



(IDeAMapSudan) SUDAN

INTEGRATED DEPRIVATION AREA MAPPING SYSTEM FOR DISPLACEMENT DURABLE SOLUTIONS AND SOCIOECONOMIC RECONSTRUCTION IN KHARTOUM, SUDAN

# FINAL SYMPOSIUM

FEBRUARY 2023



وزارة التنمية الاجتماعية  
MINISTRY OF SOCIAL DEVELOPMENT



African Population and  
Health Research Center



**nuffic**  
meet the world



# DEAMAP

SUDAN FINAL SYMPOSIUM

## Session 3: Participatory Mapping and Feedback

FEBRUARY 2023



# Participatory Geographic Information System (PGIS)

- Spatial information technologies :
  - Geographic Information Systems (GIS),
  - Global Positioning Systems (GPS),
  - Remote sensing
  - Open access to spatial data and imagery

.... empower those who control them but further marginalize communities and local people

*A woman from the pastoralist community of El Fasher in Sudan explains the 3D model to Mr. Hamza Khalil, Minister of Environment, North Darfur State © Barthélemy Boika Mahambi Yelan (source : <http://www.ict4ag.cta.int/>)*



# Participatory Geographic Information System (PGIS)

- PGIS tries to reverse this process by
  - Training local communities (or intermediate such as NGOs) to use geo-spatial technologies to construct their own maps, based on their own spatial knowledge
  - through measured, demand-driven, user-friendly and integrated applications of geo-spatial technologies
  - Local communities (or intermediaries such as NGOs) use these maps for spatial learning, discussion, information exchange, analysis, decision making and advocacy
  - Many applications such as :
    - protecting ancestral lands and resource rights;
    - management and resolution of conflicts over natural resources;
    - collaborative resource use planning and management;
    - ...



« The Power of Maps: Participatory GIS for Disaster Prevention » by Laura Verbrugge (<https://wpmu.mah.se/>)



# IDEAMAP SUDAN FINAL SYMPOSIUM

## National Mapathons in Belgium : an annual participatory GIS experience

Presenter: Prof. Eléonore Wolff  
Université Libre de Bruxelles  
[Eleonore.wolff@ulb.be](mailto:Eleonore.wolff@ulb.be)

**FEBRUARY 2023**

# About ten universities – 2 languages

- French speaking universities



- Dutch speaking universities



- Annual national participatory mapping effort with a large and general public to support urgent demands of humanitarian NGO for geographic data

# OpenStreetMap

- Collaborative and open map (+/- "Wikipedia of the map")
- Initiated in 2004 - Worldwide project
- Mapping by volunteers: everyone can become a contributor and enrich/modify/correct the database
- Based on detailed satellite images
- Rapid development
- 600,000+ volunteers worldwide







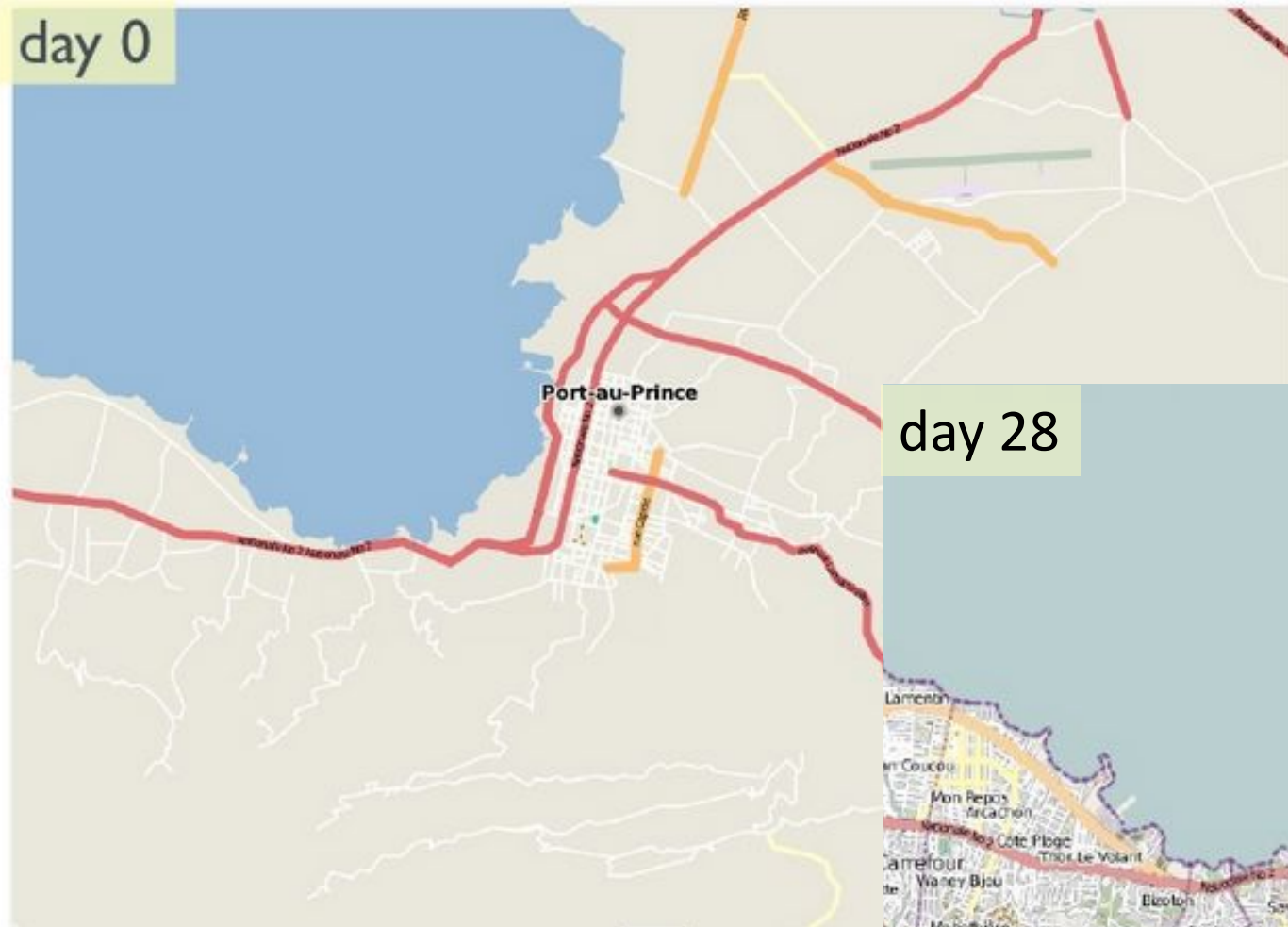
# Humanitarian OpenStreetMap Team (HOT)

- After the earthquake in Haiti in 2010, great need for maps for reconstruction
- Created the Missing Maps project and the Humanitarian OpenStreetMap Team (HOT) organization
- Since 2014 they manage mapping requests from NGOs such as Médecins Sans Frontières
- Especially during natural disasters
- Addressed to OSM volunteers
- Individual participation at anytime or collective participation during mapathons
- <http://tasks.hotosm.org/>





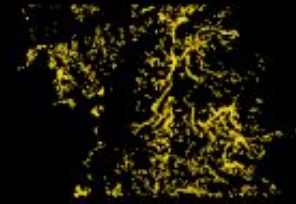
# First HOT results in Haiti in 28 days !





# Belgian National Mapathons

- Objective : mapping buildings and roads with a large and general public to support urgent demands from humanitarian NGOs on the field
  - 2016 :
    - Measles epidemic in South Kivu on the island of Idwji in DRC.
    - To stop the epidemic, they must vaccinate 95% of the population very quickly.
    - But no detailed map to locate the population with the precision required.
    - Organisation of a national Mapathon with 200 volunteers gathered on 7 Belgian university campuses
    - Timing :
      - 12/4/16 : MSF's request introduced to HOT.
      - 16/4/16 : In one morning, 23,244 buildings mapped on the island (none before) !
      - 18/04/16 : beginning of vaccination after data validation by experienced cartographers



# Belgian National Mapathons

- Operational map produced by MSF

## Estimation de la densité de population ZdS Idjwi - South Kivu, RDC

Date de production: 20/04/2016

Sources:  
rgc.cd  
openstreetmap.org  
missingmaps.org  
Routes non vérifiées

Contact: GIS.MansonUnit@london.msf.org

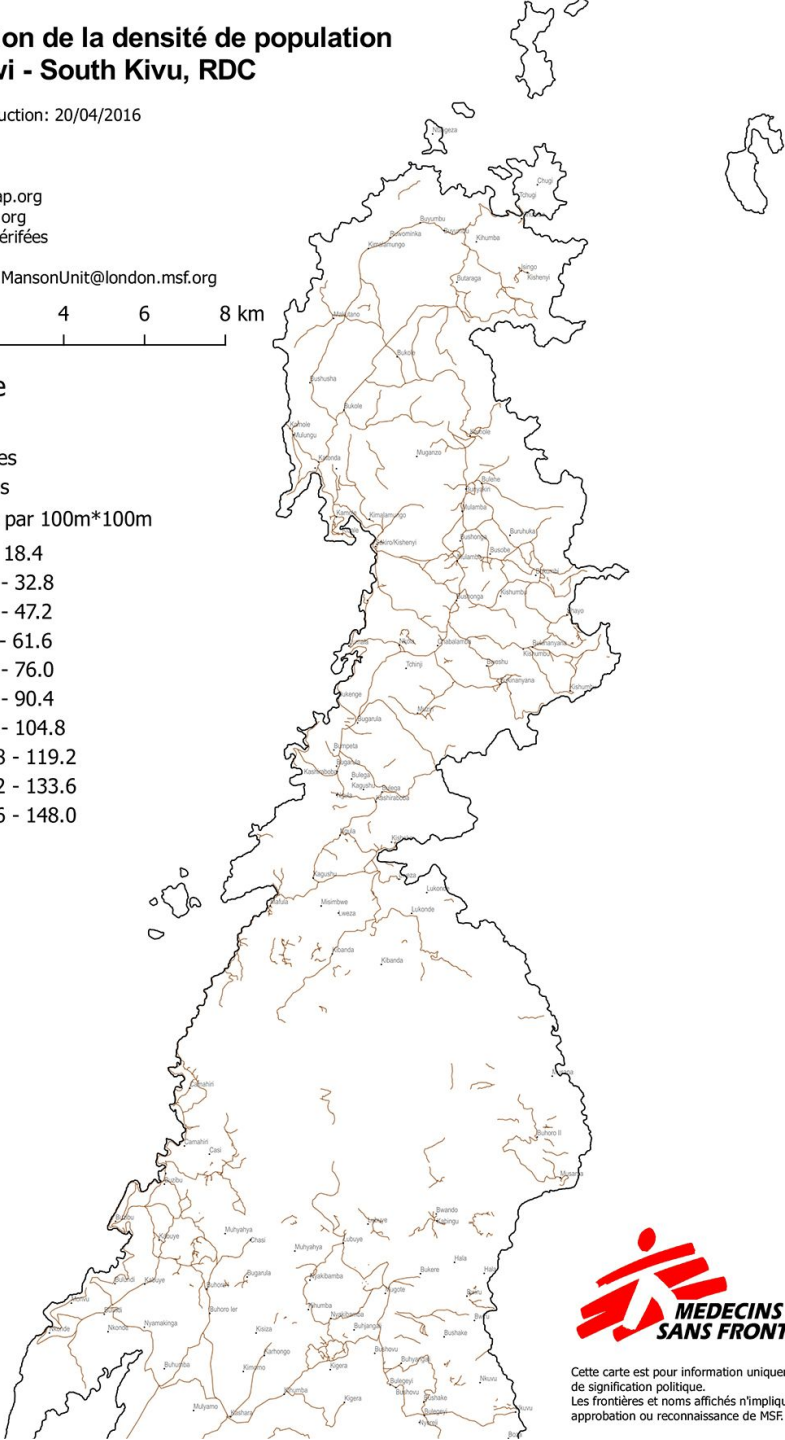
0 2 4 6 8 km

### Légende

- Idjwi
- Villages
- Routes

Population par 100m\*100m

- 4.0 - 18.4
- 18.4 - 32.8
- 32.8 - 47.2
- 47.2 - 61.6
- 61.6 - 76.0
- 76.0 - 90.4
- 90.4 - 104.8
- 104.8 - 119.2
- 119.2 - 133.6
- 133.6 - 148.0



Cette carte est pour information uniquement et n'a pas de signification politique.  
Les frontières et noms affichés n'impliquent aucune approbation ou reconnaissance de MSF.



# Others national Mapathons in Belgium

## • 2017 : Sierra Leone

- Very high infant mortality rate – world's highest maternal mortality
- National health system weakened by an Ebola epidemic
- A 4 years MSF project to support remote areas such as Gorama Mende / Wandor in the district of Kenema
- Need of detailed maps

## • 2018 : North-West of Nigeria

- Meningitis C epidemic recurring every year since 2008 in 7 Nigerian states
- Mapping of buildings and roads supports MSF's field work:
  - Distribution of vaccines
  - Access to health structures
  - Analysis of the progression of the epidemic

- After a break during COVID crisis, restarting this year



- Regions where MSF has projects
- Cities, towns or villages where MSF works



# Examples of Participatory GIS: Case study on slum mapping

Presenter: Dr. Caroline Kabaria,  
African Population & Health Research Center  
Nairobi, Kenya

# Study Sites

## Nigeria



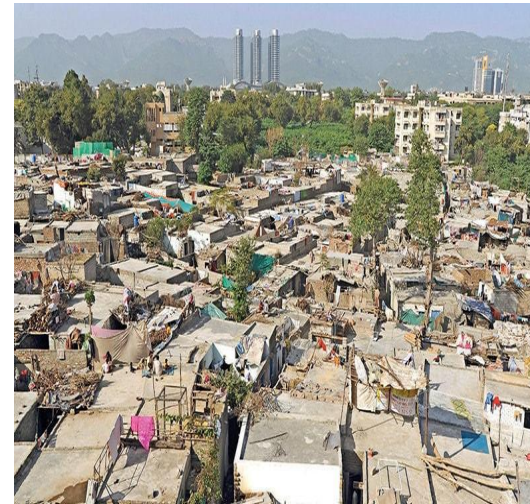
*Bariga (Lagos)  
Sasa & Idilkan(Oyo)*

## Kenya



*Korogocho &  
Viwandani, Nairobi*

## Pakistan



*Azam Basti & Neelam  
Colony, Karachi*

## Bangladesh

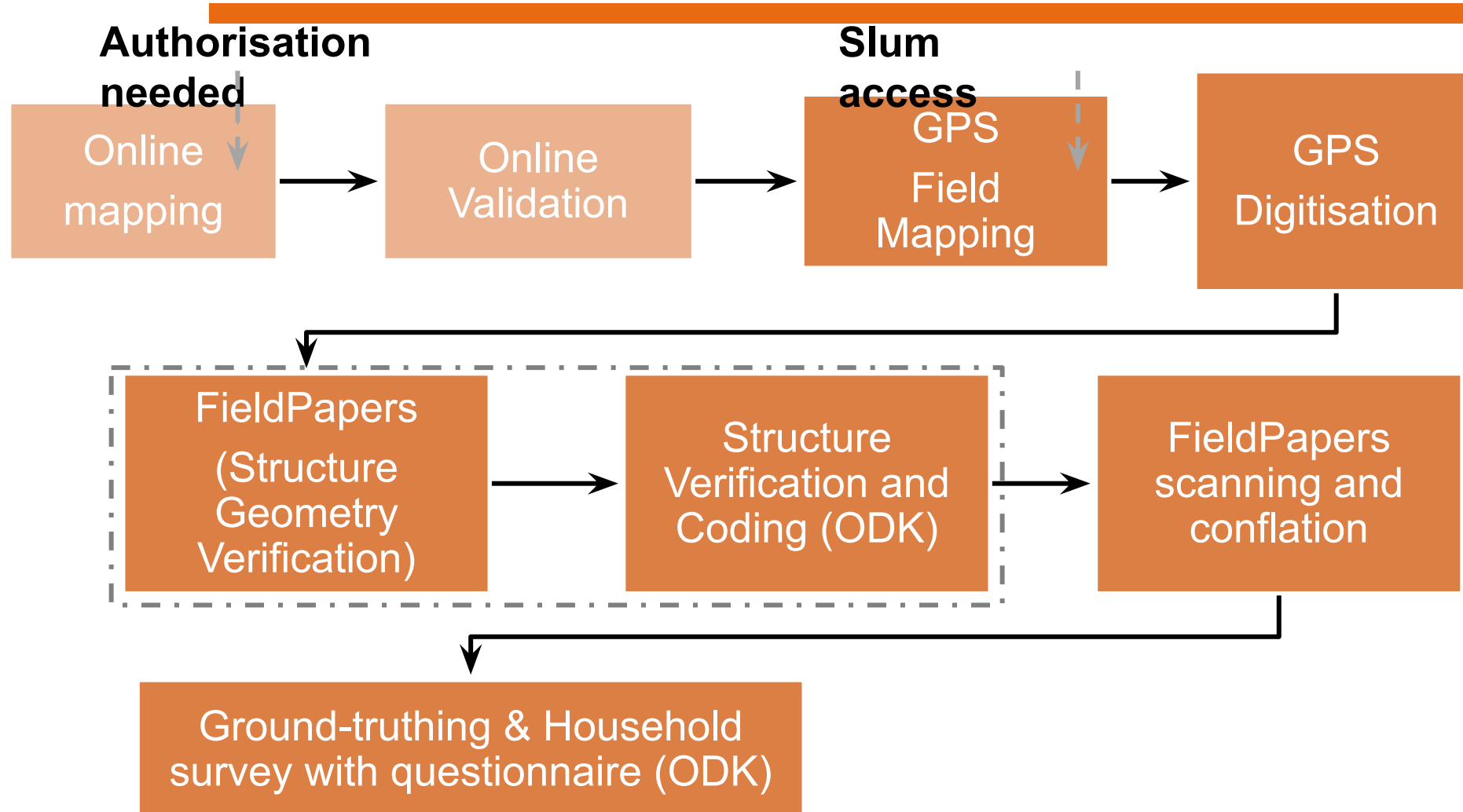


*Korail, Dhaka*

**Image sources:** (1) <http://aphrc.org/post/4793>; (2) <http://thesketchonline.com/health-experts-deploy-satellite-locate-service-centres-lagos-oyo-slums/>;  
(3) <https://www.dawn.com/news/1262820>; (4)  
<https://www.voanews.com/a/reu-migrant-journey-from-rural-bangladesh-shows-sacrifices-dangers-of-slum-life/3598045.html>



# Study approach



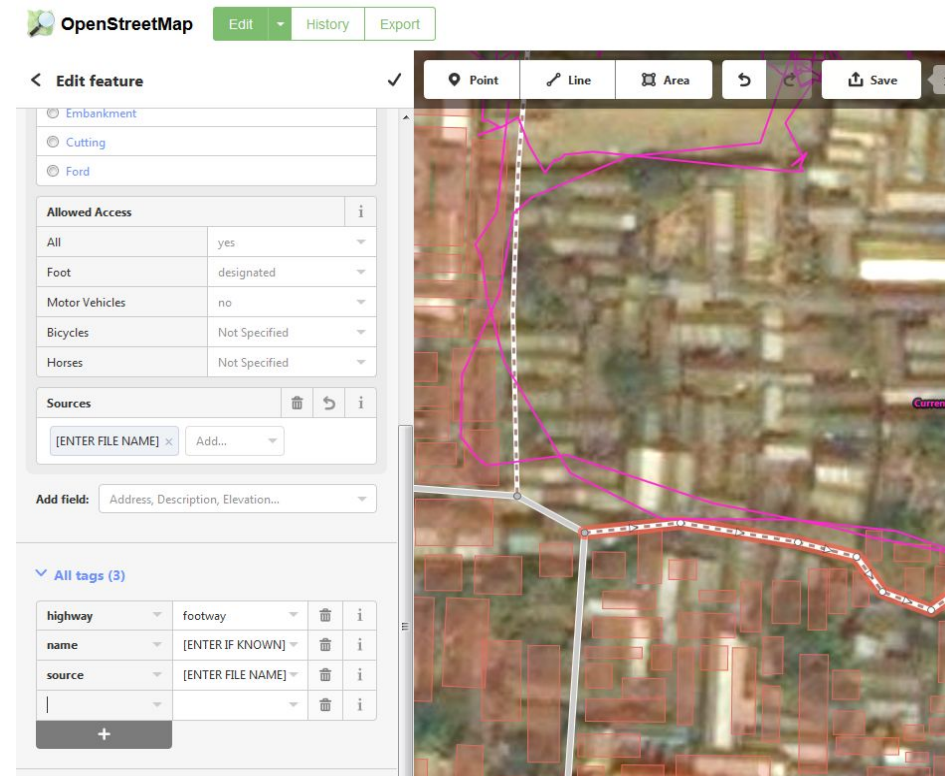
# Slum mapathon: Kenya

- Mapathons: **2**
- Number of participants: **58** mappers / **36** were in-country mappers
- In-country partner mobilisation: APHRC staff and slum community volunteers
- OSM community stakeholder involvement: Map Kibera



# GPS field mapping & Verification

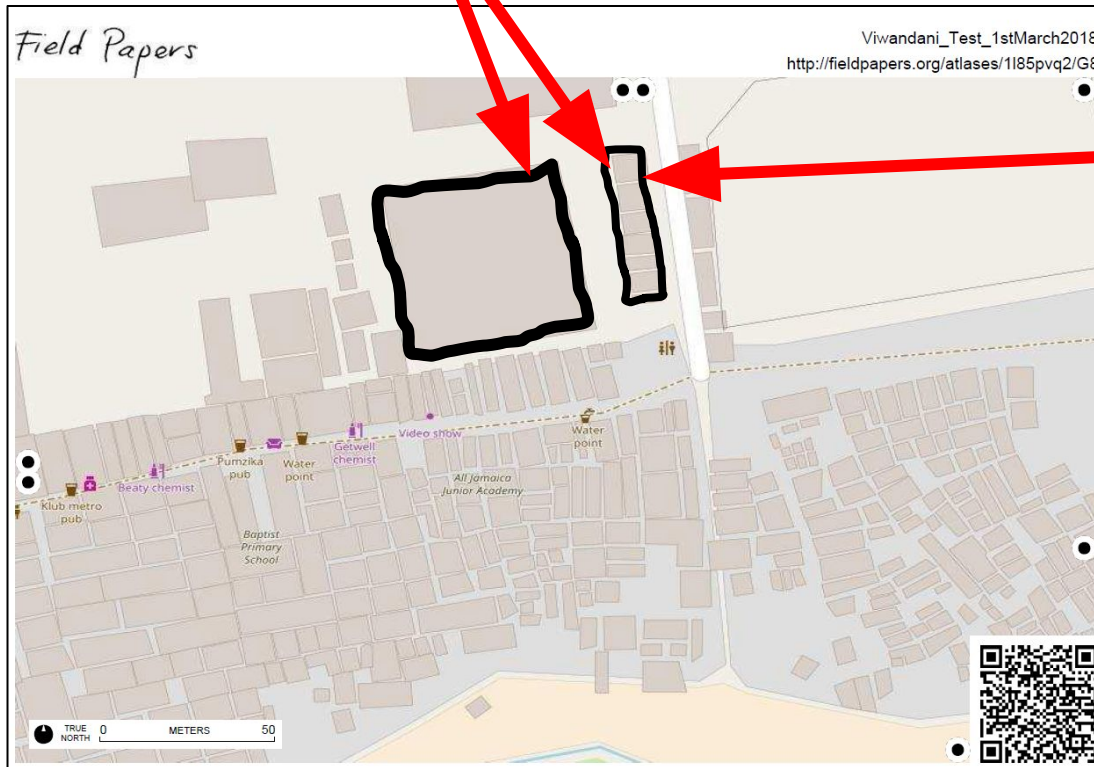
- Tracking of roads and footpaths with GPS handheld and digitisation



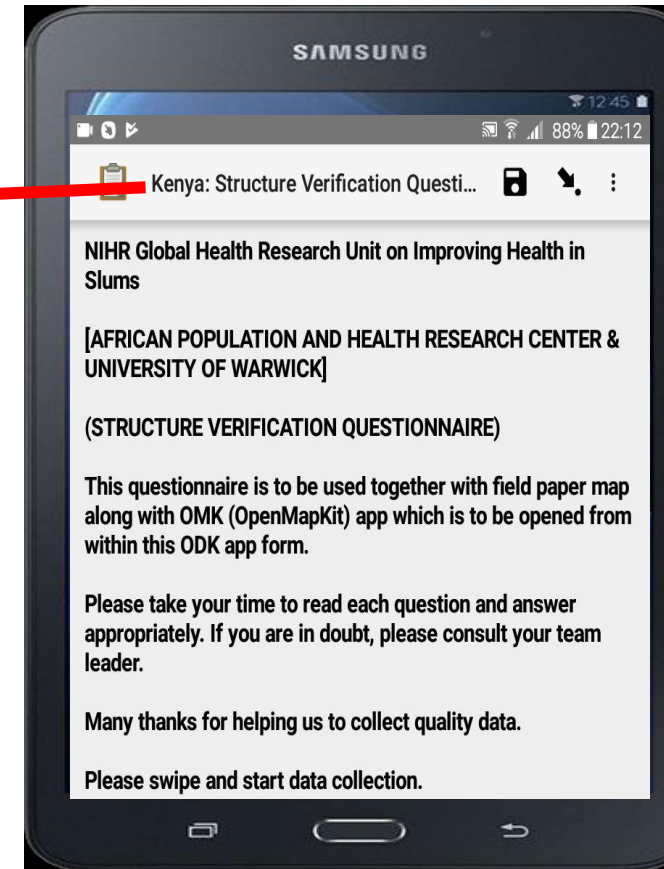


# Structure Verification with Fieldpaper and Tablet

## Structure Geometry Verification (FieldPapers)



## Structure Verification Questionnaire (Tablet)

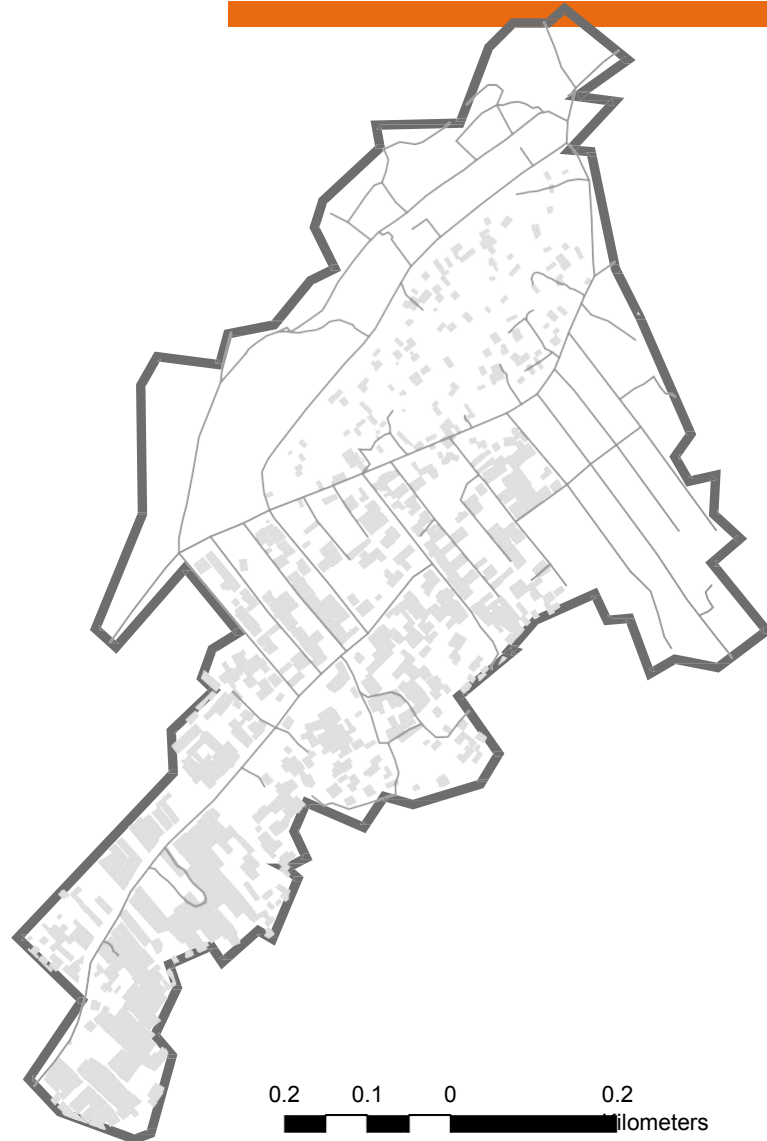


# GPS field mapping & Verification





# Kenya Mapping results - Korogocho



## BEFORE

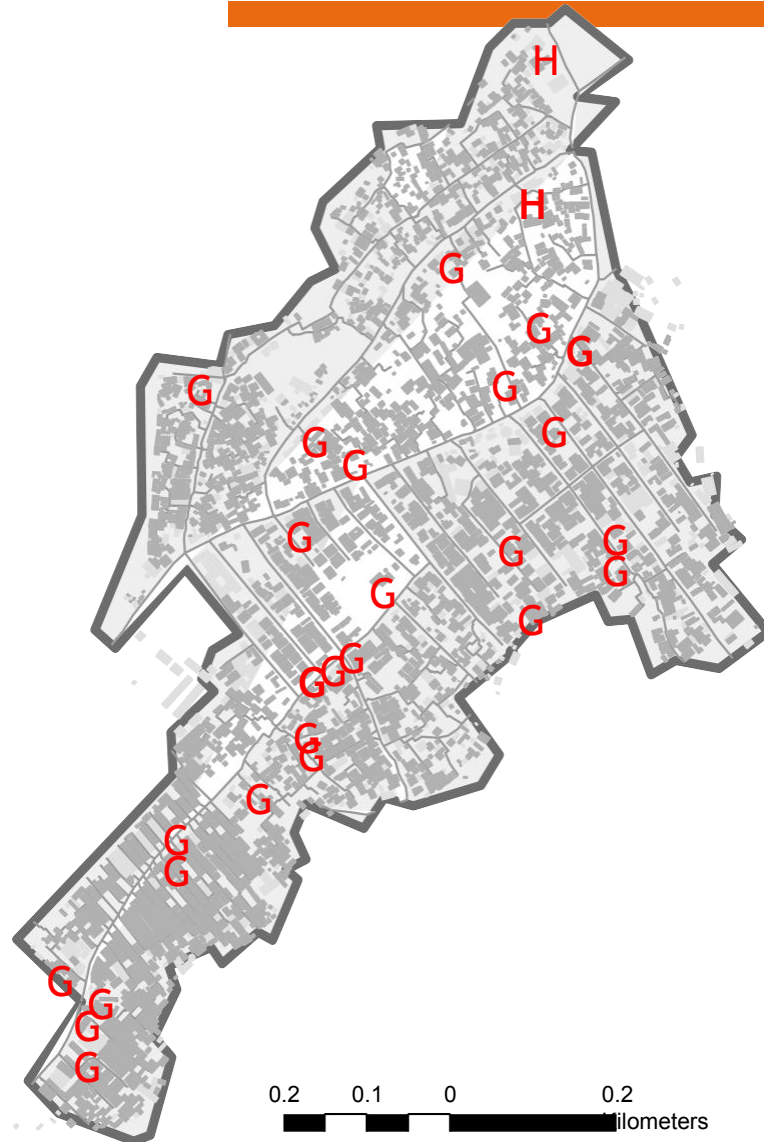
- Structures:  
(1149. duplicates: 6405)
- Road length: 9km
- Roads: 56

## Legend

- Roads (before)
- Structures (before)
- ▭ Korogocho boundary



# Kenya Mapping results - Korogocho



## CURRENT

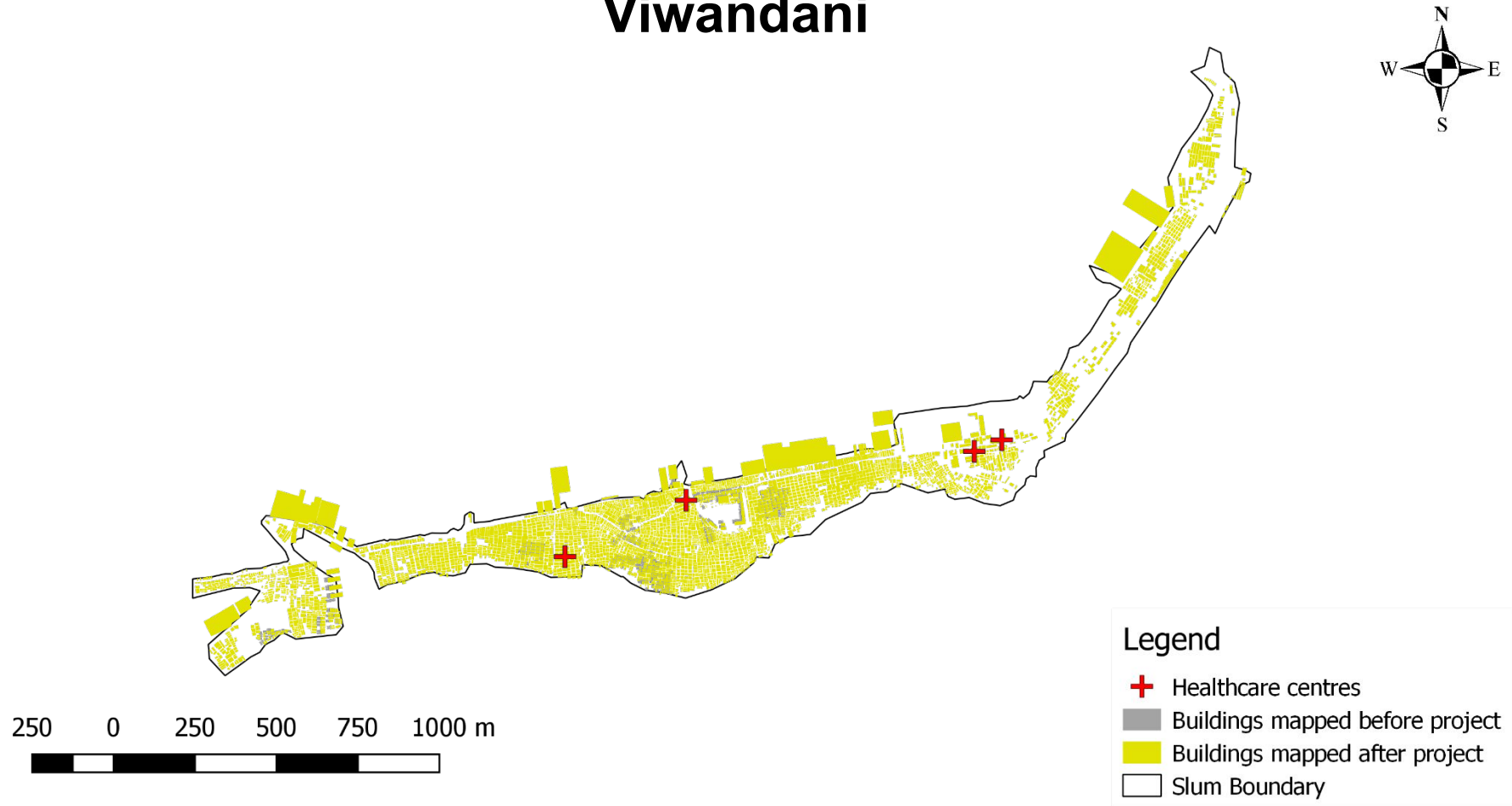
- Dwellings: 2631
- Households: 7647
- H. Facilities: ~32
- Structures: +5255
- Road length: +8km
- Roads: +125

## Legend

- G** [32] Health care facilities (GT survey)
- [2631] Dwellings
- Roads (current)
- Structures (current)
- Korogocho boundary

# Kenya Mapping results - Viwandani

## Viwandani



# Slum Mapathons: Bangladesh & Nigeria

- Mapathons to date: 1
- Number of participants: 37 mappers / 23 were in-country mappers
- In-country partner mobilisation: IUB staff, BHOOT staff and local volunteers
- OSM community stakeholder involvement: BHOOT



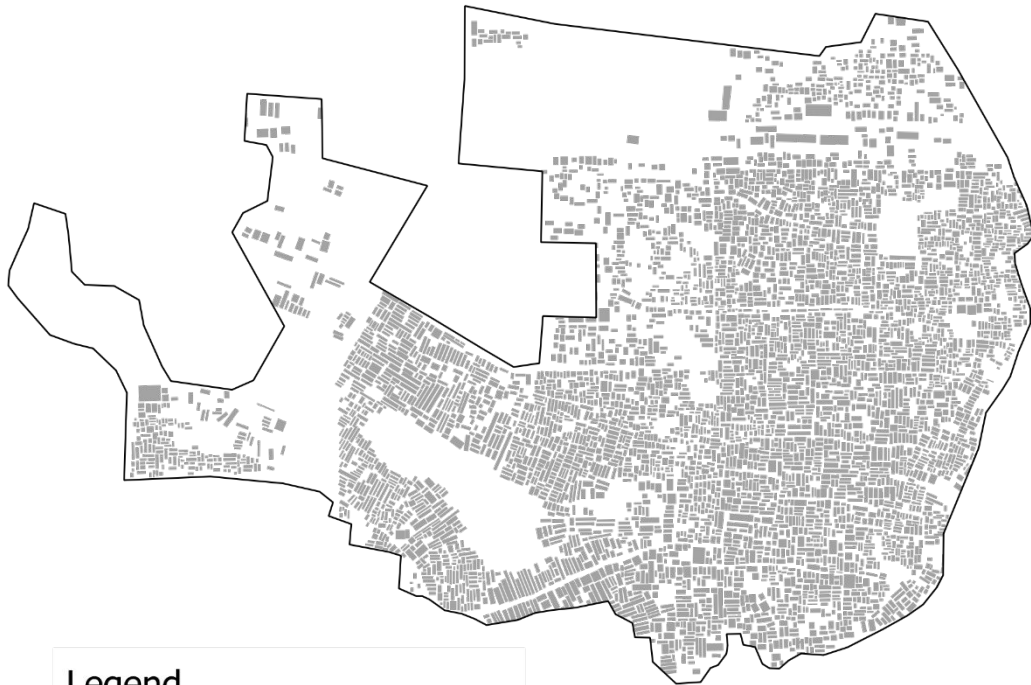
- Mapathons to date: 1
- Number of participants: **55** mappers / **35** were in-country mappers
- In-country partner mobilisation: UoL staff and students and slum community local volunteers





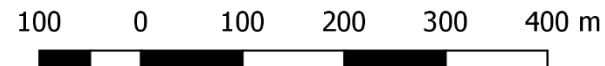
# Mapping results – Bangladesh & Nigeria

## Korail

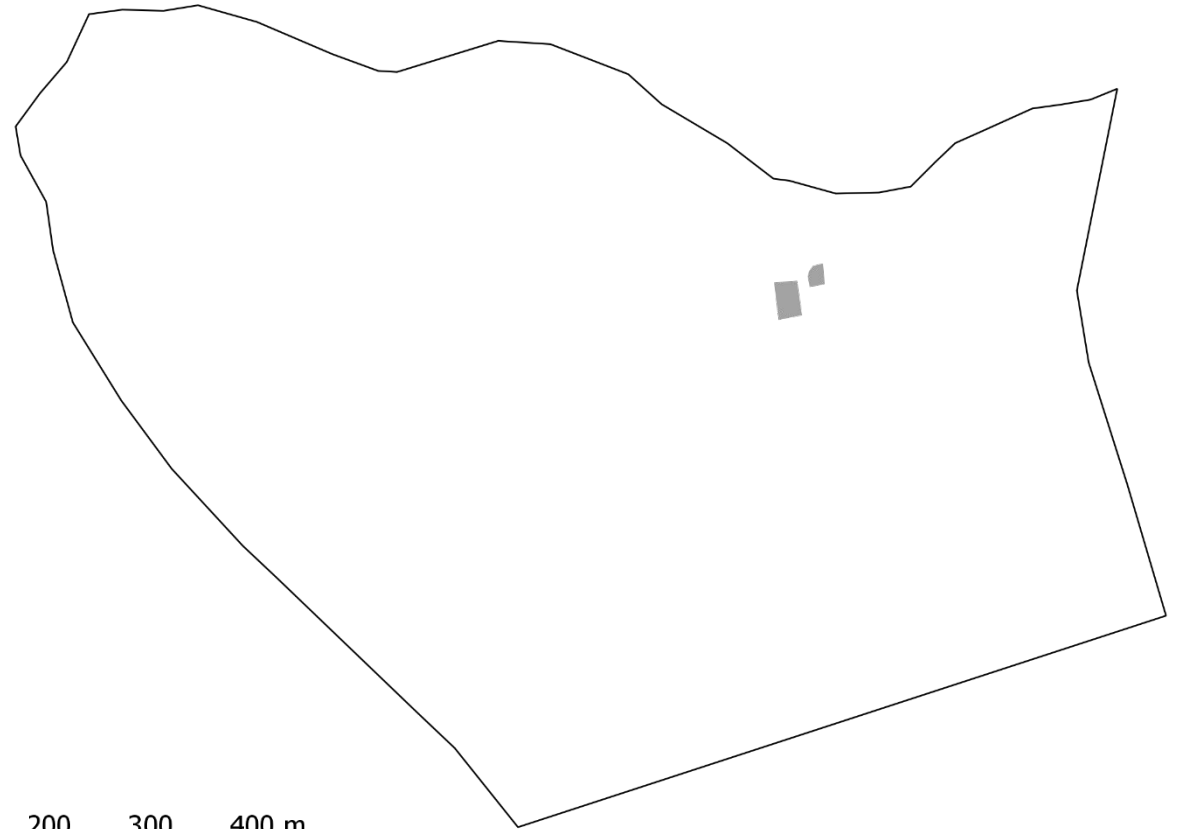


### Legend

- Healthcare centres
- Buildings mapped before project
- Buildings mapped after project
- Slum Boundary

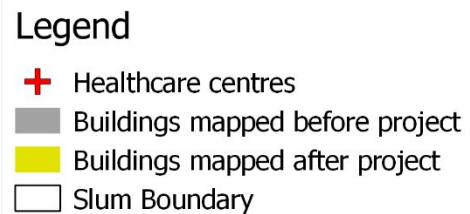
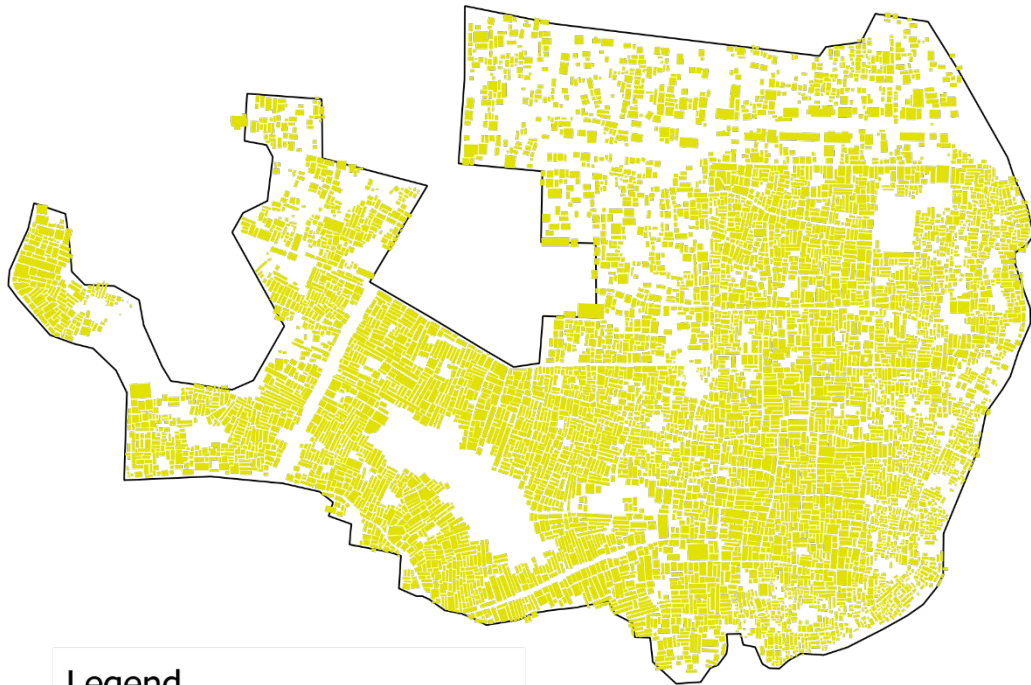


## Idikan (Nigeria)

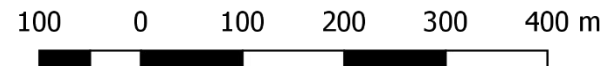
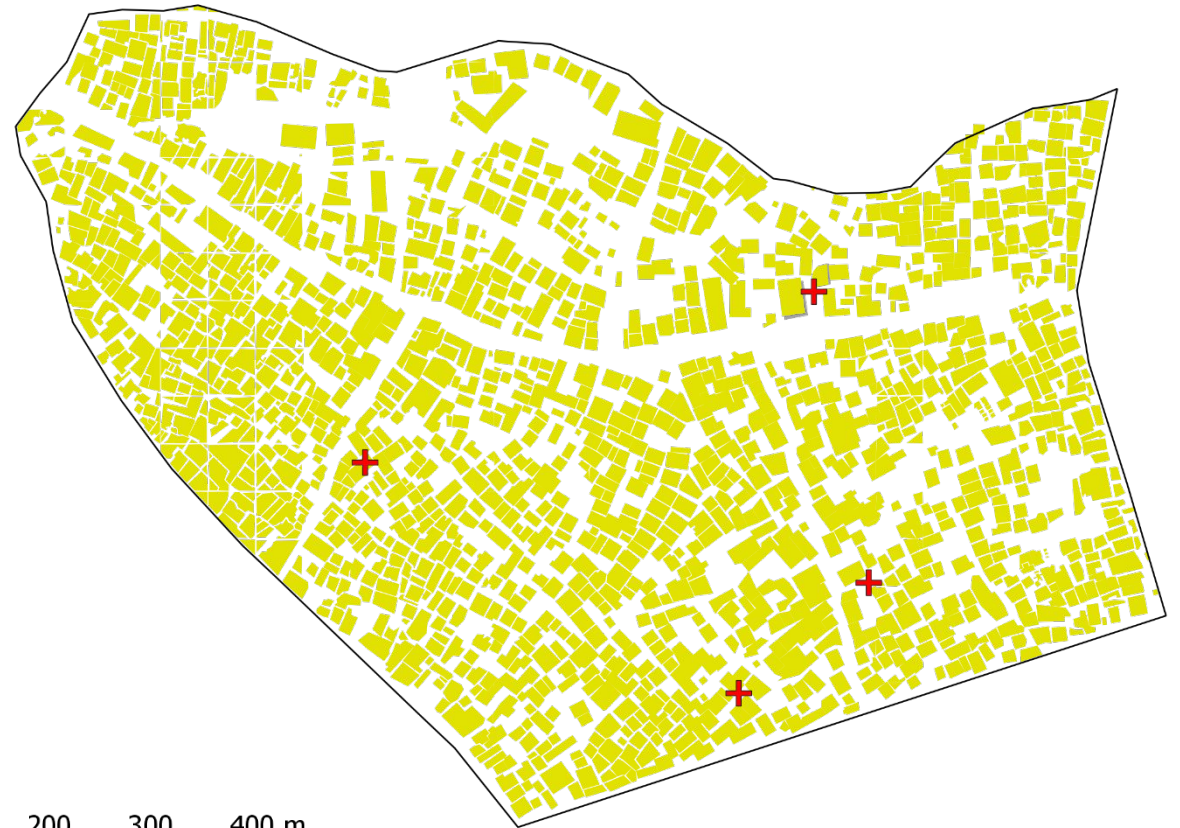


# Mapping results – Bangladesh & Nigeria

## Korail, Bangladesh

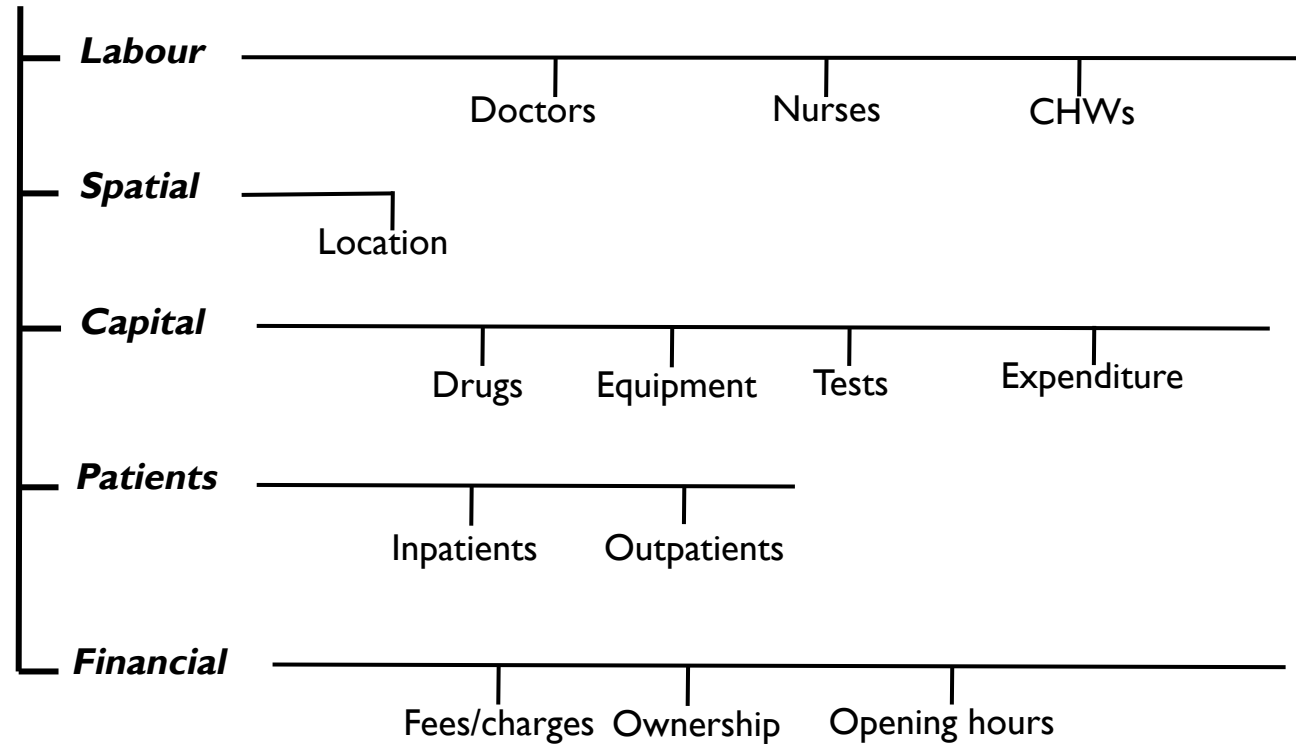


## Idikan (Nigeria)



# Geospatially map current health service delivery arrangements in slums.

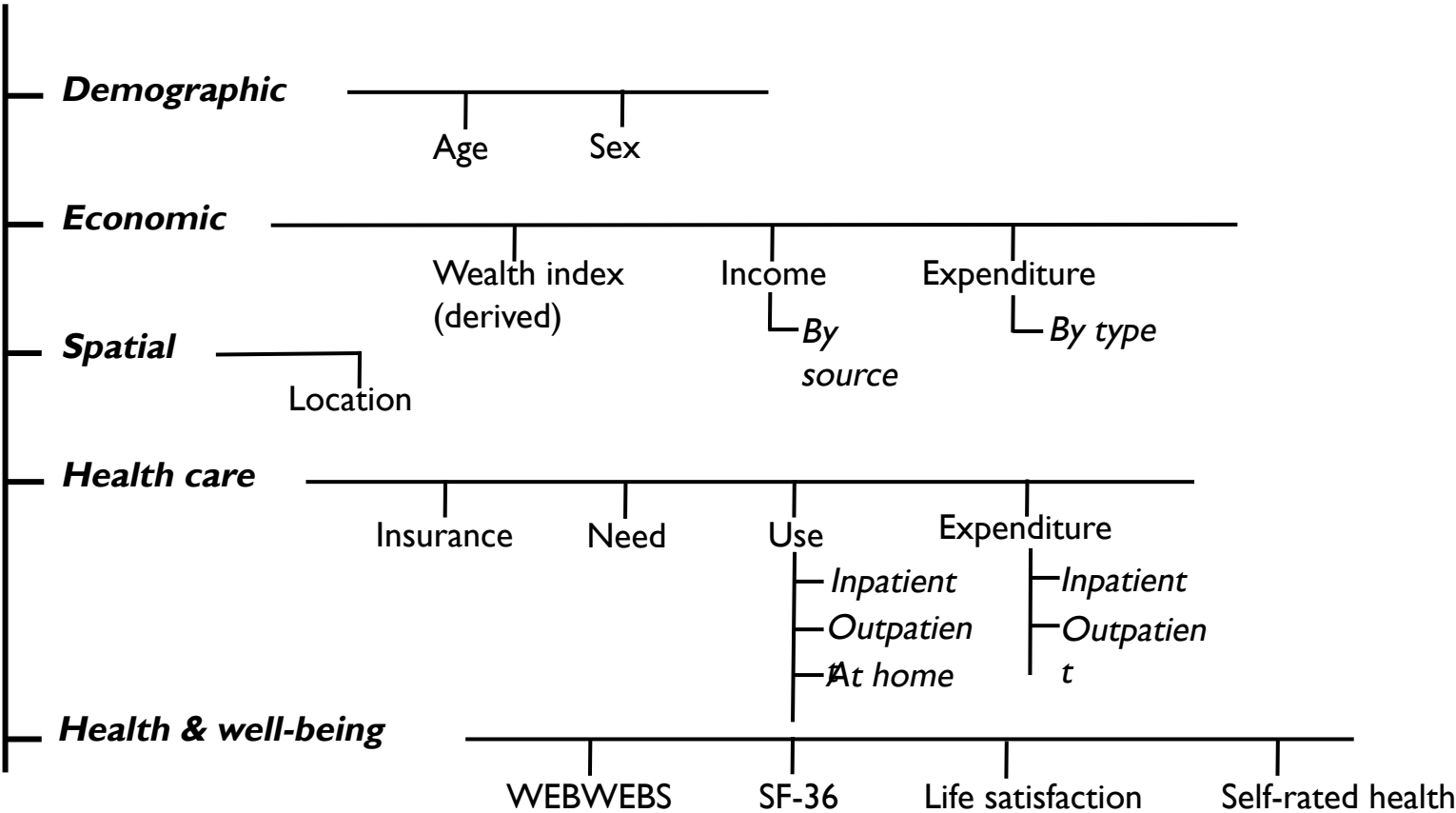
## HEALTH FACILITIES



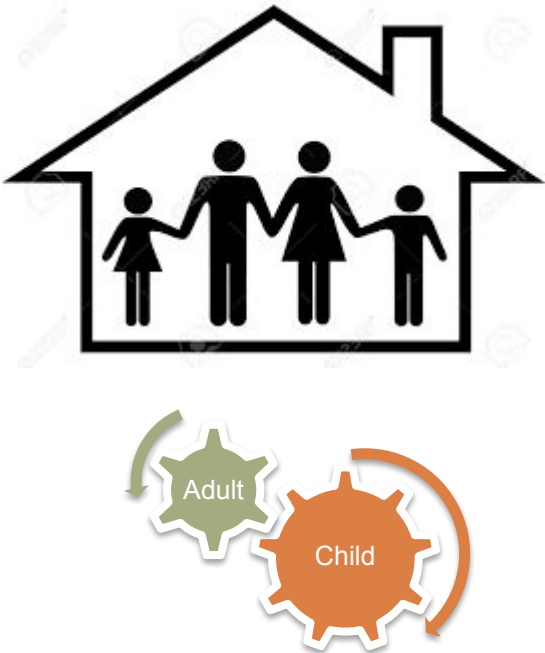


# Geospatially map current health service delivery arrangements in slums.

**HOUSEHOLD**



*C/S Household Survey:  
Sample: ~ 1000 HH per site*



Thank you...

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***Any Questions?  
Clarifications?***