



FIG Working Week 2024

19-24 May

Accra, Ghana

Your World, Our World:
Resilient Environment
and Sustainable
Resource Management
for All

Presented at the FIG Working Week 2024,
19-24 May 2024 in Accra, Ghana

Managing urban expansion: A case study from Malawi

Davie Chilonga, Malawi

Shlomo Angel, USA

Carsten Bjornsson, USA

ORGANISED BY



PLATINUM SPONSORS





FIG Working Week 2024

19-24 May

Accra, Ghana

Your World, Our World:
Resilient Environment
and Sustainable
Resource Management
for All



© Thisisplace.org

ORGANISED BY



PLATINUM SPONSORS

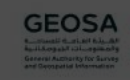


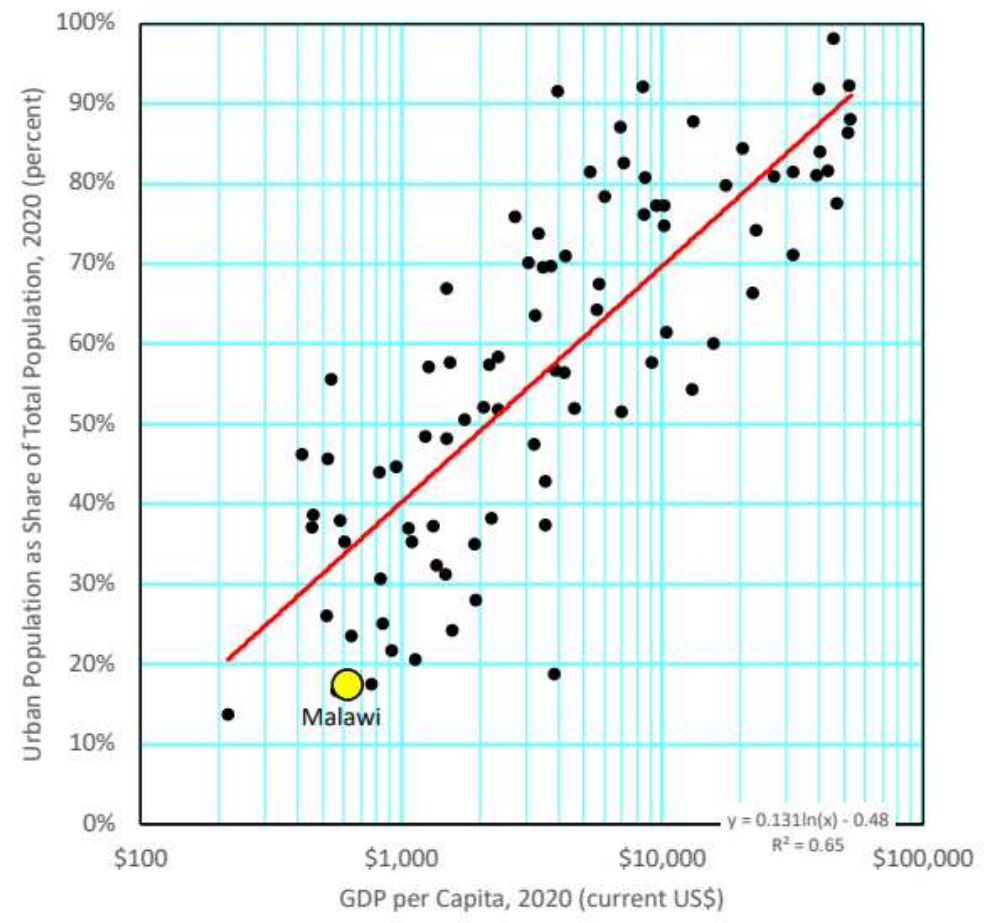


FIG Working Week 2024

19-24 May

Accra, Ghana

Your World, Our World:
Resilient Environment
and Sustainable
Resource Management
for All



- Malawi is urbanizing relatively rapidly
- Expected to increase from 17% in 2020 to 32% in 2050
- 26 cities in the country with 10,000 people or more grew 3.1% per annum between 2008 and 2018
- At these rates cities will double their populations, on average, by 2040



With their population growing, the cities are expanding into their rural peripheries

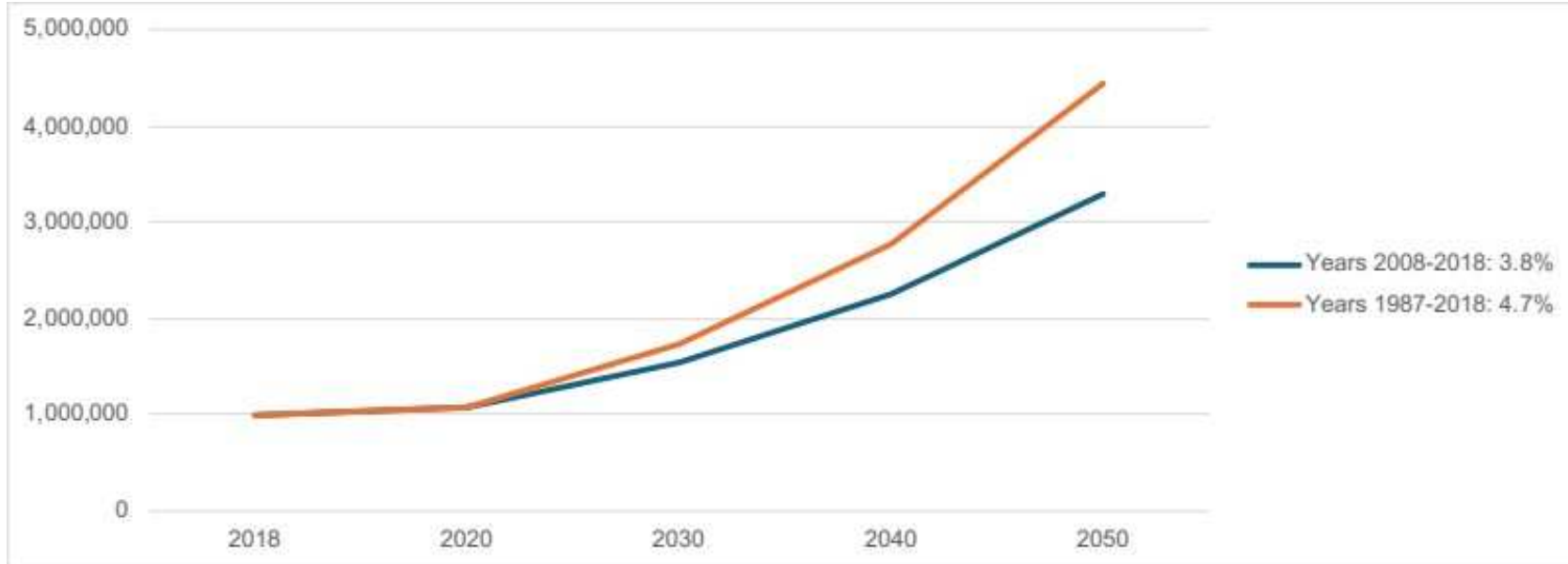


FIG Working Week 2024

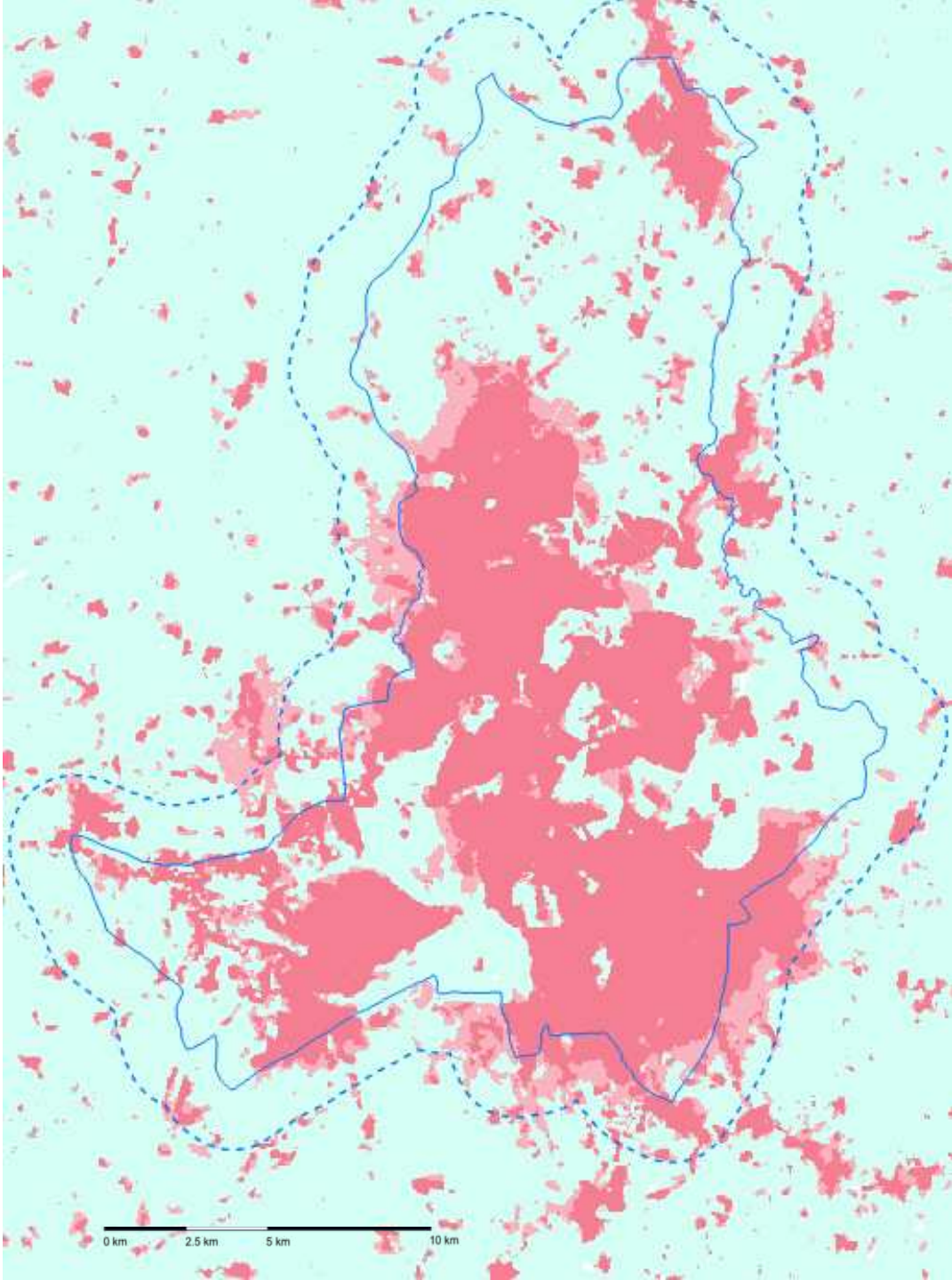
19-24 May

Accra, Ghana

Your World, Our World:
Resilient Environment
and Sustainable
Resource Management
for All



| Population growth projection - Lilongwe | Growth Rate | 2018 | 2020 | 2030 | 2040 | 2050 |
|---|-------------|---------|-----------|-----------|-----------|-----------|
| Years 2008-2018 | 3.8% | 989,000 | 1,067,000 | 1,553,000 | 2,262,000 | 3,295,000 |
| Years 1987-2018 | 4.7% | 989,000 | 1,087,000 | 1,737,000 | 2,776,000 | 4,437,000 |



Urban expansion into rural areas in Lilongwe (2017-2022)

Built up land use



2017



Lilongwe City boundary

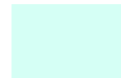


2022



2 km city expansion zone

Agricultural land use



2022

Lilongwe City (461 km²)

| | 2017 | 2022 | Change | |
|-----------------------|---------------------|---------------------|----------------------|------|
| Built up land use | 214 km ² | 253 km ² | 39 km ² | 8 % |
| Agricultural land use | 240 km ² | 198 km ² | - 42 km ² | -9 % |

2 km expansion zone (268 km²)

| | | | | |
|-----------------------|---------------------|---------------------|----------------------|-------|
| Built up land use | 42 km ² | 77 km ² | 35 km ² | 13 % |
| Agricultural land use | 225 km ² | 189 km ² | - 36 km ² | -13 % |

0 km 2.5 km 5 km 10 km



FIG Working Week 2024

19-24 May

Accra, Ghana

Your World, Our World:
Resilient Environment
and Sustainable
Resource Management
for All

| 2018 Census | | | | Average land consumption (m ²) | |
|----------------------|--|----------------------------------|---|--|------------|
| Number of households | Average household size (persons/household) | Build up area (km ²) | Population density (persons/km ²) | Per household | Per person |
| 230,000 | 4.3 | 222 | 4,456 | 964 | 286 |



| Area (km ²) needed to accommodate population growth | 2020 | 2030 | 2040 | 2050 |
|---|------|------|------|------------|
| Census 2008-2018 (3.1%) | 17 | 127 | 286 | 518 |
| Census 1987-2018 (4.1%) | 22 | 168 | 401 | 774 |



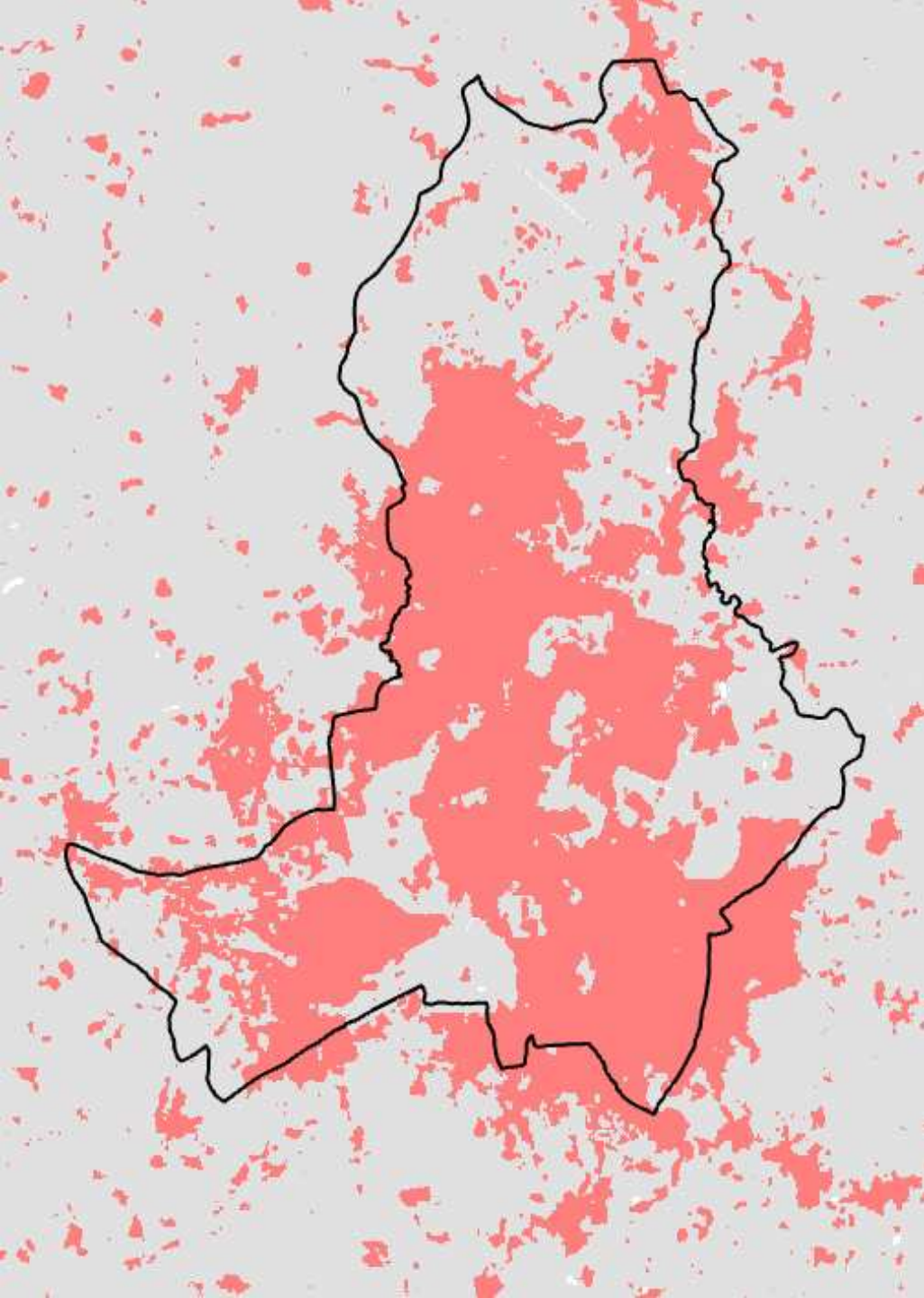
| Land use Type Lilongwe (2022) | Size (km ²) |
|-------------------------------|-------------------------|
| Agriculture | 198 |
| Living area | 253 |



Accommodate growth:

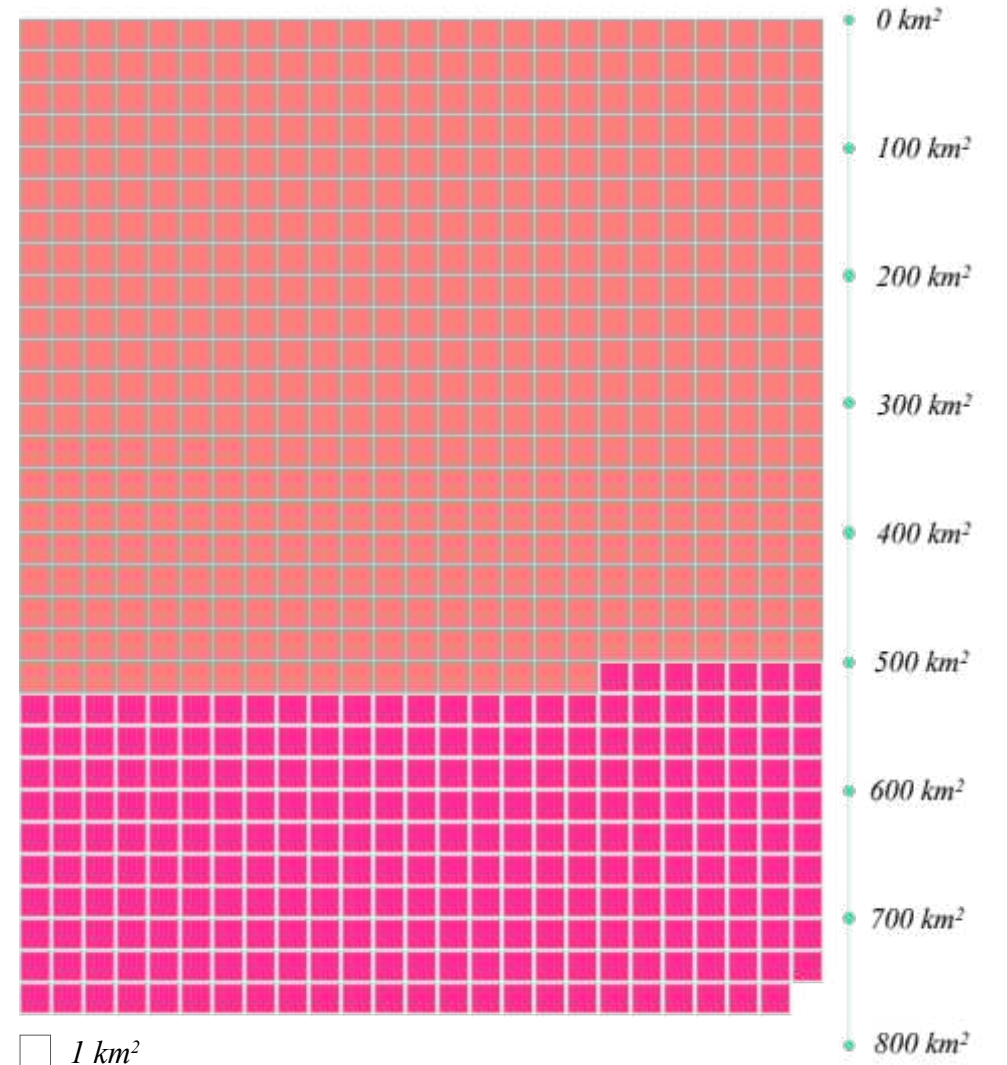
- Urban expansion
- Infill of vacant plots
- Reduction in plot size
- Increase household size
- Multi-story residential buildings

.....



Lilongwe 2022

- City boundary
- Built area
- Unbuilt land



□ 1 km²

■ Land needed by 2050 with population growth rate of 3.1 (518 km²)

■ Land needed by 2050 with population growth rate of 4.1 (774 km²)



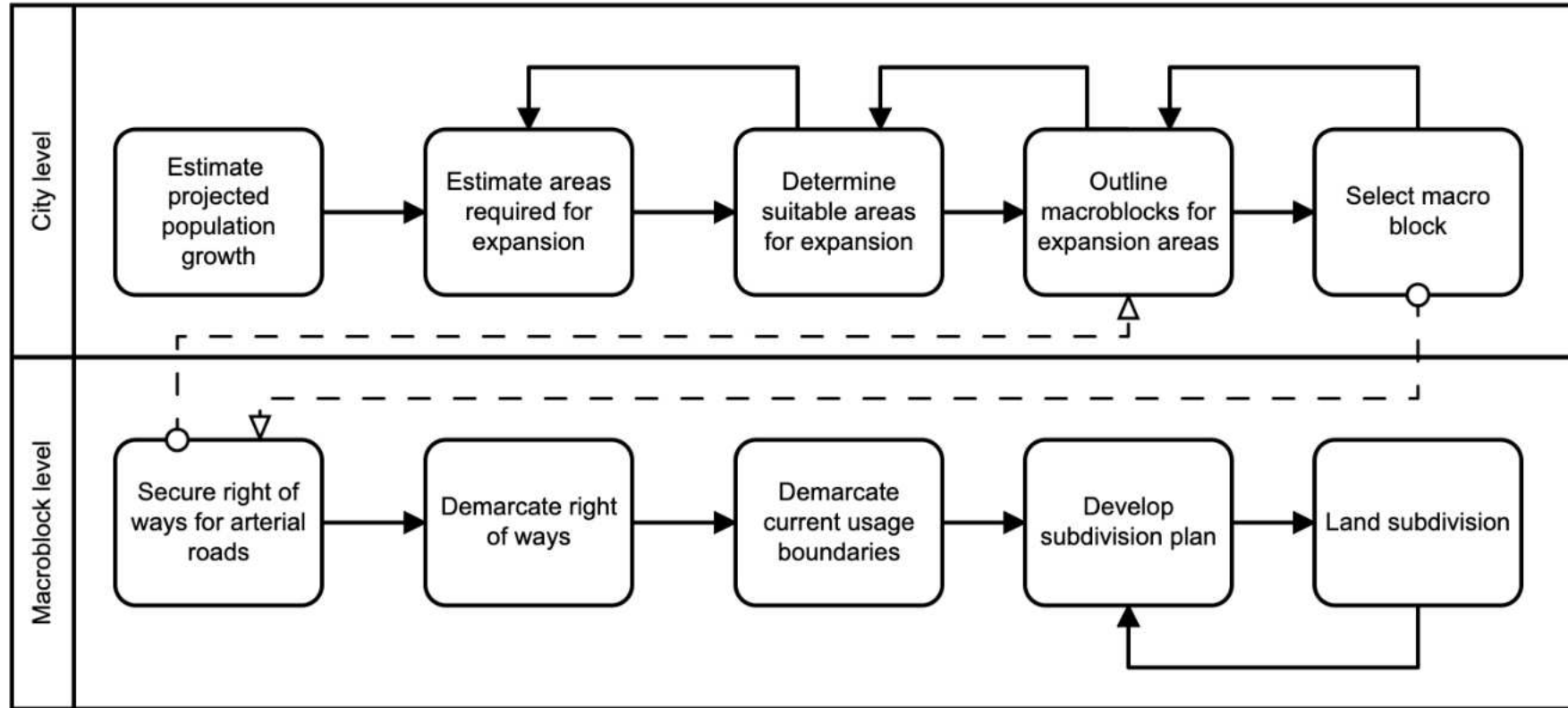
FIG Working Week 2024

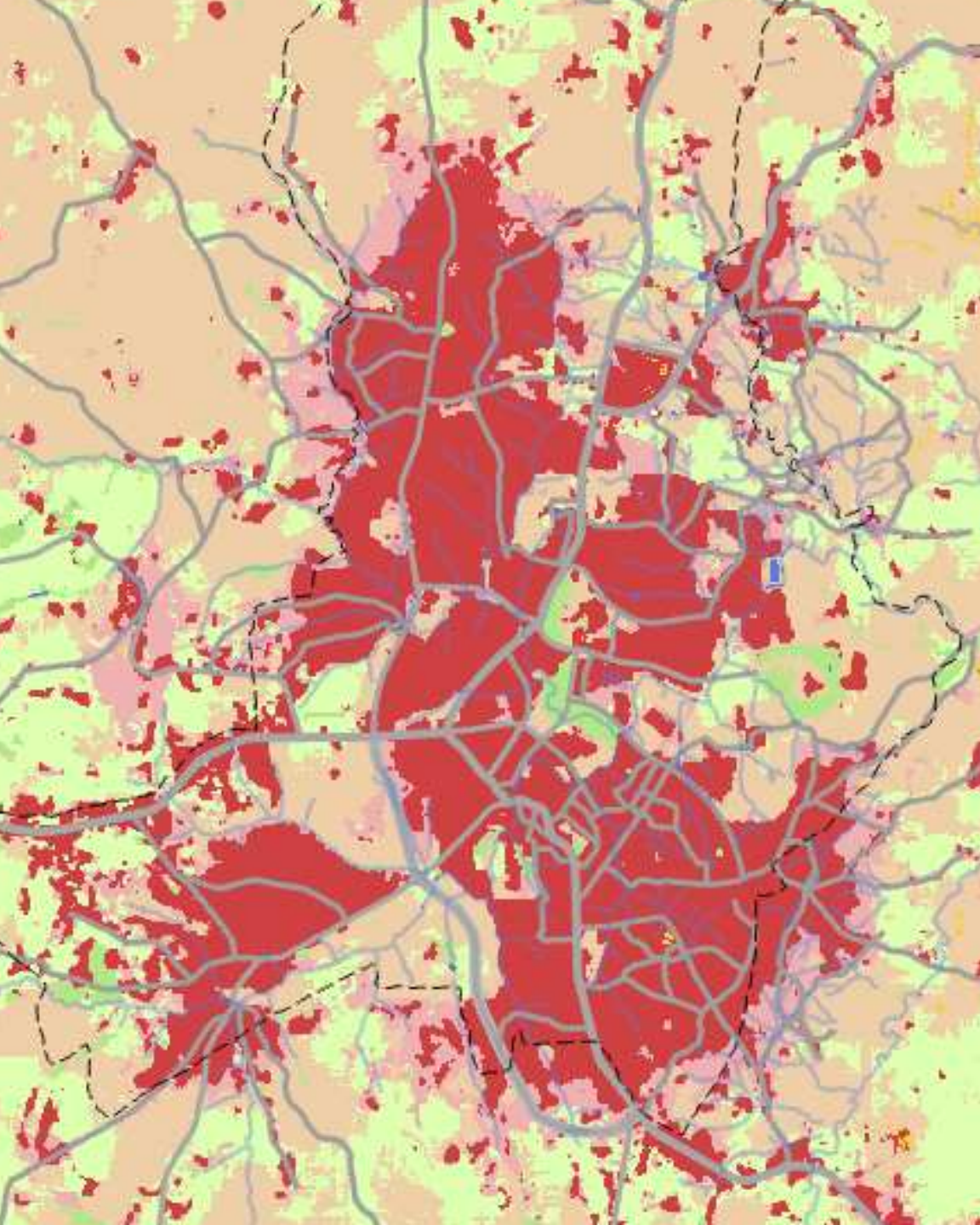
19-24 May

Accra, Ghana

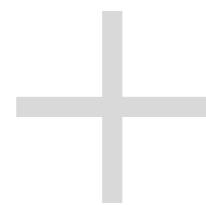
Your World, Our World:
Resilient Environment
and Sustainable
Resource Management
for All

Urban expansion planning process

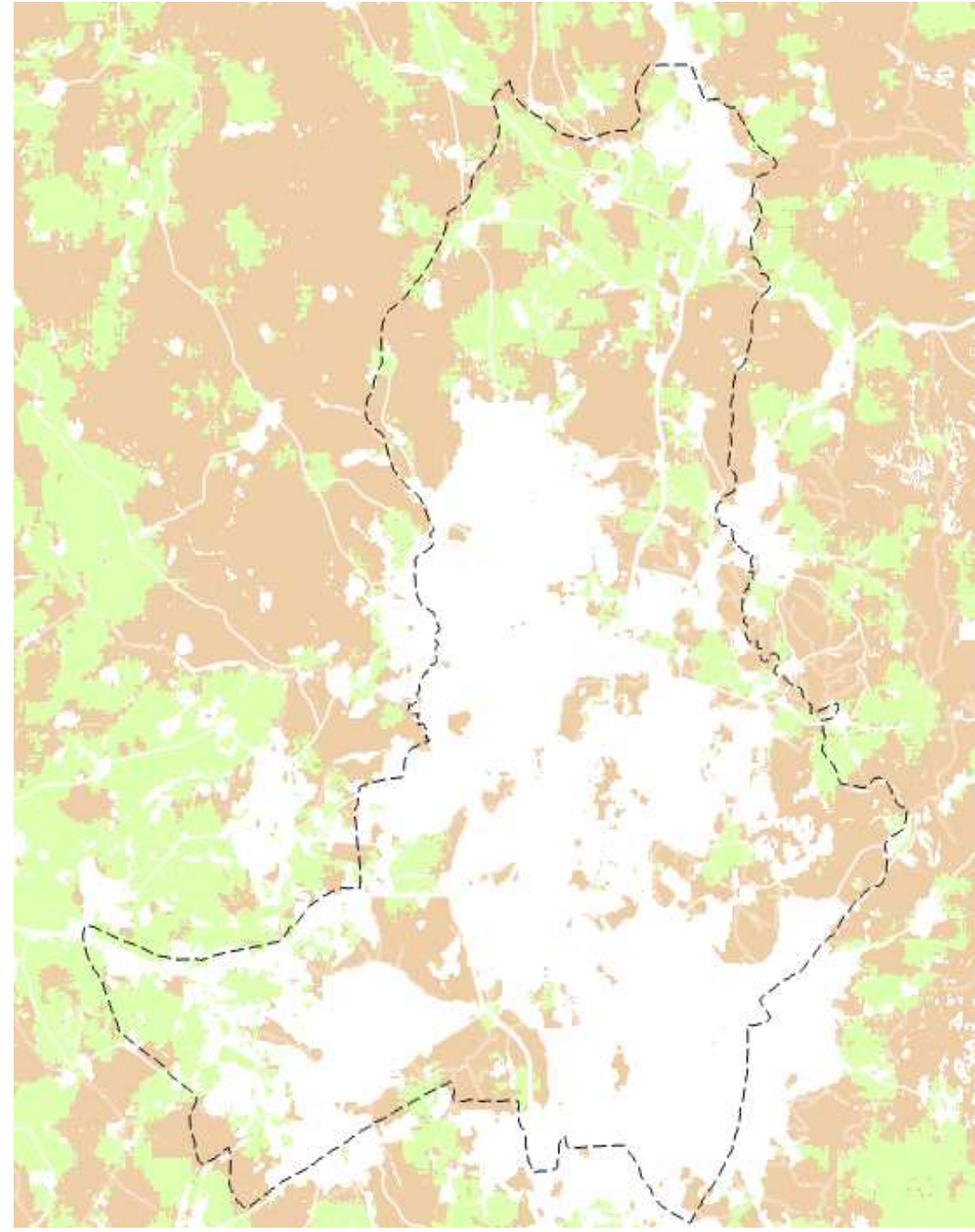




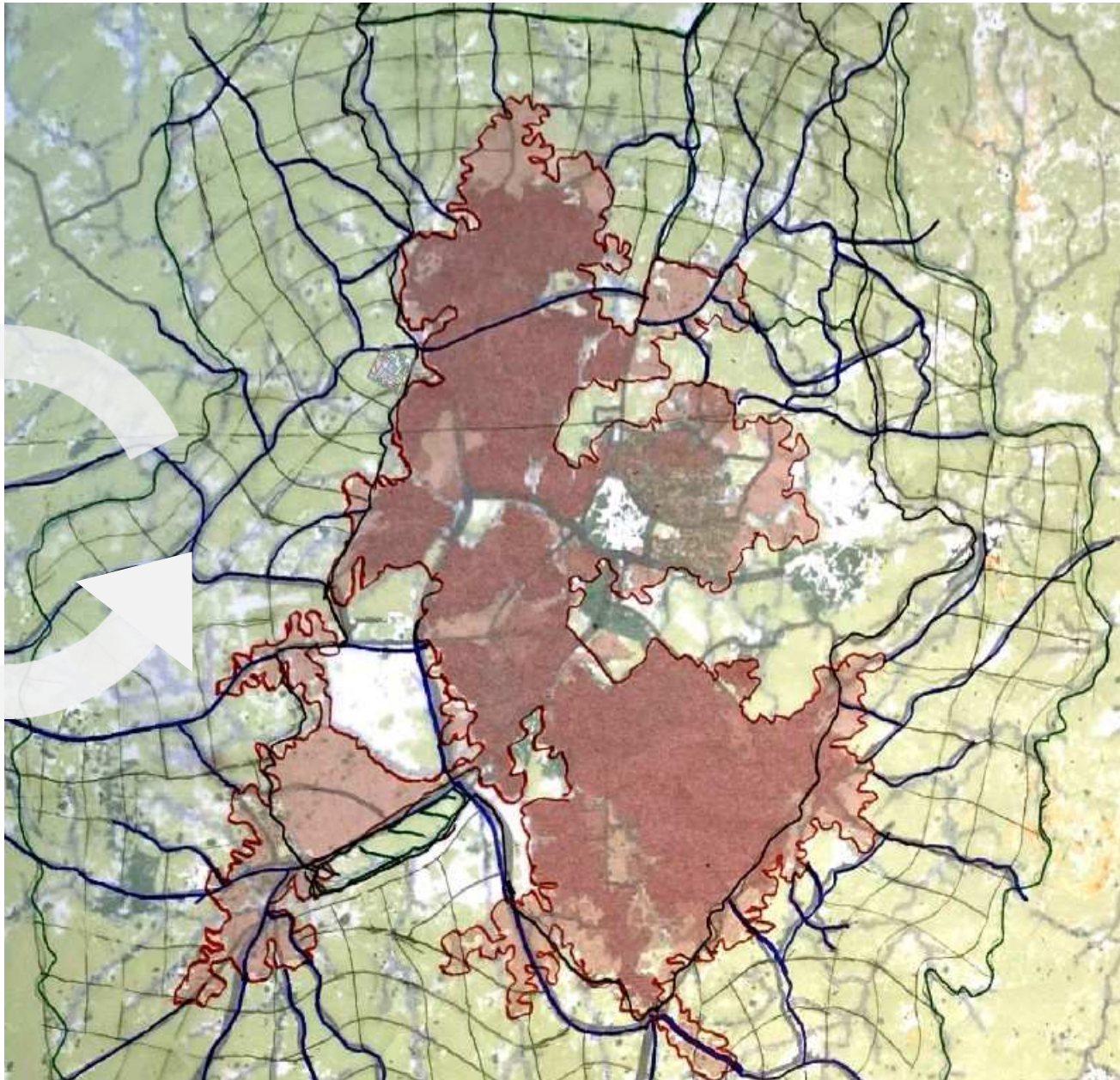
*Suitable
expansion
area map*



*Planning
base map*



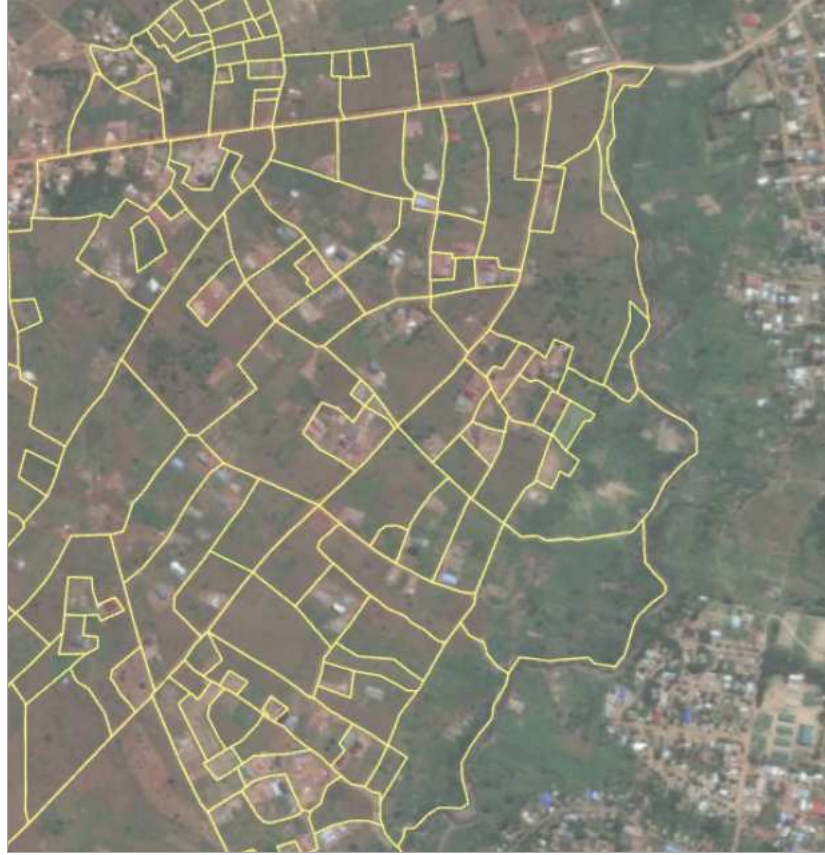
Macroblock design process



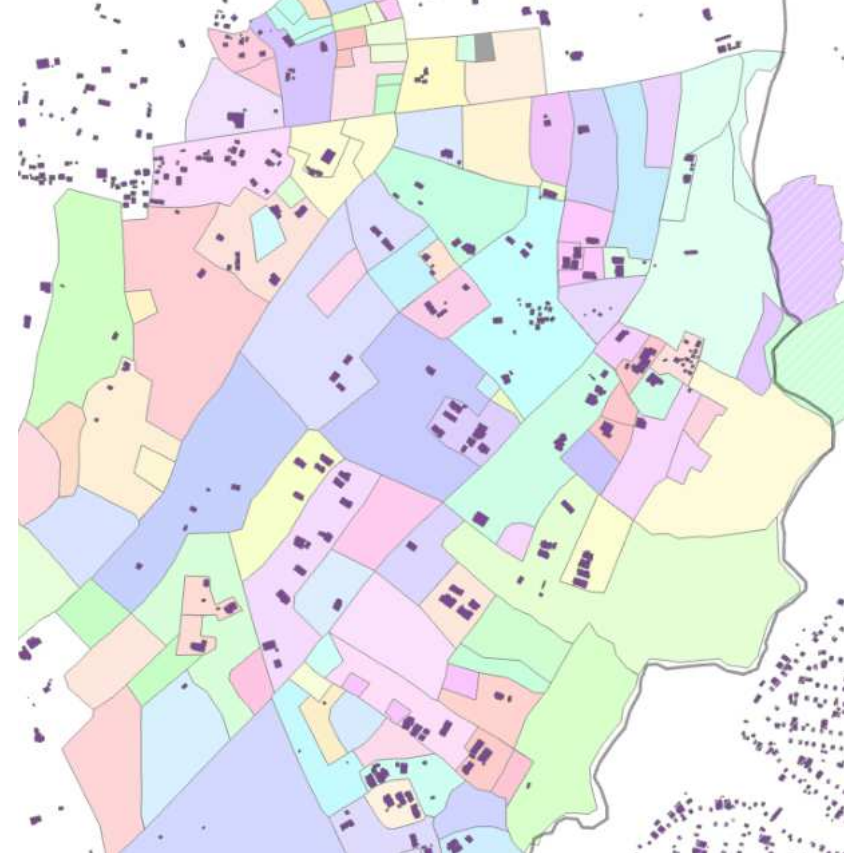
Current usage boundaries



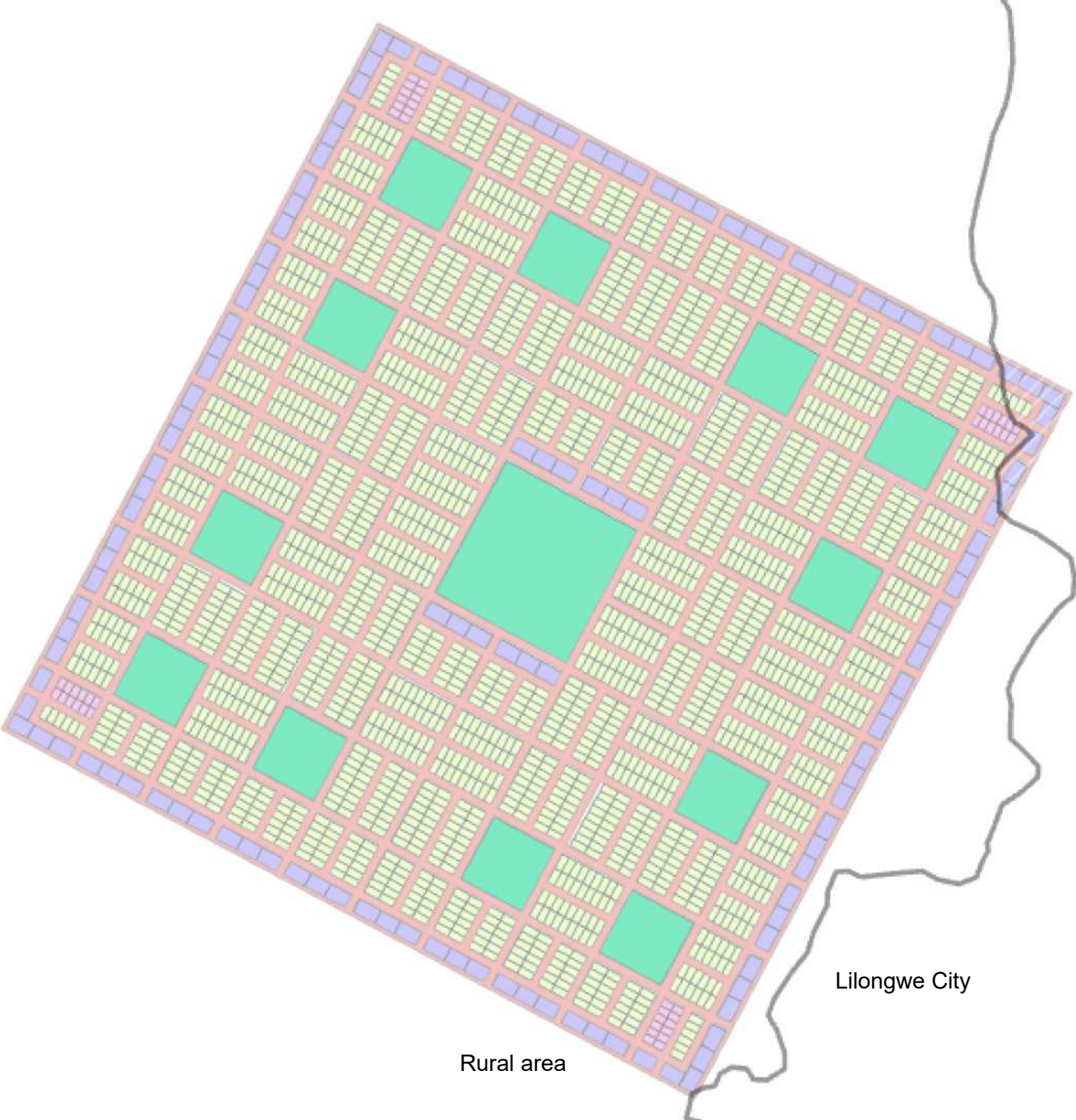
Macroblock delineation with arterial roads



Mapped usage boundaries within the macroblock

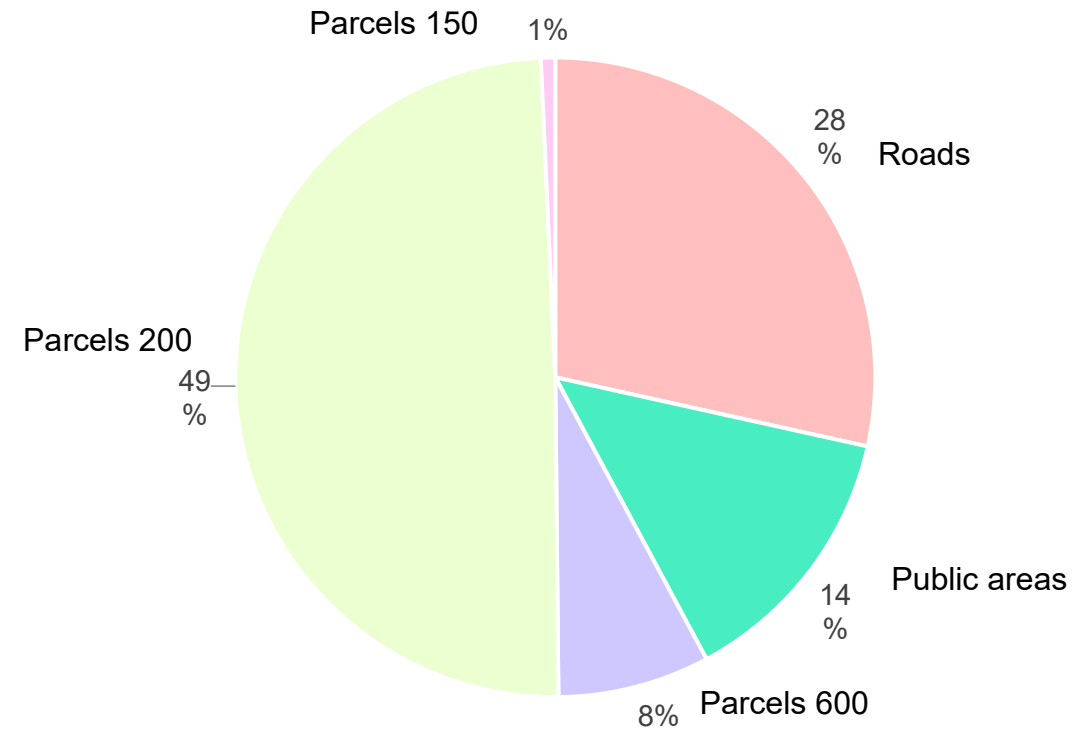


Identified rights, restrictions, and responsibilities within the macroblock

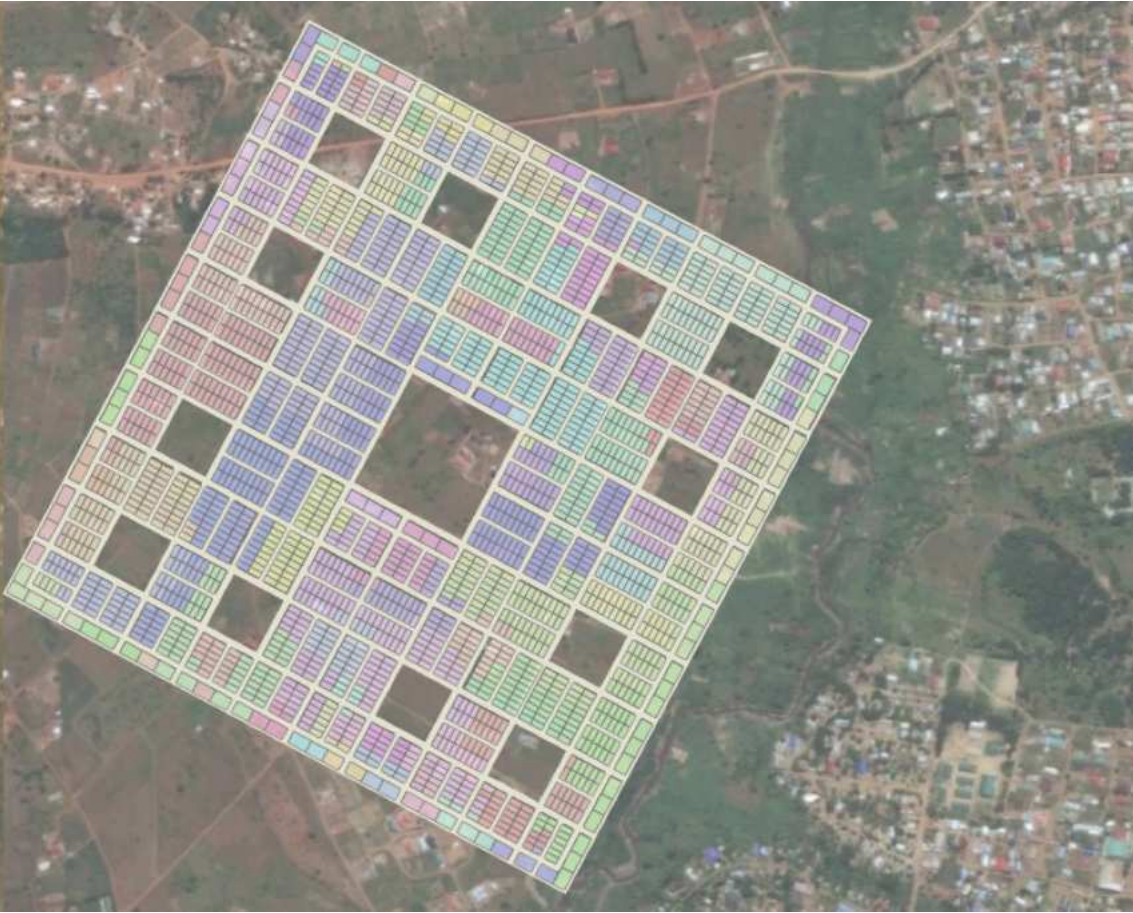
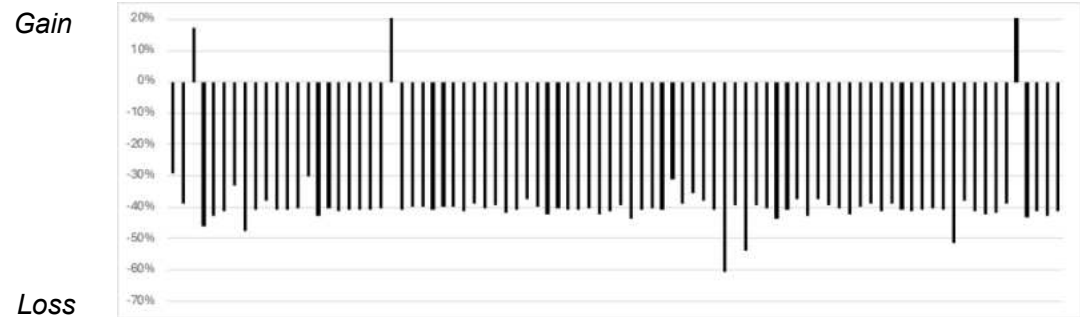
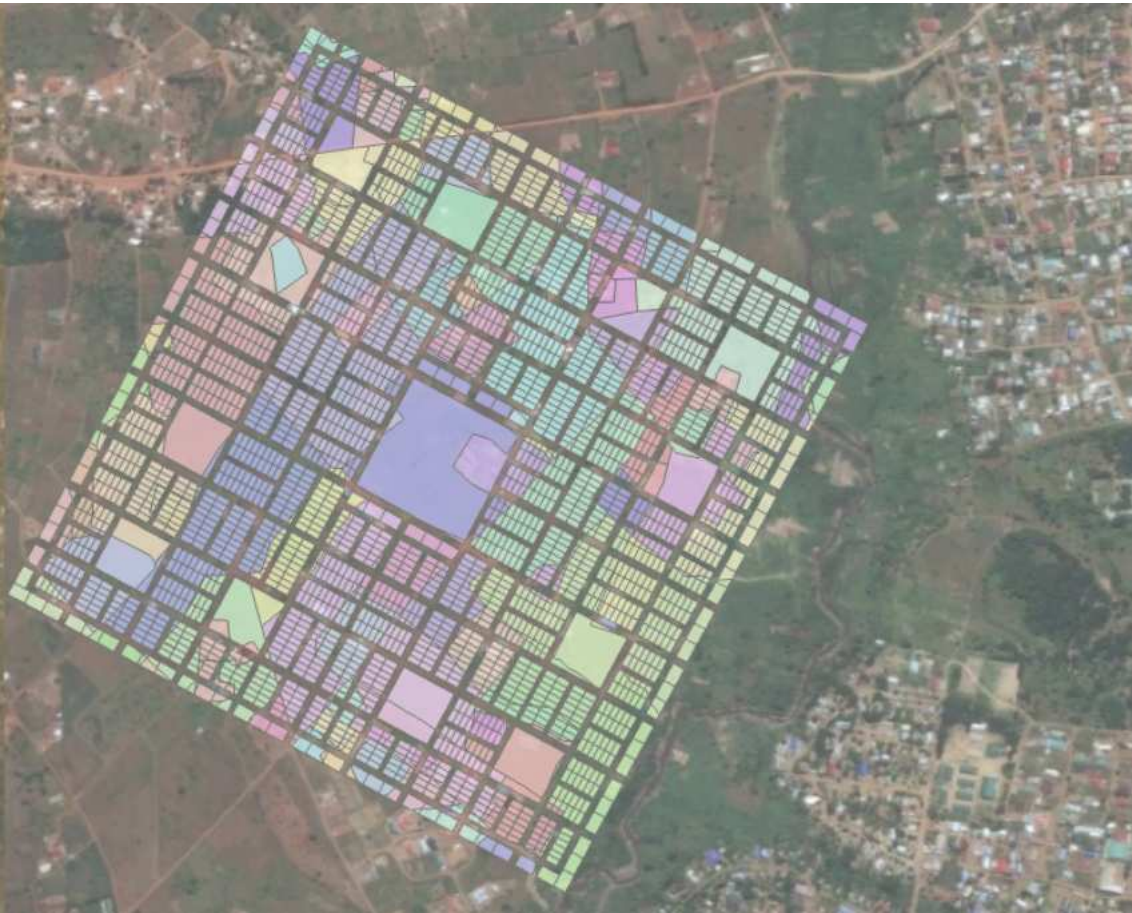


Design example: One kilometre block design - Area distribution

| Land use | Count | People per parcel type | Area (m ²) | Fraction |
|------------------------------|-------|------------------------|------------------------|----------|
| Roads | 101 | | 284.715 | 28% |
| Public areas | 13 | | 136.885 | 14% |
| Parcels – 600 m ² | 128 | 550 | 76.800 | 8% |
| Parcels – 200 m ² | 2472 | 10.629 | 494.400 | 49% |
| Parcels – 150 m ² | 48 | 206 | 7.200 | 1% |



Land pooling process



Deed of Occupancy



FIG Working Week 2024

19-24 May

Accra, Ghana

Your World, Our World:
Resilient Environment
and Sustainable
Resource Management
for All



THANK YOU