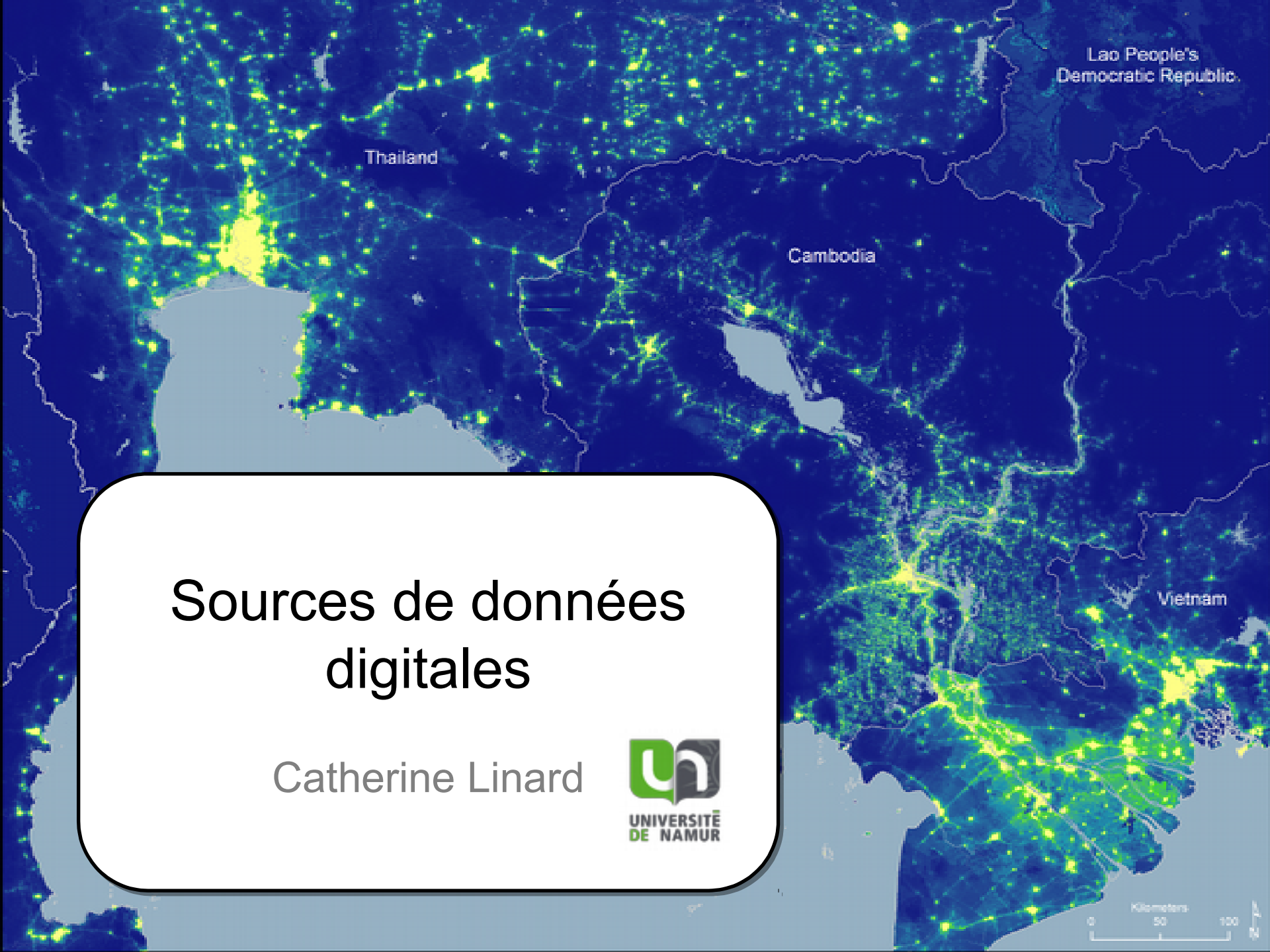


Sources de données digitales

Catherine Linard

UNIVERSITÉ DE NAMUR

Plan

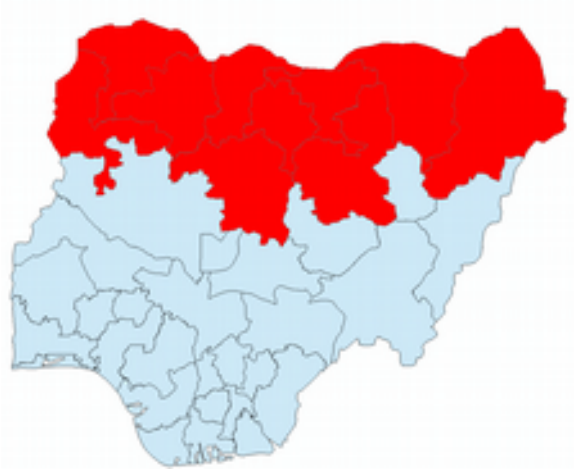
Gridded population maps

- Human population maps for health & development
- Census data: answers and problems
- Existing gridded population datasets
- WorldPop

Other interesting data sources

- GADM
- CIESIN
- GeoNetwork
- Worldclim

Northern Nigeria polio vaccination planning needs



Vaccinate as close to 100% of under 5s as possible

- Ensure correct amount of vaccine is available
  - ***Need to know how many under 5s there are***
- Plan local vaccine needs
  - ***Need to know where under 5s are and how numbers change***
- Plan vaccinator logistics and routes
  - ***Need detailed maps of the region***

POLIO GLOBAL ERADICATION INITIATIVE

BILL & MELINDA GATES foundation

Nigeria – 2012 OPV Costs

OPV = $0.15/dose

- Estimated 2012 Population Based on 2006 Census:

  170 million

- Estimated Target Population < 5 years old (20%):

  34 million

- OPV Usage based on Tally Sheet Totals:

  67 million

33 million doses = $4.95 million

Courtesy of Vincent Seaman, Bill and Melinda Gates Foundation

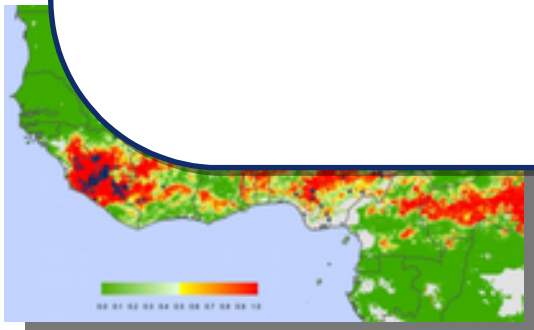
Disease mapping & modelling

Supporting data required

How many people are there and where are they?

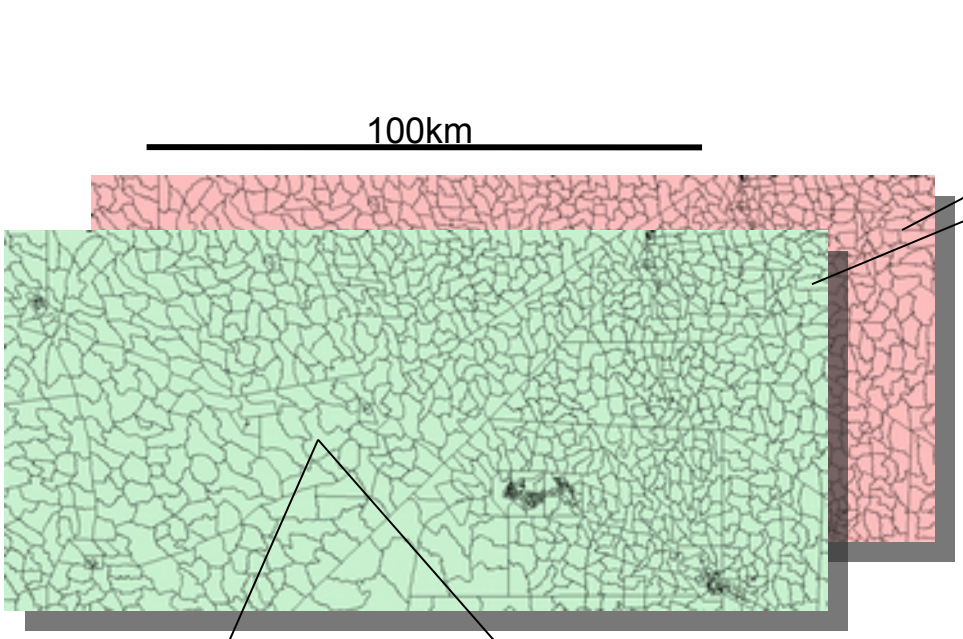
Who are these people?

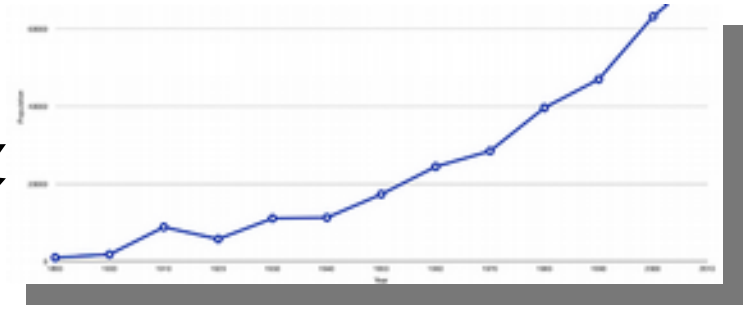
How do they move around?

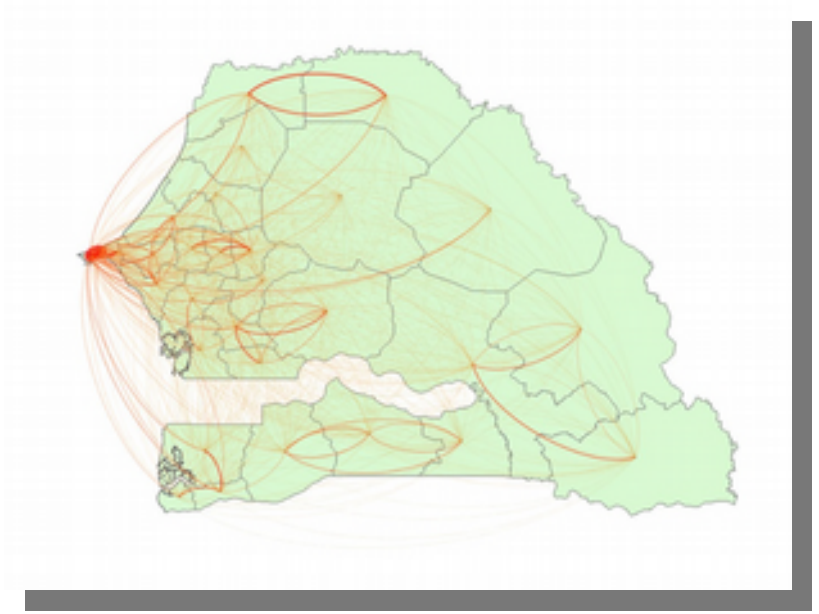


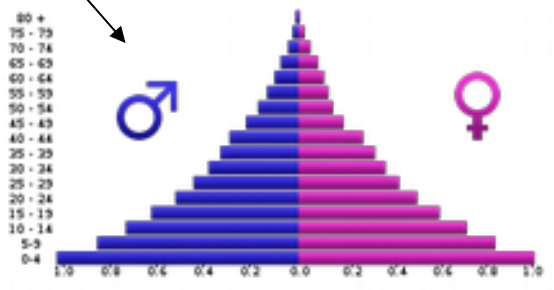
map
malaria atlas project

Census data: answers

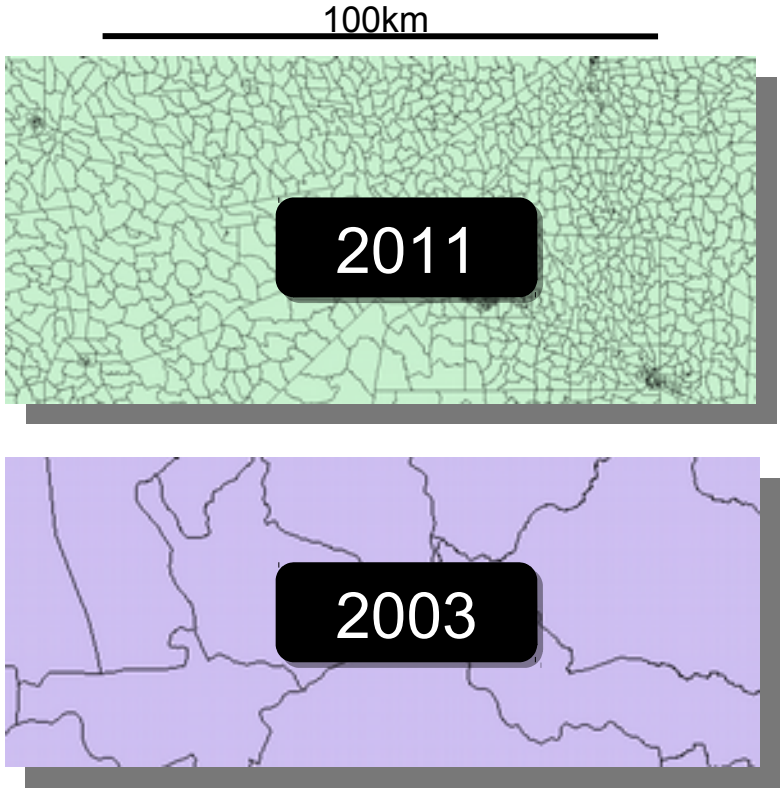


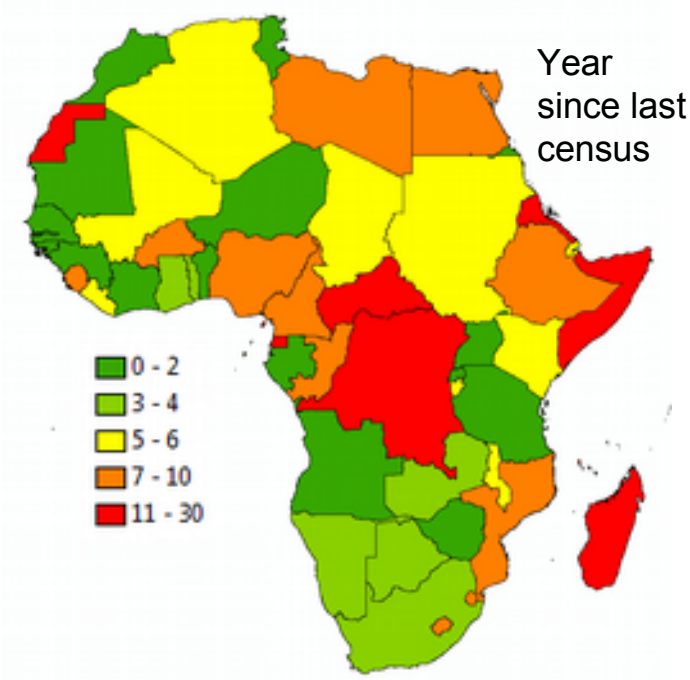




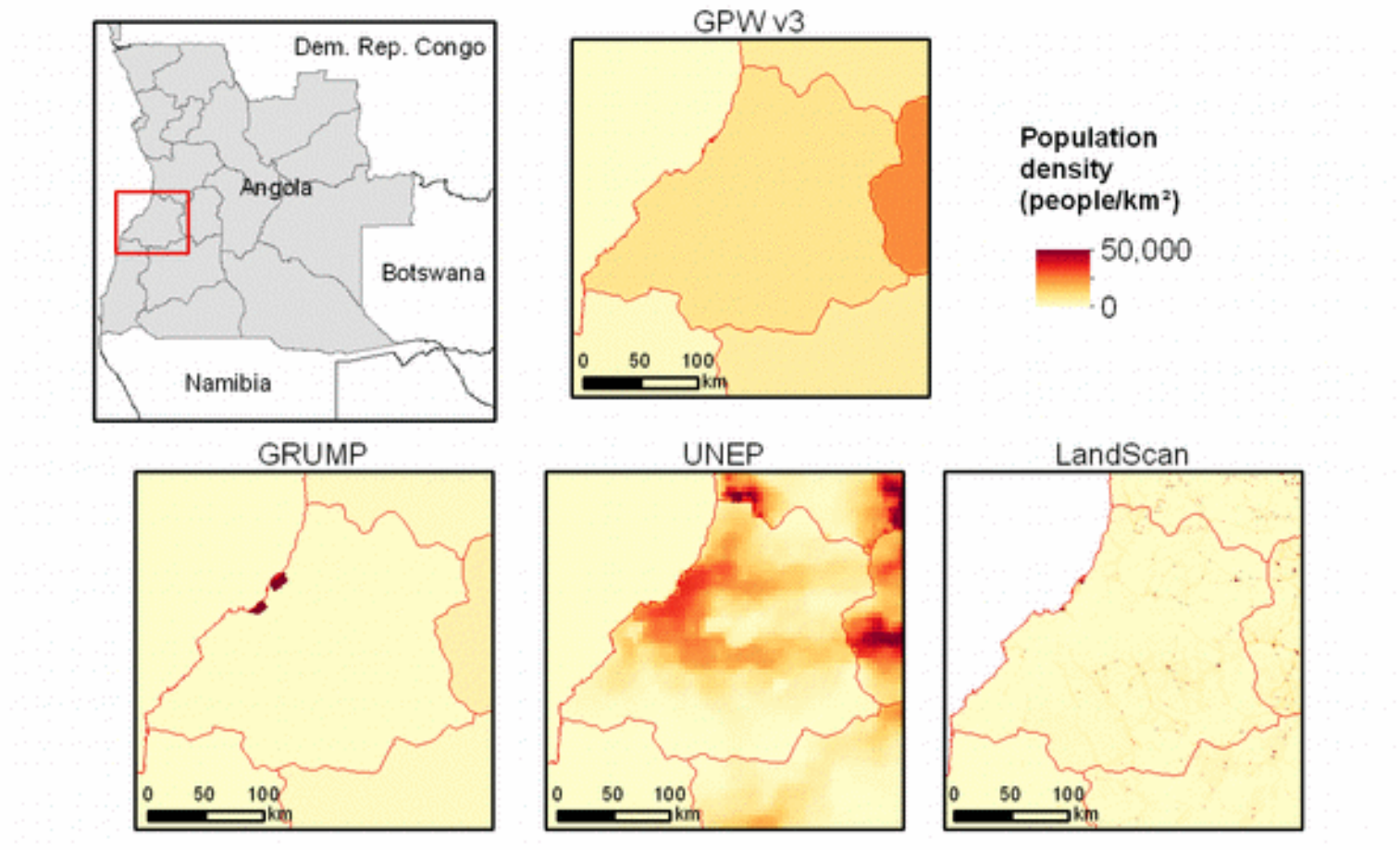


Census data: problems





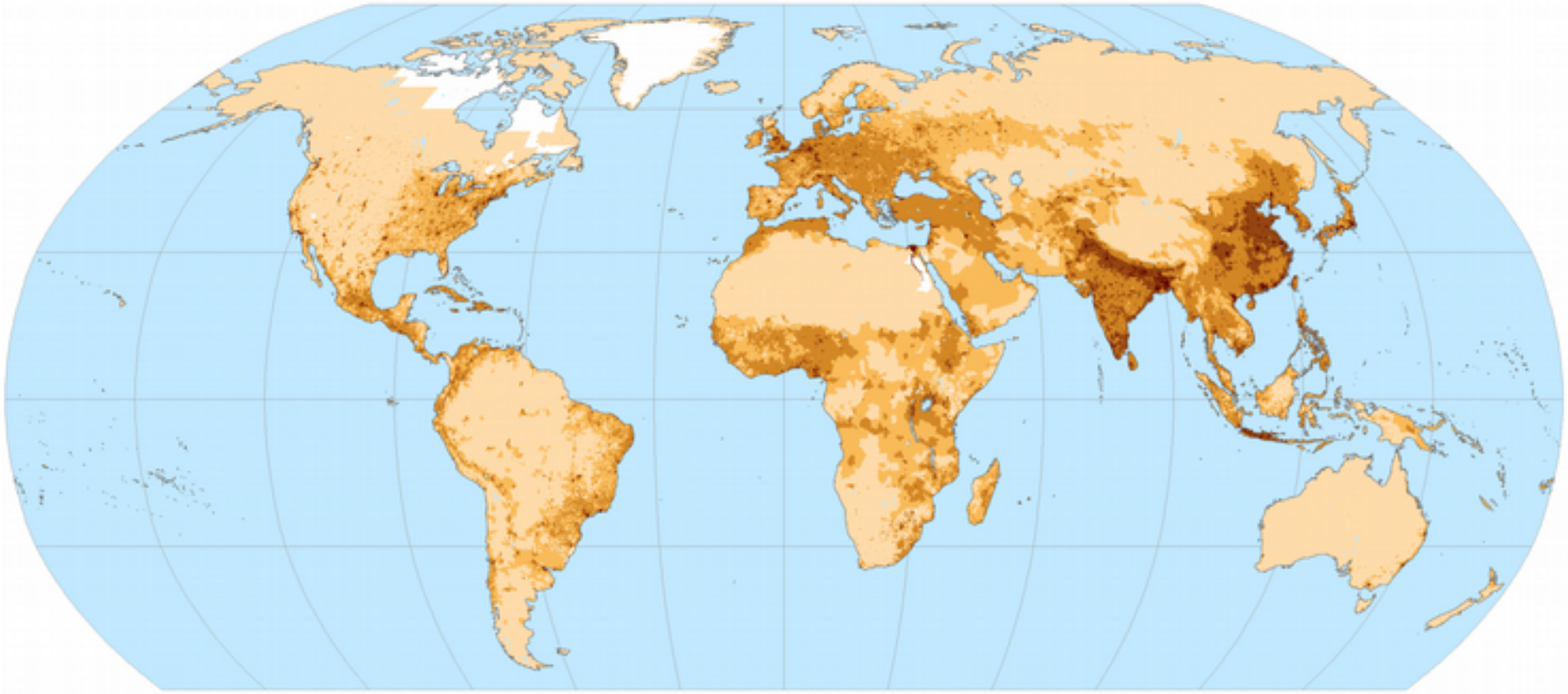
- Poor availability
- Long processing times
- Lack of matching boundary data
- Population groups missed
- Unreliable numbers
- Inconsistency in urban/rural definitions

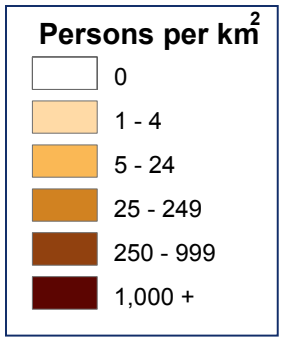


Dataset	Spatial resolution	Level of transparency in data and methods used	Last update	Distribution policy
GPW	5 km	High	2015	Open-access
GRUMP	1 km	High	2004	Open-access
UNEP	5 km	High	2000	Open-access
LandScan	1 km	Low	2012	Commercial

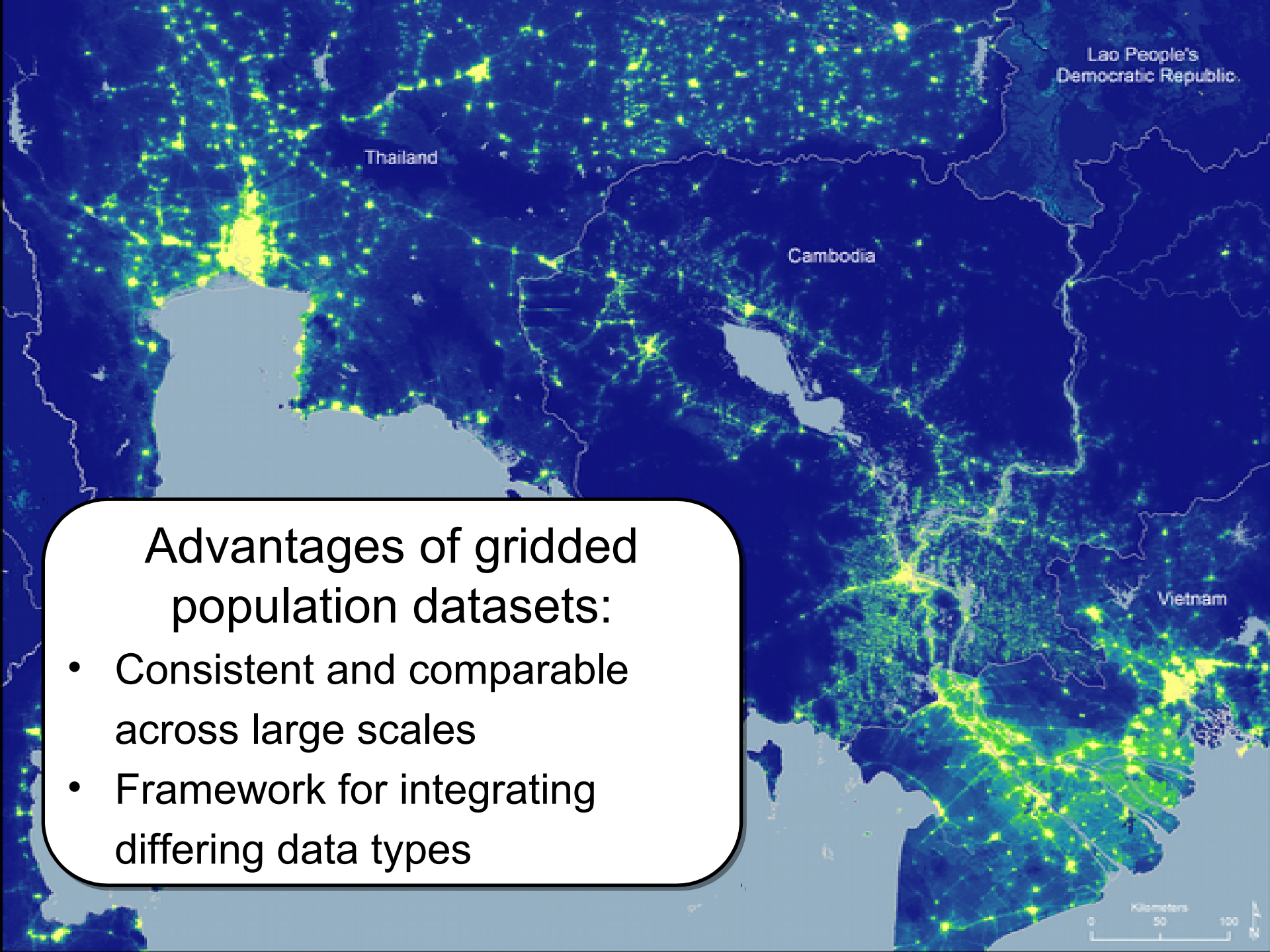
Mapping population distributions

Gridded Population of the World, v3





- Raster surface of population counts and densities
- Derived from ~400,000 administrative units and census data
- 2.5’ resolution (approximately 4.6 km/2.9mi at the equator)



Advantages of gridded population datasets:

- Consistent and comparable across large scales
- Framework for integrating differing data types

Open access archive of spatial demographic datasets

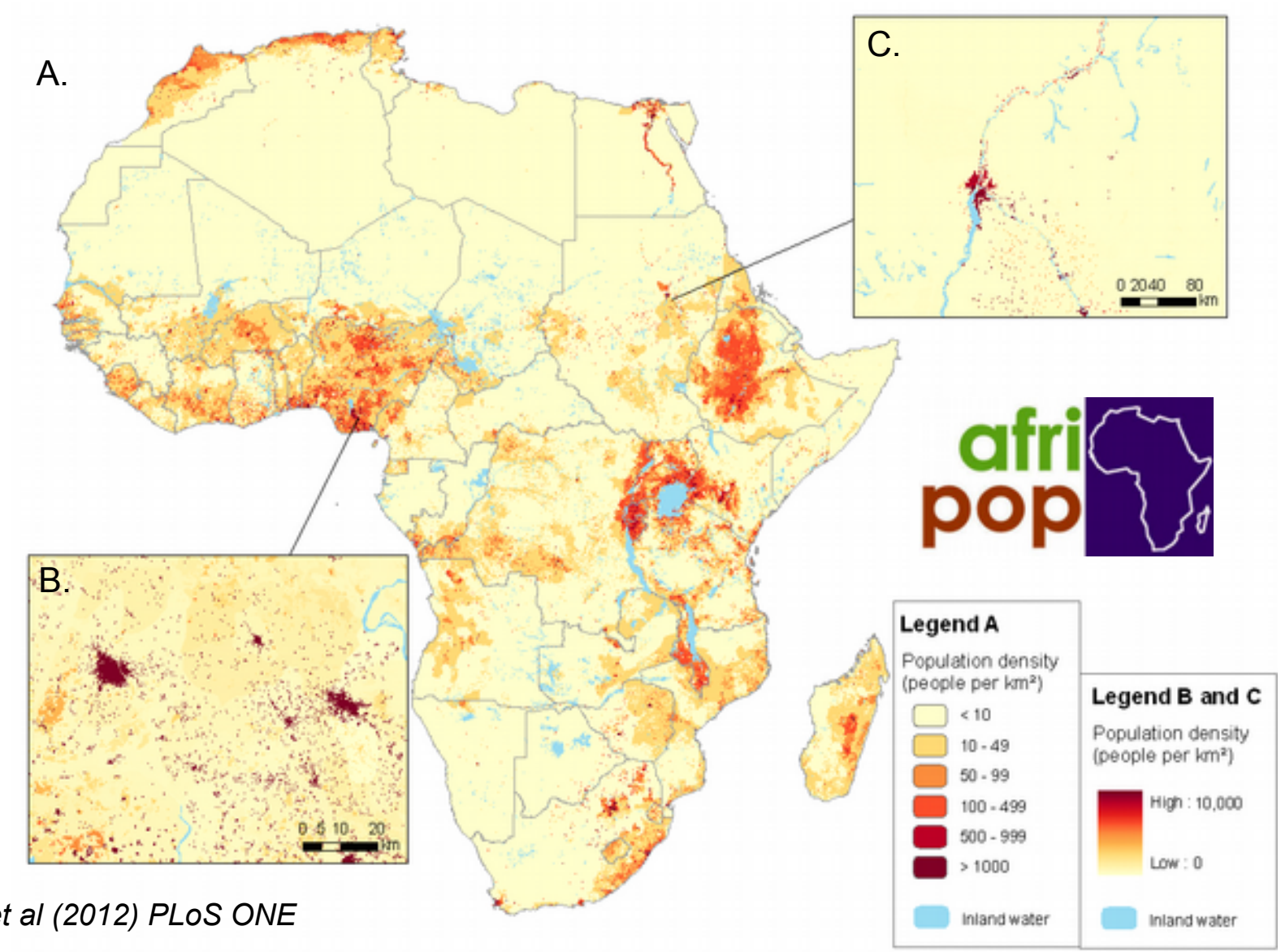
Current focus: Central and South America, Africa and Asia

Transparent and shareable methods

Support development and health applications

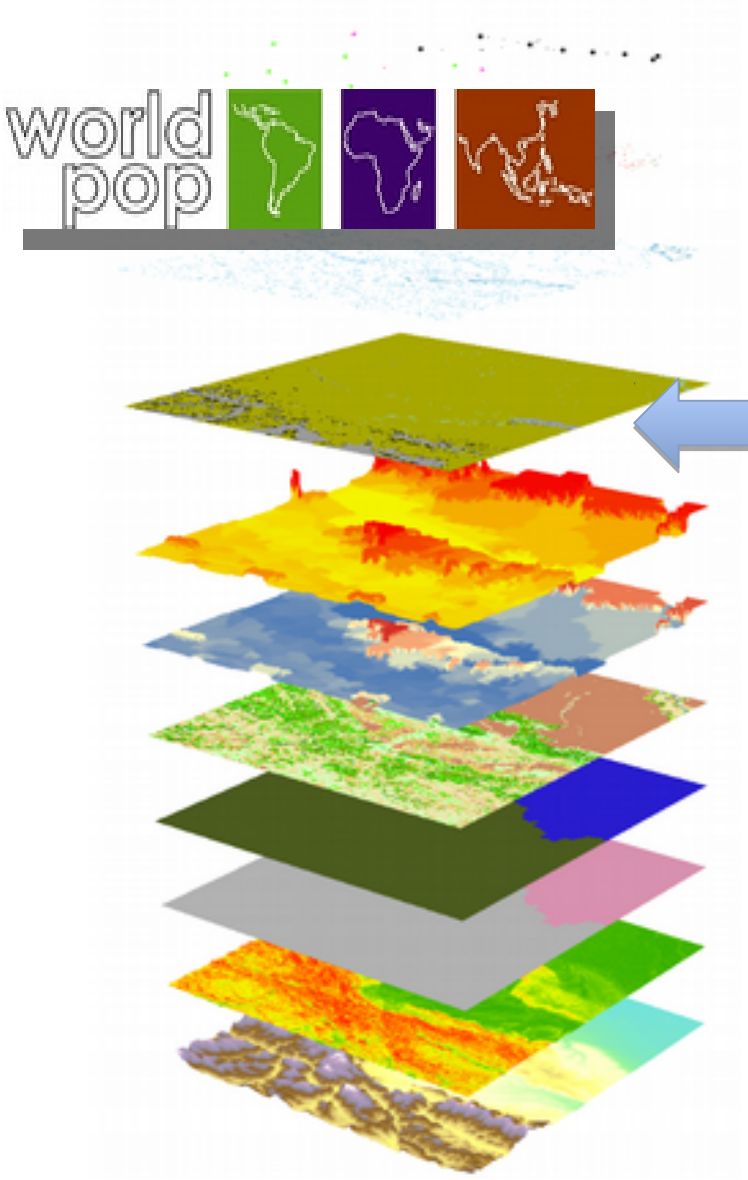
www.worldpop.org

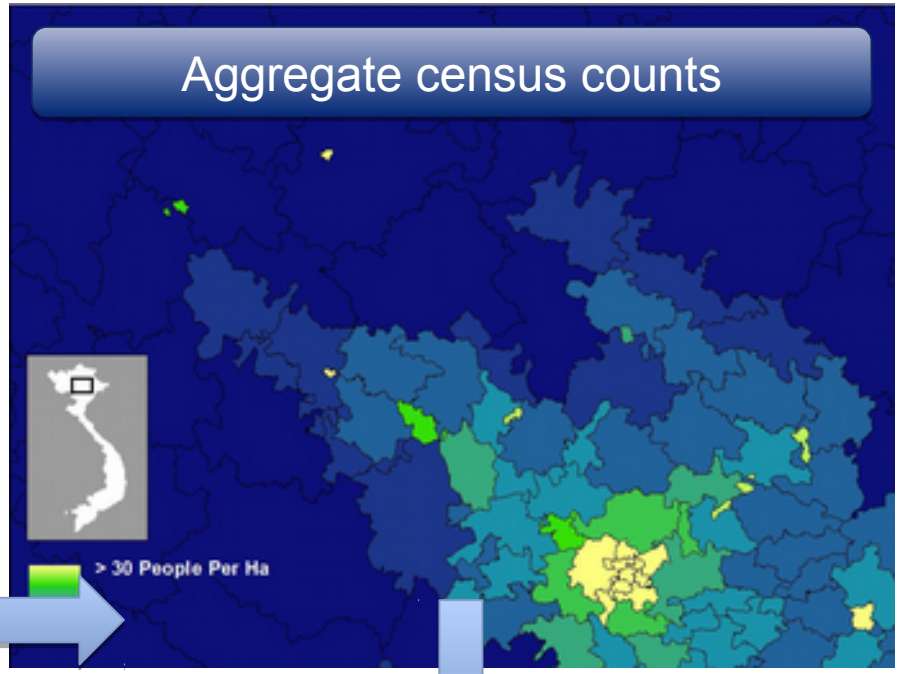
AfriPop 2010

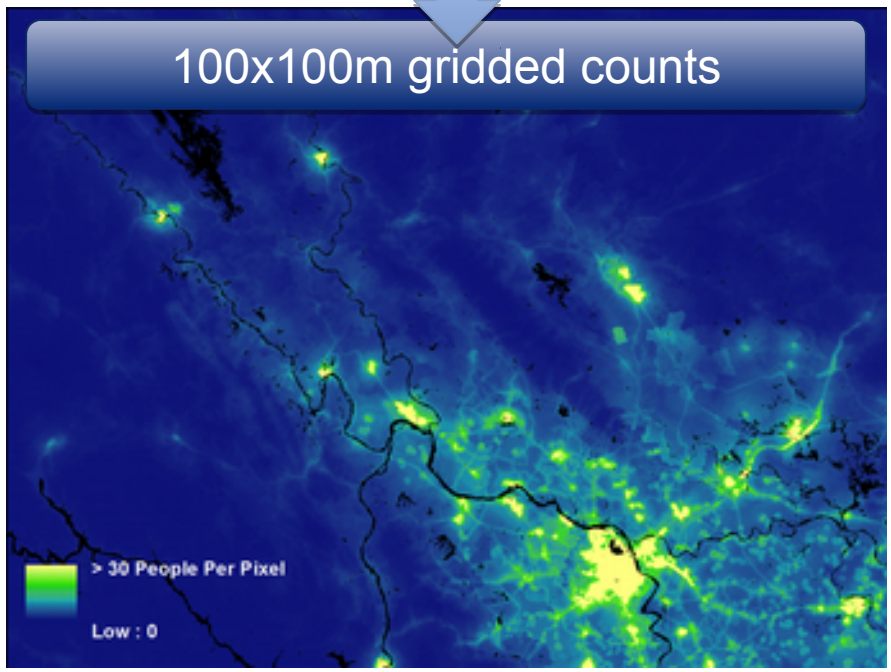


Linard et al (2012) PLoS ONE

Top-down approach







Intro to gridded population data

Census data linked to GIS administrative boundaries

↓

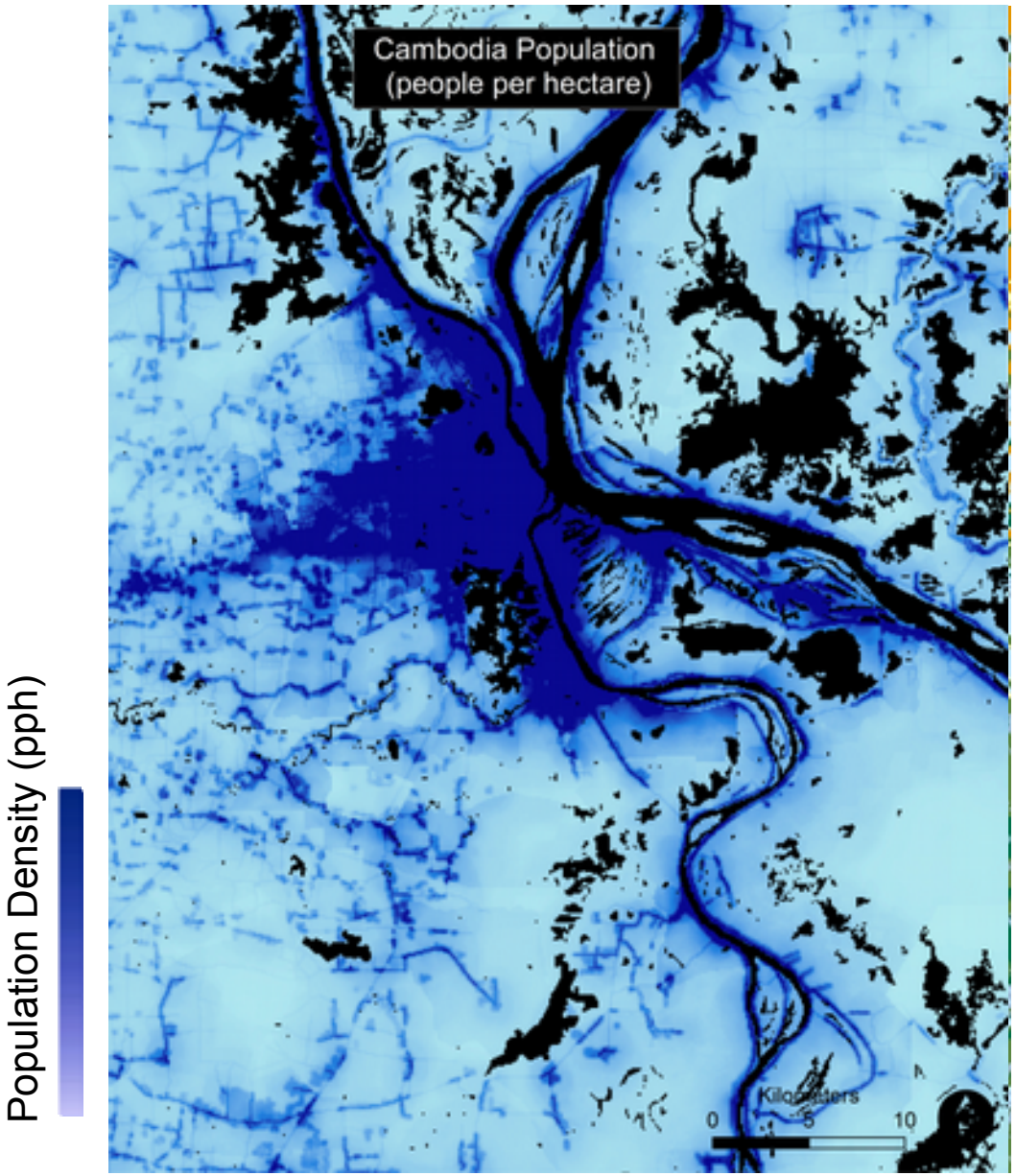
Ancillary data e.g. Settlements, roads

↓

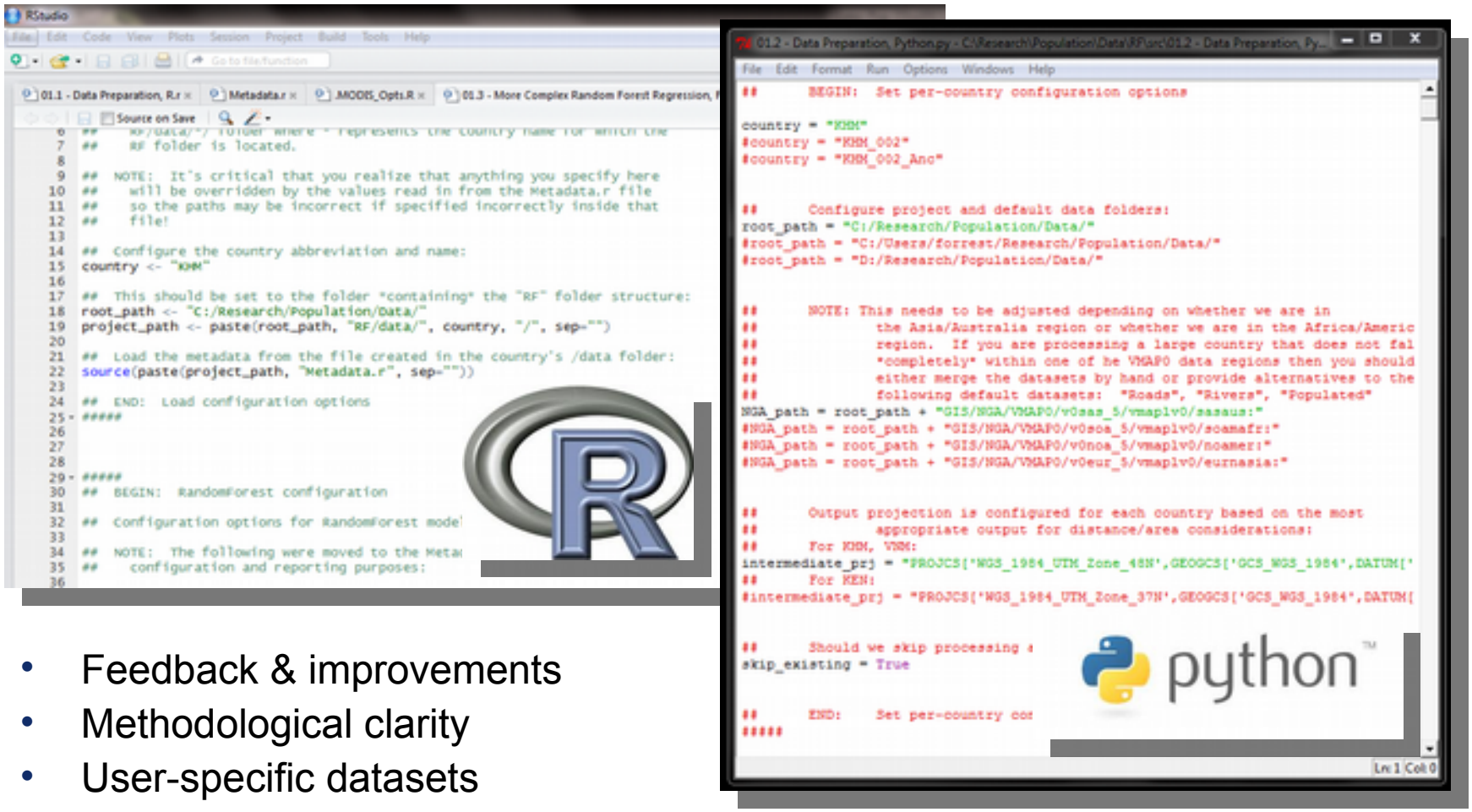
Spatial modelling rules to disaggregate census counts

↓

Estimates of number of people in each grid cell



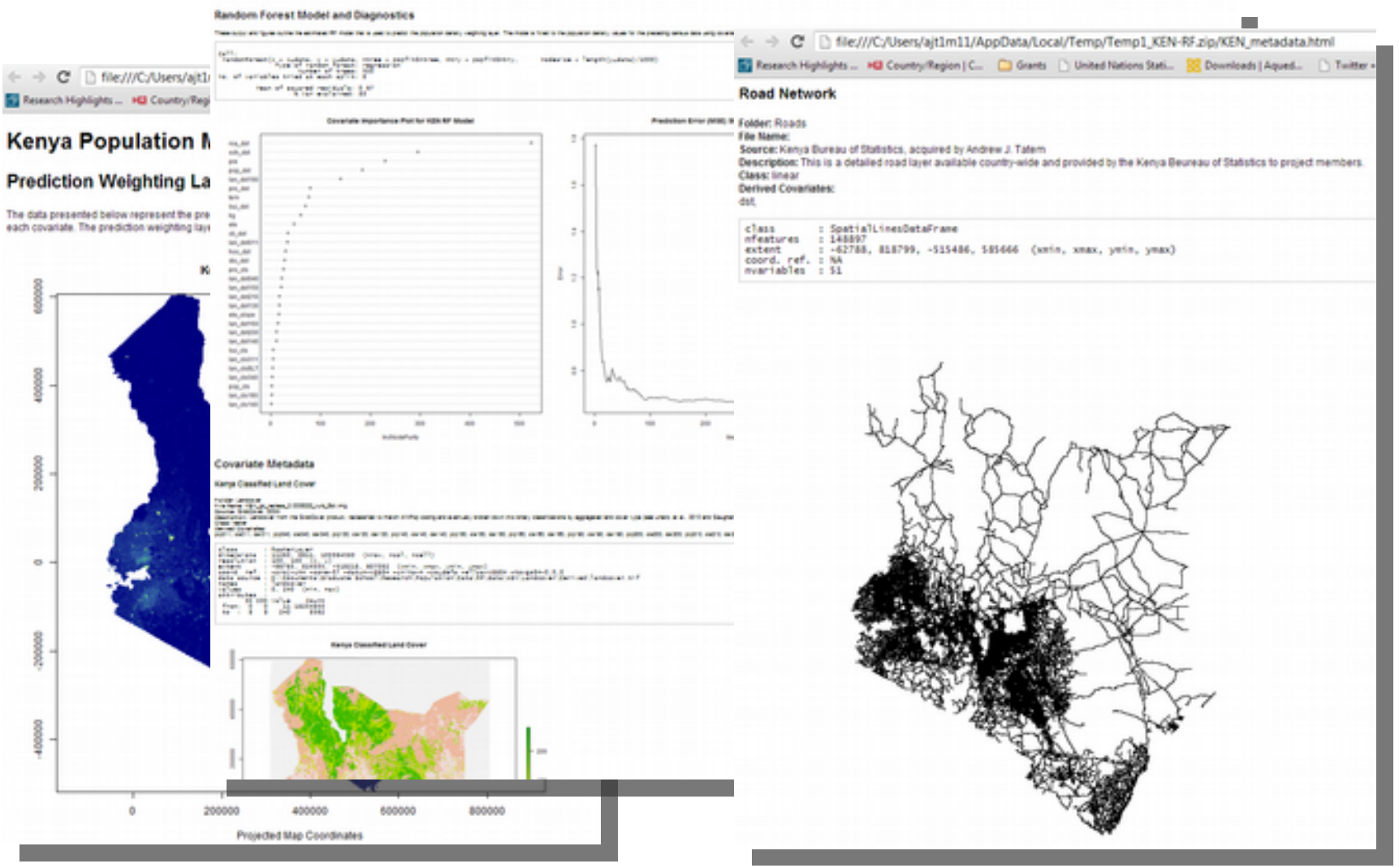
Open code



- Feedback & improvements
- Methodological clarity
- User-specific datasets
- Platform independent

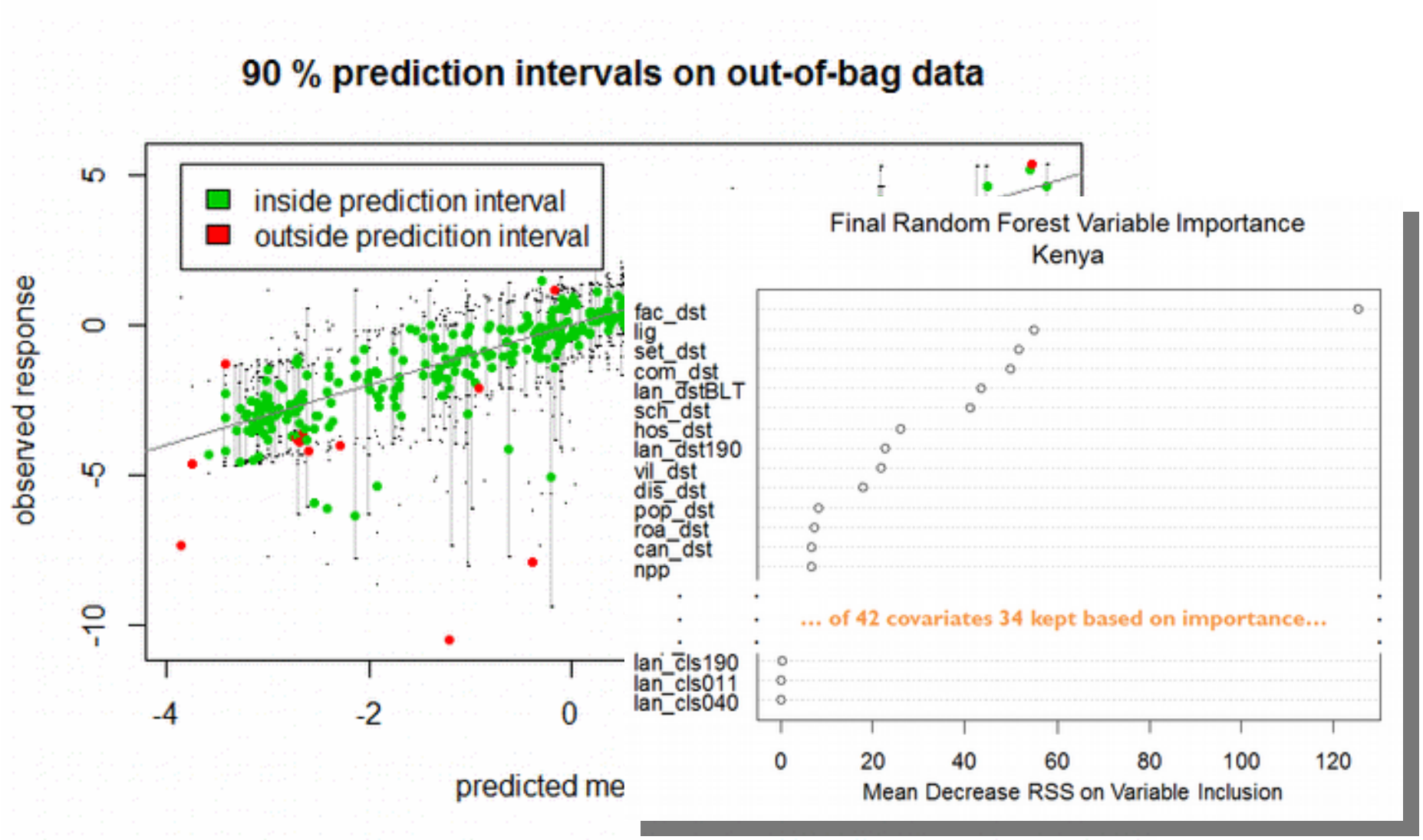
Stevens et al (2015) PLoS ONE

Automated metadata



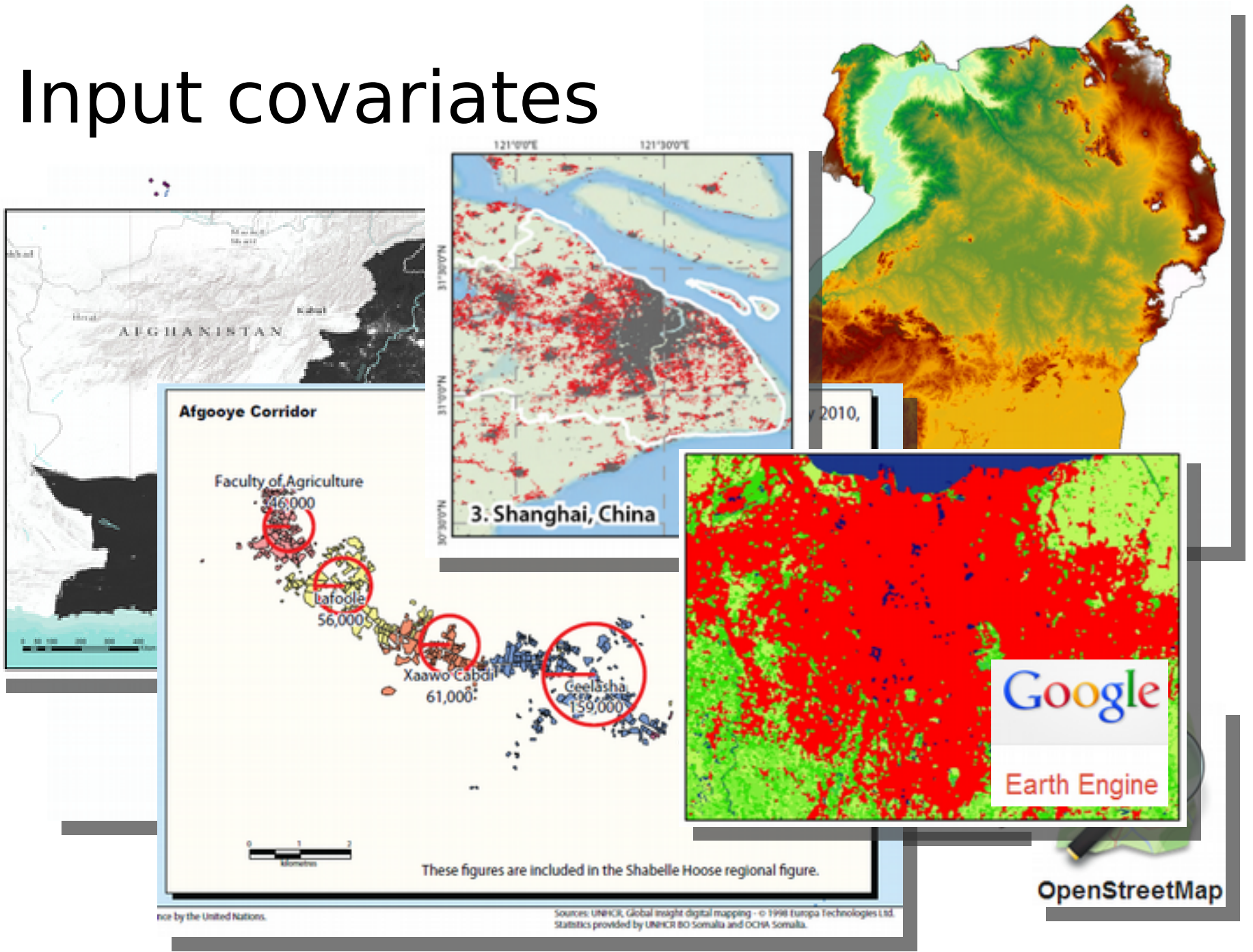
Stevens et al (2015) PLoS ONE

Internal accuracy assessments



Stevens et al (2015) PLoS ONE

Input covariates



Input covariates

Type	Variable Name(s)*	Description	Cambodia Data	Vietnam Data	Kenya Data
Census		Country-specific census and scale	2008, Admin-level 3	1999, Admin-level 4	1999, Admin-level 5
Land Cover	lan_cls011, lan_dst011	Cultivated terrestrial lands	MDA Landcover, 30m	MDA Landcover, 30m	GlobCover, 300m
	lan_cls040, lan_dst040	Woody / Trees			
	lan_cls130, lan_dst130	Shrubs			
	lan_cls140, lan_dst140	Herbaceous			
	lan_cls150, lan_dst150	Other terrestrial vegetation			
	lan_cls160, lan_dst160	Aquatic vegetation			
	lan_cls190, lan_dst190	Urban area			
	lan_cls200, lan_dst200	Bare areas			
	lan_cls210, lan_dst210	Water bodies			
	lan_cls230, lan_dst230	No data, cloud/shadow			
	lan_cls240, lan_dst240	Rural settlement			
	lan_cls250, lan_dst250	Industrial area			
	lan_clsBLT, lan_dstBLT	Built, merged urban/rural class			
Continuous					
Raster-Format	Npp	Annual NPP, 2010	MODIS 17A3	MODIS 17A3	MODIS 17A3
	Lig	Lights at night	Suomi VIIRS-Derived	Suomi VIIRS-Derived	Suomi VIIRS-Derived
	Tem	Mean temperature, 1950–2000	WorldClim/BioClim	WorldClim/BioClim	WorldClim/BioClim
	Pre	Mean precipitation, 1950–2000	WorldClim/BioClim	WorldClim/BioClim	WorldClim/BioClim
	Ele	Elevation	HydroSHEDS [31]	HydroSHEDS[31]	HydroSHEDS[31]
	ele_slope	Slope	HydroSHEDS-Derived	HydroSHEDS-Derived	HydroSHEDS-Derived
Converted					
Vector-Format	roa_dst	Distance to roads	World Food Programme	OSM [39]	Kenyan Bureau of Stat.
	riv_dst	Distance to rivers/streams	World Food Programme	VMAP0 *hydro/watrcrsl*	VMAP0 *hydro/watrcrsl*
	pop_cls, pop_dst	Generic populated places	VMAP0 *merged*†	VMAP0 *merged*†	Tatem, et al. [46]
	wat_cls, wat_dst	Water bodies	World Food Programme	OSM [39]	VMAP0 *hydro/inwatera*
	pro_cls, pro_dst	Protected areas	WDPA, IUCN [47]	WDPA, IUCN [47]	WDPA, IUCN [47]
	can_cls, can_dst	Canals	World Food Programme		
	com_cls, com_dst	Communities	World Food Programme		
	dis_cls, dis_dst	District seats	World Food Programme		
	cit_cls, cit_dst	Cities		OSM [39]	
	ham_cls, ham_dst	Hamlets		OSM [39]	
	vil_cls, vil_dst	Villages	KHM Census 2008	OSM [39]	
	sub_cls, sub_dst	Suburbs		OSM [39]	
	tow_cls, tow_dst	Towns		OSM [39]	
	poi_cls, poi_dst	Populated Points		OSM [39]	
	rai_cls, rai_dst	Railways		OSM [39]	
	fac_cls, fac_dst	Generic health facilities	HR-COD [48]		
	cli_cls, cli_dst	Health clinics			Noor, et al. [44]
	dsp_cls, dsp_dst	Dispensaries	HR-COD [48]		Noor, et al. [44]
	hos_cls, hos_dst	Hospitals			Noor, et al. [44]
	sch_cls, sch_dst	Schools	HR-COD [48]		Kenya Open Data [49]
	set_cls, set_dst	Settlement points	World Food Programme		
	bui_cls, bui_dst	Built land cover			Tatem, et al. [46]

Input satellite-derived covariates

Type	Variable Name(s)*	Description	Cambodia Data	Vietnam Data	Kenya Data
Census		Country-specific census and scale	2008, Admin-level 3	1999, Admin-level 4	1999, Admin-level 5
Land Cover	lan_cls011, lan_dst011	Cultivated terrestrial lands	MDA Landcover, 30m	MDA Landcover, 30m	GlobCover, 300m
	lan_cls040, lan_dst040	Woody / Trees			
	lan_cls130, lan_dst130	Shrubs			
	lan_cls140, lan_dst140	Herbaceous			
	lan_cls150, lan_dst150	Other terrestrial vegetation			
	lan_cls160, lan_dst160	Aquatic vegetation			
	lan_cls190, lan_dst190	Urban area			
	lan_cls200, lan_dst200	Bare areas			
	lan_cls210, lan_dst210	Water bodies			
	lan_cls230, lan_dst230	No data, cloud/shadow			
	lan_cls240, lan_dst240	Rural settlement			
	lan_cls250, lan_dst250	Industrial area			
	lan_clsBLT, lan_dstBLT	Built, merged urban/rural class			
Continuous					
Raster-Format	Npp	Annual NPP, 2010	MODIS 17A3	MODIS 17A3	MODIS 17A3
	Lig	Lights at night	Suomi VIIRS-Derived	Suomi VIIRS-Derived	Suomi VIIRS-Derived
	Tem	Mean temperature, 1950–2000	WorldClim/BioClim	WorldClim/BioClim	WorldClim/BioClim
	Pre	Mean precipitation, 1950–2000	WorldClim/BioClim	WorldClim/BioClim	WorldClim/BioClim
	Ele	Elevation	HydroSHEDS [31]	HydroSHEDS[31]	HydroSHEDS[31]
	ele_slope	Slope	HydroSHEDS-Derived	HydroSHEDS-Derived	HydroSHEDS-Derived

Données démographiques WorldPop

- Données démographiques disponibles en accès libre et gratuit
- Basé sur un processus de “machine learning” (=modélisation)
- Intègre des données de recensement, d'enquêtes, des images satellitaires et des données SIG
- WorldPop fournit notamment des estimations du nombre/de la densité de personnes résidant dans des mailles de 100x100m (2000-2020)
- Aussi : structures d'âge, naissances, grossesses
- Les cartes sont accompagnées de métadonnées

Applications possibles

- Epidémiologie spatiale
- Gestion des catastrophes
- Modèles d'accessibilité
- Transport
- Aménagement du territoire
- Etudes d'impact environnemental

etc.

esidential population count and composition mapping

Demographics

Maternal and newborn health

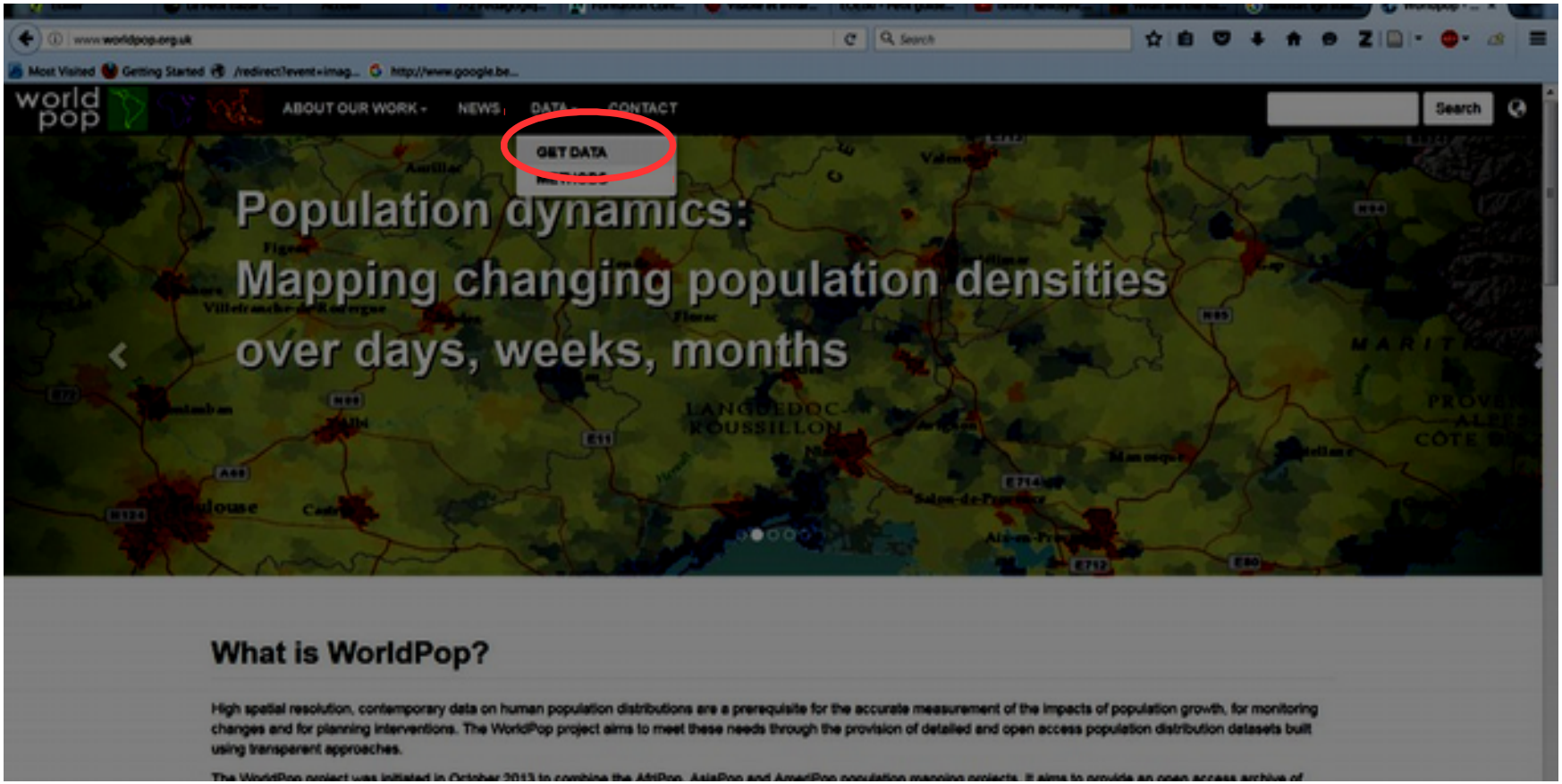
Poverty mapping

Dynamics

Urbanization and settlement growth

Population mobility

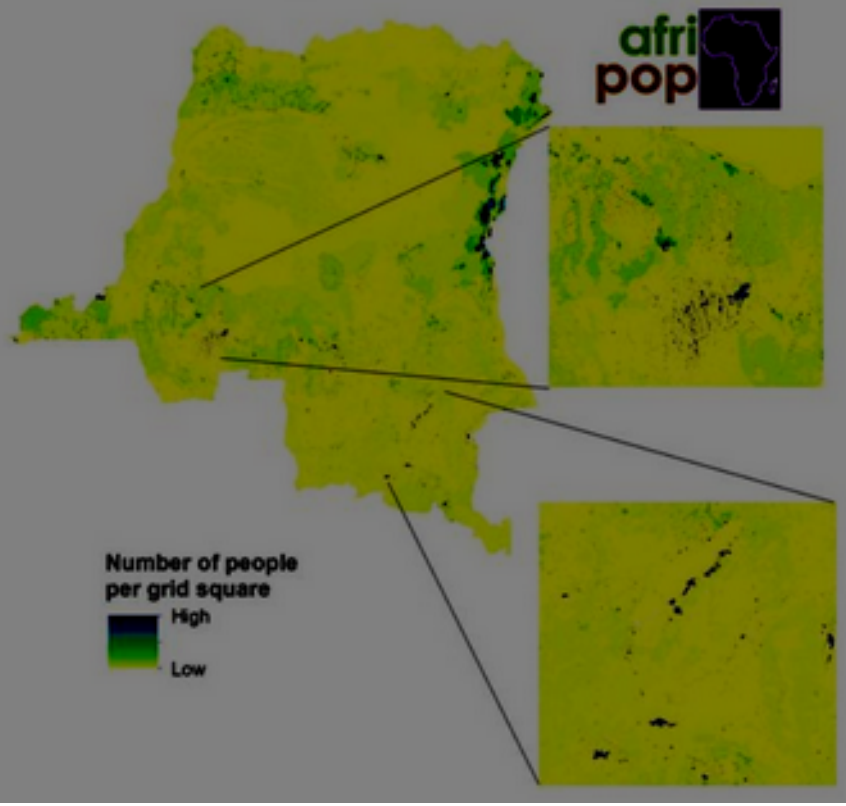
Télécharger des données



Lire les métadonnées

Summary

Selected Data : Africa > Democratic Republic of the Congo > Population



AfriPop (www.afripop.org) dataset details

DATASET: Alpha version 2010 and 2015 estimates of numbers of people per grid square, with national totals adjusted to match UN population division estimates (http://esa.un.org/wpp/) and remaining unadjusted.
REGION: Africa
SPATIAL RESOLUTION: 0.000833333 decimal degrees (approx 100m at the equator)
PROJECTION: Geographic, WGS84
UNITS: Estimated persons per grid square
MAPPING APPROACH: Land cover based, as described in: Linard, C., Gilbert, M., Snow, R.W., Noor, A.M. and Tatem, A.J., 2012, Population distribution, settlement patterns and accessibility across Africa in 2010, PLoS ONE, 7(2): e31743.
FORMAT: Geotiff (zipped using 7-zip (open access tool): www.7-zip.org)
FILENAMES: Example - AGO10adjv4.tif = Angola (AGO) population count map for 2010 (10) adjusted to match UN national estimates (adj), version 4 (v4). Population maps are updated to new versions when improved census or other input data become available.
DATE OF PRODUCTION: January 2013

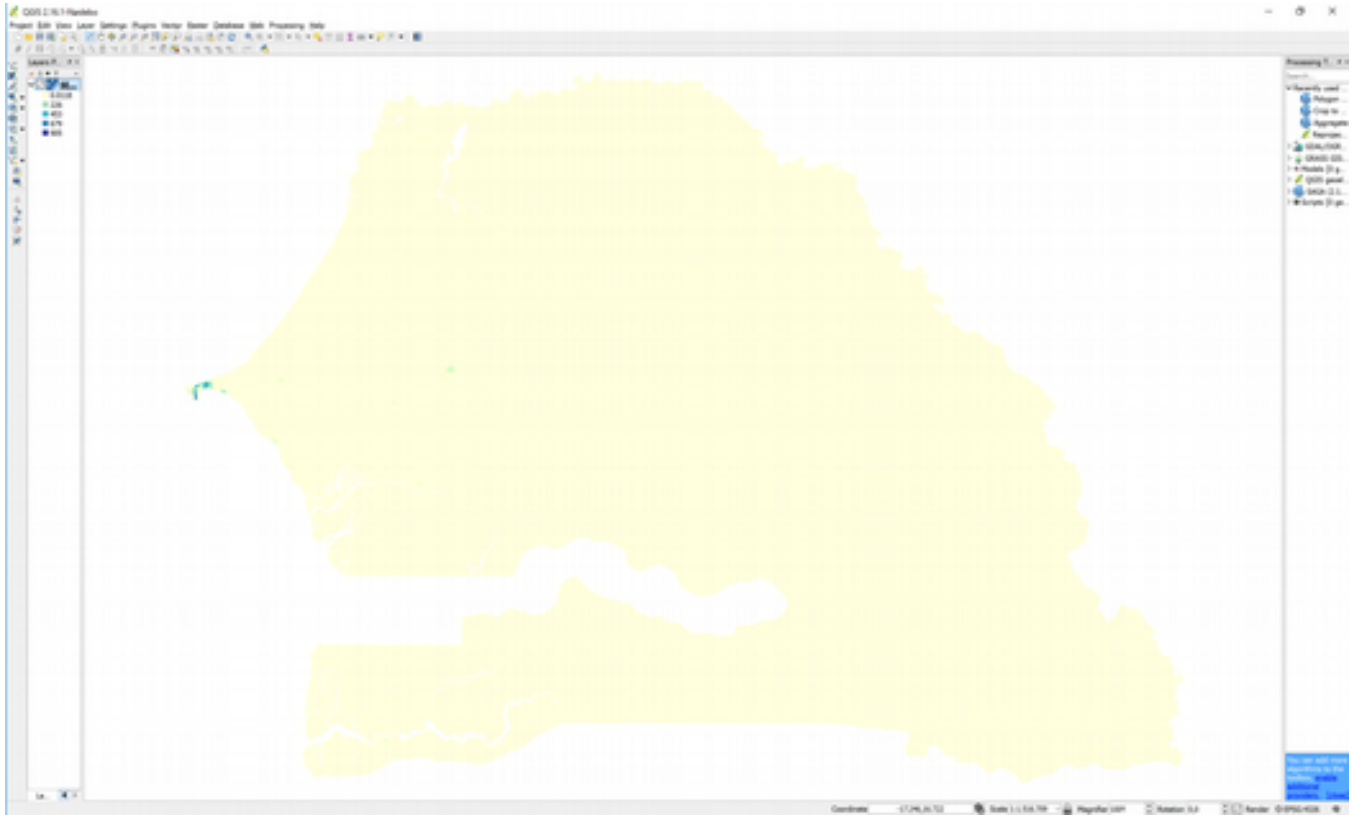
Dataset construction details and input data are provided here: www.afripop.org and here: http://www.plosone.org/article/info:doi/10.1371/journal.pone.0031743

Noms de fichier - exemple

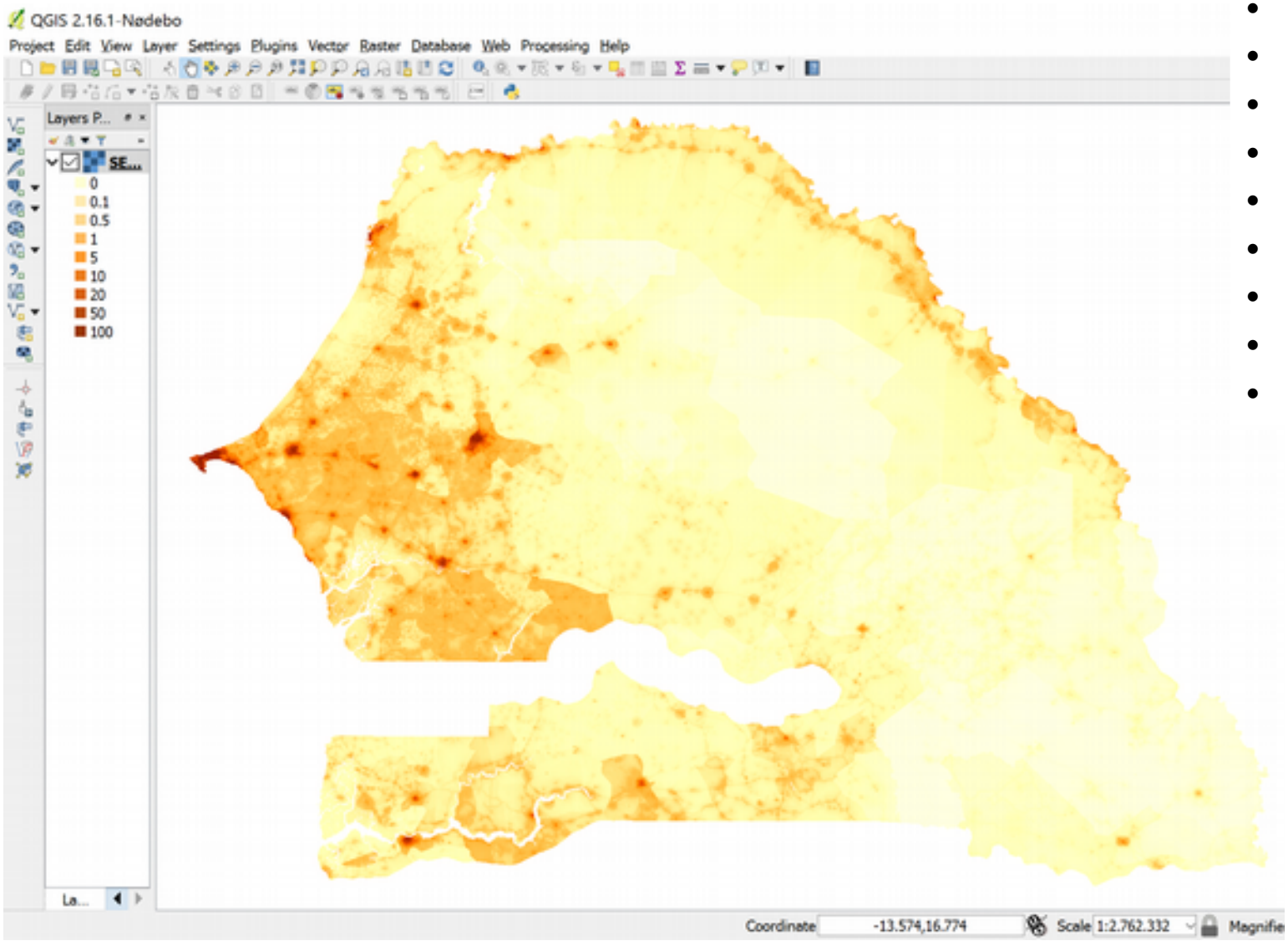
- SEN_ppp_v2b_2015_UNadj.tif =
  - Sénégal (SEN)
  - population par pixel (ppp) ou population par hectare (pph)
  - année (2015)
  - adjusted to match UN national estimates (UNadj)
  - version 2b (v2b)

WorldPop dans QGis

- La distribution asymétrique des valeurs (voir histogramme) rend la visualisation difficile avec une palette de couleur par défaut dans QGis (attention: utilisez la fonction « load min/max values » pour voir les valuers min et max correctes)



Palette de couleur personnalisée



9 classes:

- 0
- 0 – 0,1
- 0,1 – 0,5
- 0,5 – 1
- 1 – 5
- 5 – 10
- 10 – 20
- 20 – 50
- 50 – 100

Plan

Gridded population maps

- Human population maps for health & development
- Census data: answers and problems
- Existing gridded population datasets
- WorldPop

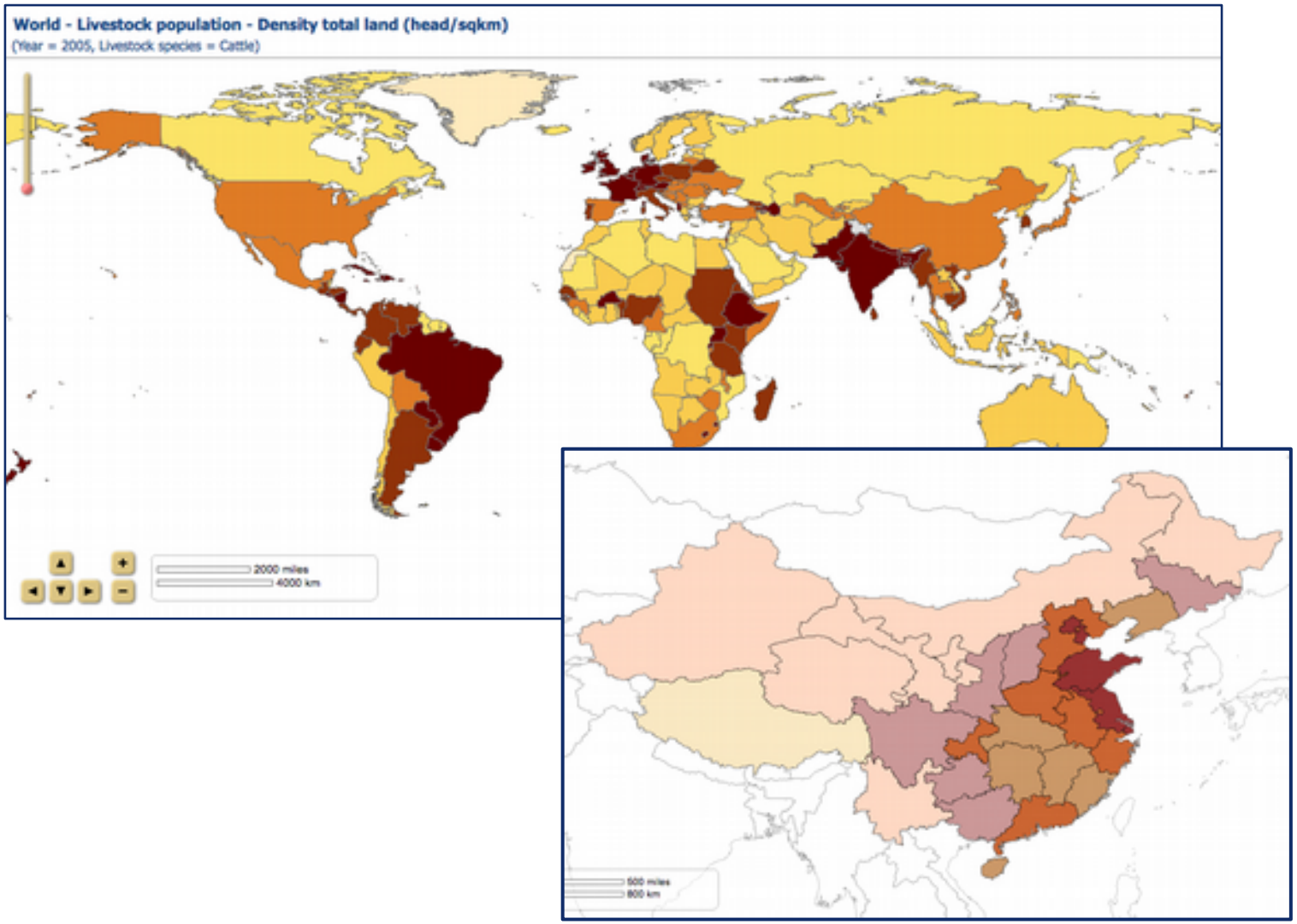
Other interesting data sources

- CIESIN
- GeoNetwork
- GADM
- Worldclim

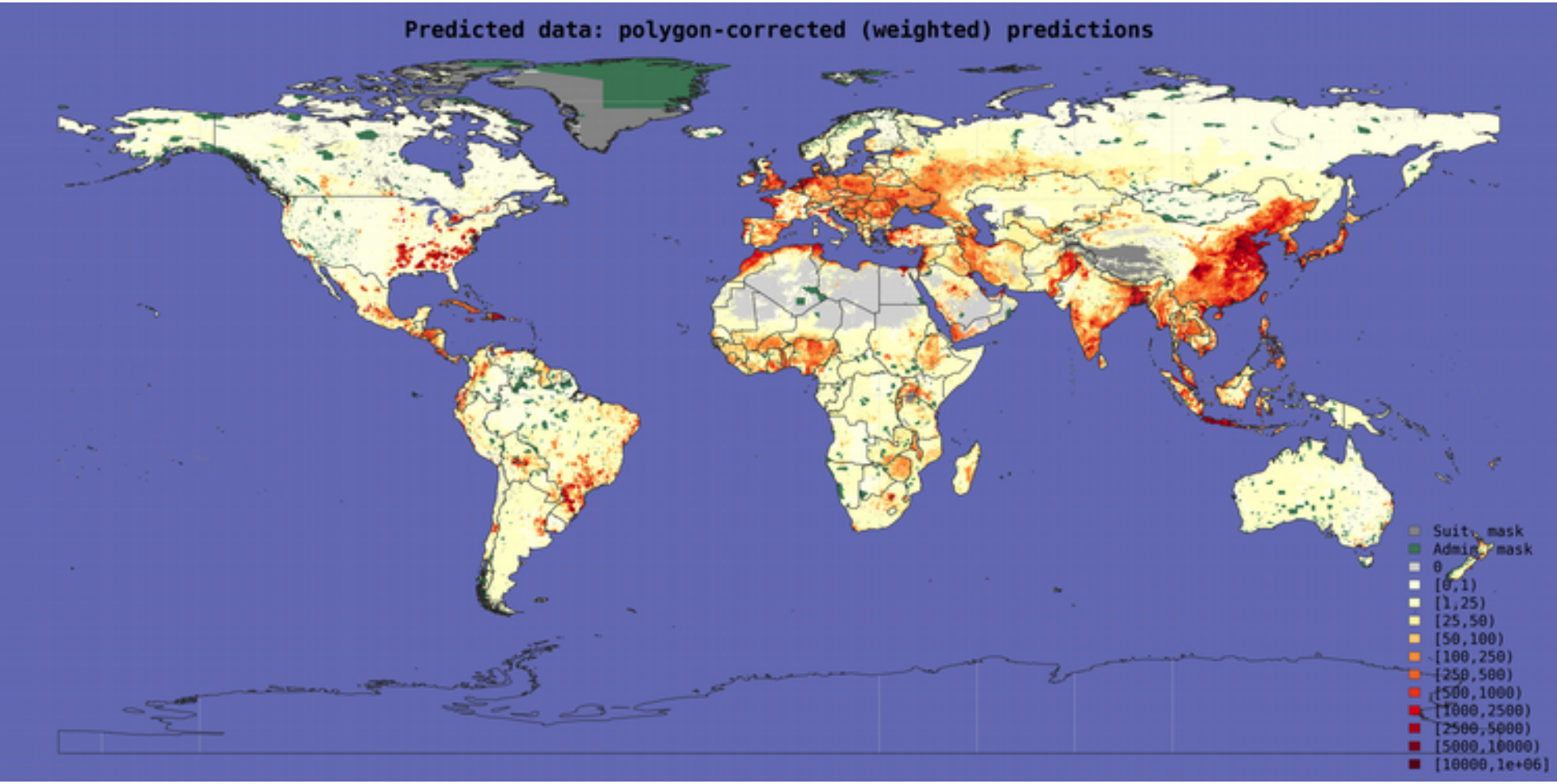
Autres sources de données: quelques exemples

- https://gadm.org/: divisions administratives
- www.ciesin.org: données environnementales et sociales variées
- http://www.fao.org/geonetwork: données GIS
- www.worldclim.org: données climatiques

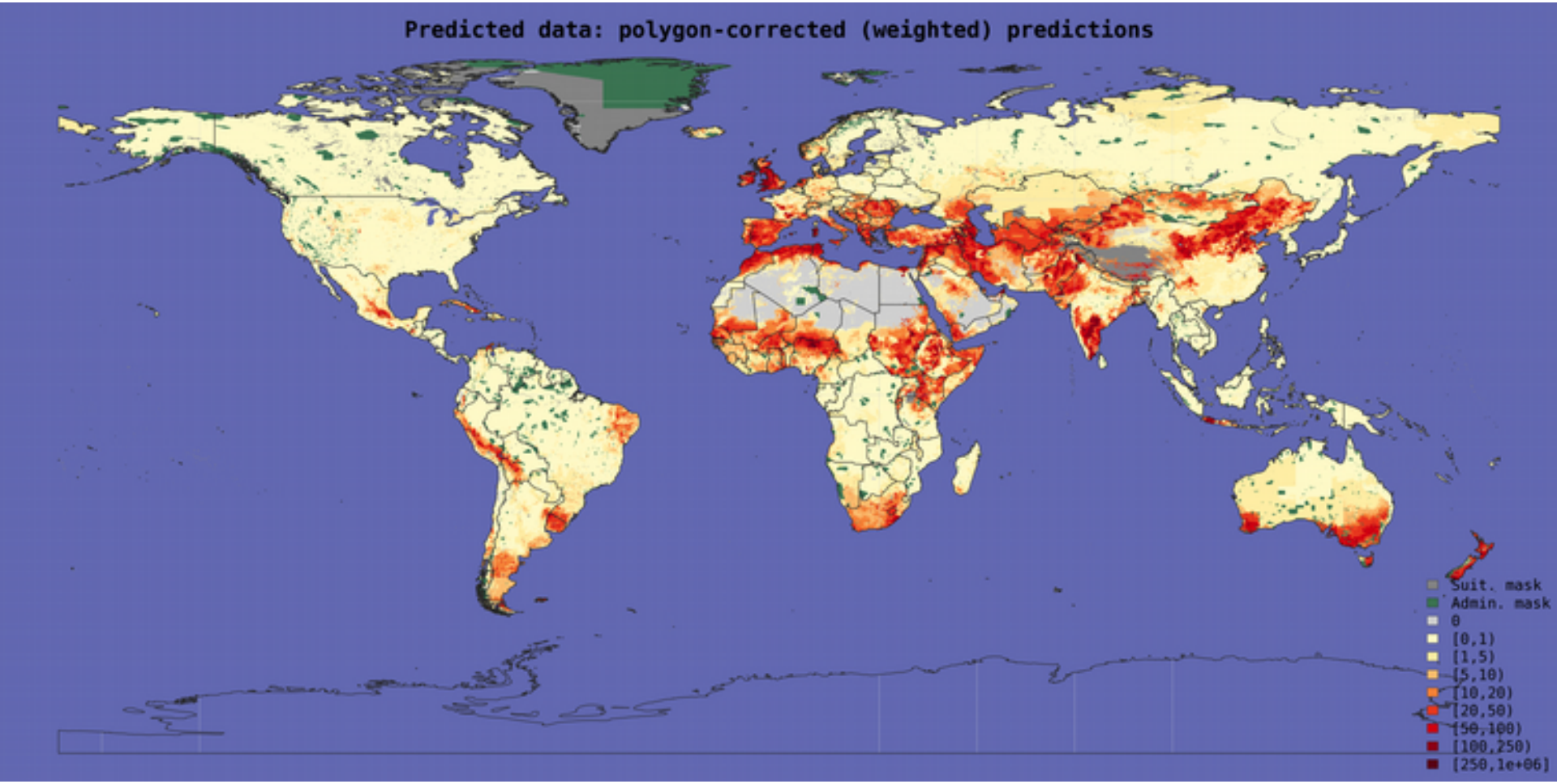
Gridded livestock of the World
(accessible via geonetwork)



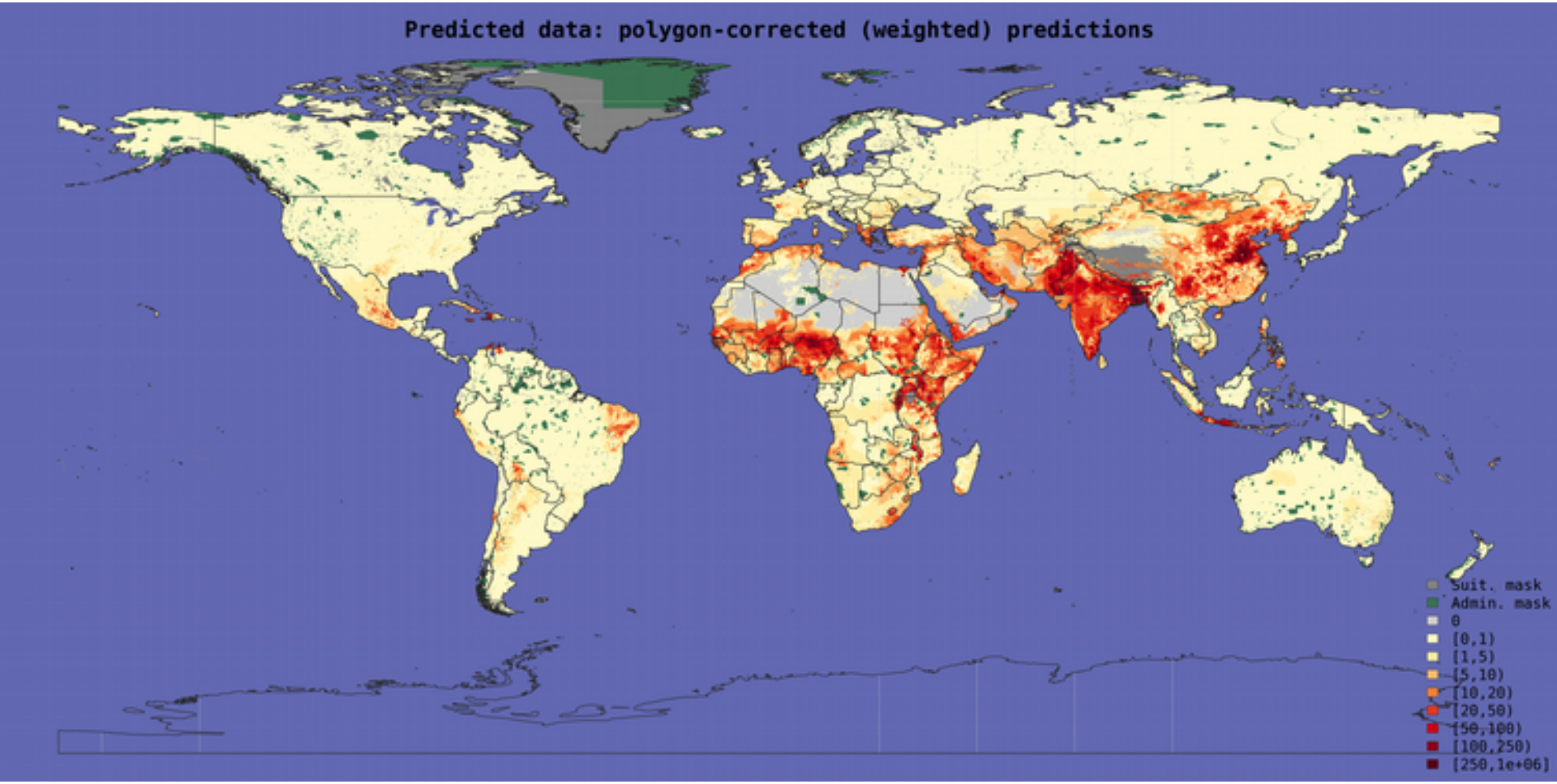
GLW 3.0 runs: chicken



GLW 3.0 runs: sheep



GLW 3.0 runs: goats



Choisissez 1 ou 2 base de données qui vous intéresse et essayez de répondre aux questions suivantes:

- Thématique des données (climat, sols, population, etc.)?
- Organisme(s) producteur(s) (nom, nationalité, type d'organisme)?
- Méthode de collecte (terrain, compilation, experts, etc.)?
- Type de données (raster, vecteur, tabulaire, etc.)?
- Région(s) couverte(s)?
- Échelle / résolution spatiale?
- Période couverte?
- Méta-données disponibles?
- Pouvez-vous télécharger les données? Visualiser?