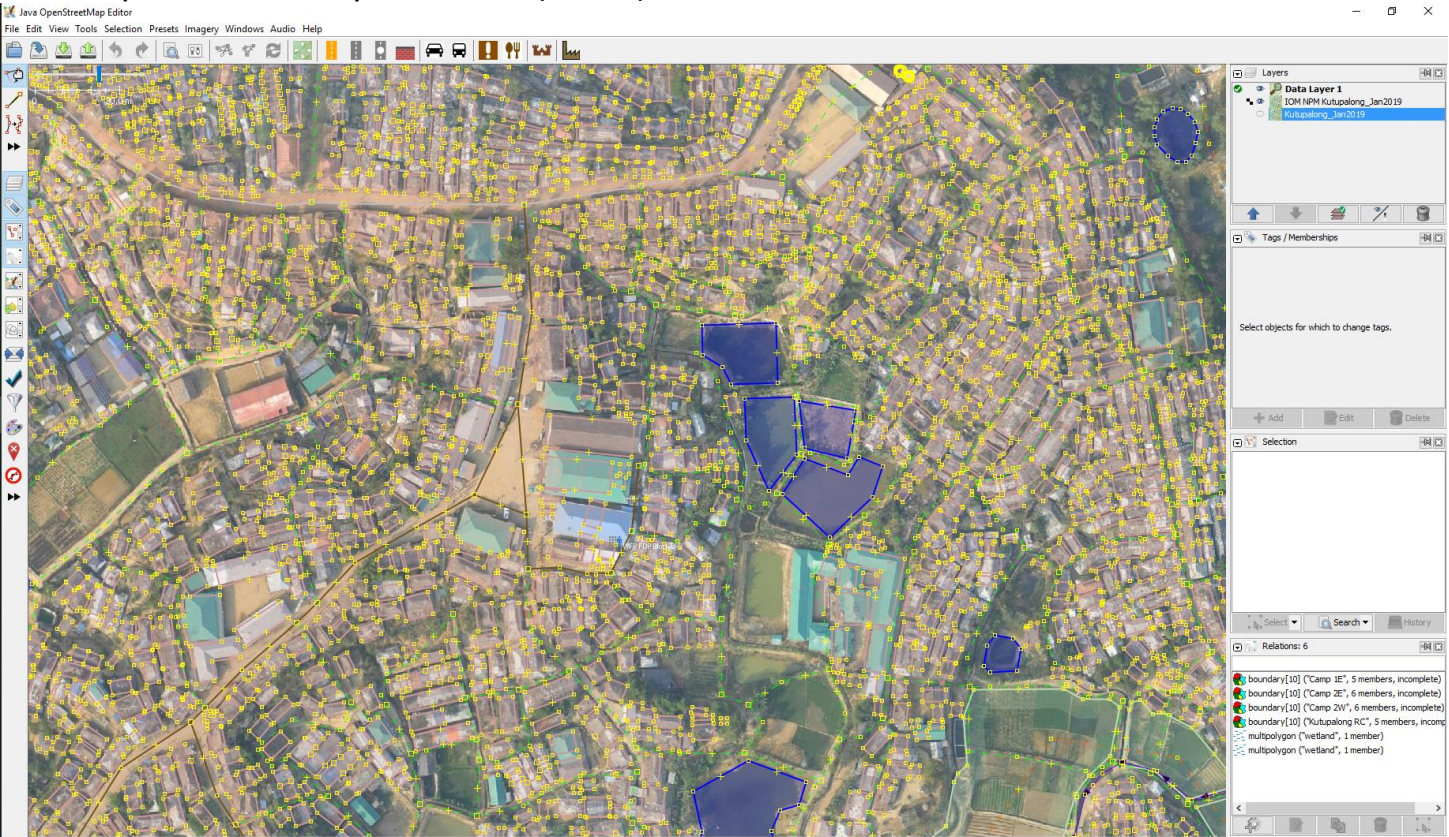







# Crowdsourcing on open-data platform

Humanitarian Open Street Map Team (HOT) and  
Java Open Street Map software (JOSM)





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Page Discussion

Read View source View history Search OpenStreetMap Wiki

WikiProject Bangladesh/RohingyaCrisis

WikiProject Bangladesh

Almost 1 million Rohingya refugees have fled Myanmar for Southeast Bangladesh in the past few months. For more informations, visit Wikipedia Northern Rakhine State clashes. Mapping to support humanitarian actors (as MSF, the Red Cross and Save the Children) has started in September 2017, and it keeps on because the camps are in constant evolution up till today.

In September the most recent imagery available for use on OpenStreetMap was the Mapbox imagery (dated 2016), this was used by the local OpenStreetMap community of Bangladesh to get the map of the general area improved. As from the end of September and the beginning of October new imagery was taken by Digital Globe where we received kindly access to thanks through the MapGive initiative. In December the IOM was able to fly drones over the camps which were made available through OpenAerialMap.

Contents [hide]

1 For all organisations

1.1 About OpenStreetMap

1.2 Exporting OpenStreetMap data

1.3 Apps for offline navigation

2 For mappers

2.1 Learn to Map

2.2 Mapping attention points in the camps

2.2.1 Mapping shelters

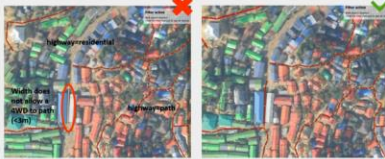
2.2.2 Mapping paths

2.3 Tasks to map

Mapping paths

There are only a few roads passable by a car or any other four wheel vehicle. So most of the ways are paths.

- For the footpaths we use highway=path
- For the main footpaths we use highway=track and motorway=no
- For the few roads passable by car we use highways=residential or where applicable highway=unclassified/tertiary/secondary



Tasks to map

A umap map has been created to have a global overview of what has already been mapped since the last available IOM drone imagery, validated and where. Please contact: @Giraud.colin (on osm, editr, control, heatmap, cingravel.com) if you have suggestions/comments/questions. A second stage of validation is under process as the mapping was split into two parts (buildings and roads). You will also find the stage of this on this Umap map.

Number of project	Name	Date of project	Imagery	Entities to map	Mapped	Validated
#4091	Bangladesh Refugee Crisis camp mapping - NW of megacamp 3 Update			Buildings, roads	100%	100%
#4757	Bangladesh Refugee Crisis camp mapping - NW of megacamp 2 Update		Drone Imagery from IOM 07/06/2018: <a href="https://files.openaerialmap.org/5b1b8d422b6a080011857ca0/5b1b8d422b6a080011857cf232304051.png">https://files.openaerialmap.org/5b1b8d422b6a080011857ca0/5b1b8d422b6a080011857cf232304051.png</a>	Buildings, roads	100%	100%
#4756	Bangladesh Refugee Crisis camp mapping - NW of megacamp 1 Update	24/06/18		Buildings, roads	100%	100%
#4760	Bangladesh Refugee Crisis - Teknaf camp shelters (new area 23)		Drone Imagery from IOM 25/04/2018: <a href="https://files.openaerialmap.org/5ae86980b093000130a8d440/5ae86980b093000130a8d44052304051.png">https://files.openaerialmap.org/5ae86980b093000130a8d440/5ae86980b093000130a8d44052304051.png</a>	Buildings	100%	100%
#4688	Bangladesh Refugee Crisis - Teknaf camp shelters (new area 22)			Buildings	100%	100%
#4651	Bangladesh Refugee Crisis - Teknaf camp shelters (new area 21)			Buildings	100%	100%

[https://wiki.openstreetmap.org/wiki/WikiProject\\_Bangladesh/RohingyaCrisis](https://wiki.openstreetmap.org/wiki/WikiProject_Bangladesh/RohingyaCrisis)





# Machine learning meets photogrammetry:

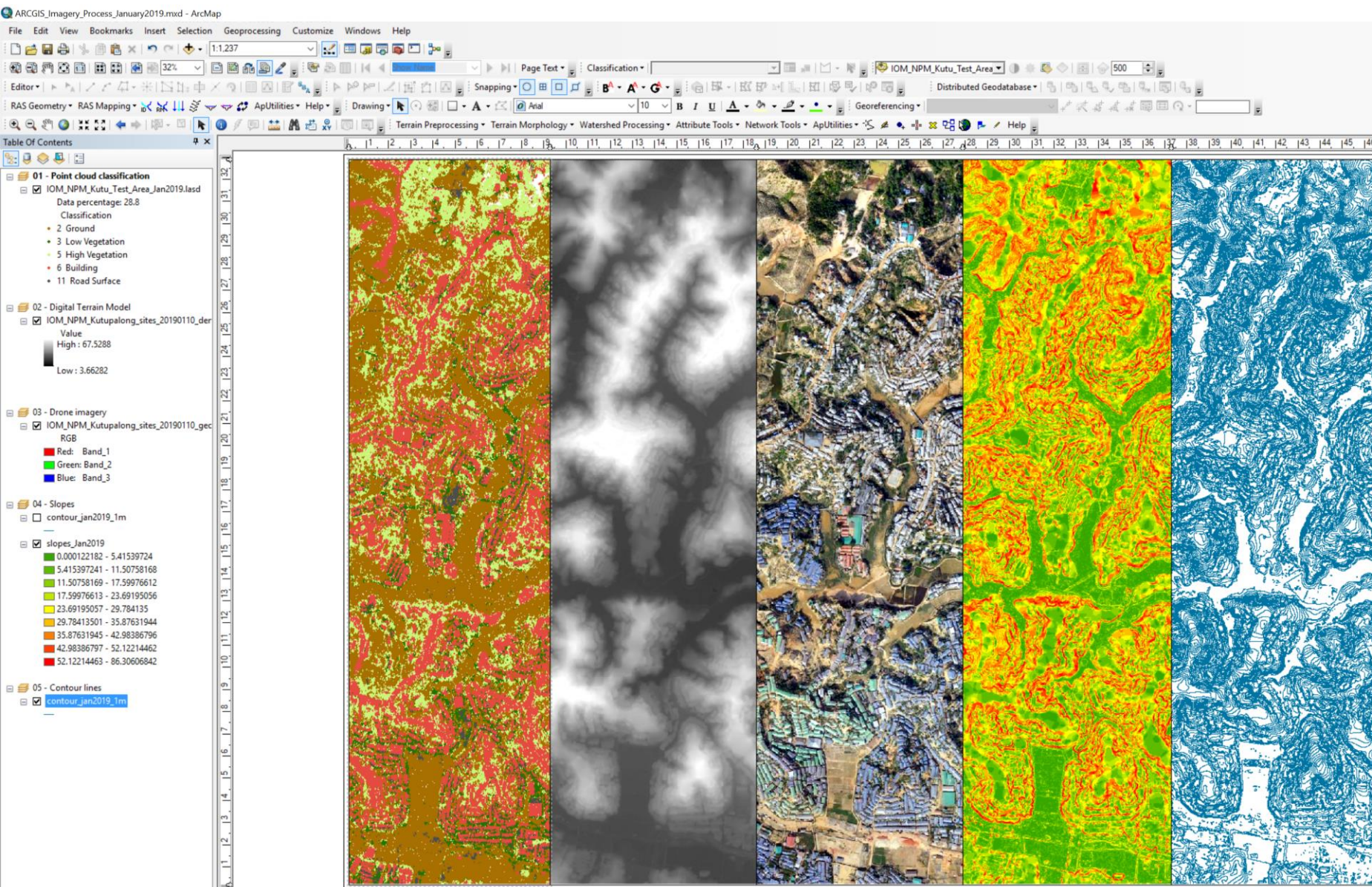
Pix4D photogrammetry software puts machine-learning tools for photogrammetry applications in your hands so you can classify 3D point clouds.

## Point classification

	Building: vertical structure or large stand-alone infrastructure
	High vegetation: trees or bushes which are taller than around half a meter
	Human-made objects: artificial objects above ground
	Roads: surfaces covered with asphalt
	Ground: soil, extremely short grass or scattered lawn







## GIS Software as ESRI Arcmap

### 01 - Point cloud:

- Classification of geographical objects
- Extraction of surface and terrain model

### 02 - Terrain model:

- Terrain model with ground information for analysis
- For site development unit and disaster risk reduction expert
- Analysis of area prone to flood risks

### 03 - Drone imagery:

- Geographical objects extraction as shelters, infrastructures, roads, waterbodies
- Used as background base map for map products
- Layers overlaid to orientation maps

### 04 - Slopes:

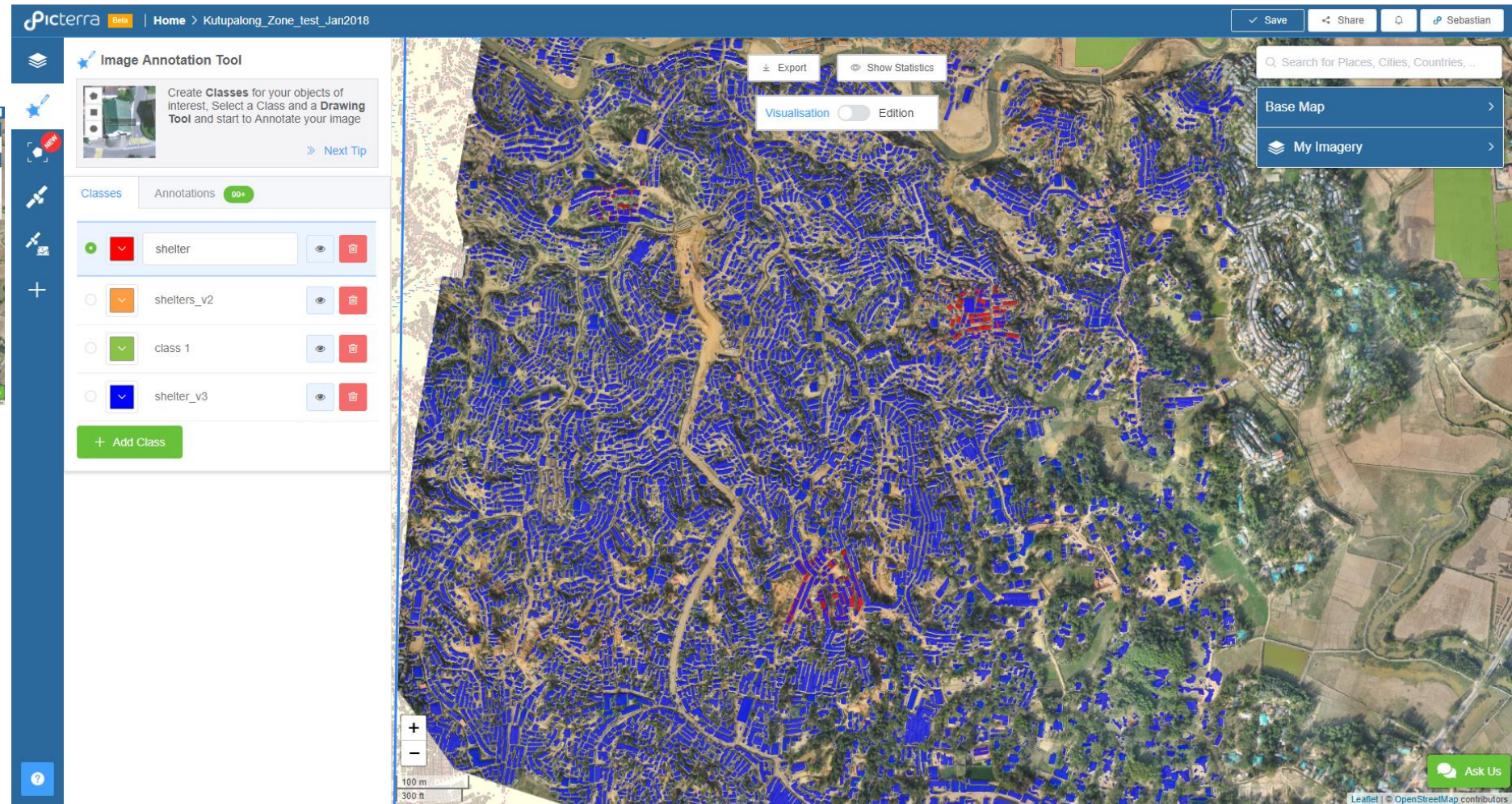
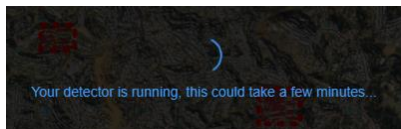
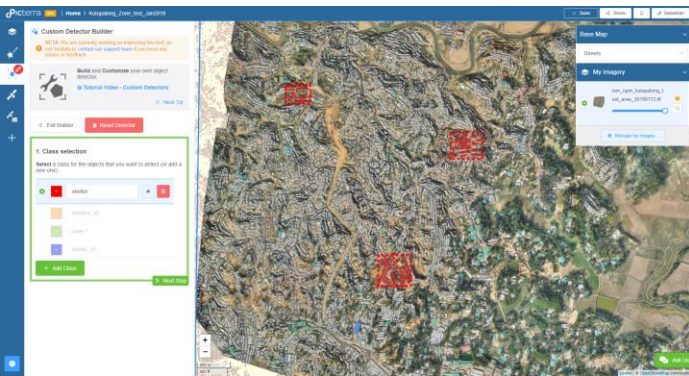
- For risks of landslides analysis and shelters in risk area
- Analyzing the terrain slope for hydrology, site planning, and infrastructure development

### 05 - Contour lines:

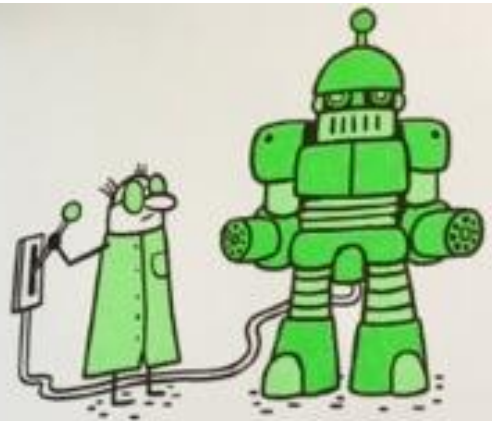
- Calculation of 1 meter contour line based on terrain model
- Layer for further risks analysis



# AI and ML based on UAV (drone) imagery

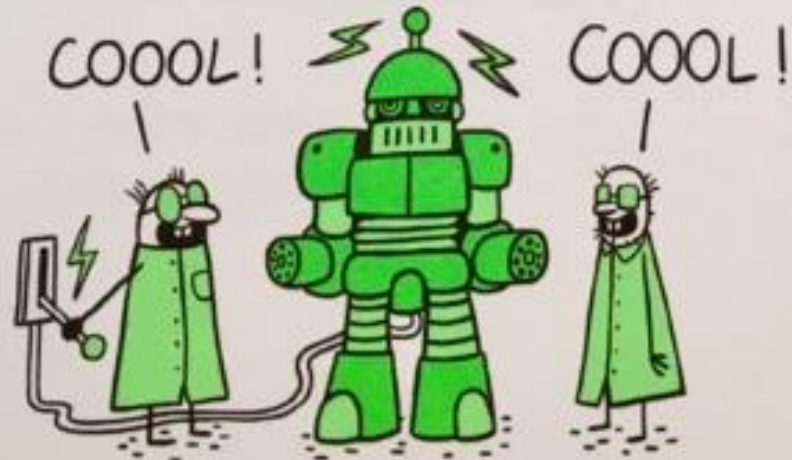
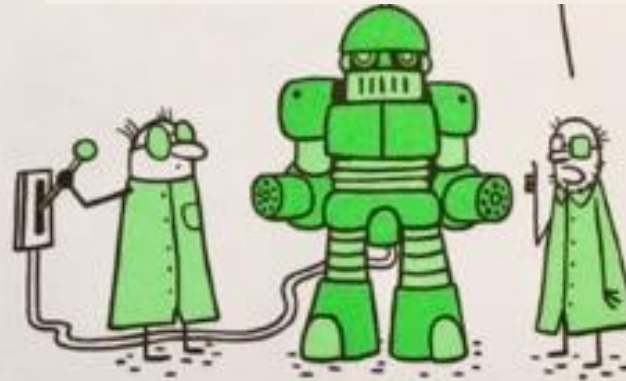






WAIT!!!!

PLACED IN THE WRONG HANDS,  
OUR INVENTION COULD DESTROY  
THE WHOLE WORLD



# Data Science and Ethics Group

## Objectives:

To identify **risks** and define **principles/guidance** for the applicability of data science practices on humanitarian data

Define joint goals to establishing an **ethical framework for data scientists** to work within when handling humanitarian data

## Outputs:

Identification of **core concerns** from field practitioners

Developed pilot **peer review mechanism** for technical and ethical considerations

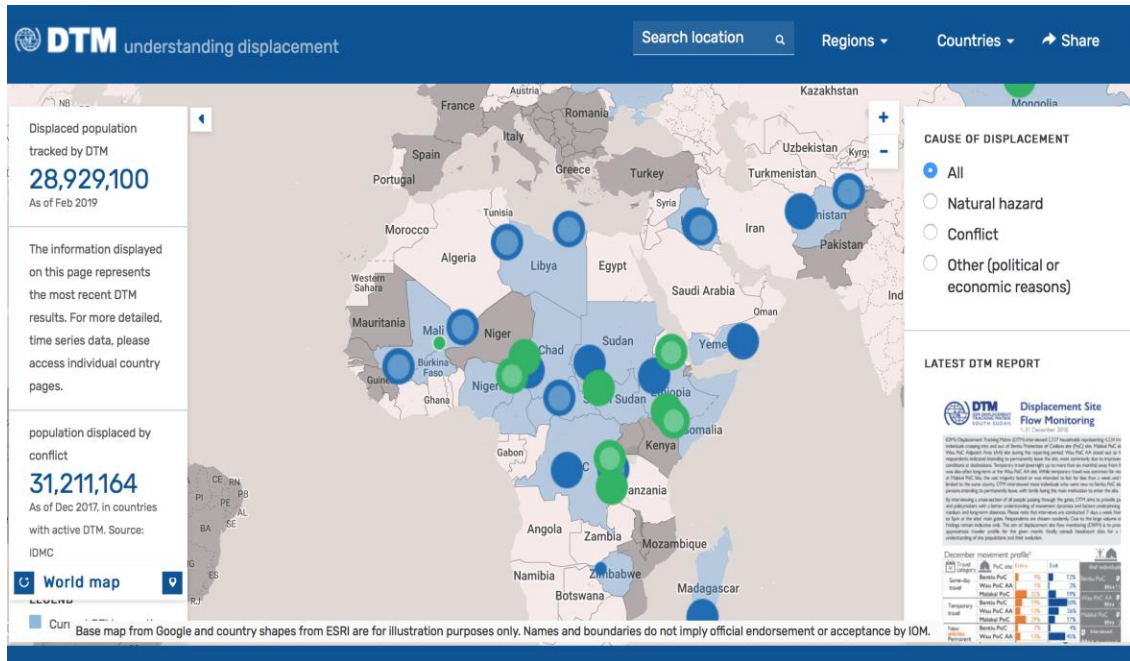


# Other IOM data initiatives



## Big Data for Migration Alliance - BD4M

displacement.iom.int



migration.iom.int

