# **Case studies on spatial demography** using Facebook data

# Southampton WorldFop **Meta**

In collaboration with the Data for Good programme at Meta, we have explored aggregated, de-identified Facebook population and mobility datasets during crises to understand the spatial distribution and mobility dynamics of populations in response to disease outbreaks and natural disasters. Facebook population datasets show the number of Facebook app users who have enabled Location Services and are observed in a location following a crisis, compared with the pre-crisis baseline period. Facebook mobility datasets show the number of users moving from one area to another, or the range of movement amongst users away from the area where they live. Below are some studies conducted by WorldPop.

East Midlands (England

East of England

North East (Englan

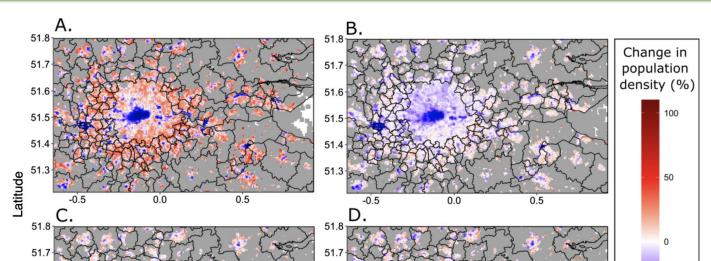
orth West (England

South West (England)

Vest Midlands (England) orkshire and The Humbe

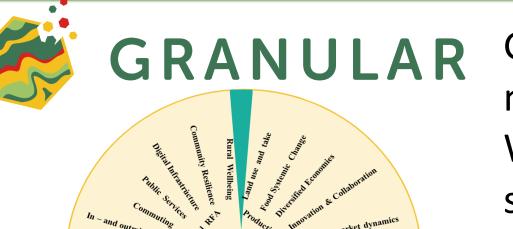
Using Facebook data to understand the effects of social distancing interventions on COVID-19

As partners of the Global COVID-19 Mobility Data Network, we produced regular analyses of population dynamics and movement patterns to



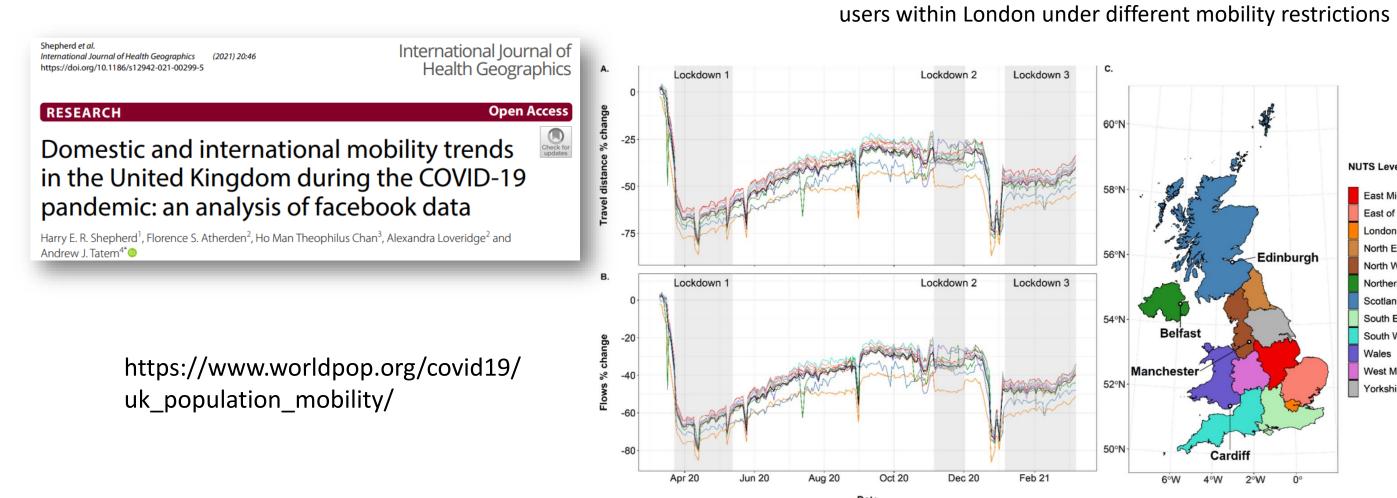
Relative changes in population density of daytime Facebook

# Defining urban-rural mobility and connectivity in Europe for the GRANULAR project



GRANULAR is generating new datasets, tools and methods to better understand rural areas in Europe. We are using Facebook user movement and activity space data to describe and predict human mobility and connectivity between rural, peri-urban, and urban areas across Europe.

## support decision-makers across the UK government on how well social distancing interventions are working.



## Identifying counter-urbanisation using Facebook's user count data

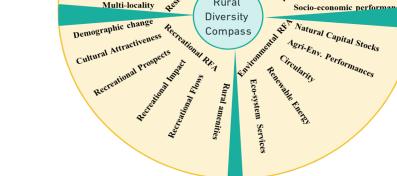
In Belgium and Thailand, rural residents (night-time user counts) increased by 1.80% and 2.14%, respectively, from March 2020 to May 2022, while urban residents decreased by 3.08% and 5.04%. However, the counterurbanisation in Thailand appears to be



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Belgium



Weekend versus weekday mobility in Scotland Total Mobility (Internal + Incoming Average total mobility in workdays Sweden as an example weekends workdavs Pairs falling below the red dashed line have statistically significantly different mobility patterns

## Exploring mobility patterns and activity spaces during disease outbreaks and natural disasters

The weighted degree (flow of absolute number of people) for major cities is higher on weekdays than weekends. Eigenvector centrality and PageRank are higher at weekends, January-April 2024.

Eigenvector Centrality in South Africa

Bojanala

Ekurhuleni Fezile Dabi

Gert Sibande Nkangala Sedibeng

West Rand

City of Cape Town City of Johannesbur

City of Tshwan

Ekurhulen Fezile Dabi

Gert Siband

Nkangala

Sedibend

Heat index — Stay home fraction

02/24

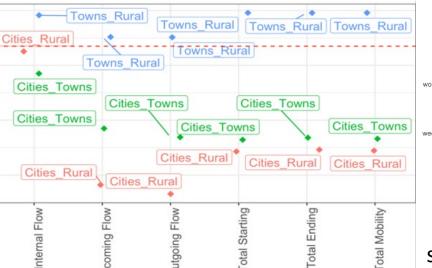
West Rand

City of Cape Town City of Johannesburg City of Tshwane

08:00:00

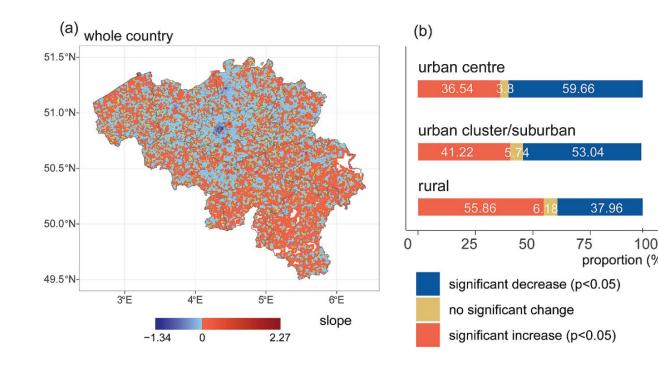
### Digital platform: data and tools at different granularity.

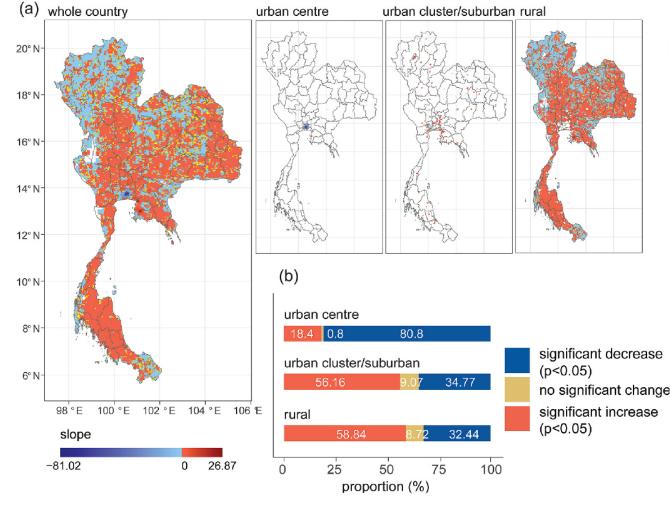


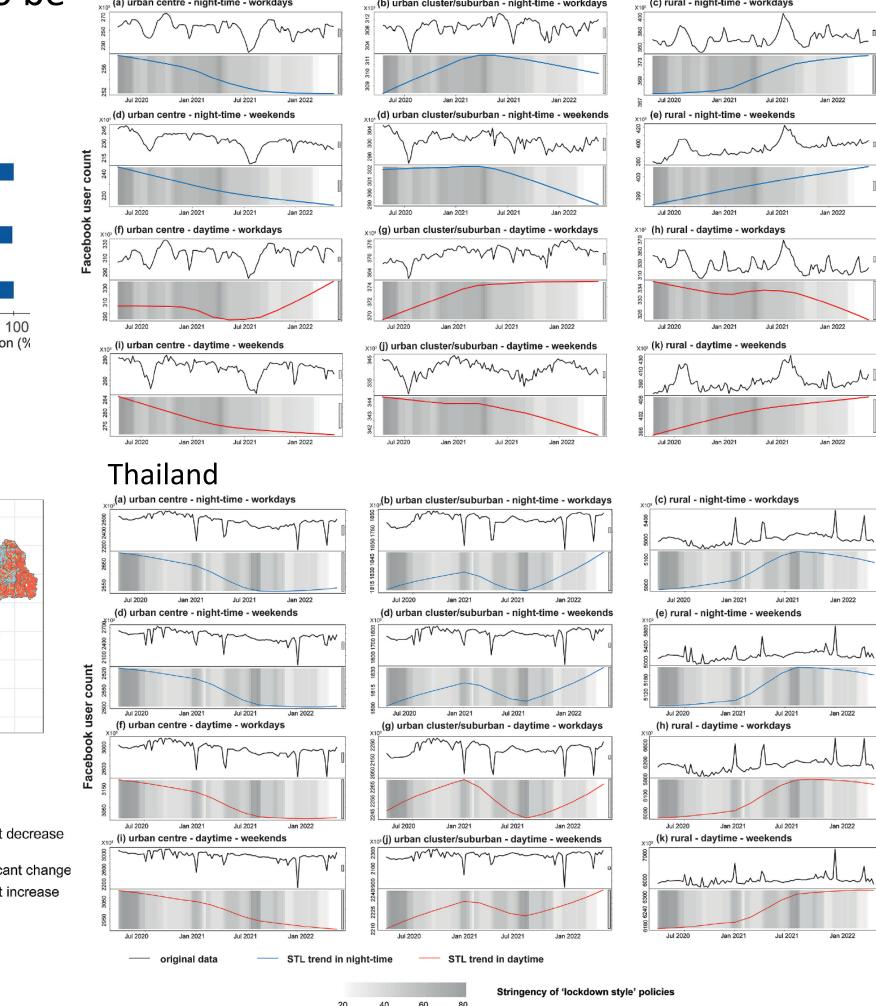


based on the metrics listed on the x-axis

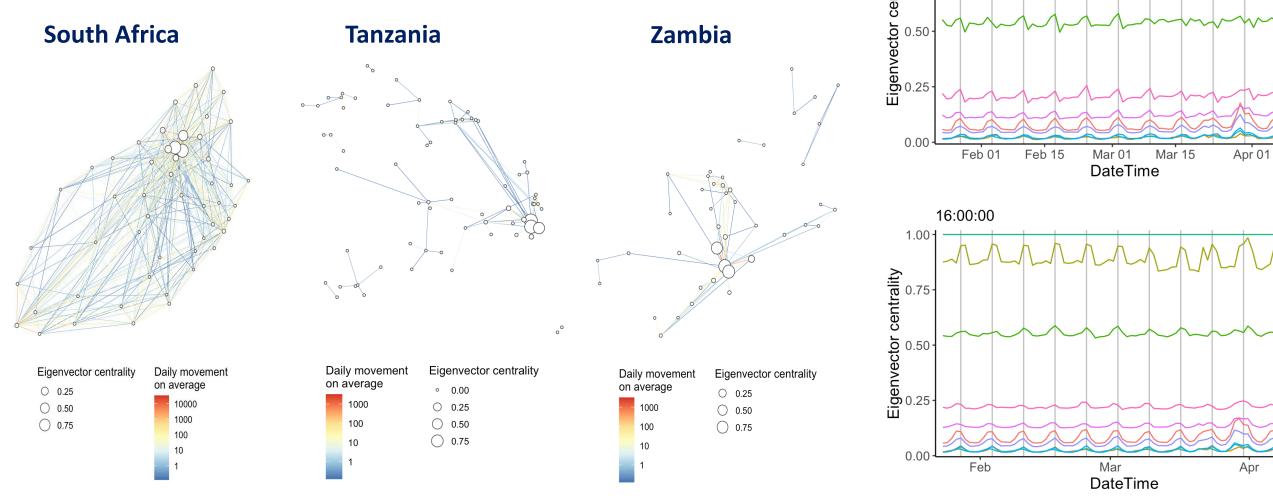






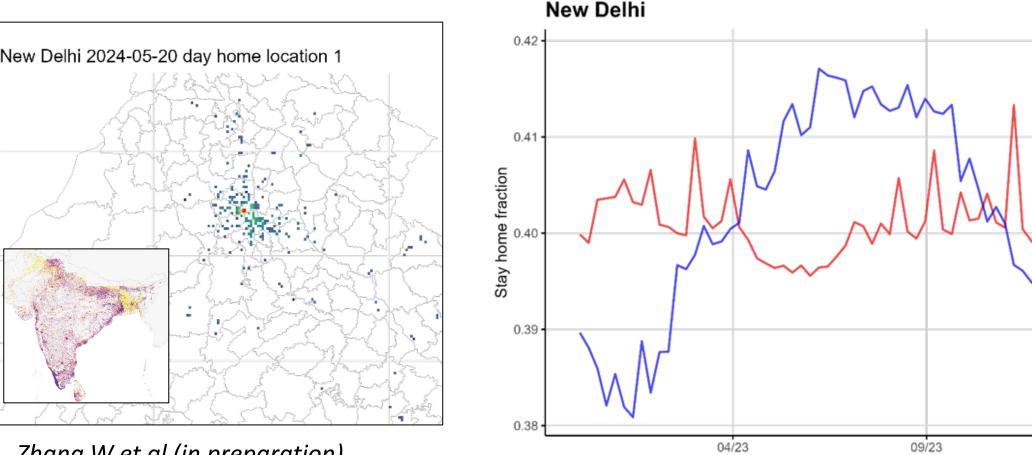


Population estimation using Facebook geolocated user data in Philippines



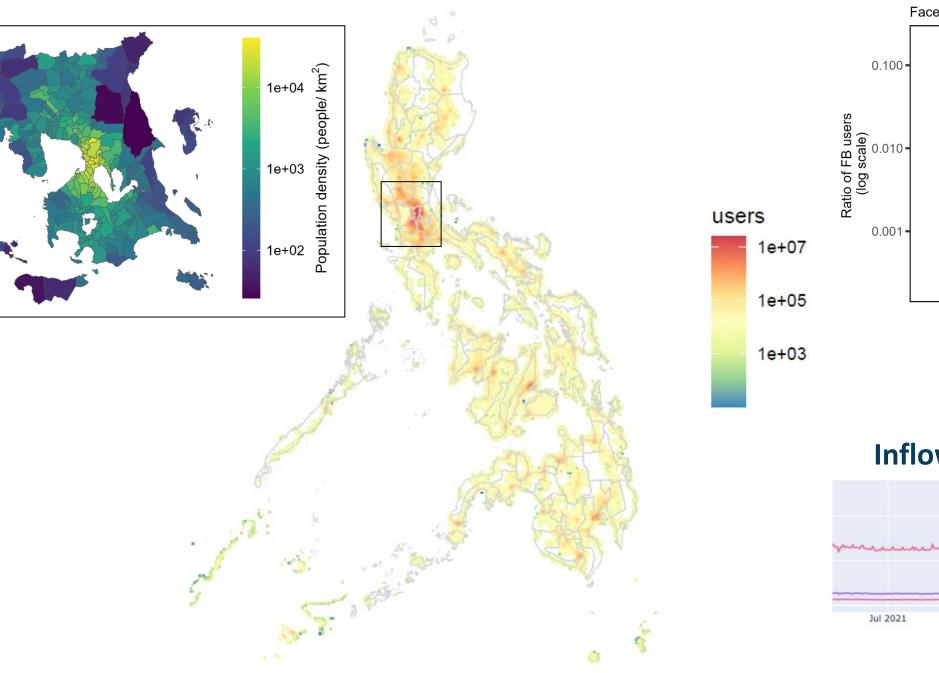
#### Steel J, Cheng Z et al (in preparation)

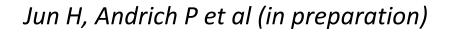
#### Exploring population activity space changes under heat waves in India

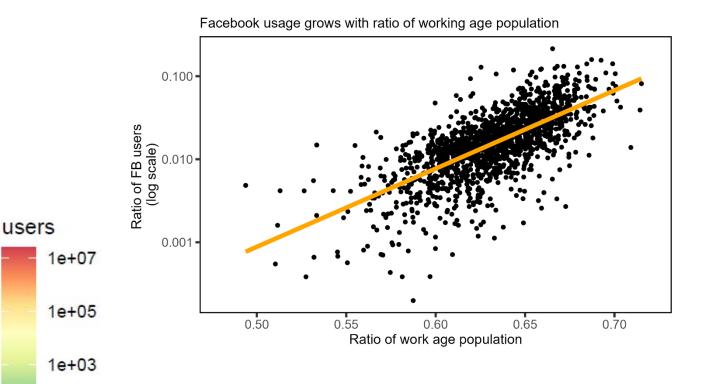


Zhang W et al (in preparation)

#### No of users at Tiles: 00:00-07:59, 2020-2022







#### Inflow of cities affected by Typhoon Rai



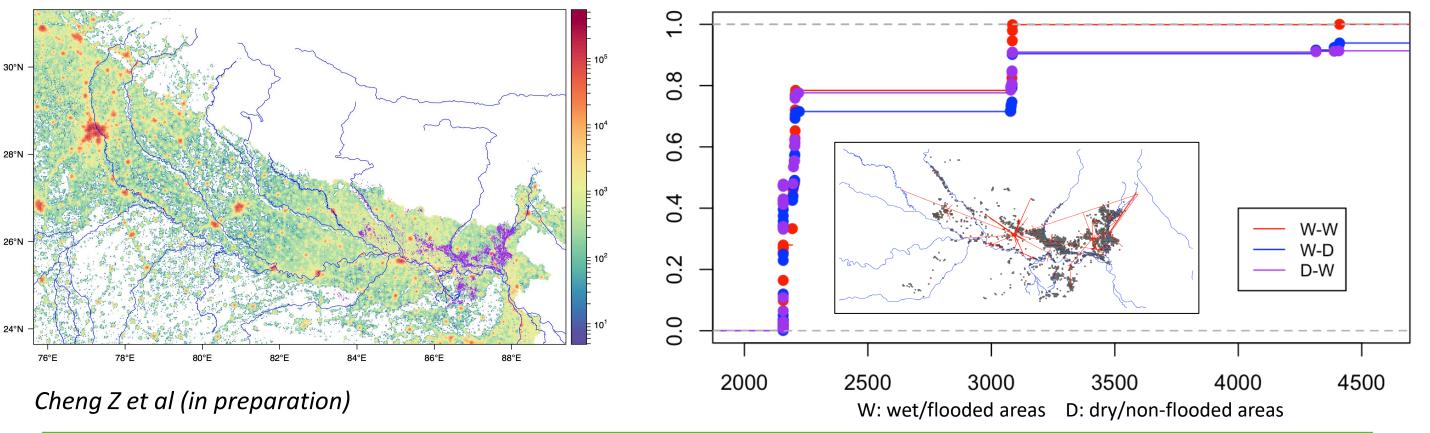
Both the inflow & outflow shows similar trend (Bohol, Cebu, Surigao del Norte) - Sudden drop and gradual increase

### Extracting flood-affected population and mobility data during the 2023 monsoon season in India



#### Movement between flooded and non-flooded areas

Dates



#### Comparing mobility datasets for measles outbreak modelling in Zambia

