Supplementary note 1: Sensitivity analysis

Methods

We conducted three sensitivity analyses to assess the robustness of our estimates and typology.

Handling of missing and "don't know" responses

For each indicator, we computed the proportion of missing and "don't know" responses across all 62 conurbations and the 33 national urban estimates, and identified instances exceeding 5%, the most conservative threshold proposed in the literature [1–3]. For these, we compared estimates under the standard DHS approach, in which "don't know" responses are coded as non-receipt of care, against a complete-case alternative excluding them. We assessed robustness by whether the 95% confidence intervals overlapped between the two approaches and whether point estimates differed by more than 5 percentage points.

Effect on typology assignments

For each conurbation where the complete-case approach differed from the original by more than 5 percentage points, we examined whether the revised estimate changed the typology assignment. This was done first for each indicator separately and then jointly for conurbations where two or more indicators met the criterion, since simultaneous changes could cumulatively affect assignment. ANC1+ was excluded, as no meaningful alternative classification exists for women reporting facility attendance but with missing or "don't know" responses on number of visits.

Comparison with DHS sampling strata

To assess sensitivity to the definition of the extended urban area, we compared conurbation-level estimates with those for the corresponding DHS sampling stratum in the 30 conurbations that aligned directly with an urban stratum (**Table 4**). Stratum estimates were recalculated from the survey microdata using the same indicator definitions, recall period, and design-based estimation applied to the conurbations, so the two sets are directly comparable, and their estimates and 95% confidence intervals were compared for each indicator (**Supplementary Table 2 and Supplementary Figure 2**). This comparison is possible only

for these aligned cities; for the remaining 32 no equivalent urban stratum exists. Because the conurbation and stratum are differently derived boundaries enclosing overlapping but not identical sets of clusters, any difference reflects this boundary and sample difference rather than instability in the conurbation estimates.

Results

Sensitivity to missing and "don't know" responses

Overall, conurbation-level missingness on the key indicators was low; however, "don't know" responses were non-negligible for PNC48 and newborn weighed. The number of conurbations exceeding 5% of missingness varied by indicator: ANC1+ (n=8), ANC4+ (n=7), FBC (n=3), PNC48 (n=17), CS (n=2), and newborn weighed (n = 21) (**Supplementary Data 1**). To assess the robustness of estimates to the handling of missing and "don't know" responses, we compared confidence intervals (CIs) between the standard DHS approach and a complete-case alternative for conurbations exceeding the 5% missingness threshold. For most indicators, CIs overlapped between the two approaches in most affected conurbations, and where point estimate differences exceeded 5%, these were below 15%. The exception was newborn weighed, where CIs overlapped in about half of affected conurbations and differences ranged from 5.2% to 46.3%. Patterns at the national urban level were broadly consistent with those observed at the conurbation level (**Supplementary Data 2**).

Sensitivity of typology assignments

The sensitivity analysis of typology assignments resulted in reclassification of seven conurbations, in all cases to a higher-coverage category (**Supplementary Note 2**), suggesting that the typology is broadly stable and that conservative DHS coding may lead to a modest underestimation of coverage in a limited number of settings, which would need to be further examined including for reasons of missingness.

Sensitivity to conurbation boundary definition

Conurbation and aligned sampling-stratum estimates were closely concordant across all six indicators, with median absolute differences of 0.2–0.9 pp and overlapping 95% confidence intervals in 27–30 of the aligned conurbations per indicator (**3Supplementary Table 2 and Supplementary Figure 2**). Few larger differences were concentrated in merged multi-town conurbations (for example Benguela–Lobito, Dakar–Rufisque), where the functional boundary and the single sampling stratum enclose different populations.

References

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Supplementary note 2: Effect of "don't know" responses on typology assignments

To assess the impact of don't know on the typology, we conducted a sensitivity analysis examining whether conurbations would be reclassified into different typology groups when Don't know responses were excluded versus included using the standard DHS approach. This assessment focused on the five indicators that contribute to the typology classification and examined the stability of categorisation across the seven typology groups. To facilitate this comparison, each of the seven typology groups was assigned a number (rather than just a title as was in the original manuscript).

Performance typology group	**Group number**
: Highest coverage: All indicators are high or highest levels (green in Table 1)	1
High coverage: All indicators are medium or above, with at least one medium (a mix of green and blue in Table 1)	2
Inconsistent (low ANC4+) relative levels among the 5 indicators (green/blue mixed with brown in Table 1), with **ANC4+** the only low or lowest	3
Inconsistent (low PNC48) relative levels among the 5 indicators (green/blue mixed with brown in Table 1) with **PNC48** the only low or lowest	4
Inconsistent (low FBC and/or newborn weighed) relative levels among the 5 indicators (green/blue mixed with brown in Table 1) with only **FBC** coverage and/or **newborn weighed** low or lowest	5
Inconsistent: **(multiple low indicators)** relative levels among the five indicators (green/blue mixed with brown in Table 1) with two or more indicators low or lowest, not limited to **FBC** and **newborn weighed**	6
Low coverage: Low relative levels **on most** indicators, with none high or highest (mix of blue-brown in Table 1)	7

Specifically, we aimed to understand whether, had complete case analysis been conducted as an alternative method of deriving estimates, conurbations would have been classified into a different typology group. This analysis was restricted to indicators where “don't know” responses exceeded 5% and where the alternative estimation method produced a difference of more than 5 percentage points from the original estimate. For example, for facility-based childbirth in Ibadan, 10.3% of observations had a don't know response; the original estimate of births occurring in a health facility was 69.1%, compared to 77.4% under the complete case approach.

We present the results of this analysis both for each indicator separately and in totality, given that multiple indicators may have been re-evaluated within a given conurbation and the combined changes could result in reclassification into a different typology group. ANC1+ was excluded from this analysis as the only defensible classification for women reporting facility-based attendance but with missing or don't know responses on number of visits is to classify them as having received at least one visit; no meaningful alternative classification exists.

ANC4:

- Six conurbations fulfilled the criteria for sensitivity analysis.
- one of the six conurbations shows some evidence that a reclassification to a better performance category could be considered.

Conurbation	Old estimate	New estimate	Old category	New category	Notes
Freetown	59%	82%	6	6	No change
Dakar	72%	86%	2	2	No change
Lagos	80%	92%	6	6	No change
Windhoek	60%	86%	3	2	Change from category 3 to 2.
Ibadan	82%	88%	5	5	No change
Yaounde	84%	89%	1	1	No change

Facility-based childbirth:

- Three conurbations fulfilled the criteria for sensitivity analysis.
- No evidence that a change in classification is supported by the data.

Conurbation	Old estimate	New estimate	Old category	New category	Notes
Ibadan	69%	77%	5	5	No change
Lagos	74%	80%	6	6	No change
Uyo	52%	57%	7	7	No change

PNC48:

- Nine conurbations fulfilled the criteria for sensitivity analysis
- the data support a change in classification in two conurbations.

Conurbation	Old estimate	New estimate	Old category	New category	Notes
Dar es Salaam	62%	73%	4	1	Change from category 4 to 1.
Niamey	68%	78%	3	3	No change
Conakry	69%	77%	3	3	No change
Bobo Dioulassou	79%	87%	1	1	No change
Maputo	60%	67%	4	2	Change from category 4 to 2.
Libreville	75%	81%	1	1	No change
Windhoek	67%	73%	3	3	No change
Yauonde	74%	79%	1	1	No change
Ouagadogou	79%	84%	2	2	No change

Newborn weighed:

- 16 conurbations fulfilled the criteria for sensitivity analysis.
- the data support a change in classification in two conurbations.

Conurbation	Old estimate	New estimate	Old category	New category	Notes

Nouakchott	29.3%	75%	6	6	No change
Bamako	68%	93%	5	2	Change from category 5 to 2.
Monrovia	40%	56%	5	5	No change
Freetown	72%	86%	6	6	No change
Lagos	67%	79%	6	6	No change
Cotonou	88%	99%	2	2	No change
N'Djamena	50%	61%	7	7	No change
Banjul	86%	96%	2	1	Change from category 2 to 1.
Conakry	84%	92%	3	3	No change
Ibadan	58%	66%	5	5	No change
Windhoek	93%	99%	2	2	No change
Bobo Dioulassou	94%	100%	1	1	No change
Ouagadogou	91%	97%	2	2	No change
Johannesburg	91%	97%	3	3	No change
Lome	88%	93%	2	2	No change
Dakar	92%	97%	2	2	No change

Overall impact

Beyond the analysis of each individual indicator and the potential impact of sensitivity analysis results on the need for re-classification, we also assessed whether a combination of two or more changes in indicators might lead to a re-classification of a conurbation. For this, we reviewed all conurbations for which two or more indicators were re-assessed in sensitivity analysis.

In nine conurbations two or more indicators were affected based on the inclusion criteria (in three conurbations, three indicators were affected; and in six conurbations, two indicators were affected).

Conurbation	Indicators reviewed	Old category	Notes on reclassification based on changes in multiple indicators
Ibadan	ANC4+, FBC, newborn weighed	6	No change in category.
Lagos	ANC4+, FBC, newborn weighed	6	No change in category.
Windhoek	ANC4+, PNC48, newborn weighed	3	Reclassified to category 2 based on ANC4+. No further change supported.
Freetown	ANC4, newborn weighed	6	Based on changes to both indicators, reclassification from 6 to 2 is supported.
Dakar	ANC4+, newborn weighed	2	Based on changes to both indicators, reclassification from 2 to 1 is supported.
Yaounde	ANC4+, PNC48	1	In best category already.
Bobo Dioulassou	PNC48, newborn weighed	1	In best category already.
Ouagadogou	PNC48, newborn weighed	2	No change in category.
Conakry	PNC48, newborn weighed	3	No change in category.

In summary, the sensitivity analysis of missingness resulted in **reclassification of seven conurbations**:

Windhoek (from 3 to 2), Dar es Salaam (from 4 to 1), Maputo (from 4 to 2), Bamako (from 5 to 2), Banjul (from 2 to 1), Freetown (from 6 to 2), Dakar (from 2 to 1).

Supplementary note 3: Harmonised definitions of the maternal and newborn health indicators

1. **ANC1+**: At least one self-reported facility-based ANC visit during the pregnancy leading to the most recent livebirth. Women who reported having received ANC in a health facility but had missing data on the number of visits or reported that they did not know the number of visits were considered as having had at least one ANC visit.

2. **ANC4+**: Women who had at least four self-reported facility-based ANC visits during the pregnancy leading to the most recent live birth; a subset of women with ANC1+. Women who had missing data or reported that they did not know the number of visits were coded as having had fewer than four visits (they were coded as yes for ANC1+ but no for ANC4+) . ANC4+ was chosen in preference to at least eight ANC contacts (ANC8+), as the most comparable indicator across the surveys included, given that the majority of the surveys were conducted before the countries transitioned to the to the 2016 WHO recommendation of 8+ antenatal contacts.

3. **Facility-based childbirth (FBC)**: If the most recent livebirth reported by women occurred in a hospital, health centre, clinic, either public or non-public sector, it was considered to have occurred in a health facility. If the location of birth was reported as the respondent's or someone else's home, missing, or noted as "other" or "abroad", we considered them to have happened outside of a health facility.

4. **Birth by caesarean section (CS)**: Women who reported giving birth via a caesarean section based on the question about the mode of birth, for most recent livebirth. Women who gave birth outside a health facility and who had missing information on mode of birth were considered to have had a vaginal birth. Women who gave birth in a health facility and had a missing value for mode of birth were also considered to have had a vaginal birth.

5. **Postnatal care (PNC) check within 48 hours after birth by a skilled provider (PNC48)**: Women who reported receiving a health check by a skilled care provider within two days of giving birth, for the most recent livebirth. This was derived based on three DHS questions which indicate 1) if somebody checked on the woman's health or not; 2) how long after giving birth did the check take place; and 3) the cadre of the care professional who provided the check. In some countries the set of questions was asked twice to women who gave birth in a health facility to indicate if they received a check both before and after discharge

from the facility. In this case the outcome PNC48 took into consideration the timing of the *earliest* check provided by a skilled provider. A skilled care provider was defined following the DHS report for each country and survey. This included doctors, nurses/midwives and technical health agents for most countries (**Supplementary Table 3**). This approach respects contextual definitions of which cadres are identified as 'skilled providers' in each conurbation to produce locally-sensitive indicators [1,2]. Therefore the approach strengthens comparability between countries and conurbations (**Supplementary Table 3**). Women who had missing data on whether they were checked, did not know the cadre of the provider, or the timing of the check, were considered not to have received a postnatal check by a skilled provider within 48 hours of birth.

6. **Baby weighed**: indicates whether the newborn was weighed at birth, either on the basis of their weight being recorded on hand-held medical records shown to DHS enumerators or based on the mother's recall, for the most recent livebirth. Babies who were not weighed or whose mothers did not know whether they were weighed, and those who had missing values were considered not to have been weighed.

References

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Supplementary Table 1: Maternal and newborn health indicator estimates with 95% confidence intervals, at national urban and conurbation levels

Conurbation (country)	ANC1+		ANC4+		FBC		CS		PNC48		Newborn weighed	
	%	95%CI	%	95%CI	%	95%CI	%	95%CI	%	95%CI	%	95%CI
Benguela/Lobito	94	[90.2-96.4]	78.3	[69.4-85.1]	78.8	[71.7-84.5]	7	[4.0-11.8]	34	[28.4-40.1]	91.1	[86.8-94.1]
Cabinda	96	[92.7-97.8]	66.7	[58.3-74.2]	88.1	[80.0-93.2]	2.9	[1.0-7.8]	22.1	[17.2-27.9]	94	[89.9-96.5]
Huambo	90.8	[79.8-96.1]	69	[54.2-80.7]	69.2	[55.2-80.4]	13.7	[6.7-25.9]	38.3	[28.3-49.4]	78.8	[66.3-87.5]
Luanda	97	[95.1-98.2]	83.3	[78.7-87.1]	73.5	[67.2-78.9]	6.8	[5.1-9.1]	38.1	[32.7-43.8]	90.8	[86.5-93.8]
Malanje	94.3	[90.8-96.6]	60.5	[50.6-69.6]	55	[41.0-68.3]	1.7	[0.6-4.6]	24.4	[19.7-29.9]	80.5	[69.1-88.5]
1. Angola	92.3	[90.8 -93.5]	73	[70.3-75.6]	66.5	[63.1-69.6]	5.9	[4.9-7.2]	30.7	[27.9-33.6]	79.2	[76.5-81.6]
Cotonou/Abomey-Calavi	98.6	[97.6-99.2]	76.7	[72.5-80.4]	99	[97.9-99.5]	13	[10.3-16.3]	73	[66.2-78.8]	87.5	[84.2-90.1]
Djougou	97.5	[94.5-98.9]	37.1	[28.9-46.1]	98.6	[94.7-99.6]	4.3	[2.1-8.4]	90	[81.0-95.0]	92.9	[85.4-96.7]
2. Benin	93.4	[91.2-95.1]	58.2	[54.9-61.5]	91.2	[88.4-93.4]	8.3	[7.0-9.7]	66.2	[62.3-69.8]	73	[69.3-76.4]
Bobo-Dioulasso	100	--	83.7	[77.9-88.2]	97.9	[95.1-99.1]	8.6	[4.8-14.9]	79.2	[73.3-84.0]	94.1	[90.7-96.3]
Ouagadou	98.4	[97.0-99.2]	70.6	[64.8-75.7]	99.2	[97.9-99.7]	11.9	[9.3-15.2]	79.3	[73.6-84.1]	91.1	[88.6-93.1]
3. Burkina Faso	98.8	[98.1-99.3]	74.7	[71.6-77.5]	98.2	[97.4-98.8]	10.3	[8.7-12.2]	80.5	[77.5-83.1]	89.7	[87.9-91.2]
Bujumbura	99.8	[98.5-100]	48.3	[39.9-56.8]	94	[90.3-96.3]	13.9	[9.7-19.6]	76.5	[67.5-83.5]	92.9	[87.6-96.0]
4. Burundi	99.7	[99.2-99.9]	50.7	[45.6-55.8]	95.5	[93.3-96.9]	16.1	[13.1-19.7]	71.6	[67.1-75.8]	93.6	[90.6- 95.7]
Bafoussam/Mbouda	98.8	[95.1-99.7]	80.7	[71.2-87.6]	98.2	[94.5-99.4]	6.3	[3.2-12.0]	77	[67.2-84.6]	95.9	[90.6-98.3]
Douala	97.3	[94.0-98.8]	90.9	[87.0-93.8]	97.3	[93.1-99.0]	12.3	[8.5-17.4]	72.4	[61.6-81.1]	97.8	[95.4-99.0]
Yaoundé	97.2	[94.9-98.5]	83.7	[77.2-88.7]	94.3	[88.2-97.3]	6.5	[4.7-8.9]	74.2	[68.9-78.9]	93.5	[90.5-95.6]
5. Cameroon	95.4	[94.0-96.5]	77.7	[75.2- 80.1]	88.8	[85.6-91.3]	6.7	[5.6-8.1]	70.1	[67.1-74.0]	88	[84.9-90.5]
N'Djamena	85.6	[81.8-88.7]	58.6	[53.6-63.4]	70.2	[64.4-75.4]	7.1	[4.7-10.7]	26.9	[23.0-31.3]	50.2	[43.7-56.8]
6. Chad	84.5	[80.8-87.6]	50.6	[47.4-53.8]	56.7	[52.7-60.6]	4.2	[3.1-5.7]	30	[26.8-33.5]	37.8	[33.6-42.3]
Kinshasa	97.6	[95.5-98.8]	72.6	[67.8-76.8]	98.5	[97.1-99.2]	6.3	[4.1-9.6]	62	[53.8-69.5]	98.9	[97.5-99.6]
Lubumbashi	88	[81.3-92.5]	54.8	[48.8-60.7]	100	--	3.9	[1.7-8.4]	68.8	[47.5-84.3]	100	--
Mbuji-Mayi	92.2	[85.6-95.9]	69.3	[62.9-75.0]	97.3	[92.3-99.1]	4.7	[0.7-25.7]	42	[23.7-62.7]	97.5	[94.6-98.9]
7. DRC	94.5	[93.2-95.6]	60	[57.7-63.0]	93.8	[92.0-95.2]	7.8	[6.3-9.5]	55.8	[51.2-60.2]	94.1	[92.4-95.5]
Addis Ababa	98.8	[95.6-99.7]	83.3	[74.3-89.6]	96.5	[93.2-98.3]	22.3	[15.6-30.7]	74.5	[67.4-80.6]	n/a	n/a
Dire Dawa	93.8	[84.6-97.6]	75.5	[66.4-82.8]	96	[89.4-98.6]	25	[17.0-35.3]	55.8	[47.4-63.8]	n/a	n/a
8. Ethiopia	85.1	[75.5-91.4]	57.6	[50.2-64.7]	73.2	[55.6-85.6]	9.9	[7.4-13.4]	45.9	[34.9-57.4]		
Libreville	97.6	[95.6-98.7]	82.1	[78.3-85.4]	97.9	[96.2-98.8]	10.5	[7.6-14.3]	74.9	[69.2-79.8]	95.5	[93.0-97.1]
9. Gabon	97.5	[96.4-98.3]	79.3	[76.8-81.5]	96.6	[95.6-97.4]	8.8	[6.9-10.9]	73.5	[70.0-76.6]	95.9	[94.5-96.9]
Banjul	99.1	[96.1-99.8]	81.8	[74.1-87.6]	93.6	[87.6-96.8]	11.7	[8.0-16.8]	88.6	[83.4-92.3]	86.4	[80.3-90.8]
10. The Gambia	99.6	[99.1-99.8]	76.6	[73.8-79.2]	89.4	[87.1-91.3]	5.4	[4.4-6.7]	86.5	[84.4-88.3]	86.4	[83.9-88.6]
Accra	96.5	[93.2-98.2]	87.9	[82.2-91.9]	92	[87.6-95.0]	30.1	[23.9-37.1]	92.9	[88.7-95.6]	91	[86.3-94.3]
Kumasi	100	-	97.4	[90.1-99.4]	95.8	[91.0-98.1]	32.2	[24.8-40.6]	89.1	[79.9-94.4]	94.5	[88.8-97.4]
Tamale, Ghana	98.5	[94.7-99.6]	95.9	[92.4-97.8]	94.7	[91.0-96.9]	18.8	[11.7-28.8]	90	[86.4-92.7]	91	[83.0-95.5]

11. Ghana	98.6	[97.7-99.2]	91.5	[89.5-93.1]	93.5	[91.9-94.8]	26.3	[23.7-29.1]	90.3	[88.2-92.1]	89.5	[87.5-91.3]
Conakry	95	[90.8-97.4]	53.3	[47.2-59.3]	88.5	[84.4-91.6]	6.7	[4.8-9.2]	69	[62.6-74.8]	83.9	[77.5-88.7]
12. Guinea	95.7	[93.5-97.1]	52.6	[48.2-56.9]	84.5	[81.5-87.1]	6.6	[5.2-8.2]	66.5	[62.2-70.5]	81.5	[77.7-84.7]
Abidjan	98.6	[95.8-99.5]	79.1	[71.1-85.3]	94.9	[91.3-97.0]	15.6	[11.5-20.8]	70.1	[63.9-75.7]	91.7	[87.7-94.4]
13. Côte d'Ivoire	97.5	[96.5-98.3]	68.4	[64.8-71.7]	90.9	[88.9-92.5]	12.4	[10.5-14.7]	74.5	[71.4-77.3]	89	[86.8-90.9]
Kisumu	99.5	[96.6-99.9]	63.7	[54.4-72.1]	97.6	[93.9-99.1]	11.4	[6.9-18.3]	89.2	[82.8-93.3]	96.9	[88.2-99.2]
Mombasa	99.1	[97.1-99.7]	71.2	[65.2-76.6]	93.1	[89.0-95.7]	17.3	[13.3-22.1]	79.3	[72.0-85.0]	97.3	[93.1-99.0]
Nairobi/Ruiru	99.8	[98.7-100]	79	[73.5-83.6]	99	[97.6-99.6]	28.4	[22.2-35.5]	85.6	[80.0-89.8]	99.5	[98.6-99.9]
14. Kenya	98.9	[98.5-99.3]	75.7	[72.9-78.2]	97.1	[96.4-97.7]	24.1	[21.1-27.5]	83.5	[80.9-85.8]	96.9	[96.2-97.6]
Maseru	96.2	[90.1-98.6]	85.1	[76.9-90.7]	91.2	[83.8-95.4]	25.9	[18.0-35.6]	82.4	[75.7-87.5]	90.8	[83.7-95.0]
15. Lesotho	96.9	[93.9-98.5]	78.3	73.4-82.6]	90.2	[86.1-93.1]	12	[8.9-15.9]	71.6	[65.4-77.1]	93.9	[90.2-96.3]
Monrovia	98.7	[96.5-99.5]	88.8	[83.8-92.3]	79.7	[73.4-84.8]	7.3	[4.4-12.0]	71.4	[64.4-77.5]	39.9	[33.9-46.2]
16. Liberia	98.8	[97.6-99.4]	89.6	[86.2-92.3]	86.4	[82.4-89.6]	7.2	[5.2-9.9]	74.3	[70.1-78.0]	38.8	[34.6-43.2]
Antananarivo	98.1	[95.9-99.1]	80.6	[74.8-85.3]	78.4	[72.7-83.1]	11.3	[8.1-15.5]	74.6	[69.4-79.3]	80.4	[74.5-85.2]
17. Madagascar	95.9	[94.2-97.2]	73	[68.7-76.9]	60.2	[54.9-65.3]	7.2	[5.6-9.1]	64.3	[58.3-69.9]	69.4	[62.9-75.1]
Blantyre	98.1	[95.1-99.3]	52.7	[45.1-60.1]	95.4	[92.0-97.3]	9.7	[6.2-14.7]	32.6	[26.9-38.9]	93.5	[87.8-96.7]
Lilongwe	100	--	61.8	[51.2-71.4]	96.6	[91.4-98.7]	13.3	[7.9-21.5]	63.8	[49.8-75.8]	93.3	[88.4-96.3]
18. Malawi	98.9	[97.8-99.4]	58.5	[54.1-62.8]	96.7	[94.8-97.9]	11.9	[9.4-15.1]	51.9	[46.5-57.4]	93.6	[91.2-95.4]
Bamako	95.7	[92.2-97.7]	70	[63.8-75.6]	96.6	[94.3-98.0]	4.5	[3.1-6.5]	75.7	[69.9-80.7]	67.7	[60.9-73.9]
19. Mali	94.1	[90.5-96.4]	67.4	[62.2-72.2]	93.8	[90.9-95.9]	5.3	[4.0-6.9]	74.3	[69.4-78.6]	62.5	[56.8-67.8]
Nouakchott	97.6	[96.0-98.6]	44.8	[40.4-49.3]	98.6	[97.21-99.3]	15	[12.3-18.2]	52.1	[46.1-58.1]	29.1	[24.8-33.7]
20. Mauritania	95.7	[94.7-96.5]	45.1	[42.3-47.9]	95.2	[94.2-96.1]	12.1	[10.4-13.9]	53.1	[49.5-56.6]	27	[24.4-29.8]
Maputo	99.5	[98.1-99.9]	84.6	[80.4-87.9]	96.9	[94.9-98.2]	19.3	[15.6-23.7]	60.4	[50.9-69.3]	94.3	[91.1-96.4]
21. Mozambique	96.3	[94.0-97.0]	67	[64.4-70.5]	89.2	[85.5-92.0]	10.7	[9.3-12.5]	42.4	[37.8-47.1]	85.5	[81.7-88.6]
Windhoek	95.1	[92.0-97.0]	60	[48.9-70.2]	96.7	[93.9-98.3]	27.8	[22.1-34.3]	67.4	[56.6-76.6]	93.4	[89.6-95.8]
22. Namibia	96.1	[94.9-97.1]	64.2	[59.6-68.5]	95.7	[94.1-96.8]	22.4	[19.7-25.2]	69.2	[64.7-73.3]	93.6	[91.9-94.9]
Niamey	98.7	[97.1-99.4]	48.6	[43.8-53.4]	89.4	[86.5-91.8]	9.2	[6.8-12.2]	67.5	[61.5-73.0]	90.4	[87.5-92.7]
23. Niger	97.7	[96.6-98.4]	46.6	[43.4-49.8]	85.3	[82.3-87.8]	5.7	[4.5-7.3]	66.7	[62.5-70.7]	82.8	[79.6-85.6]
Aba	95.7	[91.1-98.0]	90.2	[82.8-94.6]	84.2	[55.3-95.8]	5	[3.2-7.6]	57.6	[44.1-70.1]	51.33	[33.1-69.3]
Abuja	87.3	[75.0-94.1]	69.9	[60.6-77.8]	69.9	[59.8-78.3]	8.2	[4.7-14.1]	65.9	[58.4-72.6]	61.08	[47.9-72.9]
Enugu	96.7	[92.2-98.7]	90.8	[84.6-94.7]	83.6	[74.3-90.0]	8.3	[4.6-14.4]	84.4	[75.1-90.7]	65.47	[53.0-76.1]
Ibadan	95	[89.9-97.9]	82	[75.9-86.8]	69.1	[62.1-75.3]	5.2	[2.8-9.4]	82	[71.5-89.2]	58.1	[49.2-66.5]
Ikot Ekpene/ Uyo	85.2	[74.2-92.1]	70.6	[57.8-80.7]	52.2	[40.0-64.1]	6.5	[2.8-14.2]	43.3	[33.2-54.0]	54	[42.8-64.9]
Kano State	94.7	[87.2-97.9]	65.1	[56.9-72.4]	41.5	[30.9-52.8]	3.3	[1.7-5.9]	41.7	[30.0-54.5]	26.4	[16.6-39.3]
Lagos / Ikorodu	95.6	[91.6-97.8]	80	[75.1-84.1]	73.6	[67.3-79.1]	12	[8.0-17.5]	66.4	[56.8-74.8]	66.82	[56.5-75.7]

Maiduguri	70.5	[54.2-82.8]	37.1	[23.5-53.2]	44.3	[32.3-56.9]	1.7	[0.4-6.3]	36.4	[23.9-51.0]	28.4	[18.4-41.0]
Onitsha/Umuahia/Owerri/Nnewi	97.9	[96.2-98.8]	83.2	[79.5-86.3]	94.8	[92.5-96.4]	7.2	[4.7-10.9]	82.1	[78.3-85.3]	79.8	[75.7-83.3]
Port Harcourt	93.5	[87.6-96.7]	88.3	[76.4-94.6]	70.3	[55.6-81.8]	13.9	[6.1-28.7]	55.4	[41.5-68.4]	69.4	[61.7-76.1]
Sokoto	75.3	[62.6-84.7]	54.8	[40.4-68.5]	29.1	[13.2-52.5]	1.4	[0.2-7.7]	32.5	[15.6-55.6]	18	[7.2-38.0]
24. Nigeria	89.8	[88.1-91.3]	72.8	[70.8-74.7]	61.4	[58.7-63.9]	5.4	[4.6-6.3]	57.1	[54.4-59.8]	44.9	[42.2-47.7]
Kigali	97.7	[95.4-98.8]	47.3	[41.4-53.2]	97.7	[95.7-98.8]	27.6	[23.5-32.0]	72.7	[67.1-77.7]	97.5	[95.0-98.8]
25. Rwanda	97.7	[95.7 - 98.8]	49.9	[44.7-55.2]	98.2	[97.1-99.0]	27.6	[24.4-31.1]	72.4	[68.1-76.2]	98.5	[97.3-99.2]
Dakar	98	[94.1-99.3]	71.9	[65.7-77.3]	98.4	[95.6-99.5]	16.9	[12.1-23.0]	92.2	[88.6-94.7]	82.9	[78.5-86.6]
26. Senegal	98.3	[96.7-99.2]	72.1	[68.7-75.2]	97.7	[96.4-98.5]	14.9	[12.3-18.0]	85.9	[83.5- 88.2]	81.6	[78.9-83.9]
Freetown	94.1	[88.8-97.0]	59.3	[52.5-65.8]	89.9	[85.7-93.0]	6.6	[4.1-10.4]	89.6	[85.3-92.7]	72.1	[66.8-76.8]
27. Sierra Leone	96.8	[94.2-98.2]	73.3	[69.3-76.9]	90.6	[88.3-92.5]	7	[5.5-9.0]	88.2	[85.6-90.4]	73.6	[70.6-76.4]
Johannesburg/Ekurhuleni/West Rand	95.6	[85.5-98.8]	65.5	[55.9-74.1]	97.6	[92.6-99.2]	12.1	[7.7-18.5]	81.2	[71.6-88.1]	91.2	[84.5-95.2]
28. South Africa	93.4	[90.3-95.6]	74.3	[70.5-77.8]	96.7	[95.1-97.9]	26	[22.4-30.0]	84.8	[81.3-87.7]	91.5	[88.8-93.6]
Dar es Salaam	94.2	[82.5-98.3]	84.8	[74.0-91.6]	100	--	22.4	[14.9-32.1]	62	[55.1-68.4]	98.9	[95.8-99.7]
Zanzibar	98.4	[95.7-99.4]	86.1	[79.9-90.6]	92.5	[88.2-95.3]	18.4	[12.3-26.7]	71	[63.9-77.2]	92.7	[88.4-95.5]
29. Tanzania	92.1	[89.2-94.3]	76.1	[72.4-79.4]	94.1	[92.0-95.7]	17.4	[14.2-21.1]	59.4	[55.9-62.9]	95.1	[93.0-96.5]
Lomé	98.5	[96.7-99.3]	72.2	[67.7-76.3]	97	[95.1-98.2]	13.5	[10.8-16.7]	79.4	[75.3-83.0]	87.7	[84.6-90.2]
30. Togo	98.6	[97.5-99.2]	71.1	[67.3-74.6]	94.8	[91.5-96.8]	13.4	[11.2-16.1]	81.4	[77.9-84.5]	85.9	[82.4-88.9]
Kampala	98.9	[97.4-99.6]	62.6	[57.4-67.5]	94	[91.3-95.9]	18.3	[15.3-21.8]	71.9	[66.5-76.8]	90.4	[87.9-92.4]
31. Uganda	99.3	[98.6-99.6]	66.5	[63.4-69.4]	89.3	[86.7-91.4]	14.3	[12.3-16.5]	65.9	[62.3-69.3]	87	[84.5-89.1]
Lusaka	98.1	[94.9-99.3]	57.1	[52.3-61.7]	91.8	[88.0-94.5]	8.9	[6.0-13.0]	81.5	[77.2-85.2]	93.8	[91.2-95.7]
Kitwe	100	--	64.6	[56.3-72.0]	97.0	[92.6-98.9]	11.9	[7.6-18.2]	90.2	[79.4-95.7]	100	--
32. Zambia	99.1	[97.9-99.6]	60.3	[57.5-63.1]	93.5	[91.0-95.3]	9.3	[7.43-11.7]	80.4	[77.8-82.8]	94.5	[92.3-96.1]
Bulawayo	97.9	[95.0-99.1]	79.7	[74.3-84.3]	94.6	[90.0-97.2]	13.4	[9.5-18.4]	68.3	[60.6-75.1]	97.9	[94.9-99.2]
Harare/Chitungwiza	92.4	[87.8-95.4]	69.2	[63.2-74.7]	90.9	[85.4-94.5]	10.4	[7.1-14.8]	59.5	[53.3-65.3]	95.3	[91.3-97.5]
33. Zimbabwe	95.1	[92.8-96.7]	75.7	[72.3-78.8]	92.9	[90.1-95.1]	11.9	[9.8-14.4]	66.2	[62.2-69.9]	96.4	[94.2-97.8]

Supplementary Table 2. Conurbation-level maternal and newborn health indicator estimates (with 95% confidence intervals) and the corresponding DHS-reported sampling-stratum estimates, for the 30 conurbations that align directly with an urban DHS sampling stratum ("Yes" in Table 4).

Country (DHS year)	Conurbation	ANC1+		ANC4+		FBC	
		Conurbation % [95% CI]	DHS stratum % [95% CI]	Conurbation % [95% CI]	DHS stratum % [95% CI]	Conurbation % [95% CI]	DHS stratum % [95% CI]
Angola (2015)	Luanda	97.0 [95.1–98.2]	97.1 [95.1–98.3]	83.3 [78.7–87.1]	83.1 [78.6–86.3]	73.5 [67.2–78.9]	72.5 [66.3–77.9]
Angola (2015)	Benguela and Lobito	94.0 [90.2–96.4]	77.1 [70.6–82.5]	78.3 [69.4–85.1]	56.6 [49.7–63.2]	78.8 [71.7–84.5]	49.1 [44.1–54.1]
Angola (2015)	Cabinda	96.0 [92.7–97.8]	92.3 [85.1–96.2]	66.7 [58.3–74.2]	62.0 [52.9–70.4]	88.1 [80.0–93.2]	81.5 [72.0–88.3]
Cameroon (2018)	Douala	97.3 [94.0–98.8]	97.3 [94.0–98.8]	90.9 [87.0–93.8]	90.9 [87.0–93.7]	97.3 [93.1–99.0]	97.3 [93.1–99.0]
Cameroon (2018)	Yaoundé	97.2 [94.9–98.5]	97.5 [95.2–98.7]	83.7 [77.2–88.7]	83.3 [76.4–88.5]	94.3 [88.2–97.3]	93.8 [87.5–97.1]
Chad (2014)	N'Djaména	85.6 [81.8–88.7]	85.8 [82.1–88.8]	58.6 [53.6–63.4]	58.2 [53.4–66.8]	70.2 [64.4–75.4]	70.1 [64.6–75.1]
Côte d'Ivoire (2021)	Abidjan	98.6 [95.8–99.5]	98.6 [95.9–99.5]	79.1 [71.1–85.3]	79.0 [71.4–85.0]	94.9 [91.3–97.0]	94.9 [91.5–97.0]
DRC (2013)	Kinshasa	97.6 [95.5–98.8]	97.6 [95.5–98.8]	72.6 [67.8–76.8]	72.5 [67.7–76.8]	98.5 [97.1–99.2]	98.4 [97.1–99.2]
Ethiopia (2019)	Addis Ababa	98.8 [95.6–99.7]	98.8 [95.7–99.7]	83.3 [74.3–89.6]	83.3 [74.5–89.5]	96.5 [93.2–98.3]	96.5 [93.2–98.2]
Gabon (2019)	Libreville	97.6 [95.6–98.7]	97.5 [95.2–98.8]	82.1 [78.3–85.4]	82.0 [77.6–85.7]	97.9 [96.2–98.8]	98.5 [96.7–99.3]
Gambia (2019–20)	Banjul	99.1 [96.1–99.8]	99.1 [96.3–99.8]	81.8 [74.1–87.6]	81.7 [74.4–87.3]	93.6 [87.6–96.8]	93.7 [88.8–96.8]
Ghana (2022)	Accra	96.5 [93.2–98.2]	96.8 [92.3–97.8]	87.9 [82.2–91.9]	87.3 [81.2–91.6]	92.0 [87.6–95.0]	90.6 [85.7–93.9]
Guinea (2018)	Conakry	95.0 [90.7–97.4]	95.3 [90.6–97.7]	53.3 [47.2–59.3]	57.3 [49.2–65.1]	88.5 [84.4–91.6]	88.3 [83.1–92.1]
Kenya (2022)	Mombasa	99.1 [97.1–99.7]	99.0 [96.1–99.7]	71.2 [65.2–76.6]	70.1 [61.6–77.4]	93.1 [89.0–95.7]	94.9 [90.7–97.2]
Kenya (2022)	Nairobi and Ruiru	99.8 [98.7–100]	100 [–]	79 [73.5–83.6]	81.9 [75.0–87.2]	99.0 [97.6–99.6]	99.2 [97.4–99.8]
Lesotho (2023–24)	Maseru	96.2 [90.1–98.6]	97.1 [92.5–98.9]	85.1 [76.9–90.7]	83.1 [76.3–88.3]	91.2 [83.8–95.4]	91.3 [85.6–94.9]
Madagascar (2021)	Antananarivo	98.1 [95.9–99.1]	96.9 [93.6–98.5]	80.6 [74.8–85.3]	75.3 [68.5–81.0]	71.4 [72.7–83.1]	71.2 [64.2–77.4]
Malawi (2015)	Blantyre and Limbe	98.1 [95.1–99.3]	97.1 [96.1–97.9]	52.7 [45.1–60.1]	48.2 [46.3–50.1]	95.4 [92.0–97.3]	98.1 [95.1–99.3]
Mali (2018)	Bamako	95.7 [92.2–97.7]	96.8 [94.9–98.0]	70 [63.8–75.6]	72.3 [65.6-78.2]	96.6 [94.3–98.0]	92.8 [91.4–94.0]
Mauritania (2019)	Nouakchott	97.6 [96.0–98.6]	97.6 [96.0–98.6]	44.8 [40.4–49.3]	44.2 [39.9–48.6]	98.6 [97.2–99.3]	98.6 [97.3–99.3]
Niger (2012)	Niamey	98.7 [97.1–99.4]	98.7 [97.1–99.4]	48.6 [43.8–53.4]	48.6 [43.9–53.4]	89.4 [86.5–91.8]	89.4 [86.5–91.8]
Nigeria (2018)	Lagos and Ikorodu	95.6 [91.6–97.8]	95.9 [91.1-98.1]	80 [75.1–84.1]	79.7 [74.3–84.3]	73.6 [67.3–79.1]	71.4 [63.7–78.0]
Nigeria (2018)	Enugu	96.7 [92.2–98.7]	95.9 [91.5–98.0]	90.8 [84.6–94.7]	89.1 [82.6–93.4]	83.6 [74.3–90.0]	81.0 [71.1–88.0]
Rwanda (2019-20)	Kigali	97.7 [95.4–98.8]	97.1 [94.5–98.5]	47.3 [44.4–53.2]	46.2 [39.9–52.7]	97.7 [95.7–98.8]	97.5 [95.3–98.7]
Senegal (2023)	Dakar and Rufisque	98.0 [94.1–99.3]	98.2 [94.2–99.5]	71.9 [65.7–77.3]	71.5 [65.3–76.9]	98.4 [95.6–99.5]	98.4 [95.6–99.4]
Tanzania (2022)	Dar es Salaam	94.2 [82.5–98.3]	99.4 [97.4–99.8]	84.8 [74.0–91.6]	89.9 [83.1–94.2]	100 [–]	100 [–]
Togo (2013)	Lomé	98.5 [96.7–99.3]	99.1 [97.5–99.7]	72.2 [67.7–76.3]	73.5 [68.7–77.9]	97.0 [95.1–98.2]	97.1 [95.3–98.2]
Uganda (2016)	Kampala	98.9 [97.4–99.6]	98.5 [95.6–99.5]	62.6 [57.4–67.5]	64.8 [58.3–70.8]	94.0 [91.3–95.9]	93.7 [90.6–95.8]
Zambia (2018)	Lusaka	98.1 [94.9–99.3]	98.2 [95.6–99.2]	57.1 [52.3–61.7]	58.7 [54.3–63.0]	91.8 [88.0–94.5]	91.2 [87.9–93.7]
Zimbabwe (2015)	Bulawayo	97.9 [95.0–99.1]	97.5 [94.7–98.9]	79.7 [74.3–84.3]	80.1 [75.0–84.4]	94.6 [90.0–97.2]	94.0 [89.4–96.7]

Country (DHS year)	Conurbation	CS		PNC48		Newborn weighed	
		Conurbation % [95% CI]	DHS stratum % [95% CI]	Conurbation % [95% CI]	DHS stratum % [95% CI]	Conurbation % [95% CI]	DHS stratum % [95% CI]
Angola (2015)	Luanda	6.8 [5.1–9.1]	6.8 [5.0–9.0]	38.1 [32.7–43.8]	37.8 [32.4–43.45	90.8 [86.5–93.8]	90.1 [85.6–93.3]
Angola (2015)	Benguela and Lobito	7 [4.0–11.8]	4.3 [2.9–6.3]	34 [28.4–40.1]	26.4 [22.1–31.1]	91.1 [86.8–94.1]	60.5 [54.5–66.3]
Angola (2015)	Cabinda	2.9 [1.0–7.8]	3.1 [1.3–7.0]	22.1 [17.2–27.9]	20.3 [15.8–25.6]	94 [89.9–96.5]	90.5 [82.2–95.2]
Cameroon (2018)	Douala	12.3 [8.5–17.4]	12.3 [8.5–17.4]	72.4 [61.6–81.1]	72.4 [61.6–81.1]	97.8 [95.4–99.0]	97.8 [95.4–99.0]
Cameroon (2018)	Yaoundé	6.5 [4.7–8.9]	6.5 [4.6–9.1]	74.2 [68.9–78.9]	74.0 [68.2–79.0]	93.5 [90.5–95.6]	93.7 [90.3–95.9]
Chad (2014)	N'Djaména	7.1 [4.7–10.7]	7.2 [4.9–10.6]	26.9 [23.0–31.3]	27.1 [23.3–31.4]	50.2 [43.7–56.8]	49.9 [43.6–56.2]
Côte d'Ivoire (2021)	Abidjan	15.6 [11.5–20.8]	15.4 [11.44–20.5]	70.1 [63.9–75.7]	70.4 [64.3–75.9]	91.7 [87.7–94.4]	91.7 [87.8–94.4]
DRC (2013)	Kinshasa	6.3 [4.1–9.6]	6.3 [4.0–9.6]	62 [53.8–69.5]	62.1 [53.8–69.7]	98.9 [97.5–99.6]	98.9 [97.5–99.6]
Ethiopia (2019)	Addis Ababa	22.3 [15.6–30.7]	22.3 [15.7–30.5]	74.5 [67.4–80.6]	74.5 [67.5–80.56]	n/a	n/a
Gabon (2019)	Libreville	10.5 [7.6–14.3]	10.6 [7.4–15.1]	74.9 [69.2–79.8]	75.3 [68.8–80.8]	95.5 [93.0–97.1]	95.4 [92.5–97.2]
Gambia (2019–20)	Banjul	11.7 [8.0–16.8]	11.8 [8.3–16.7]	88.6 [83.4–92.3]	88.1 [83.1–91.8]	86.4 [80.3–90.8]	86.6 [80.8–90.8]
Ghana (2022)	Accra	30.1 [23.9–37.1]	31.7 [24.9–39.3]	92.9 [88.7–95.6]	90.8 [85.9–94.1]	91 [86.3–94.3]	89.5 [84.3–93.1]
Guinea (2018)	Conakry	6.6 [4.8–9.2]	7.0 [4.9–9.8]	69.0 [62.5–74.8]	69.5 [62.3–75.8]	83.8 [77.5–88.7]	84.7 [77.4–90.0]
Kenya (2022)	Mombasa	17.3 [13.3–22.1]	21.5 [16.2–28.0]	79.3 [72.0–85.0]	75.9 [65.4–84.0]	97.3 [93.1–99.0]	97.3 [92.1–99.1]
Kenya (2022)	Nairobi and Ruiru	28.4 [22.2–35.5]	28.2 [20.0–38.1]	85.6 [80.0–89.8]	84.9 [77.2–90.4]	99.5 [98.6–99.9]	99.8 [98.6–100.0]
Lesotho (2023–24)	Maseru	25.9 [18.0–35.6]	25.7 [19.3–33.3]	82.4 [75.7–87.5]	84.2 [78.7–88.4]	90.8 [83.7–95.0]	89.6 [84.4–93.2]
Madagascar (2021)	Antananarivo	11.3 [8.1–15.5]	11.3 [7.5–16.6]	74.6 [69.4–79.3]	69.5 [62.1–76.1]	80.4 [74.5–85.2]	73.9 [66.2–80.4]
Malawi (2015)	Blantyre and Limbe	9.7 [6.2–14.7]	5.5 [4.7–6.4]	32.6 [26.9–38.9]	39.3 [37.0–41.7]	93.5 [87.8–96.7]	85.7 [84.1–87.2
Mali (2018)	Bamako	4.5 [3.1–6.5]	5.1 [3.5–7.3]	75.7 [69.9–80.7]	77.9 [71.7.–83.0]	67.7 [60.9–73.9]	68.2 [60.9–74.7]
Mauritania (2019)	Nouakchott	15 [12.3–18.2]	14.8 [12.2–17.9]	52.1 [46.1–58.1]	52.0 [46.1–57.9]	29.1 [24.8–33.7]	28.5 [23.4–33.1]
Niger (2012)	Niamey	9.2 [6.8–12.2]	9.2 [6.8–12.2]	67.5 [61.5–73.0]	67.5 [61.6–72.9]	90.4 [87.5–92.7]	90.4 [87.5–92.7]
Nigeria (2018)	Lagos and Ikorodu	12 [8.0–17.5]	12.5 [8.0–19.0]	66.4 [56.8–74.8]	63.6 [53.2–72.9]	66.8 [56.5–75.7]	65.6 [54.0–75.6]
Nigeria (2018)	Enugu	8.3 [4.6–14.4]	6.8 [3.8–12.0]	84.4 [75.1–90.7]	82.7 [73.9–89.0]	65.47 [53.0–76.1]	59.6 [45.2–72.5]
Rwanda (2019-20)	Kigali	27.6 [23.5–32.0]	28.6 [24.4–33.3]	72.7 [67.1–77.7]	72.5 [66.4–77.9]	97.5 [95.03–98.8]	98.1 [94.9–99.3]
Senegal (2023)	Dakar and Rufisque	16.9 [12.1–23.0]	16.9 [12.3–23.0]	92.2 [88.6–94.7]	92.1 [88.5–94.7]	82.9 [78.5–86.6]	83.1 [78.7–86.8]
Tanzania (2022)	Dar es Salaam	22.4 [14.9–32.1]	24.6 [16.9–34.3]	62 [55.1–68.4]	63.5 [56.1–70.3]	98.9 [95.8–99.7]	98.8 [95.4–99.7]
Togo (2013)	Lomé	13.5 [10.8–16.7]	14.1 [11.2–17.5]	79.4 [75.3–83.0]	81.0 [76.8–84.5]	87.7 [84.6–90.2]	88.4 [85.4–90.8]
Uganda (2016)	Kampala	18.3 [15.3–21.8]	14.3 [11.3–17.9]	71.9 [66.5–76.8]	75.3 [71.3–79.0]	90.4 [87.9–92.4]	90.8 [86.8–93.8]
Zambia (2018)	Lusaka	8.9 [6.0–13.0]	8.0 [5.5–11.5]	81.5 [77.2–85.2]	81.1 [77.2–84.4]	93.8 [91.2–95.7]	93.3 [91.0–95.0]
Zimbabwe (2015)	Bulawayo	13.4 [9.5–18.4]	14.8 [10.7–20.1]	68.3 [60.6–75.1]	69.0 [61.7–75.4]	97.9 [94.9–99.2]	97.6 [94.7–98.9]

Conurbation values are the estimates and 95% confidence intervals reported in Supplementary Table 1; the DHS survey year for each country is shown in parentheses. Values are percentages. ANC1+, at least one antenatal care visit; ANC4+, at least four antenatal care visits; FBC, facility-based childbirth; CS, caesarean section; PNC48, postnatal check within 48 hours; CI, confidence interval; n/a, not available (newborn weight not collected in Ethiopia).

Supplementary table 3: Postnatal check within 48 hours after birth by a skilled provider (PNC48)

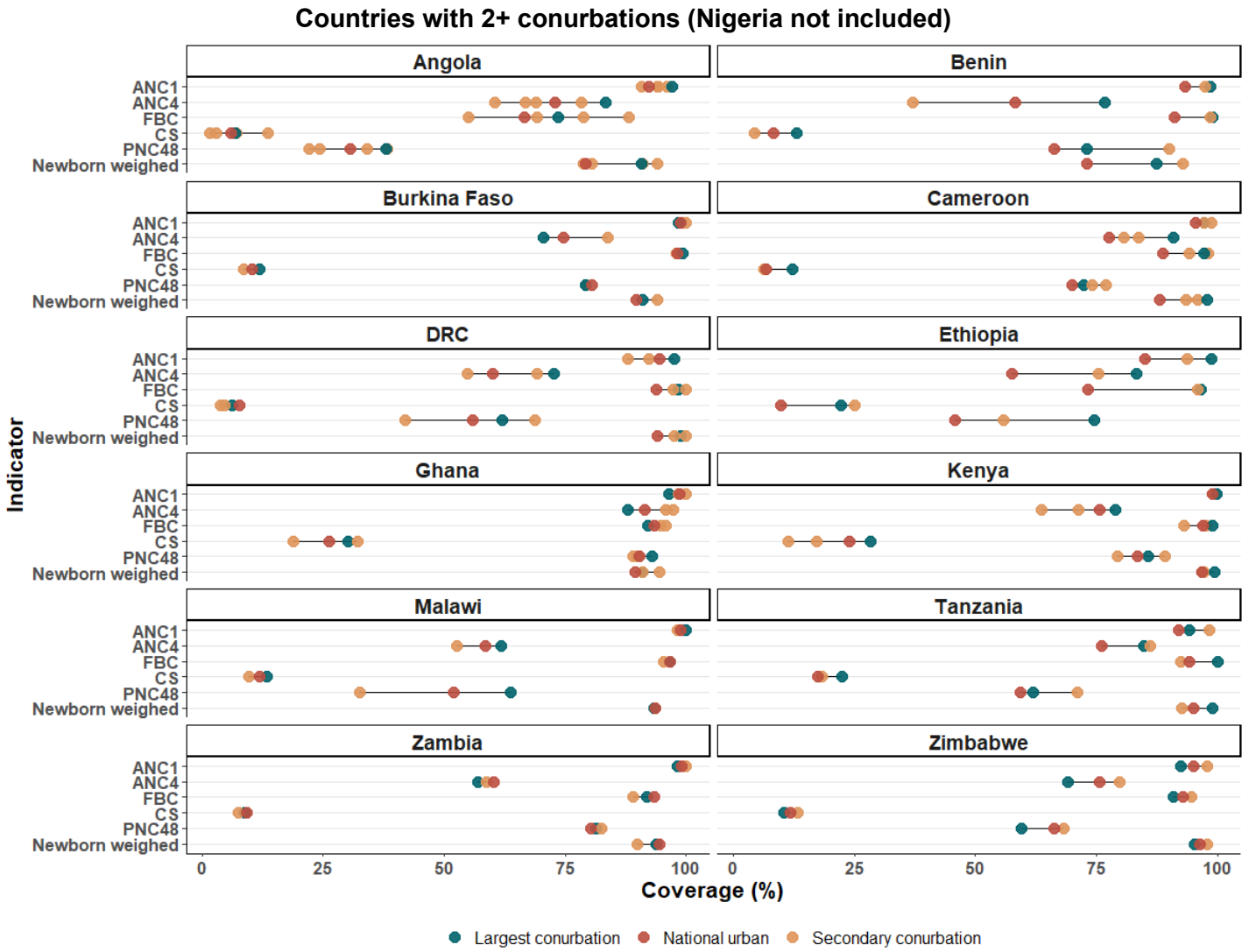
A skilled care provider was defined following the DHS report for each county and survey. This included doctors, nurses/midwives and technical health agents for most countries as in the table below

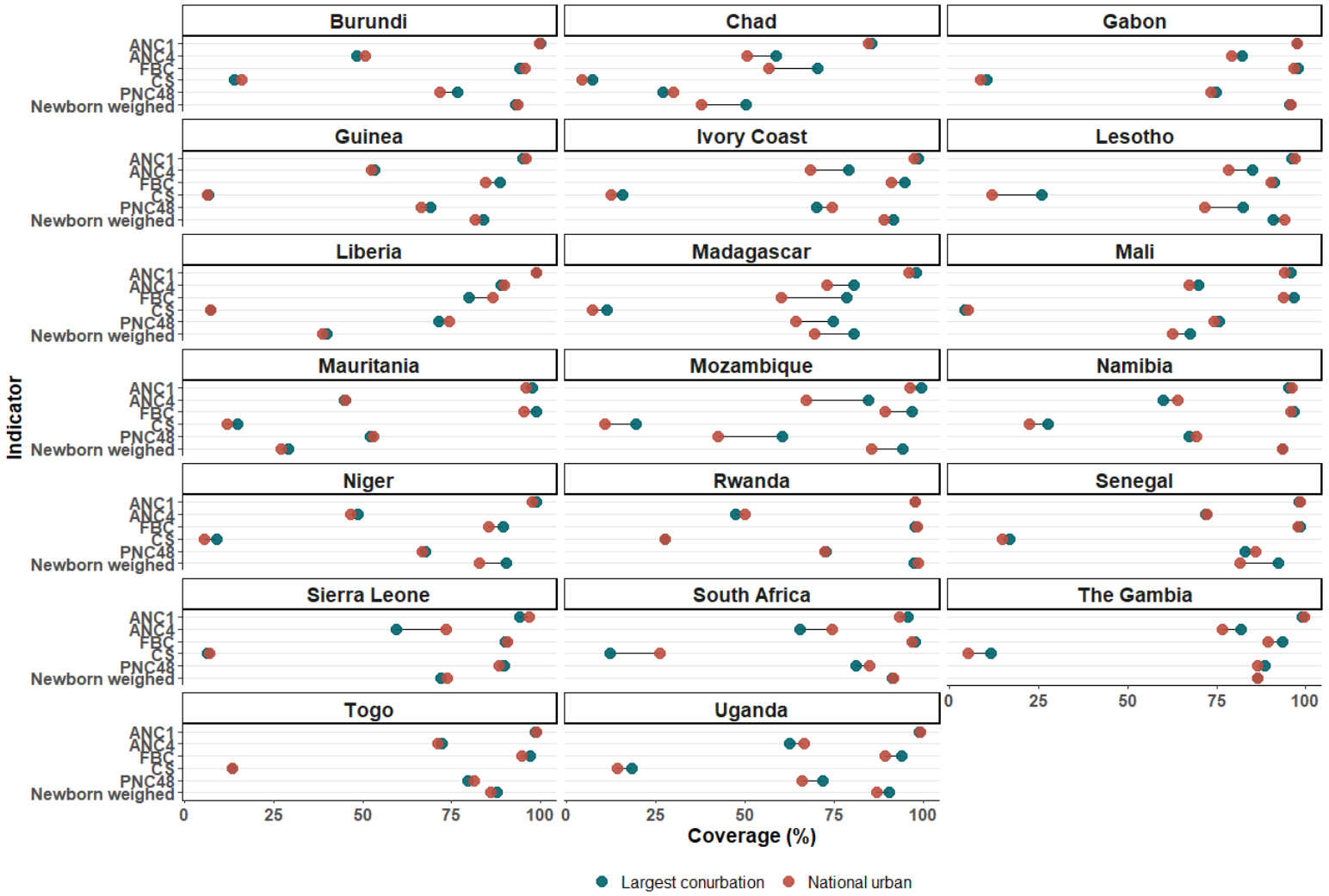
ID	**Country**	**DHS survey**	**Skilled care provider**	**Report link**
1	Angola	2015-16	"Médico, enfermeira ou parteira" (Doctor, nurse or midwife)	https://dhsprogram.com/pubs/pdf/FR327/FR327.pdf
2	Benin	2017	"Médecins, les infirmières/sages-femmes." (Doctors, nurses/midwives)	https://dhsprogram.com/pubs/pdf/FR350/FR350.pdf
3	Burkina Faso	2021	"Médecin, conseillers de santé, sage-femmes, maïeuticiens d'état, infirmiers, attachés de santé, accoucheuses brevetées et les accoucheuses auxiliaires." (Doctors, health advisors, midwives, state midwives, nurses, health assistants, licensed midwives and auxiliary midwives.)	https://dhsprogram.com/pubs/pdf/FR378/FR378.pdf
4	Burundi	2016-17	"Médecins, infirmiers et sages-femmes." (Doctors, nurses and midwives)	https://dhsprogram.com/pubs/pdf/FR335/FR335.pdf
5	Cameroon	2018	"Médecins, les infirmiers, les sages-femmes, et les aides-soignants." (Doctors, nurses, midwives and nursing assistants)	https://dhsprogram.com/pubs/pdf/FR360/FR360.pdf
6	Chad	2014-15	"Médecins, infirmières/sages-femmes, et matrones et agents de l'hôpital/centre de santé." (Doctors, nurses/midwives, and matrones and hospital/health center staff.)	https://dhsprogram.com/pubs/pdf/FR317/FR317.pdf
7	Côte d'Ivoire	2021	"Médecins, infirmières/sage-femme et sage-femme auxiliaire/aide-soignante." (Doctors, nurses/midwives and auxiliary midwives/nursing assistants.)	https://dhsprogram.com/pubs/pdf/FR385/FR385.pdf
8	DRC	2013-14	"Médecins, infirmières ou accoucheuses." (Doctors, nurses, midwives)	https://dhsprogram.com/pubs/pdf/FR300/FR300.pdf
9	Ethiopia	2019	Doctor, nurse, midwife, health officer, and health extension worker.	https://dhsprogram.com/pubs/pdf/FR363/FR363.pdf
10	Gabon	2019	"Médecin (gynécologue/autre médecin), sage-femme, infirmier/infirmière accoucheur(euse) et infirmier/infirmière" (Doctor (gynaecologist/other doctor), midwife, obstetric nurse and nurse.)	https://dhsprogram.com/pubs/pdf/FR371/FR371.pdf
11	Gambia	2019-20	Doctor, nurse, and midwife.	https://dhsprogram.com/pubs/pdf/FR369/FR369.pdf
12	Ghana	2022	Doctor and nurse/midwife (community health nurse, community health officer, enrolled nurse, public health nurse, or general nurse).	https://dhsprogram.com/pubs/pdf/FR387/FR387.pdf
13	Guinea	2018	"Médecins, infirmières/sages-femmes" (Doctors, nurses/midwives)	https://dhsprogram.com/pubs/pdf/FR353/FR353.pdf

ID	Country	DHS survey	Skilled care provider	Report link
14	Kenya	2022	Doctor, a nurse, a midwife, or a clinical officer.	https://dhsprogram.com/pubs/pdf/FR380/FR380.pdf
15	Liberia	2019-20	Doctor, nurse, midwife, and physician's assistant.	https://dhsprogram.com/pubs/pdf/FR362/FR362.pdf
16	Lesotho	2023-2024	Doctor and nurse/midwife	https://dhsprogram.com/pubs/pdf/FR309/FR309.pdf
17	Madagascar	2021	"Médecins, infirmières et sage-femmes." (Doctors, nurses and midwives)	https://dhsprogram.com/pubs/pdf/FR376/FR376.pdf
18	Malawi	2015-16	Doctor, clinical officer, medical assistant, nurse, and midwife.	https://dhsprogram.com/pubs/pdf/FR319/FR319.pdf
19	Mali	2018	"Médecins, infirmières, sages-femmes (auxilliary midwife) et matrones (trained traditional BA)". (Doctors, nurses, midwives and auxilliary midwives, and trained traditional birth attendants.)	https://dhsprogram.com/pubs/pdf/FR358/FR358.pdf
20	Mauritania	2019	"Gynécologues/médecins, infirmières/sages-femmes et accoucheuses auxiliaires" (Gynaecologists/doctors, nurses/midwives and auxilliary midwives)	https://dhsprogram.com/pubs/pdf/FR373/FR373.pdf
21	Mozambique	2022-23	"Médicos, enfermeiros ou parteiras." (Doctors, nurses or midwives)	https://dhsprogram.com/pubs/pdf/FR389/FR389.pdf
22	Namibia	2013	Doctors, nurses or midwives	https://dhsprogram.com/pubs/pdf/FR298/FR298.pdf
23	Niger	2012	"Médecins, infirmières et sages-femmes" (Doctors, nurses, and midwives)	https://dhsprogram.com/pubs/pdf/FR277/FR277.pdf
24	Nigeria	2018	Doctor, nurse, midwife, and auxiliary nurse/midwife.	https://dhsprogram.com/pubs/pdf/FR359/FR359.pdf
25	Rwanda	2019-20	Doctor, nurse/midwife, auxiliary midwife, community health worker, community health mother and child.	https://dhsprogram.com/pubs/pdf/FR370/FR370.pdf
26	Senegal	2023	"Médecins, sages-femmes, infirmières, chefs de poste (ICP) et assistantes infirmières." (Doctors, midwives, nurses, head nurses, and nursing assistants.)	https://dhsprogram.com/pubs/pdf/FR390/FR390.pdf
27	Sierra Leone	2019	Doctor, nurse/midwife, and auxiliary midwife	https://dhsprogram.com/pubs/pdf/FR365/FR365.pdf
28	South Africa	2016	Doctor and nurse/midwife	https://dhsprogram.com/pubs/pdf/FR337/FR337.pdf
29	Tanzania	2022	Doctor/assistant medical officer (AMO), clinical officer, assistant clinical officer, nurse/midwife, assistant nurse, and maternal and child health (MCH) aide.	https://dhsprogram.com/pubs/pdf/FR382/FR382.pdf

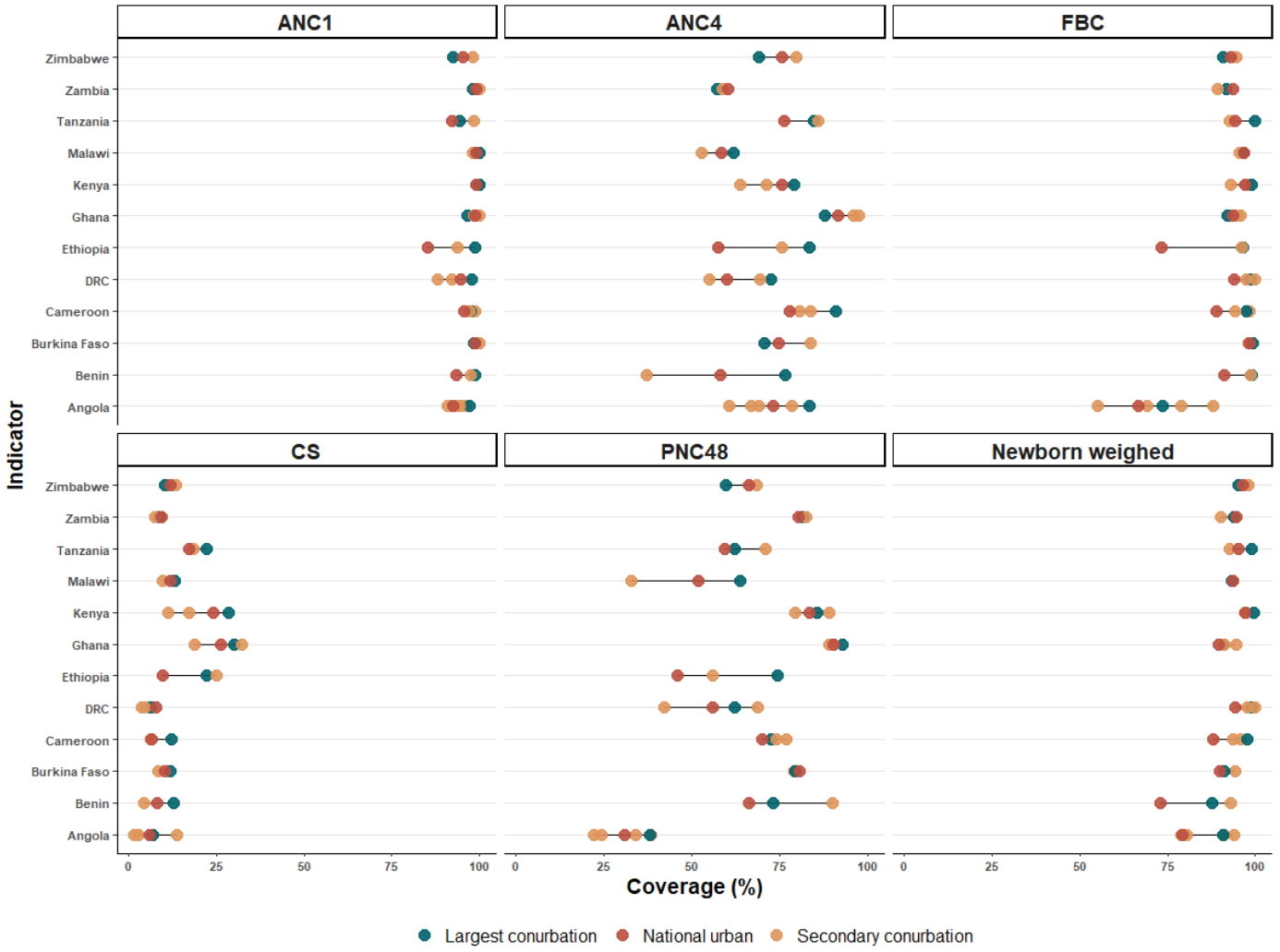
ID	**Country**	**DHS survey**	**Skilled care provider**	**Report link**
30	Togo	2013-14	"Médecins, assistants médicaux, infirmières, sages-femmes et accoucheuses auxiliaires." (Doctors, medical assistants, nurses, midwives, and auxilliary midwives.)	https://dhsprogram.com/pubs/pdf/FR301/FR301.pdf
31	Uganda	2016	Doctor, nurse/midwife, and medical assistant/clinical officer.	https://dhsprogram.com/pubs/pdf/FR333/FR333.pdf
32	Zambia	2018	Doctor, nurse/midwife, and clinical officer.	https://dhsprogram.com/pubs/pdf/FR361/FR361.pdf
33	Zimbabwe	2015	Doctor, nurse, and nurse midwife.	https://dhsprogram.com/pubs/pdf/FR322/FR322.pdf

Supplementary Figure 1: Equiplots comparing maternal and newborn health indicators estimates


Countries with 2+ conurbations (Nigeria not included)
Angola
Benin
Burkina Faso
Cameroon
DRC
Ethiopia
Ghana
Kenya
Malawi
Tanzania
Zambia
Zimbabwe
ANC1
ANC4
FBC
CS
PNC48
Newborn weighed
Indicator
0
25
50
75
100
Coverage (%)
Largest conurbation
National urban
Secondary conurbation

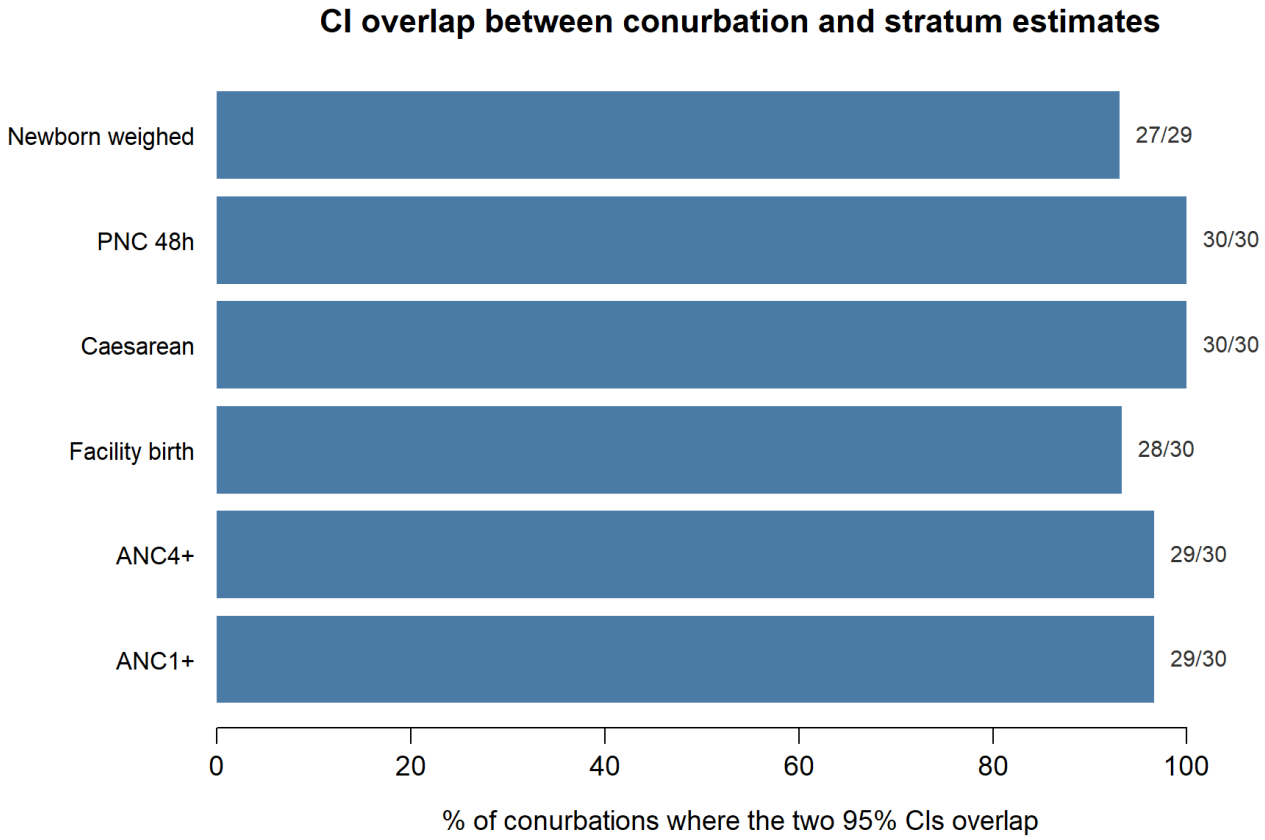

Countries with 1 conurbation
Burundi
Chad
Gabon
Guinea
Ivory Coast
Lesotho
Liberia
Madagascar
Mali
Mauritania
Mozambique
Namibia
Niger
Rwanda
Senegal
Sierra Leone
South Africa
The Gambia
Togo
Uganda
ANC1
ANC4
FBC
CS
PNC48
Newborn weighed
Indicator
0
25
50
75
100
Coverage (%)
Largest conurbation
National urban

Plots by indicator. – countries with 2+ conurbations.



Aupplementary Figure 2: Comparison of conurbation and DHS sampling-stratum estimates across the six indicators for the aligned conurbations

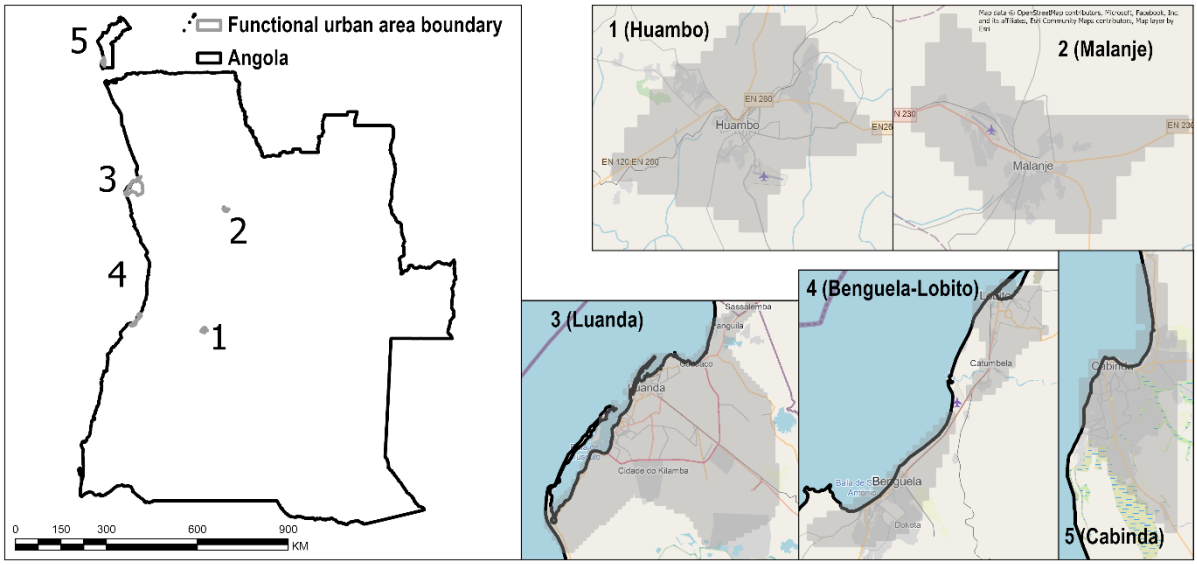
Percentage of conurbations aligned with a DHS sampling stratum in which the 95% confidence intervals of the conurbation and stratum estimates overlap, by indicator (n = 30; n = 29 for newborn weighed, not collected in Ethiopia). Estimates of 100% without a confidence interval were treated as overlapping.



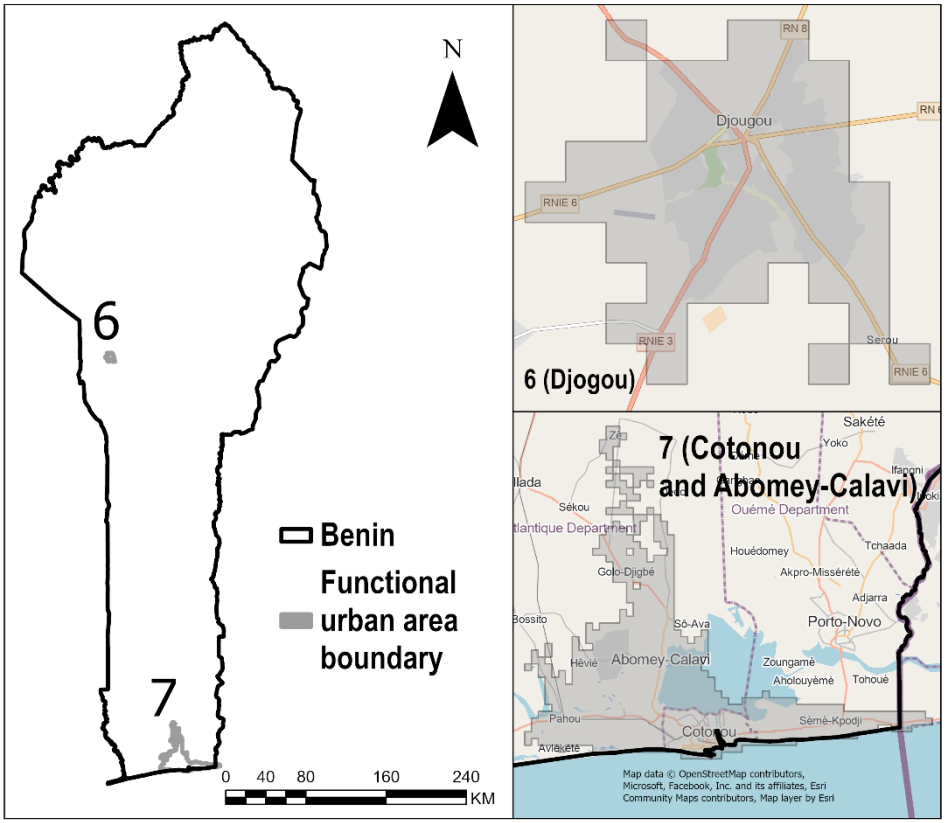
Supplementary Figure 3: Conurbations boundaries by country

Conurbations boundaries by country

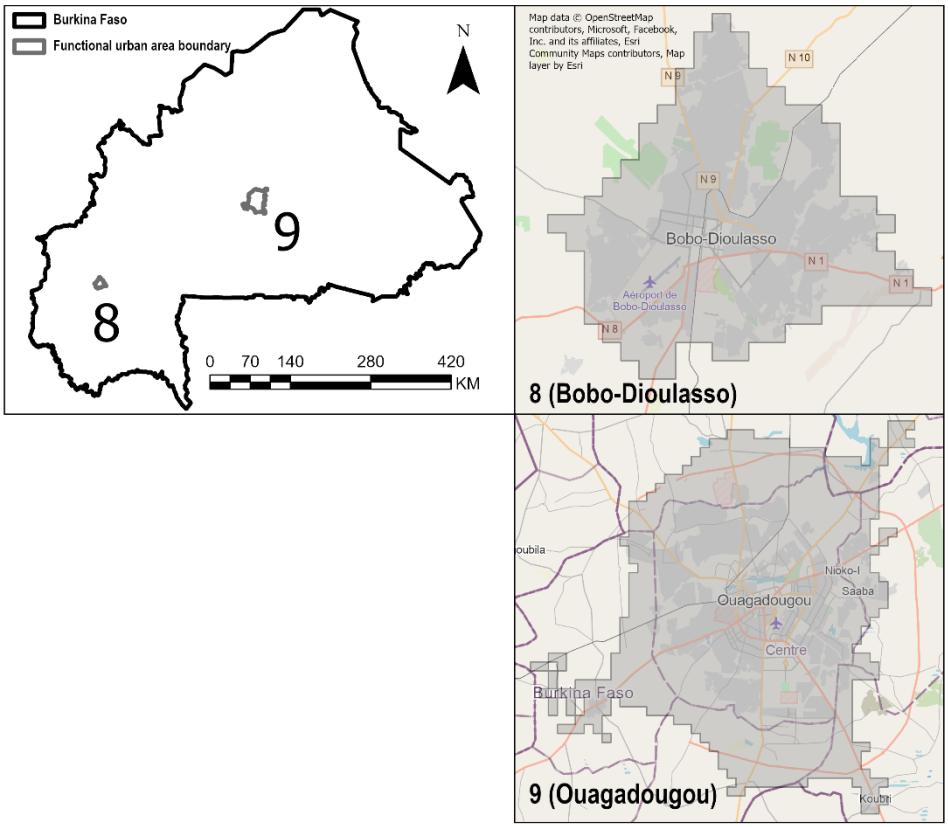
1. Angola



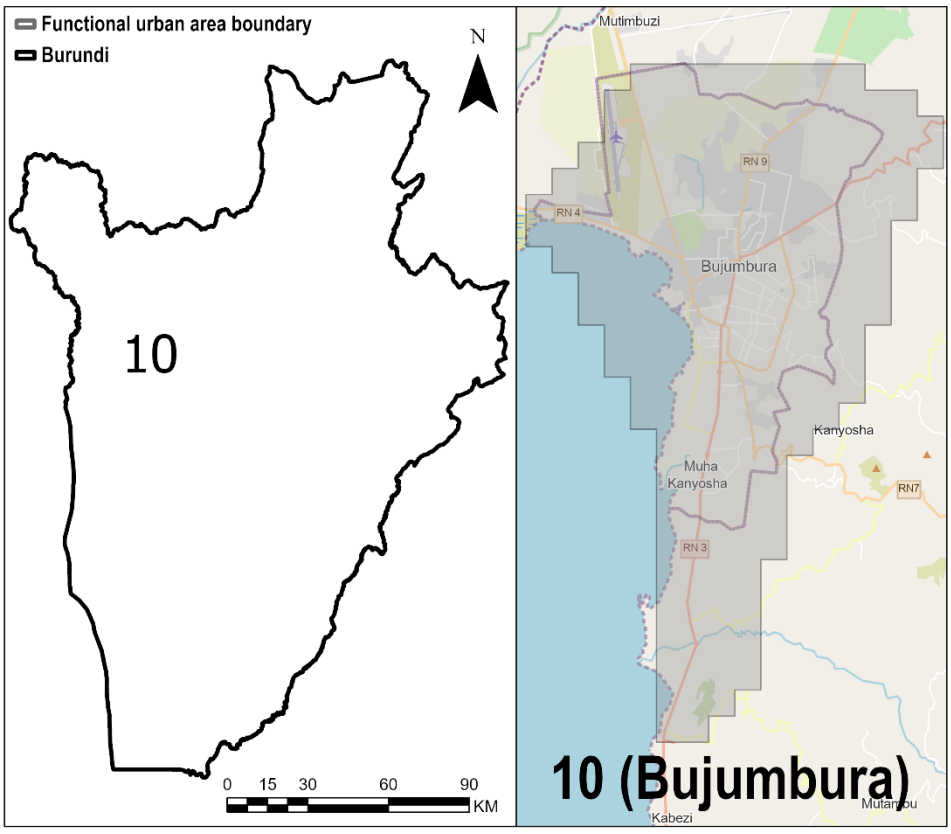
2. Benin



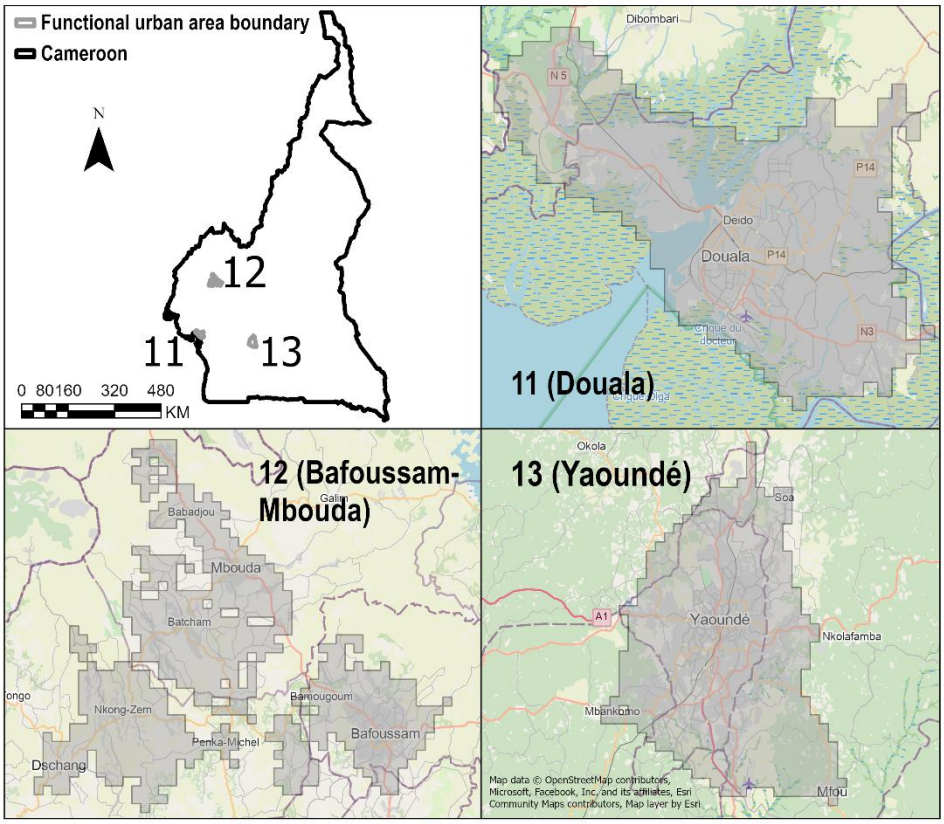
3. Burkina Faso



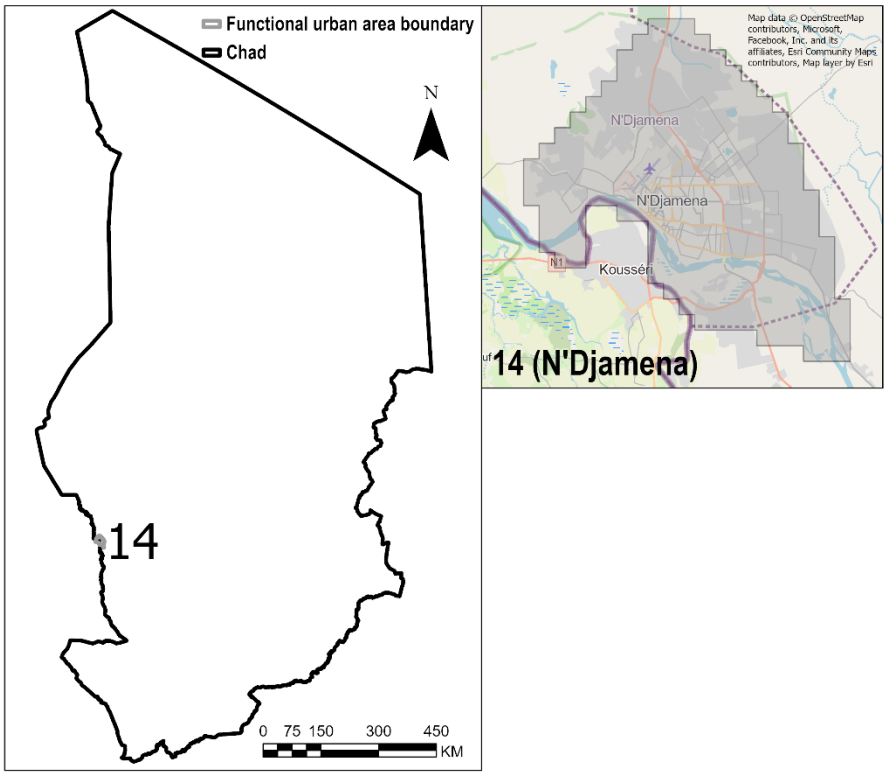
4. Burundi



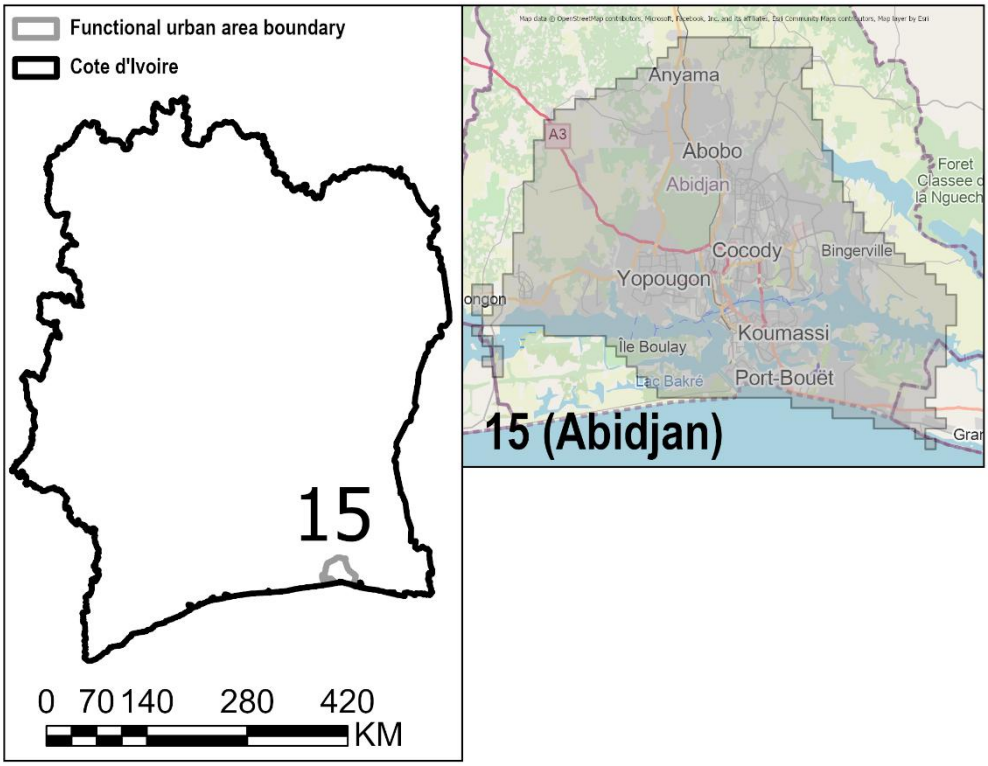
5. Cameroon



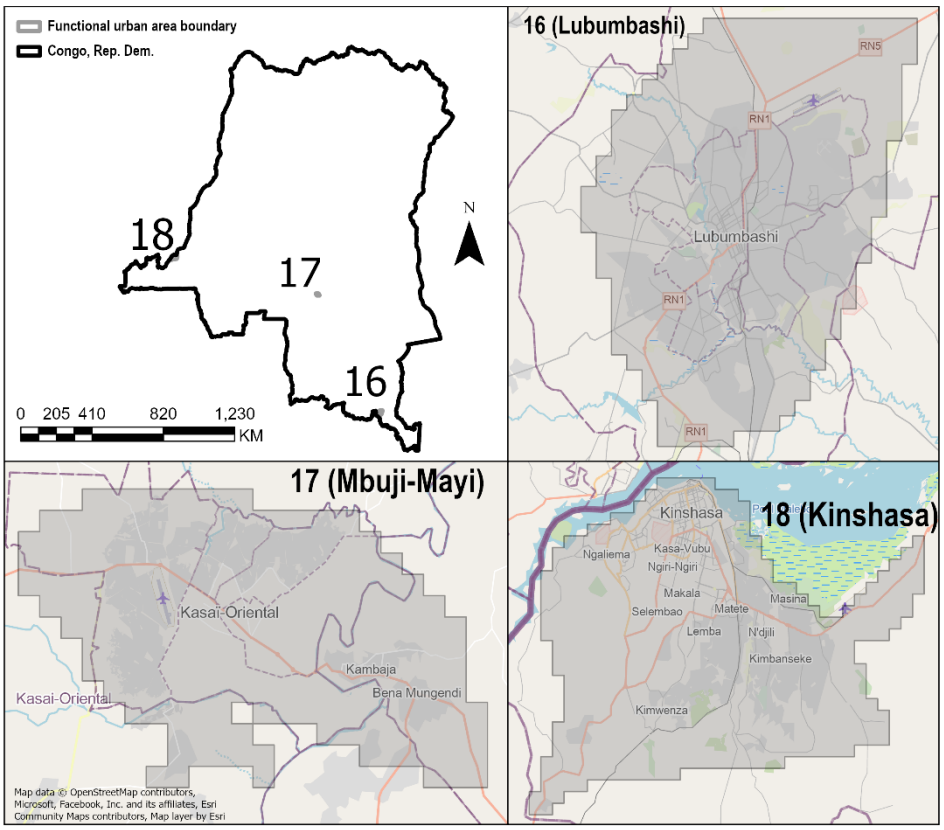
6. Chad



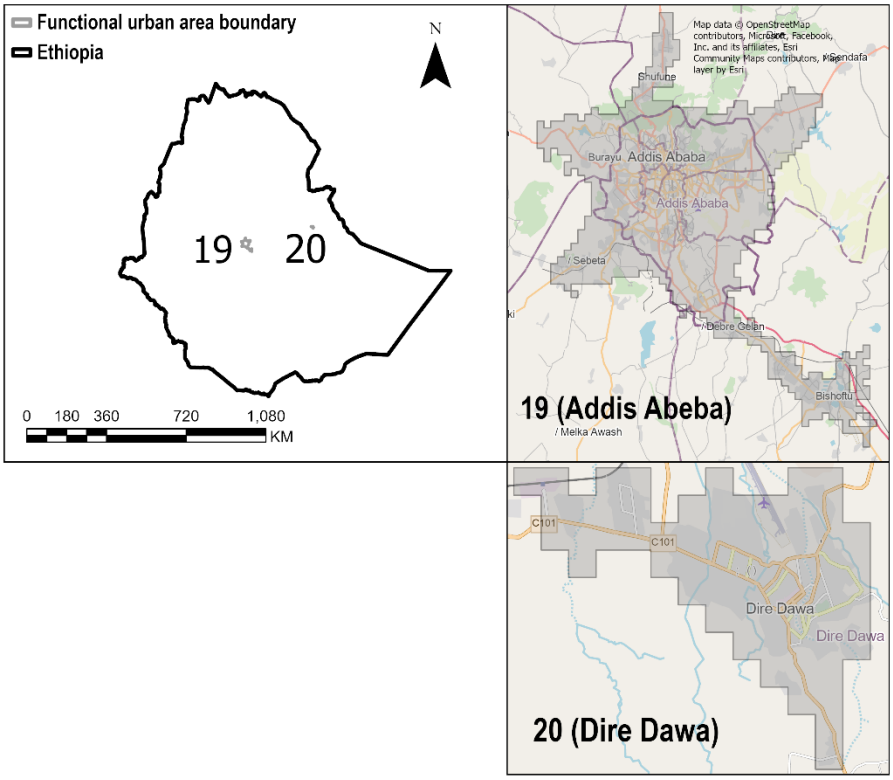
7. Côte d'Ivoire



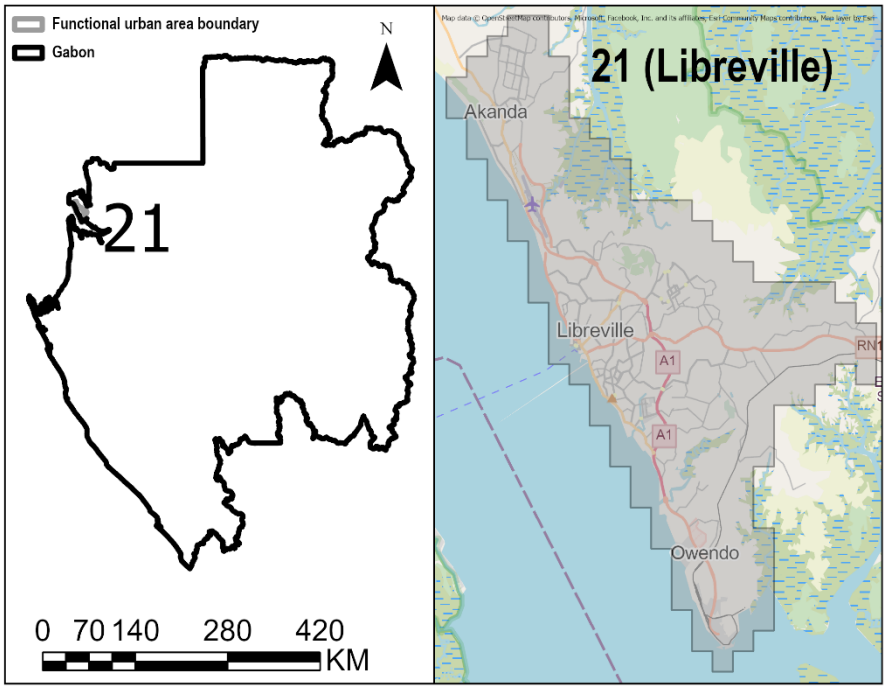
8. DRC



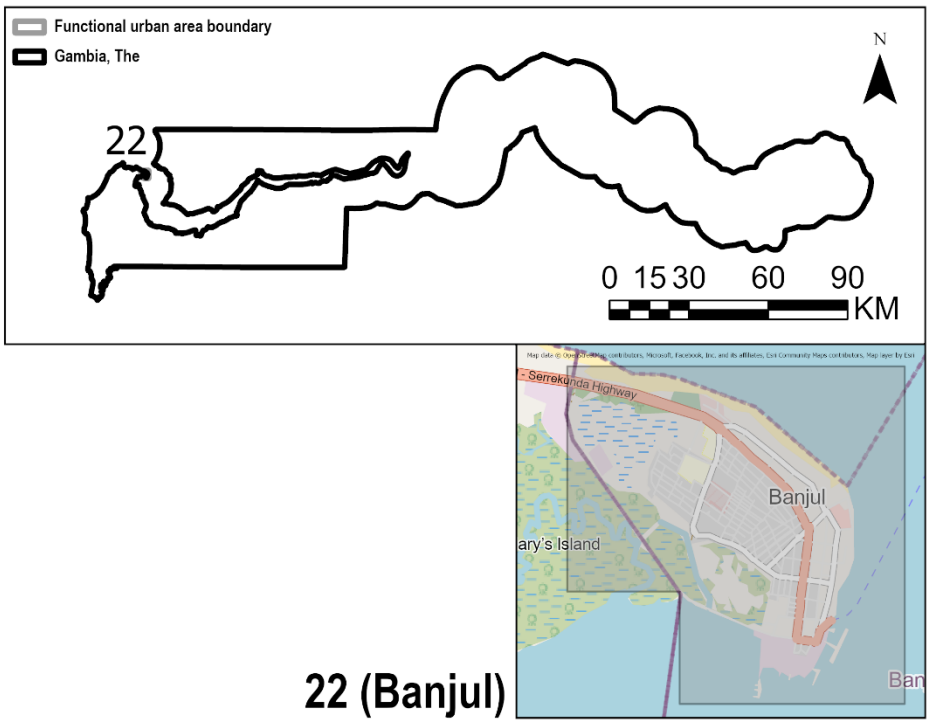
9. Ethiopia



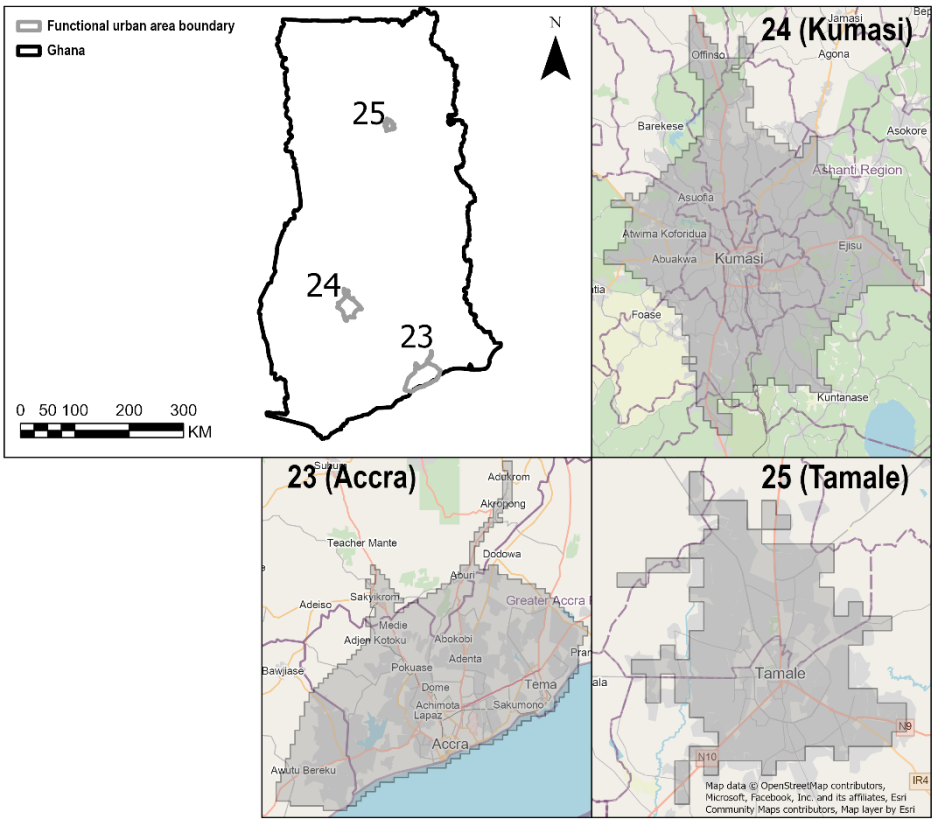
10. Gabon



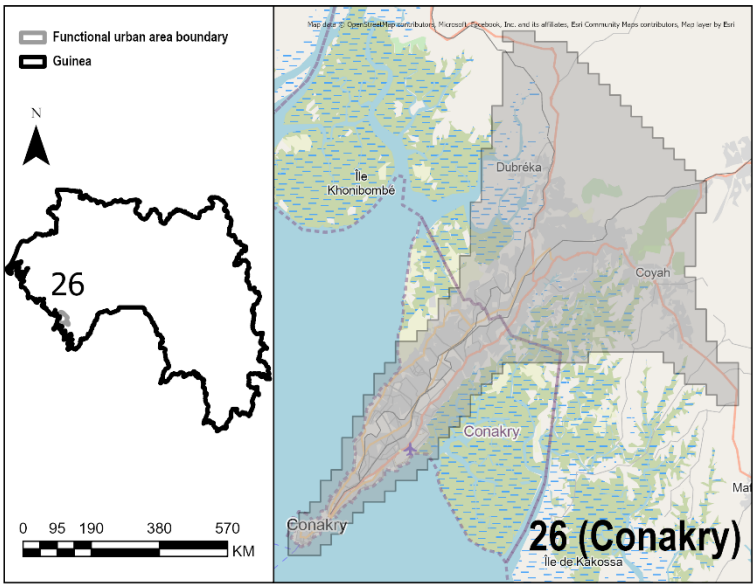
11. Gambia



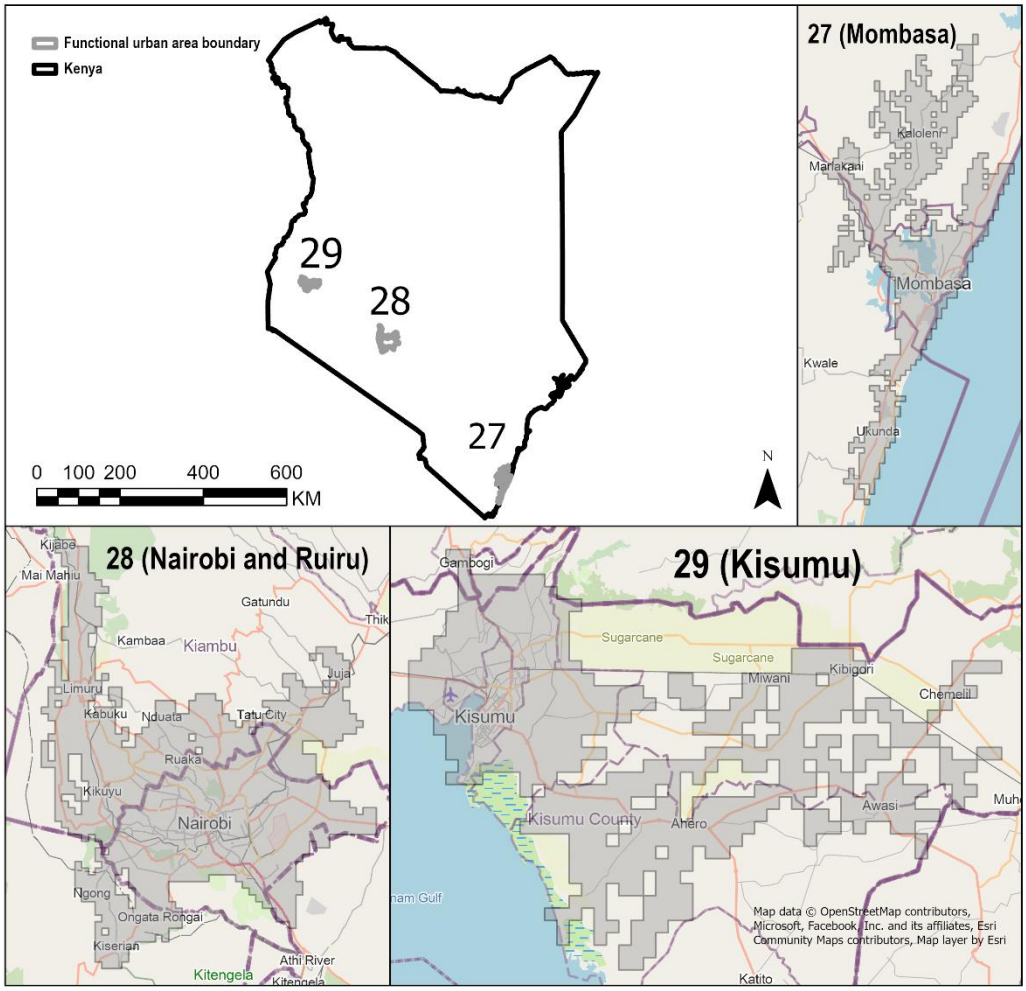
12. Ghana



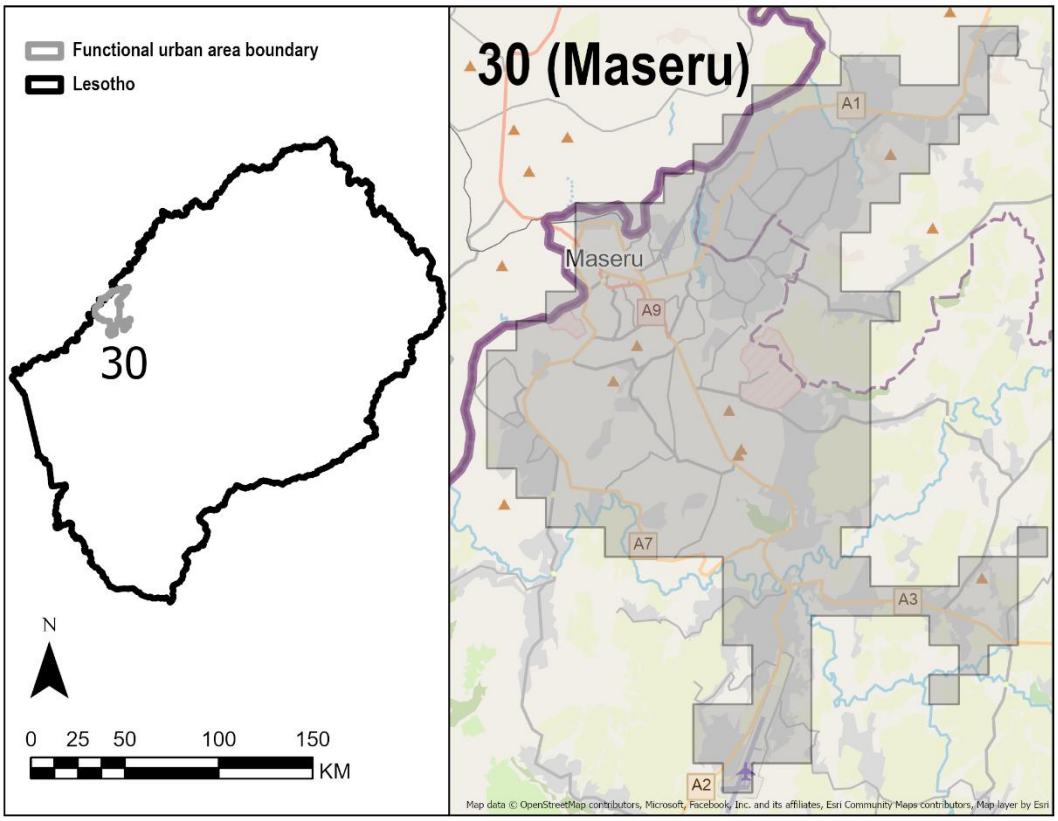
13. Guinea



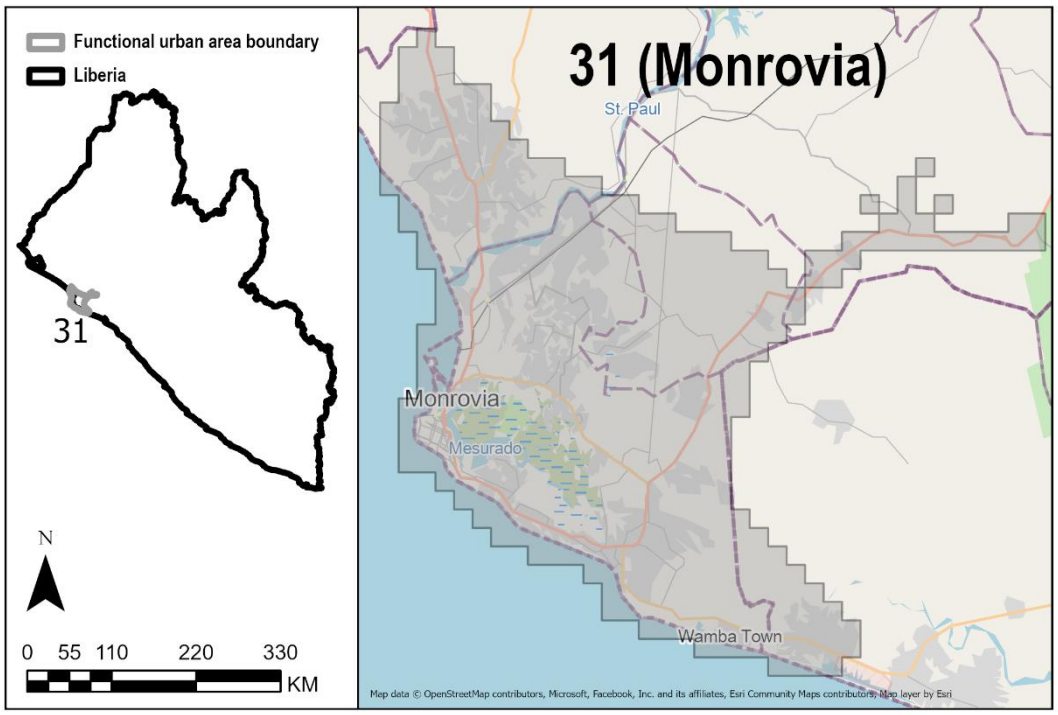
14. Kenya



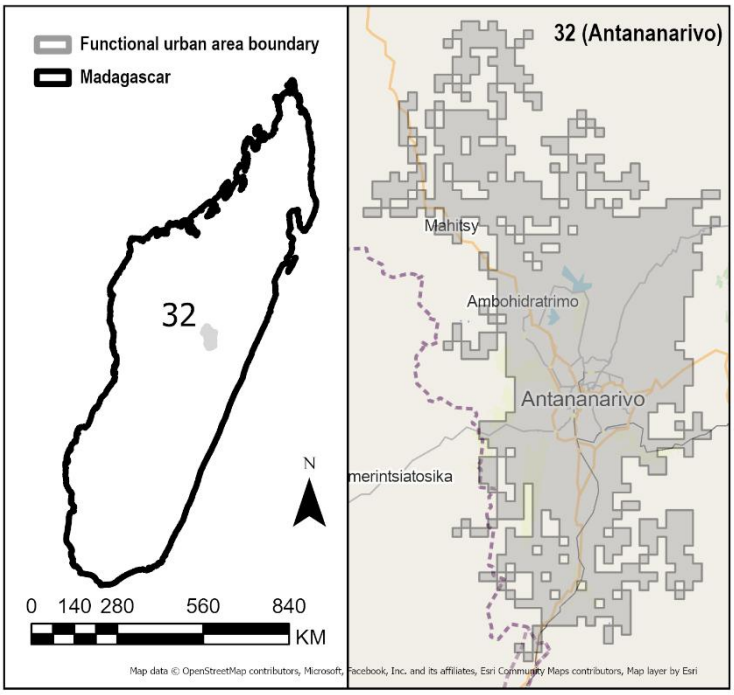
15. Lesotho



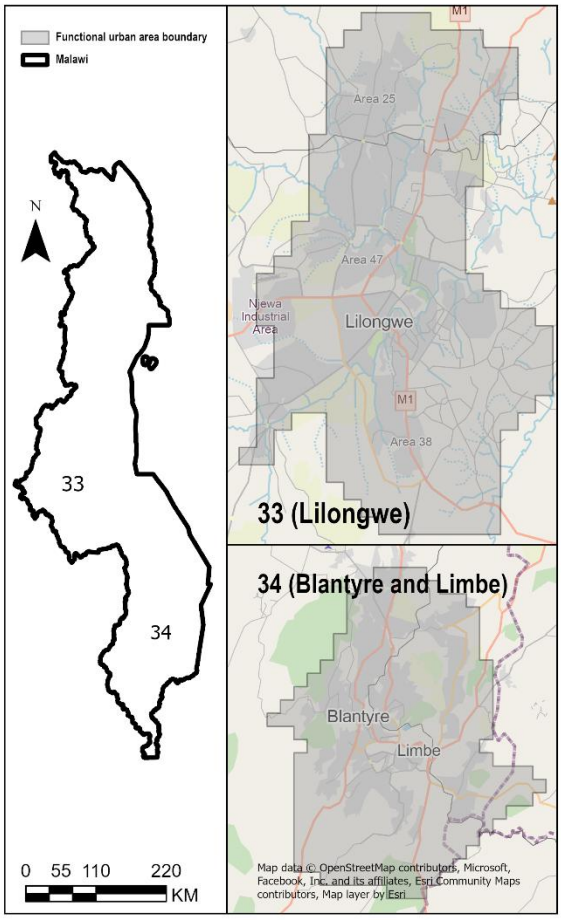
16. Liberia



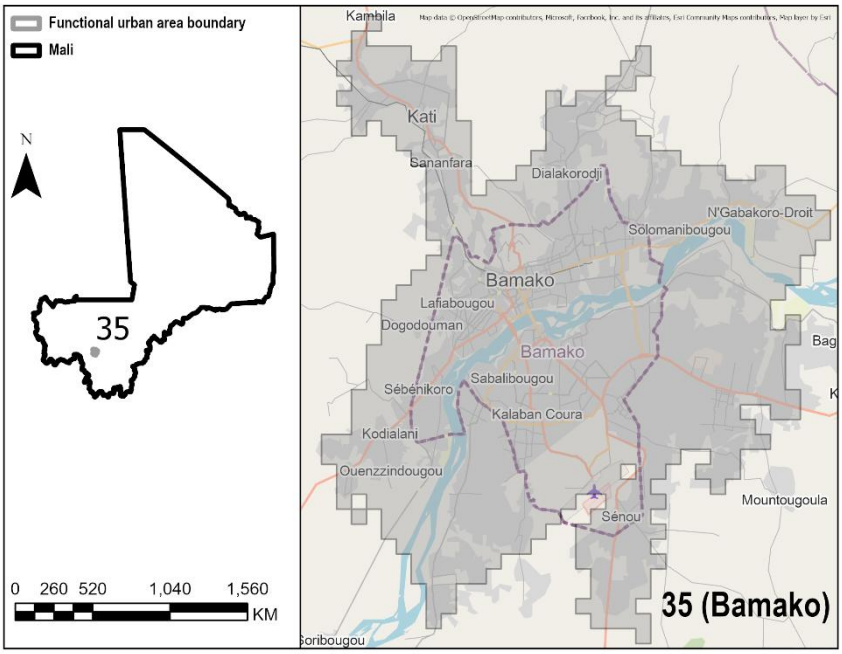
17. Madagascar



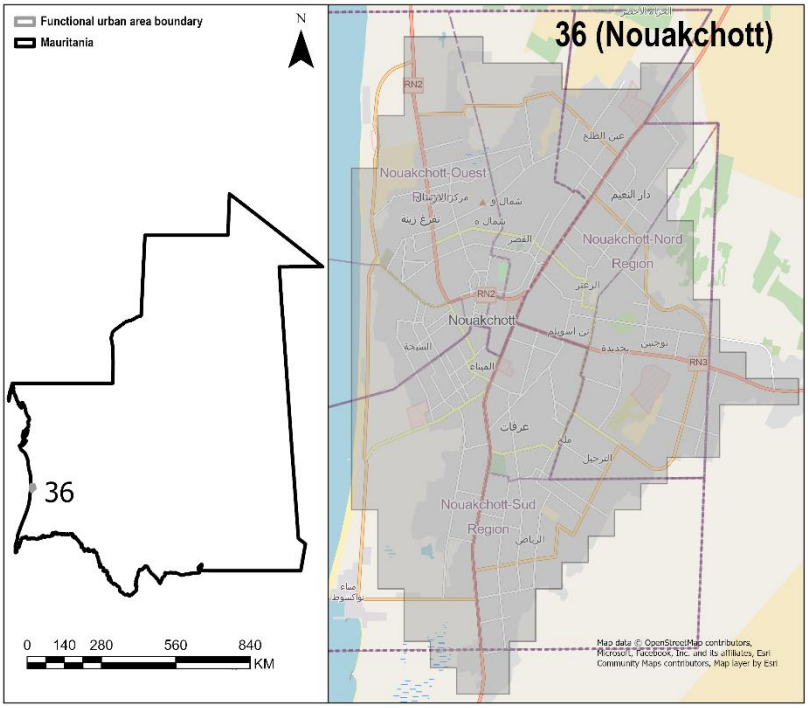
18. Malawi



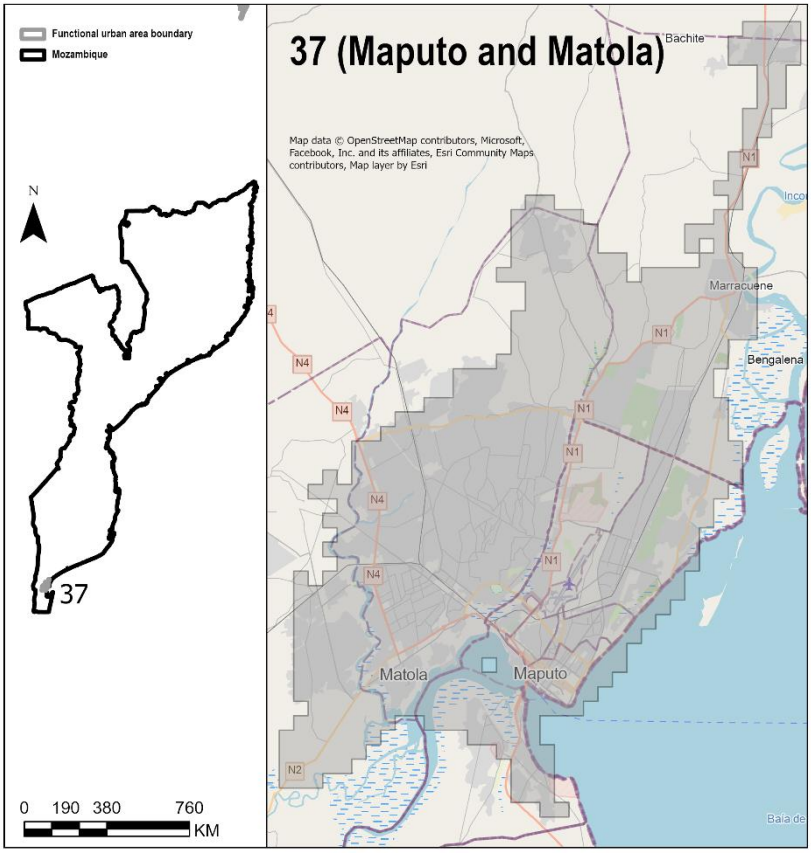
19. Mali



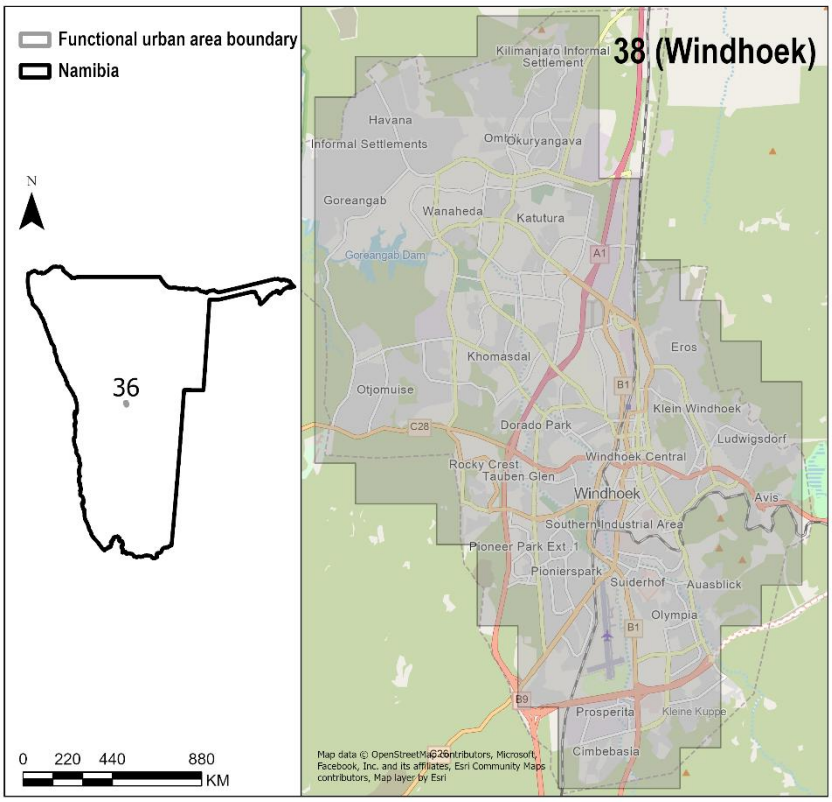
20. Mauritania



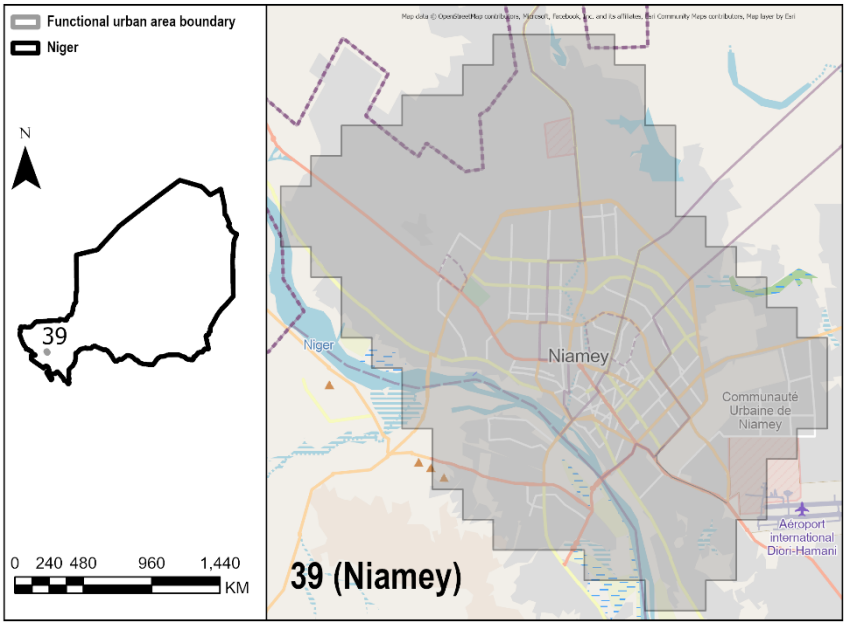
21. Mozambique



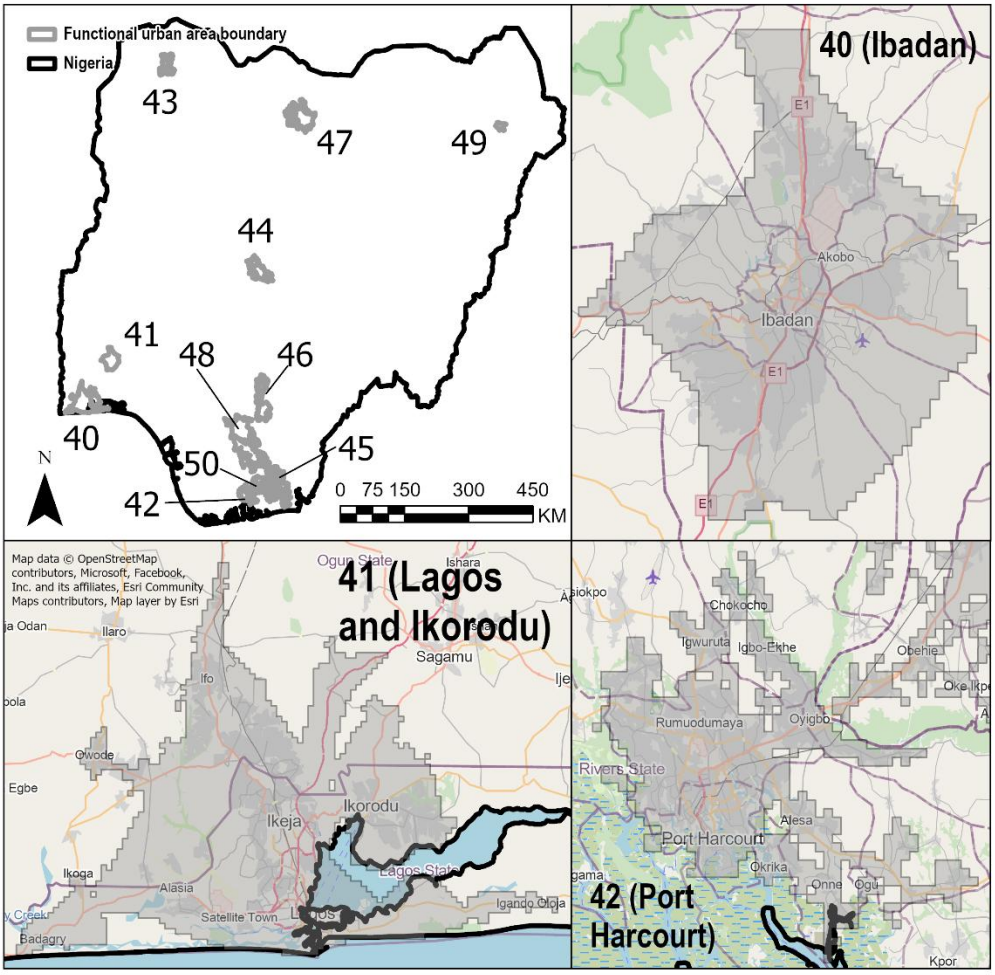
22. Namibia

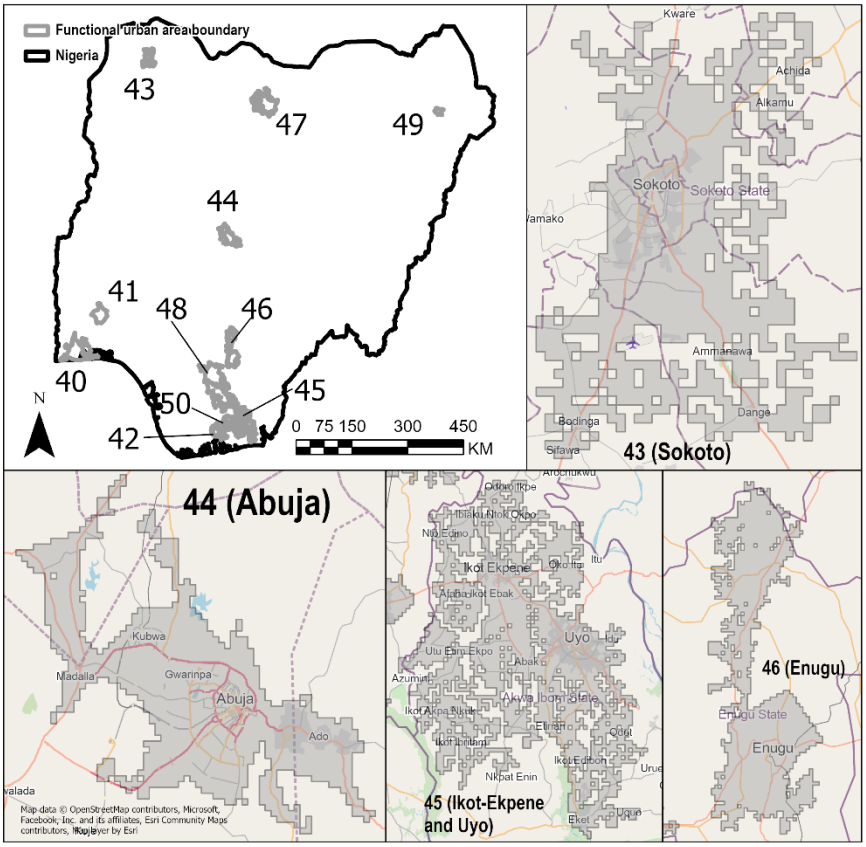


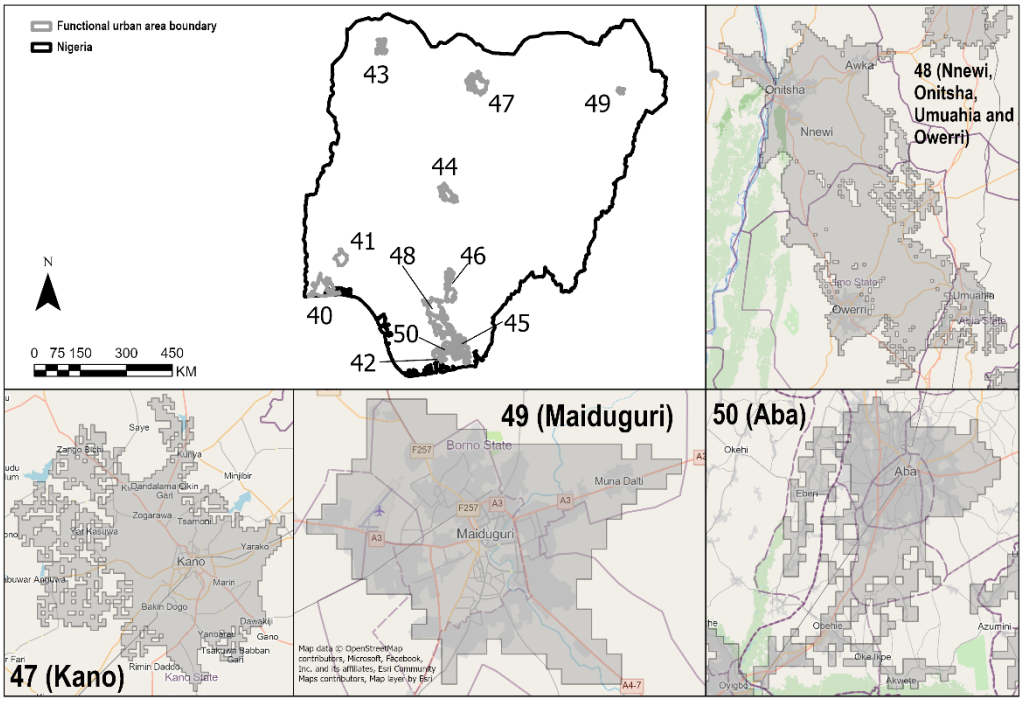
23. Niger


Functional urban area boundary
Niger
N
39
0 240 480 960 1,440
KM
Niger
Niamey
Communauté Urbaine de Niamey
Aeroport international Diori-Hamani
39 (Niamey)

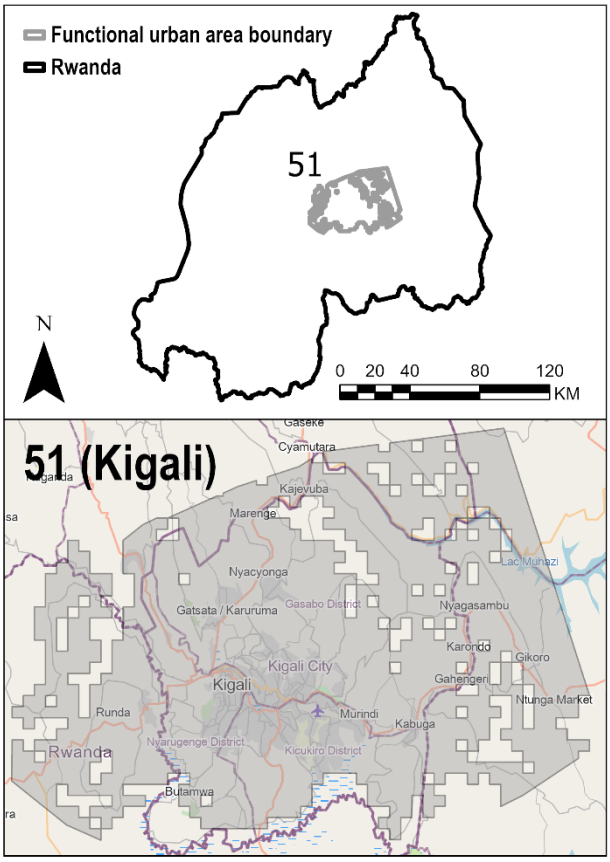
24. Nigeria


Functional urban area boundary
Nigeria
43
47
49
44
41
48
46
40
50
45
42
N
0 75 150 300 450
KM
40 (Ibadan)
E1
Akobo
Ibadan
41 (Lagos and Ikorodu)
Map data © OpenStreetMap contributors, Microsoft, Facebook, Inc. and its affiliates, Esri Community Maps contributors, Map layer by Esri
Ogun State
Ishara
Ilaro
Sagamu
Ijebu
Ifo
Ojiwode
Egbe
Ikorodu
Ikeja
Lagos State
Ikoqa
Alasia
Satellite Town
Badagry
Igando Ojoa
Chokocho
Igwuruta
Igbo-Ekhe
Obehie
Rumuodumaya
Oyigbo
Rivers State
Alesa
Port Harcourt
Okrika
Onne
Ogu
42 (Port Harcourt)

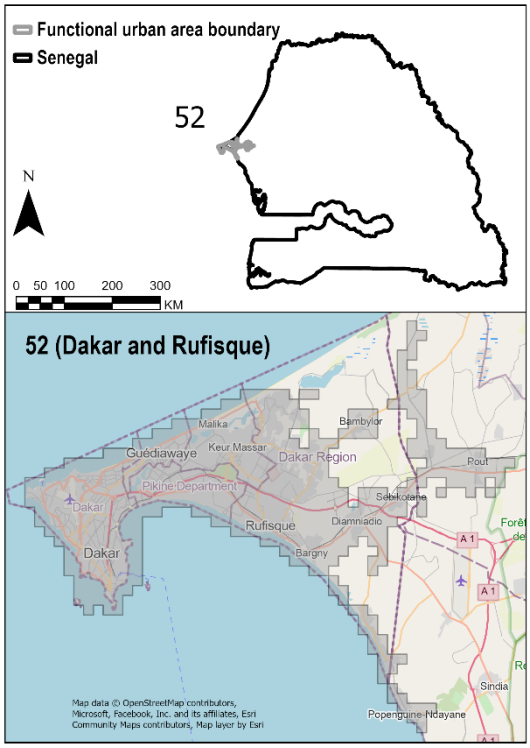

Functional urban area boundary
Nigeria
43
47
49
44
41
48
46
40
50
45
42
N
0 75 150 300 450
KM
Kware
Achida
Alkamu
Sokoto
Sokoto State
Yamako
Ammanawa
Dange
Bodinga
Sifawa
43 (Sokoto)
44 (Abuja)
Kubwa
Madalla
Gwarinpa
Abuja
Ado
Map data © OpenStreetMap contributors, Microsoft, Facebook, Inc. and its affiliates, Esri Community Maps contributors, Map layer by Esri
Ikot Ekpene
Uyo
Azumini
Ikot Abasi
Eket
45 (Ikot-Ekpene and Uyo)
46 (Enugu)
Enugu State
Enugu


Functional urban area boundary
Nigeria
43
47
49
44
41
48
46
40
50
45
42
N
0 75 150 300 450
KM
Awka
Onitsha
Nnewi
Owerri
48 (Nnewi, Onitsha, Umuahia and Owerri)
Umuahia
Saye
Zango Birni
Kunya
Minjibir
Gandalama Gikin Gari
Zogarawa
Tsamanni
Yan Kasuwa
Yarako
Kano
Marin
Bakin Dogo
Dawakiji
Yanbatari
Gano
Tsamiyar Babban Gari
Ramin Dadda
Kano State
47 (Kano)
Borno State
Muna Dalti
Maiduguri
49 (Maiduguri)
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Okehi
Aba
Eberi
Obehie
Azumini
Oka Ikpe
Akwete
50 (Aba)

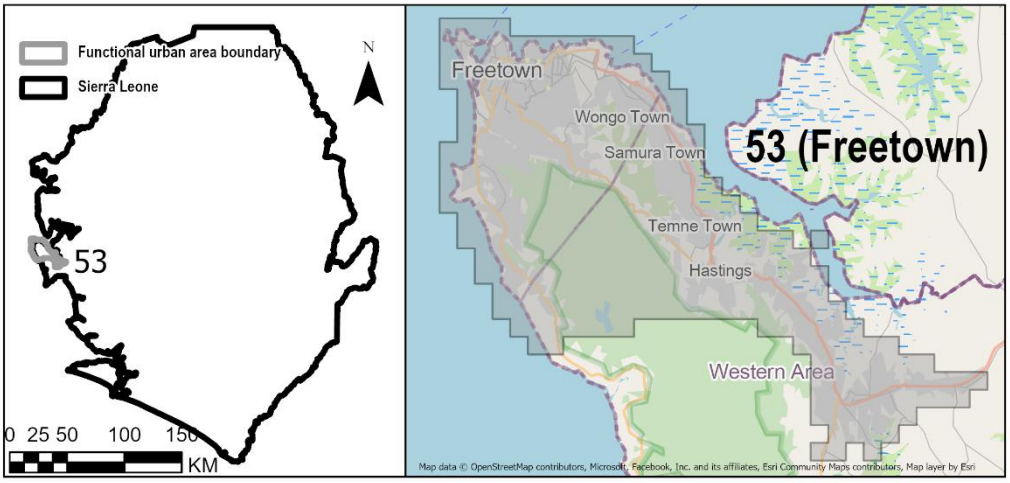
25. Rwanda



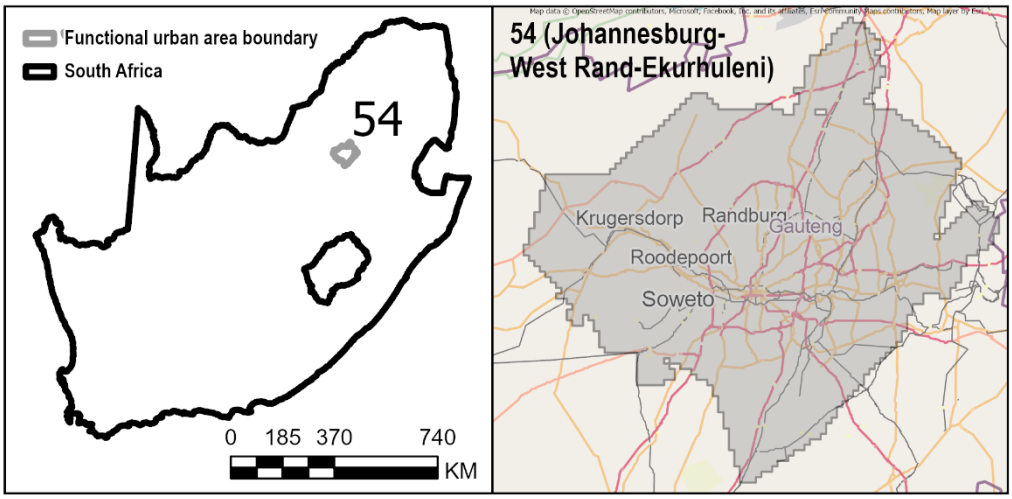
26. Senegal



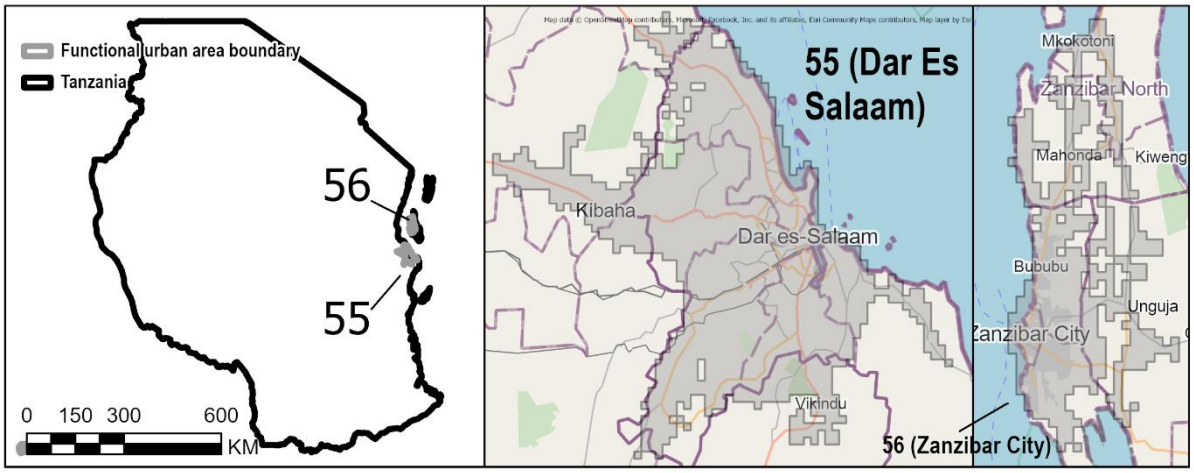
27. Sierra Leone



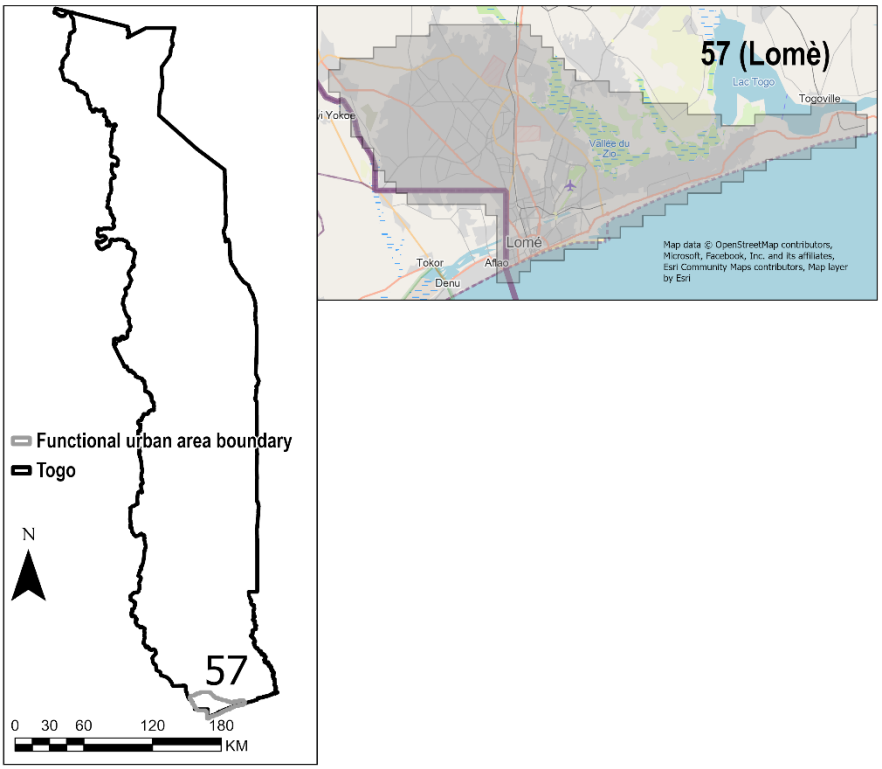
28. South Africa



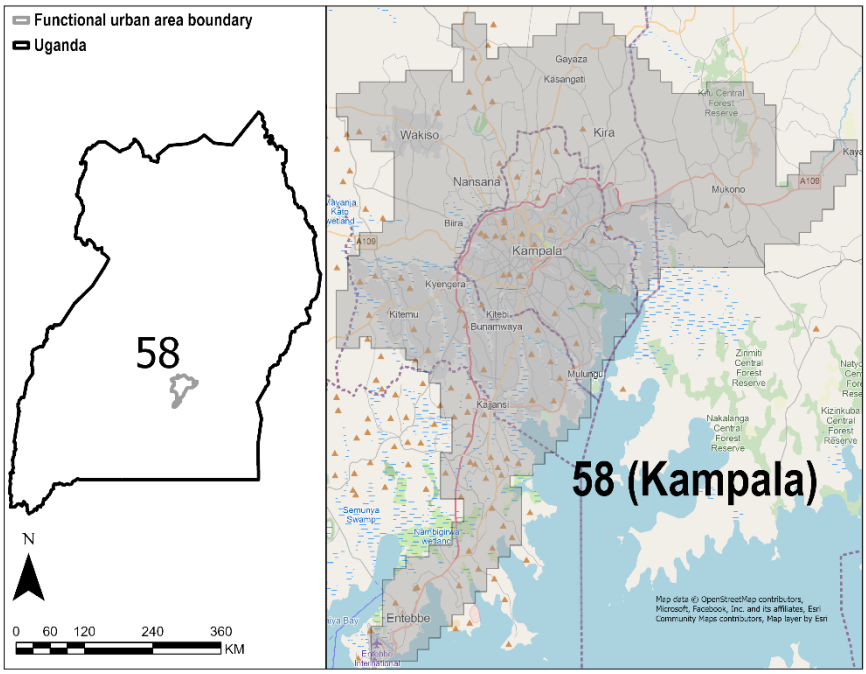
29. Tanzania



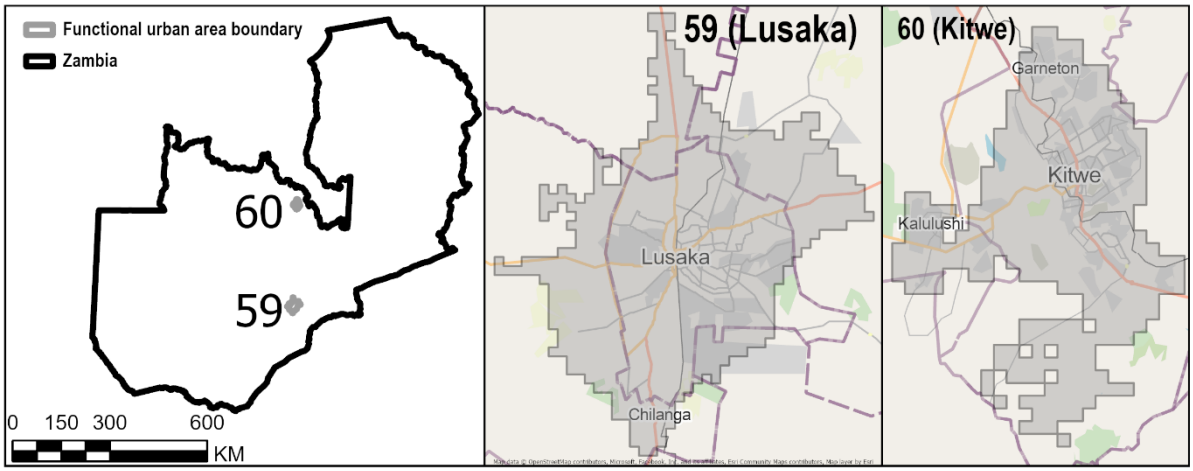
30. Togo



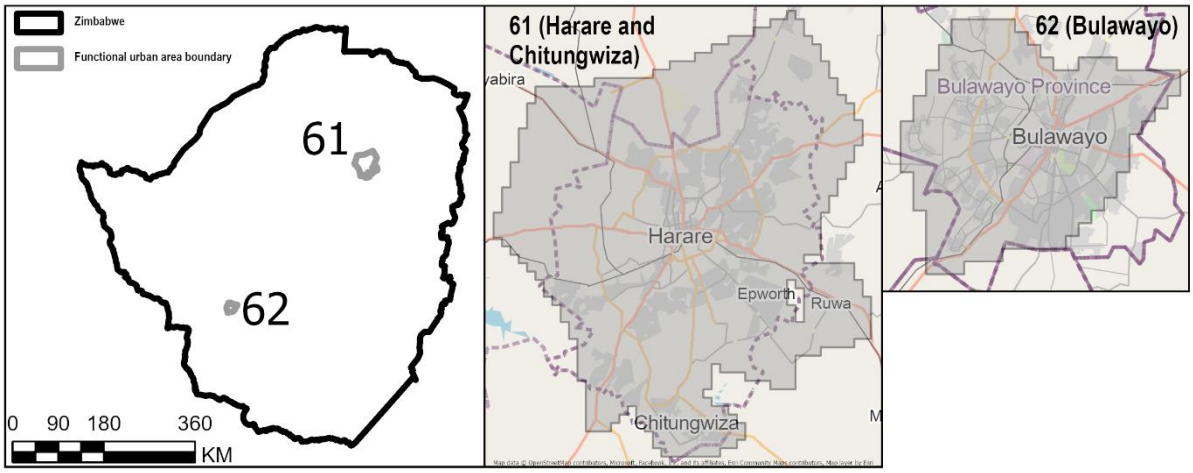
31. Uganda



32. Zambia


Functional urban area boundary
Zambia
60
59
0 150 300 600
KM
59 (Lusaka)
Lusaka
Chilanga
60 (Kitwe)
Garneton
Kitwe
Kalulushi

33. Zimbabwe


Zimbabwe
Functional urban area boundary
61
62
0 90 180 360
KM
61 (Harare and Chitungwiza)
Harare
Epworth
Ruwa
Chitungwiza
62 (Bulawayo)
Bulawayo Province
Bulawayo