African History through the Lens of Economics

Mapping Contemporary African Development

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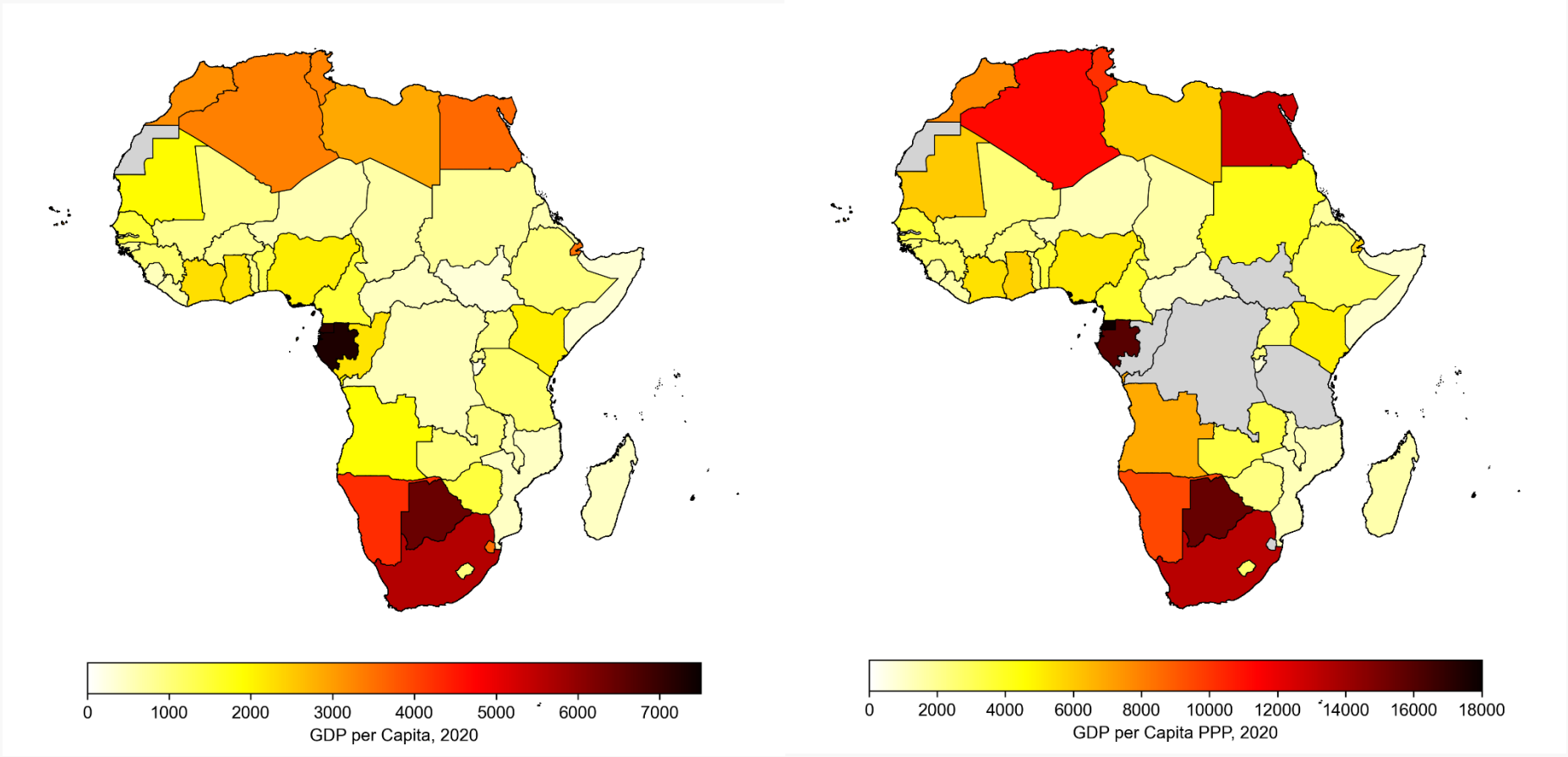
Structure

1. **Measuring Spatial Development**
   - GDP
   - Why?
   - Approach
2. **Main Pan-African Datasets**
   - GIS data: Luminosity, Landcover, Agriculture, Elevation.
   - Surveys: Demographic and Health Surveys, Afrobarometer.
   - Admin data: Country censuses, IPUMS.
   - Other: Conflict, Institutions, Imagery, Machine Learning.
3. **Summary and Takeaways**

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Africa 2020. GDP p.c. & GDP PPP p.c.



GDP

— **Missing data and information for a few (many) countries (before 1990)**

— **Data quality**

- Statistical agencies; PWT [Penn World Tables] “rating”
- Price and purchasing power adjustments [PPP series]

— **Measurement issues**, especially for agriculture specializing countries

- Strong correlation between agriculture employment share and GDP p.c.

— **Continuous revisions**

- According to PWT 6.2 Equatorial Guinea is the second-fastest growing economy among 40 African countries. However, according to PWT 6.1, released four years before, Equatorial Guinea was the slowest growing country [Johnson, Papageorgiou, Larson, and Subramanian (2009)]

— **Conceptual issues, esp. expansion of cross-border investment**

- GDP - GNP

GDP across Africa. Penn World Tables PWT 6.1 vs 6.2

Table 1. Average growth rates in African countries (1975–1999)

Top 10 countries

PWT 6.2		PWT 6.1		Countries not appearing on both lists
Country	Growth	Country	Growth	
Botswana	4.50%	Botswana	5.10%	Congo, Republic of
Equ.Guinea	4.00%	Cape Verde	4.70%	Equatorial Guinea
Cape Verde	3.70%	Mauritius	4.30%	Ethiopia
Egypt	3.70%	Egypt	3.70%	Malawi
Mauritius	3.70%	Tunisia	2.50%	Mali
Lesotho	3.50%	Uganda	1.70%	Uganda
Tunisia	2.70%	Morocco	1.70%	
Mali	2.00%	Lesotho	1.50%	
Ethiopia	1.60%	Congo, Rep of	1.50%	
Morocco	1.60%	Malawi	1.20%	

Bottom 10 countries

PWT 6.2		PWT 6.1		Countries not appearing on both lists
Country	Growth	Country	Growth	
Gabon	-2.60%	Equ. Guinea	-2.70%	Chad
Zambia	-2.10%	Mozambique	-2.40%	Cote d'Ivoire
Madagascar	-1.90%	Zambia	-1.80%	Gabon
Togo	-1.70%	Comoros	-1.60%	Guinea-Bissau
Guinea-Bissau	-1.40%	Madagascar	-1.40%	Mauritania
Comoros	-1.20%	Cote d'Ivoire	-1.40%	Namibia
Niger	-0.70%	Niger	-1.30%	Nigeria
Nigeria	-0.50%	Mauritania	-1.30%	Togo
Chad	-0.50%	Togo	-1.00%	
Mozambique	-0.40%	Namibia	-0.90%	
				Country switching lists: Equ. Guinea

Source: Johnson, Papageorgiou, Larson, and Subramanian (2009)

Improve GDP. Approach

Complementary Approach. Combine GDP with "other" data

— Micro-individual survey data [Young (JPE 2010)]

— Satellite imagery on light density at night [Henderson *et al*. (AER 2012)]

— Other (Big) Data

Move beyond GDP

— **Regional** (and sectoral) **disaggregation**; important for Africa, given history and considerable spatial and industry differences in productivity

— **Inequality**. Significant challenge, given rising inequality; issue across all countries [see Zucman, Saez, and Blanchet (2022)]

- Need to move beyond mean/averages
- Rural-urban differences
- Spatial differences
- within-city

African Spatial Development

- Anecdotal evidence of large differences in well-being [income, consumption, education, health, public goods access] both across but also within (African) countries
- Spatial differences in well-being across administrative-units, pixels, and ethnic regions appear the largest in Africa [Alesina, Michalopoulos, and Papaioannou (JPE 2016)]
  - On average spatial inequality larger in relatively low(er) income countries [Williamson (EDCC 1965), Kanbur and Venables (book 2005)]
- State capacity [fiscal, legal, and security] on average weaker in relatively low(er) income countries, esp. in Africa
- Noisy macroeconomic aggregates, like income and GDP

African Spatial Development and Policies

— Policies often yield heterogeneous across space impacts
  - Agriculture policies of newly-independent African states
  - Trade openness and infrastructure investment has on average positive effects that are quite heterogeneous [Hohmann (2018), Storeygard (RES 2016)]
  - Foreign aid and foreign direct investment is often clustered

— Pervasive evidence of regional favoritism (discrimination) often with an ethnic angle across many (African) countries
  - Pan-African Evidence. [Franck and Rainer (APSR 2012), Amodio, Chiovelli, and Hohmann (2021)]
  - Country Case Studies. Kenya [Burgess, et al. (AER 2015)], Zambia [Gisselquist et al. (WD 2016)]

African Spatial Development and History

— **Heterogeneous** impact of large historical events across regions, ethnic, and religious groups in the same (contemporary) country (former colony, protectorate)

— **Example 1.** Slave Trades [Nunn (QJE 2008), Nunn and Puga (REStat 2010)]

- Huge impact for African societies close to the coast and the major trade routes
- Smaller –or even nil- direct impact for societies living in the interior

— **Example 2.** Colonization. "Bundle Treatment"

- Transportation investments differed wildly across areas
- Colonial and Missionary school
- Violence, repression, and forced labor

African Spatial Development. Modern Approach

— Geospatial data variation ➔ exploit richness of policies, interventions, history

— Move beyond correlational patterns [though we learn a lot simply visualizing the data and performing simple tabulations]

- Experimental variation. Compare villages with Christian missionary schools to nearby villages without such investments [Wantchekon et al. (QJE 2014)]
- Exploit discontinuities in historical boundaries. Compare areas inside concessionary boundaries facing violence and extortion to areas just outside [Lowes and Montero (QJE 2021]
- Use border artificiality to advance on causality [Michalopoulos and Papaioannou (AER 2016)]
- Quasi-random variation (perhaps conditional on observable features) and historical placebos

African Spatial Development. Modern Approaches

— **Macro designs.** Cross-country Variation
  - Ideology of African Independence Movements and Political Modernization [Wantchekon and Garcia-Ponce (AJSP 2021)]
  - Slave Trades and Economic Development [Nunn (QJE 2007)]

— **Meso design.** Regional Variation
  - The Long-Run Effects of the Scramble for Africa [Michalopoulos and Papaioannou (AER 2016)]
  - Precolonial Political Centralization and Contemporary African Development [Michalopoulos and Papaioannou (ECMA 2013)]

— **Micro design.** Individual Level
  - Colonial schools and human capital externalities [Wantchekon et al. (QJE 2014)]

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3. **Summary and Takeways**

GIS data. Luminosity / Light Density at Night

Overview

— **Data Overview**

- Proxy: Income / output / development [level and changes]
- Universal coverage
- Every 1 km^2 across the world
- Every year since 1992 [1992 – 2013, DMSP; 2013-2021 VIIRS]

— **Source: NOA/NASA**

- Download DMSP at the Earth Observation Group
- Download VIIRS at the Earth Observation Group



Source: NASA

GIS data. Luminosity / Light Density at Night

Overview

— **Caveats**

- Broad notion of "development" [mixing population and income/output]
- Technical issues [e.g., blooming, top-coding, etc.]
- Many unlit areas



Source: NASA

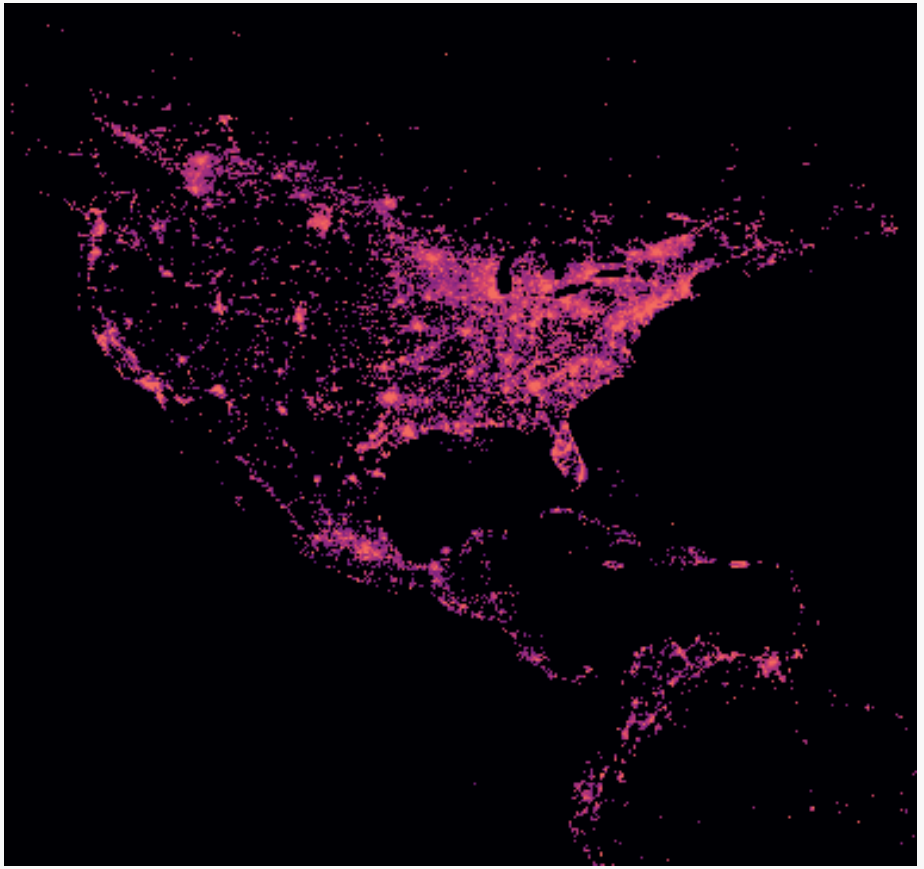
GIS data. Luminosity / Light Density at Night

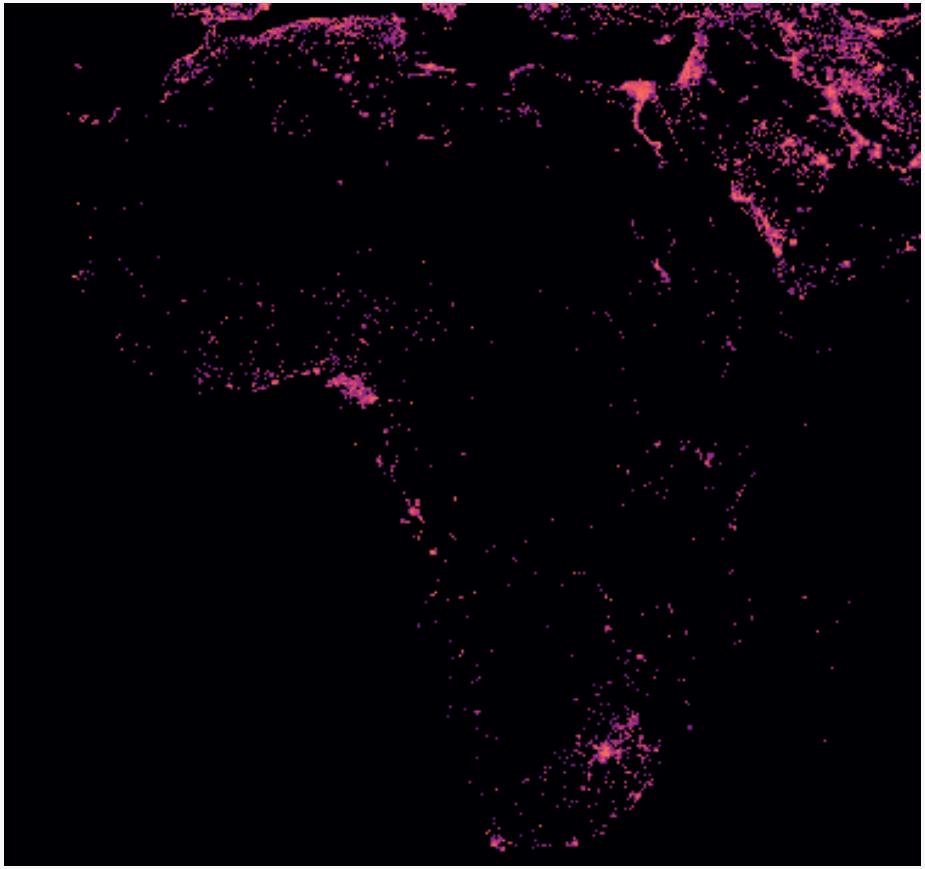
Africa at Night



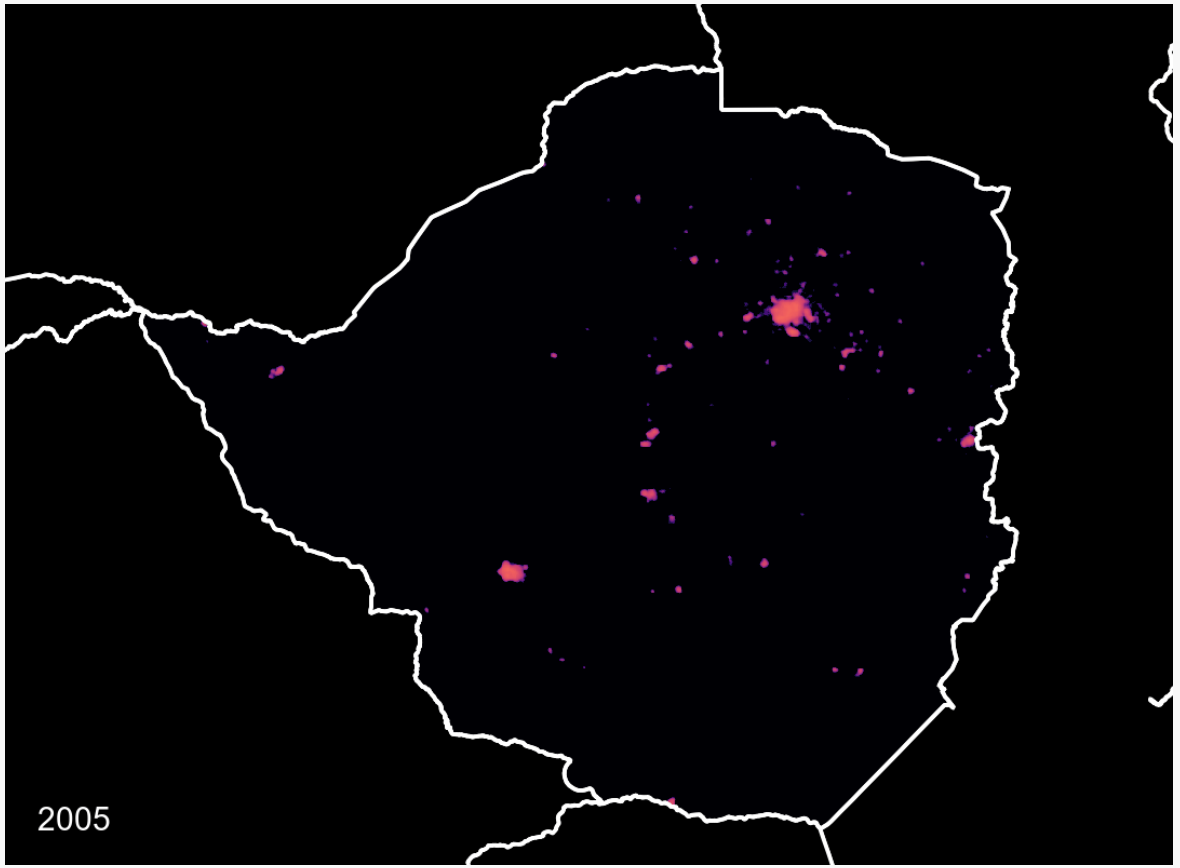
GIS data. Luminosity / Light Density at Night

A Contrast with the North America





GIS data. Luminosity as Proxy of Spatial Development.
Example 1. Zimbabwe. 2005-2010 Hyperinflation



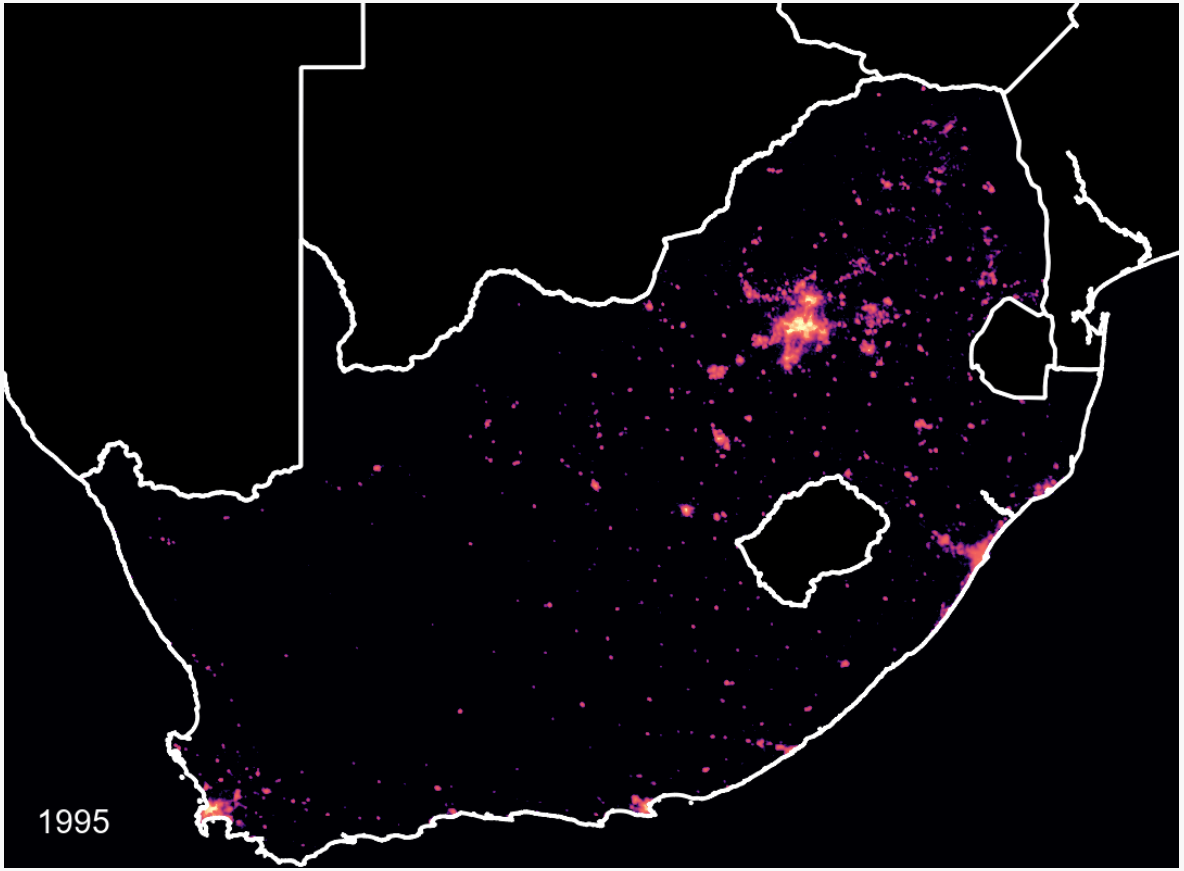
Hyperinflation in Zimbabwe

- Inflation increased rapidly, peaking in 2008 [79,600,000,000% in Nov.]
- Official statistics stop in 2008

Nightlights show

- declining light to 2008
- Slight rebound afterwards

GIS data. Luminosity as Proxy of Spatial Development.
Example 2. South Africa. Democratic Era



South Africa Post-Apartheid

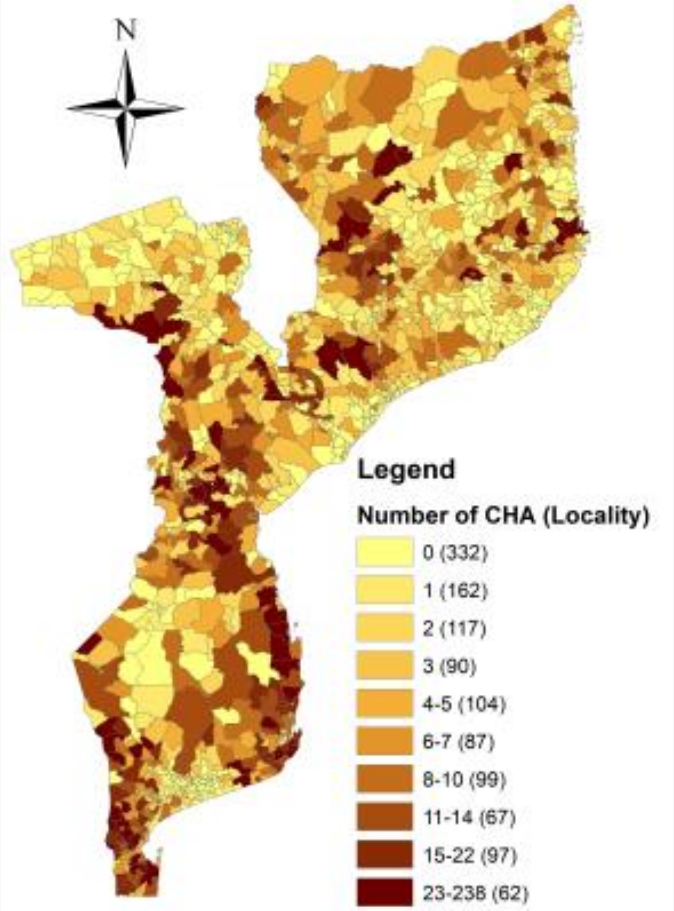
- Population growth 44% since 1995
- GDP growth 97% since 1995

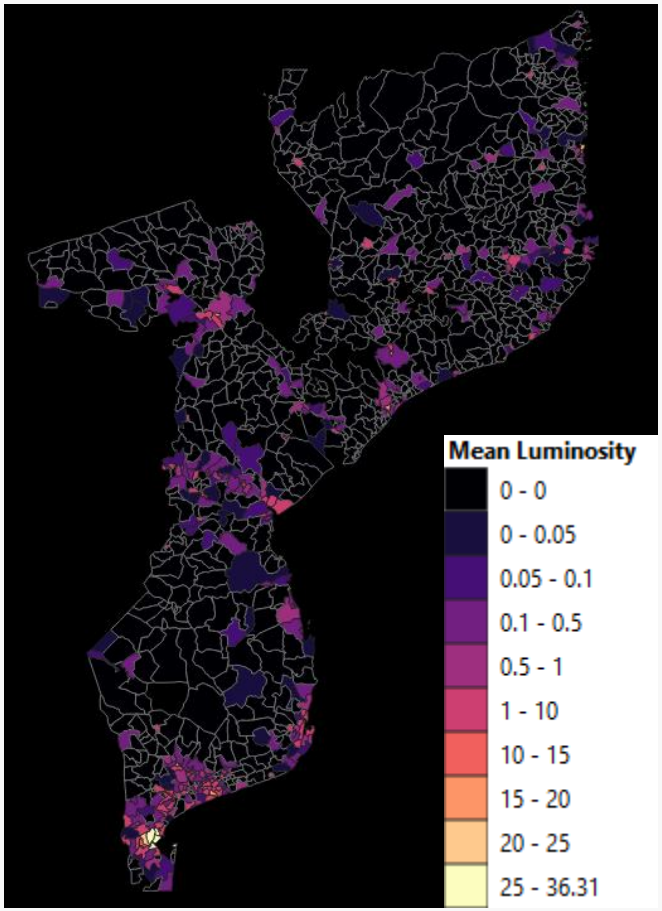
Nightlights show

- Growth of Johannesburg/Durban
- Growth in the hinterlands
- Drop in spatial inequality

GIS data. Luminosity Application.

["Landmines and Spatial Development". Chiovelli, Michalopoulos, and Papaioannou. (2021).]





GIS data. Luminosity Applications.
Historical African Development

— Michalopoulos, S., & Papaioannou, E. (2013). Pre-colonial ethnic institutions and contemporary African development. *Econometrica*, *81*(1), 113-152. **week 2**

— Jedwab, R., Kerby, E., & Moradi, A. (2017). History, path dependence and development: Evidence from colonial railways, settlers and cities in Kenya. *The Economic Journal*, *127*(603), 1467-1494.

— Michalopoulos, S., & Papaioannou, E. (2014). National institutions and subnational development in Africa. *The Quarterly journal of economics*, *129*(1), 151-213.

— Dickens, A. (2018). Ethnolinguistic favoritism in african politics. *American Economic Journal: Applied Economics*, *10*(3), 370-402.

— Chiovelli, G., Michalopoulos, S., & Papaioannou, E. (2018). *Landmines and spatial development*. NBER working paper (no. w24758).

GIS data. Luminosity.
Bibliography

— Hodler, R., & Raschky, P. A. (2014). Regional favoritism. *The Quarterly Journal of Economics*, *129*(2), 995-1033.

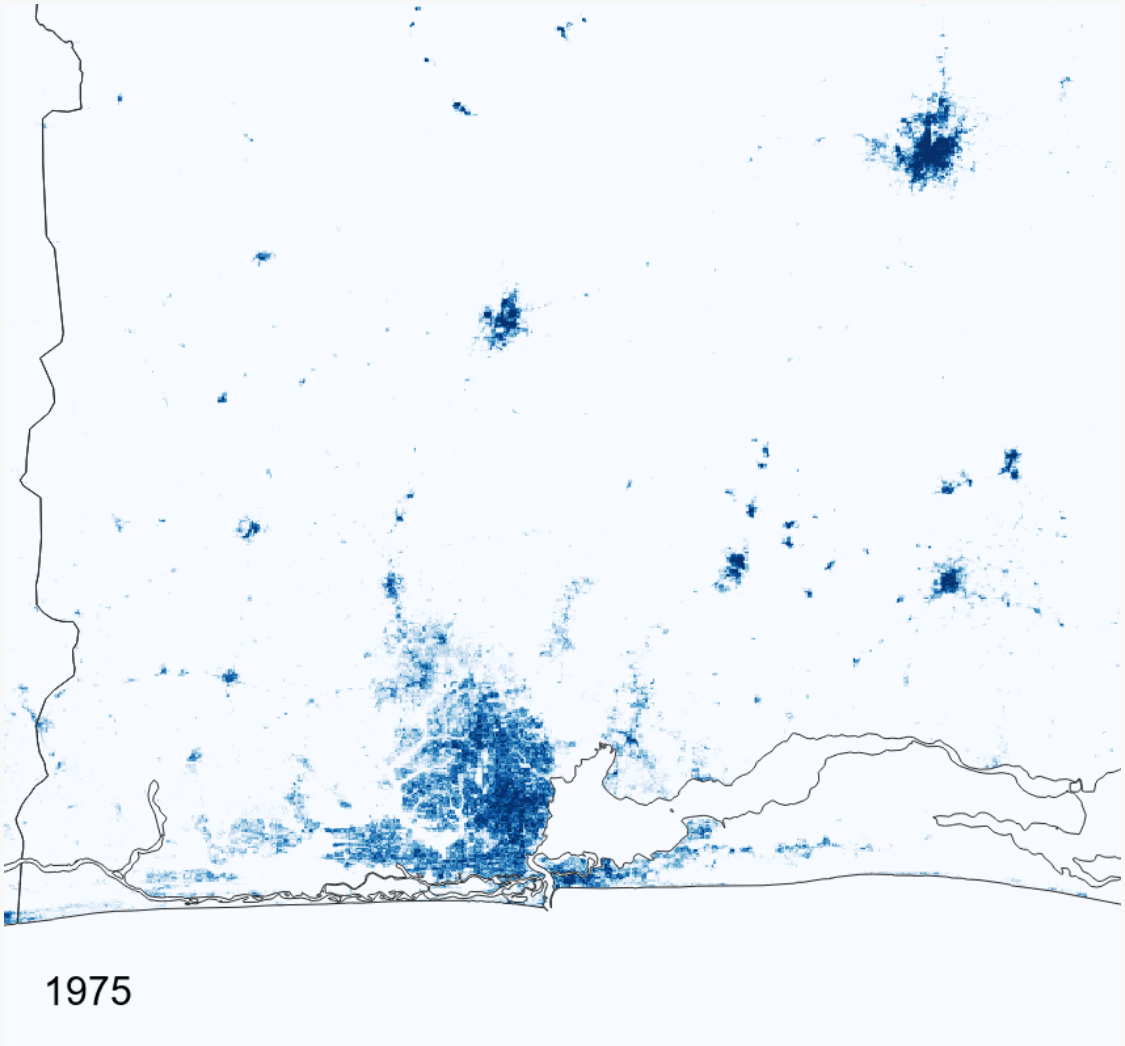
— Henderson, J. V., Storeygard, A., & Weil, D. N. (2012). Measuring economic growth from outer space. *American economic review*, *102*(2), 994-1028.

— Pinkovskiy, M., & Sala-i-Martin, X. (2016). Lights, camera… income! Illuminating the national accounts-household surveys debate. *The Quarterly Journal of Economics*, *131*(2), 579-631.

— Donaldson, D., & Storeygard, A. (2016). The view from above: Applications of satellite data in economics. *Journal of Economic Perspectives*, *30*(4), 171-98.

— Besley, T., & Reynal-Querol, M. (2014). The legacy of historical conflict: Evidence from Africa. *American Political Science Review*, *108*(2), 319-336.

GIS data. Landcover (GHSL).
Brief summary



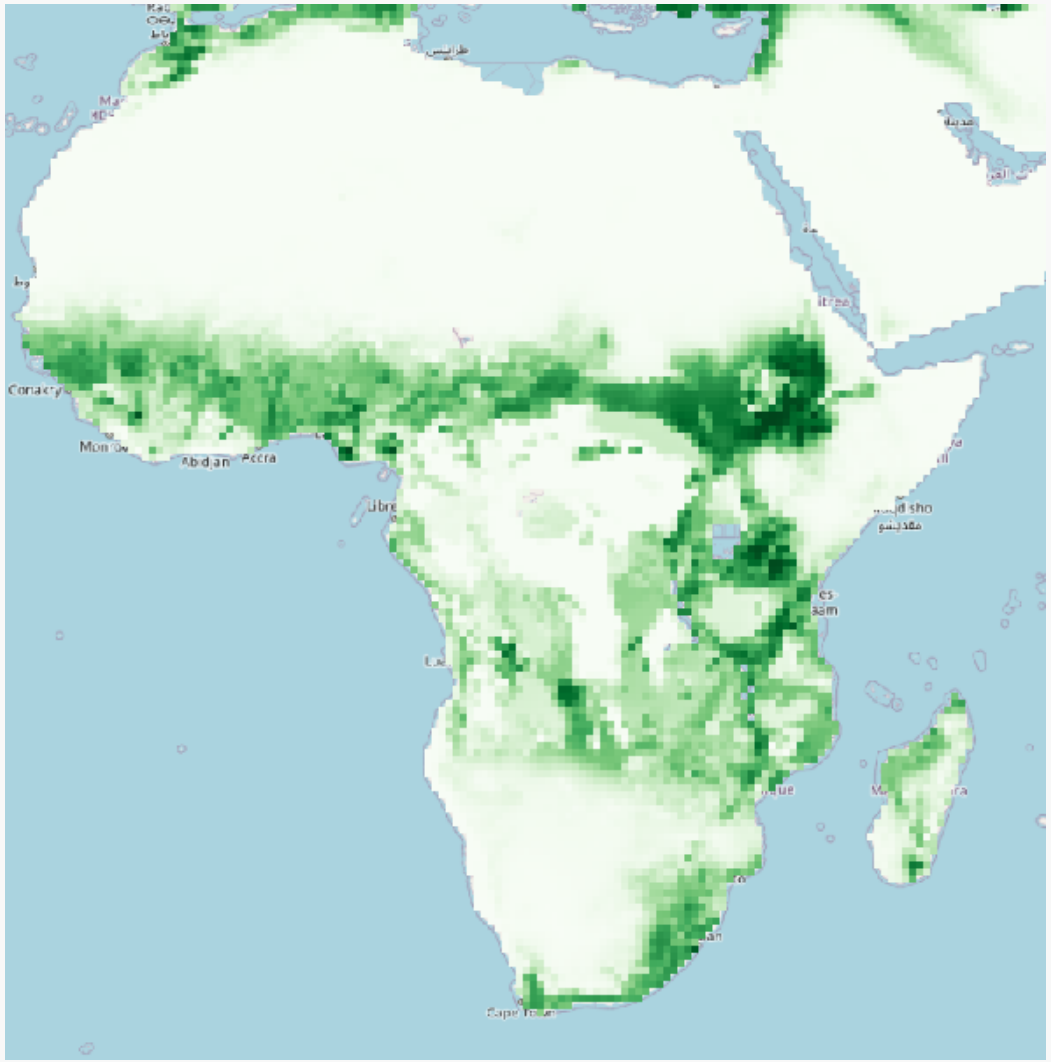
- **Share of land that is 'built-up'**
  - Worldwide
  - Epochs: 1975, 1990, 2000, 2014
- **Built space at a very fine level**
  - Growth of cities and towns
  - Pattern of urban development ('leap-frogging')
- **Application:**
  - "Colonial Legacies: Shaping African Cities". Baruah, Henderson, and Peng (JEGeo 2017).
- **Source: European Commission**
  - Download at GHSL

GIS data. Elevation (SRTM).
Brief summary



- **Height above sea level**
  - Worldwide
  - One point in time
- **Measure features of the terrain**
  - Important for agriculture, flooding, conflict, etc.
- **Application:**
  - "Ruggedness: The Blessing of Bad Geography in Africa". Nunn and Puga (REStat 2017).
- **Source: USGS**
  - Download from the EROS Center

GIS data. Agricultural Suitability.
Brief summary



— **Fraction of land suitable for agriculture.**
  - Worldwide
  - One point in time

— **Application:**
  - "The Origins of Ethnolinguistic Diversity". Michalopoulos (AER 2012).

— **Source: University of Wisconsin-Madison**
  - Download from the CSGE

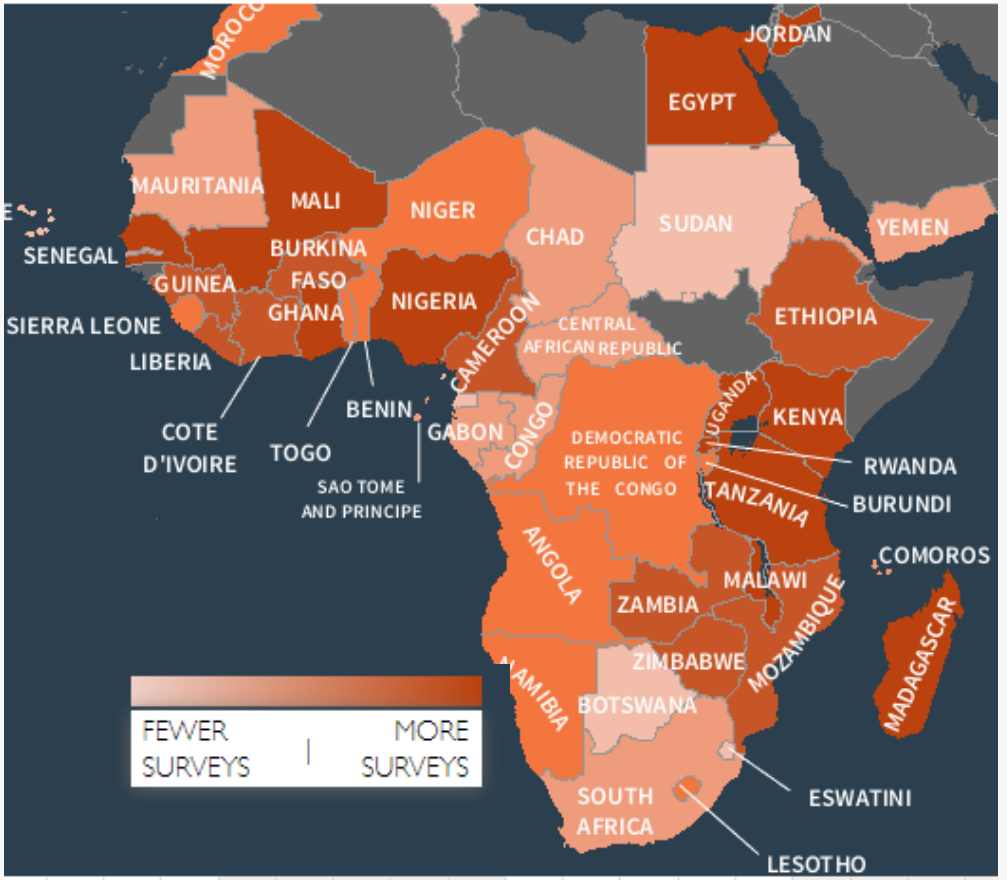
Surveys. Demographic and Health Survey (DHS). Overview

— **Aspects:**
  - Fertility, education, household structure, assets and wealth, immunization, access to public goods, …

— **Coverage (see map)**

— Samples of the population for a given country and year [from 1985]

— **Source: USAID, DHS Program**
  - Download at the DHS Program

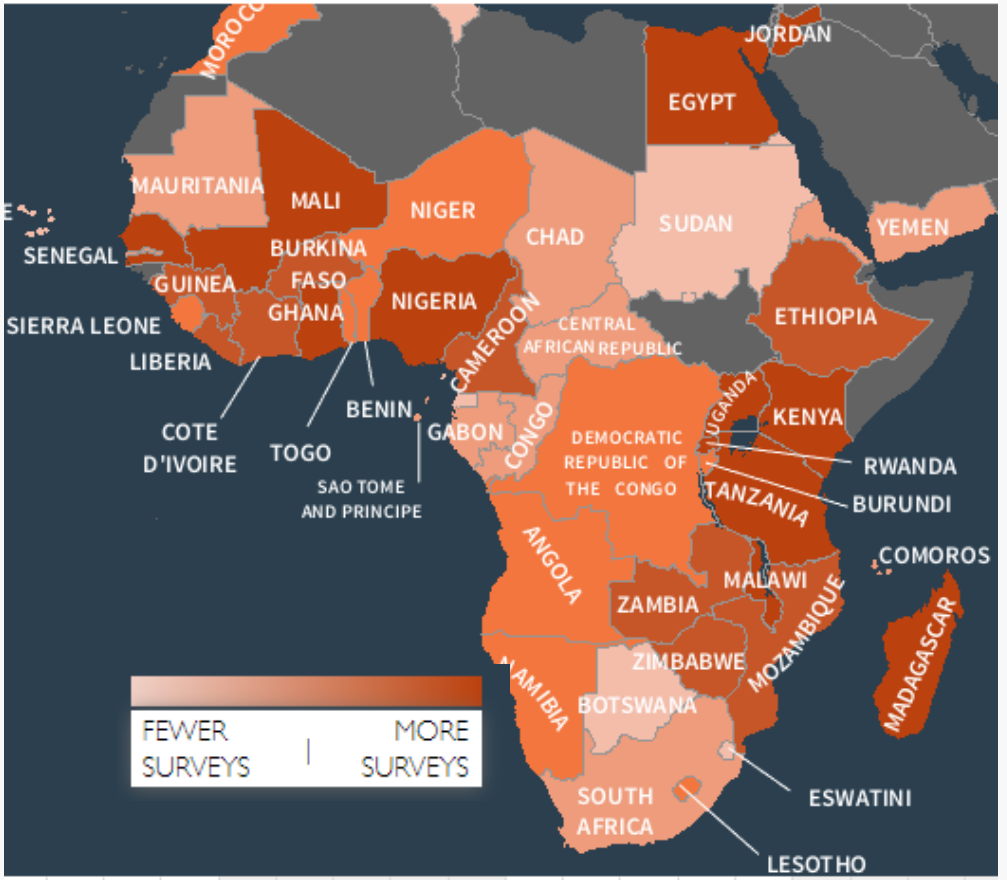


Surveys. Demographic and Health Survey (DHS). Caveats

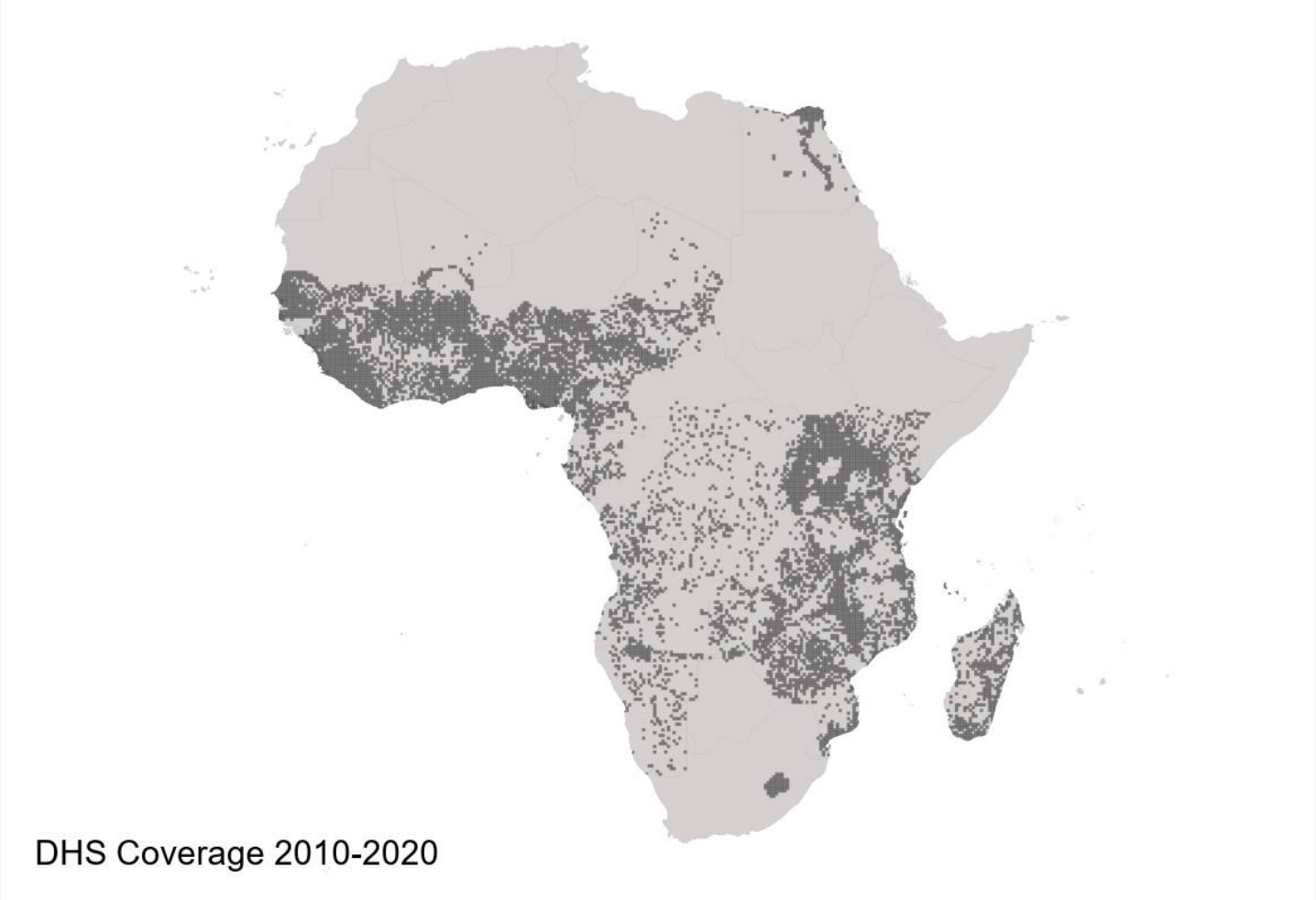
— Same locations not necessarily repeated over time

— Sample may differ (only female in some year, all citizens in others, not all surveys give location)

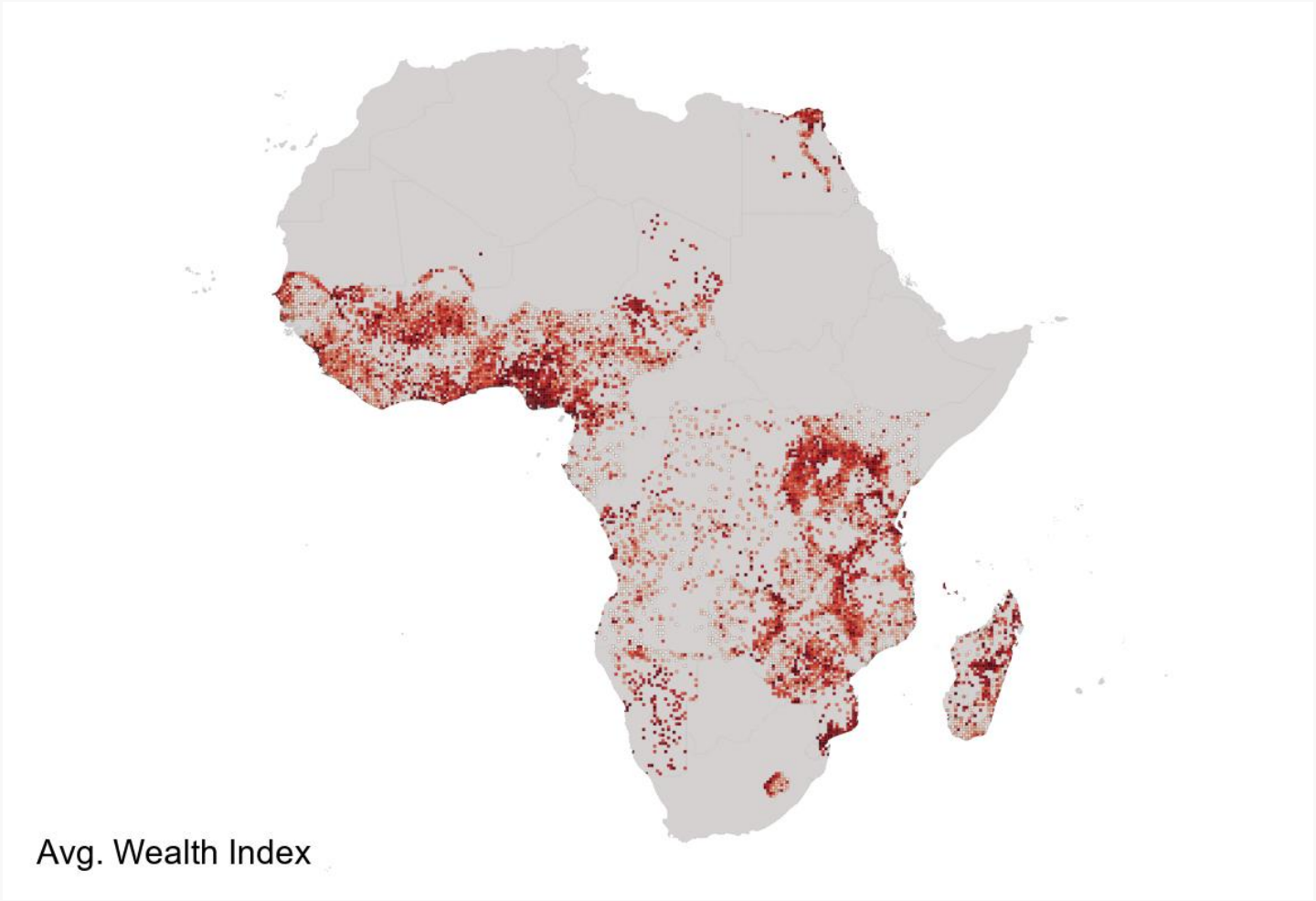
— Oversampling of proximate to capitals and other big cities areas



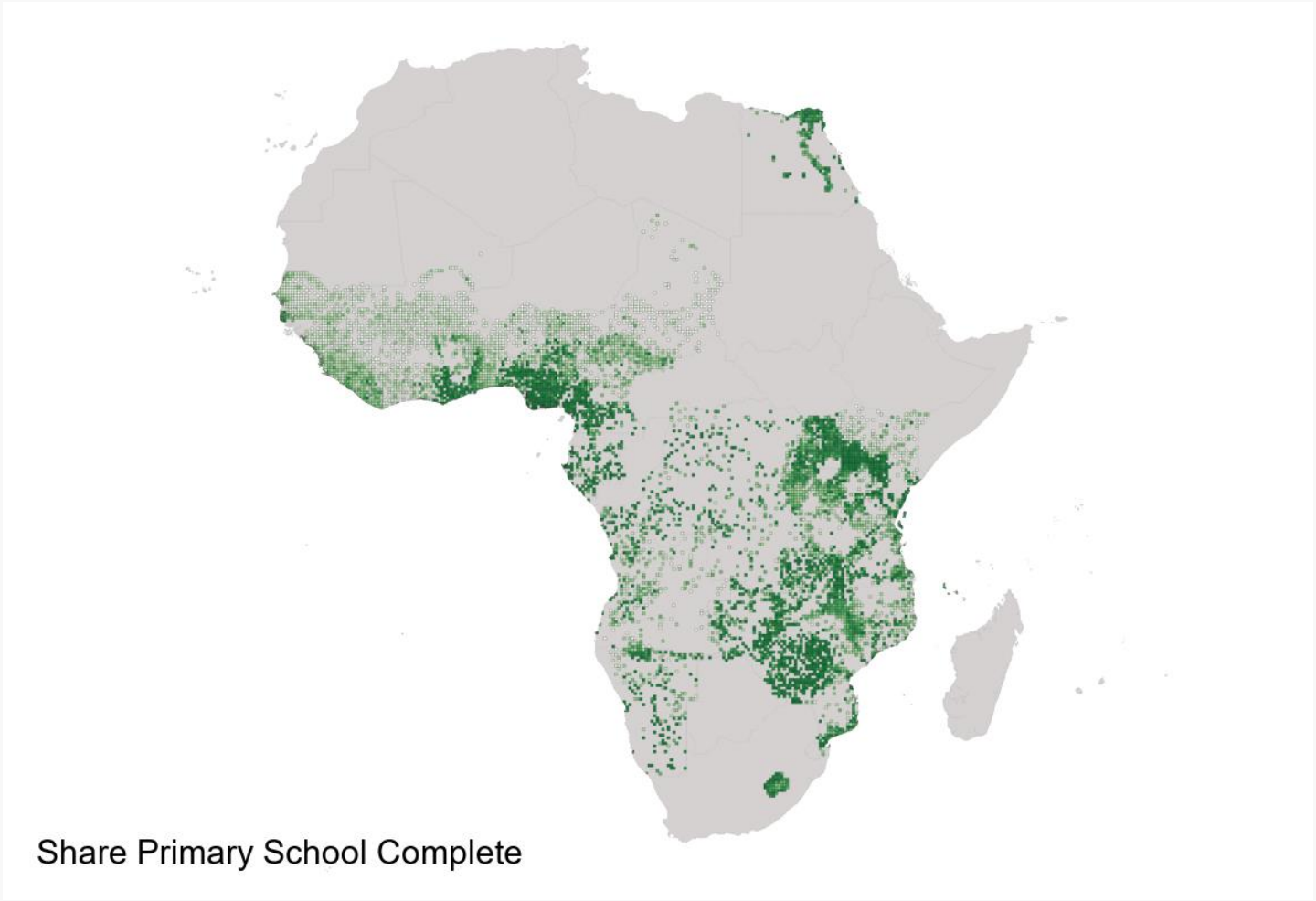
Surveys. Demographic and Health Survey (DHS).
Example 1. Pan-African coverage.



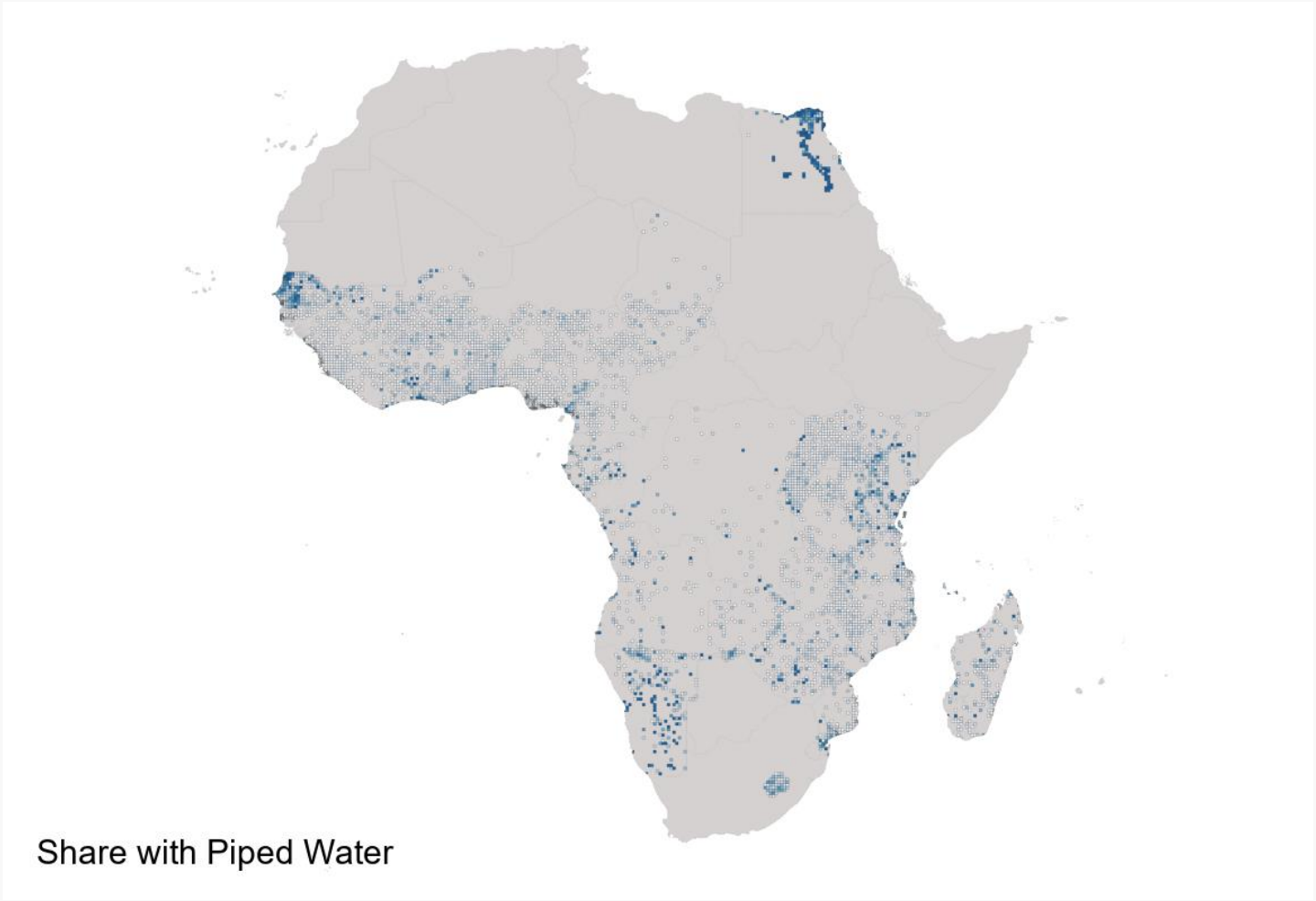
Surveys. Demographic and Health Survey (DHS).
Example 1. Pan-African coverage: Wealth.



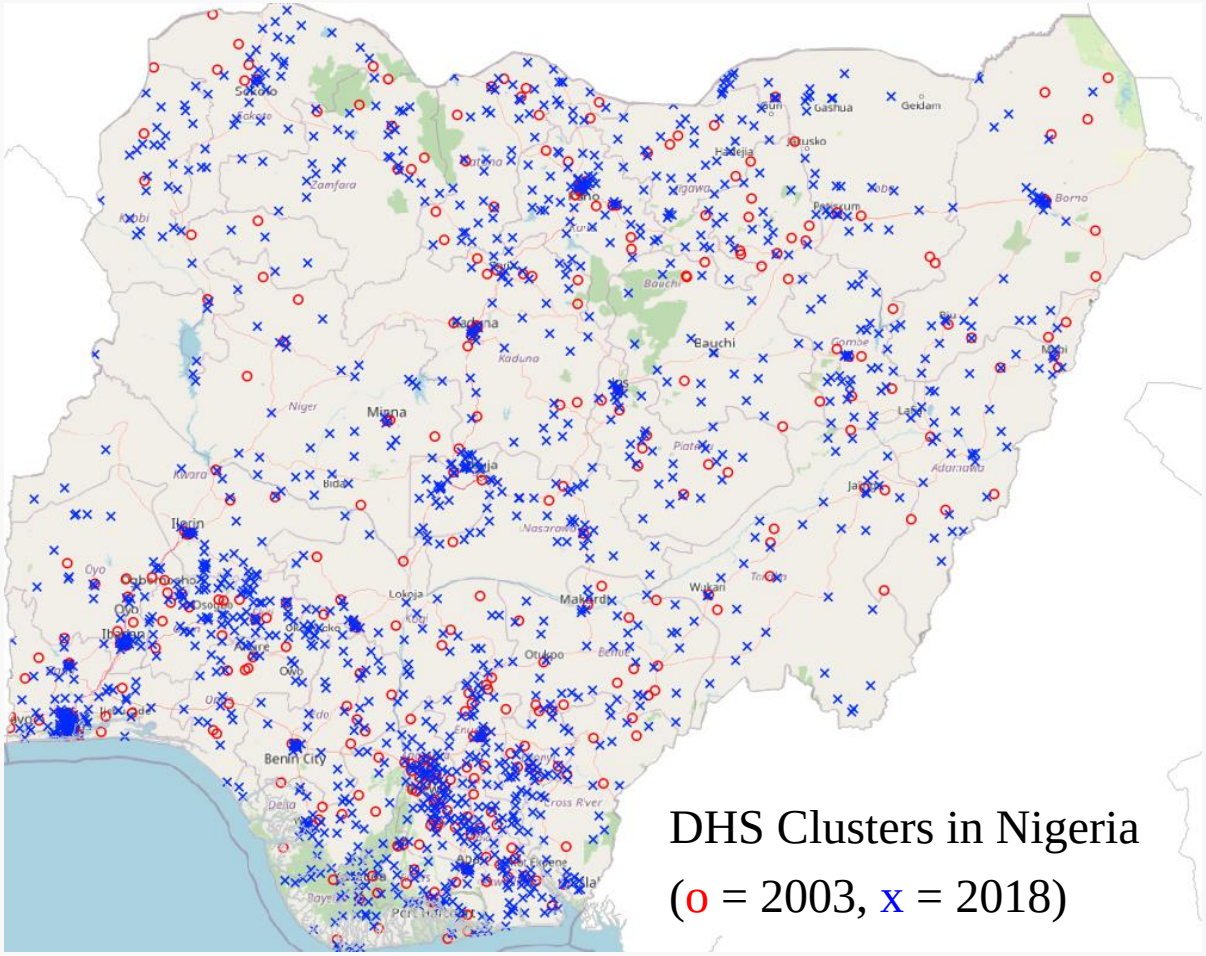
Surveys. Demographic and Health Survey (DHS).
Example 1. Pan-African coverage: Education.



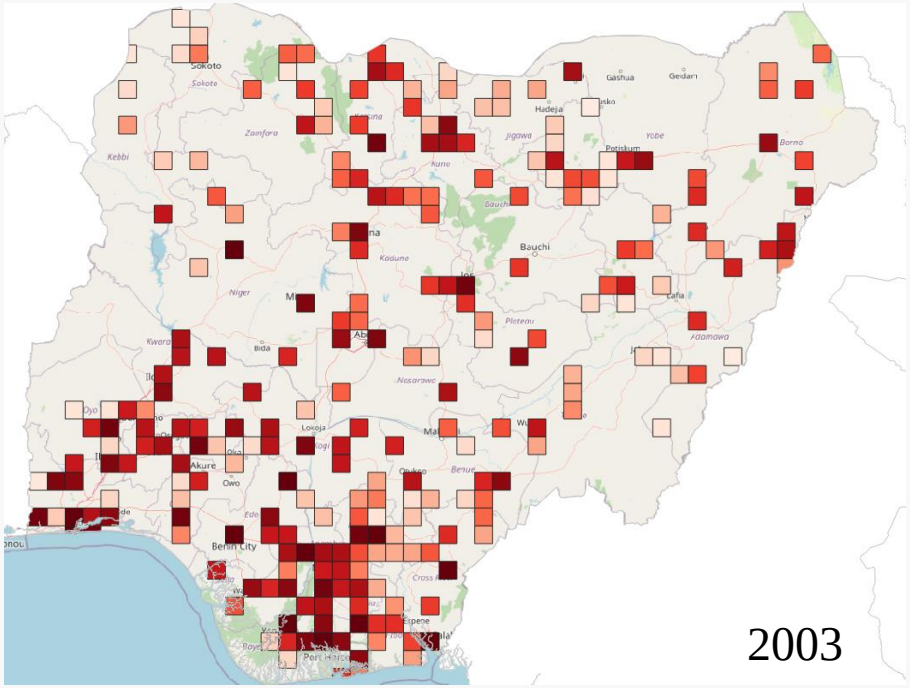
Surveys. Demographic and Health Survey (DHS).
Example 1. Pan-African coverage: Water Access.

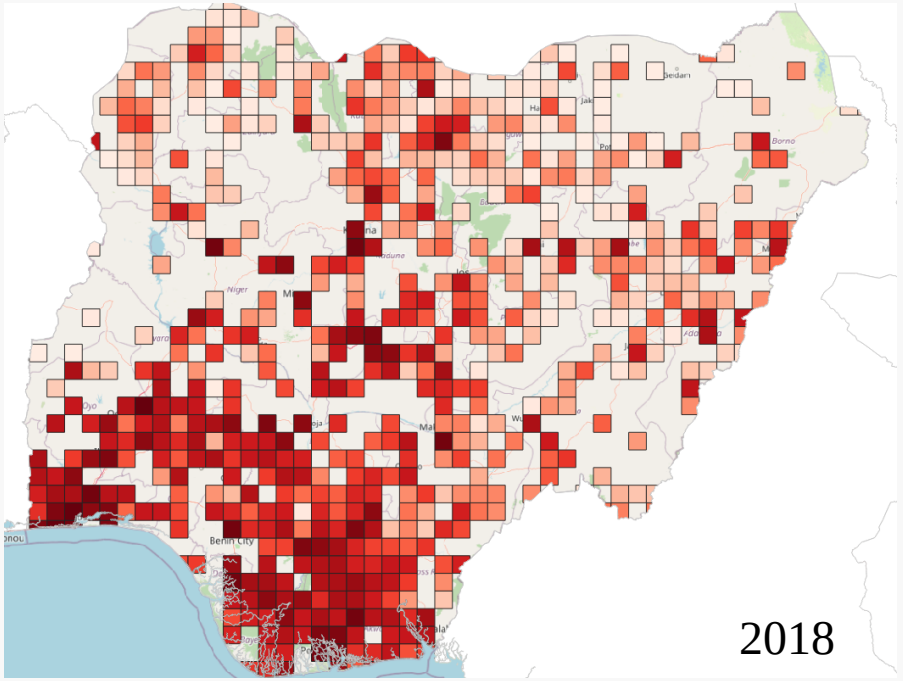


Surveys. Demographic and Health Survey (DHS).
Example 2. Nigeria coverage.

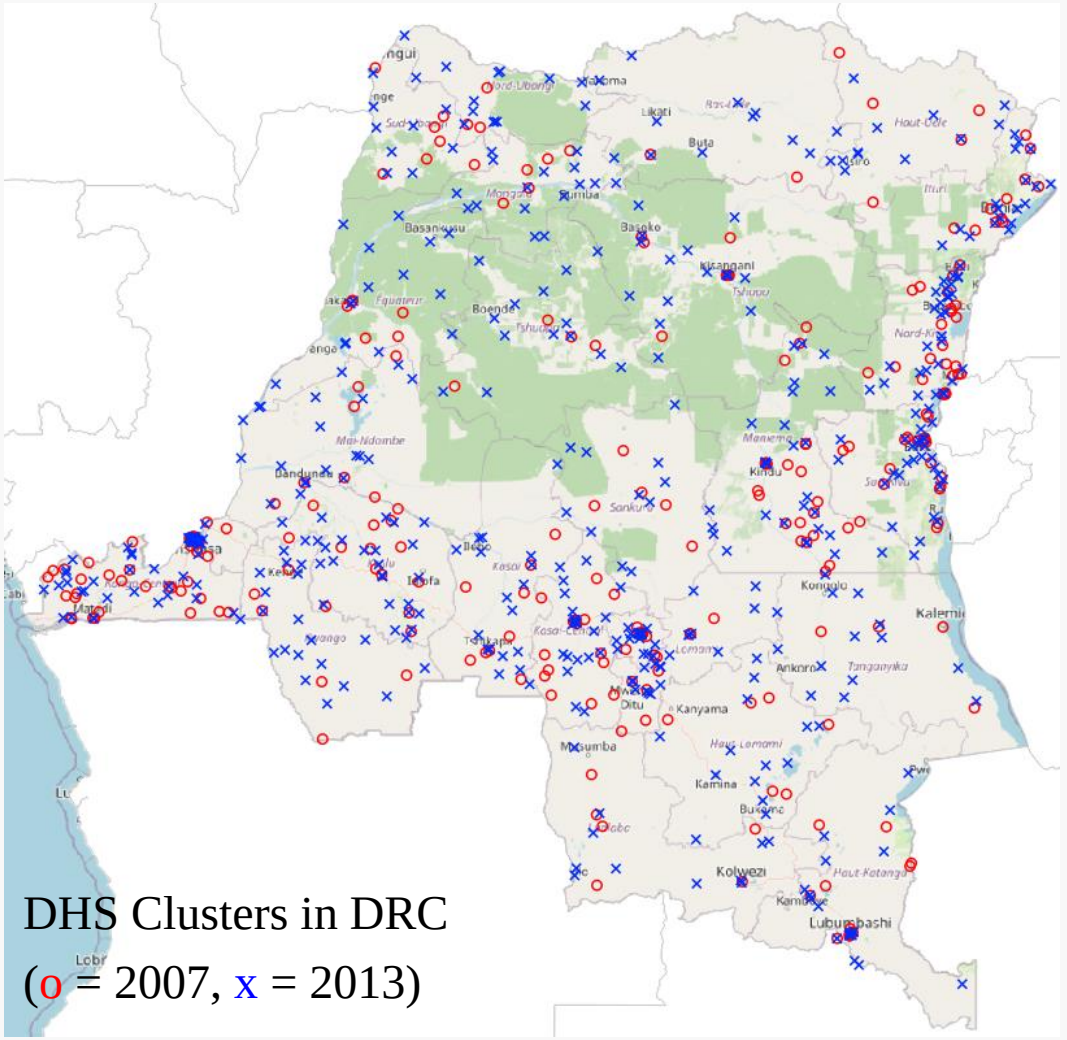


Surveys. Demographic and Health Survey (DHS).
Example 2. Nigeria Composite Wealth Index.

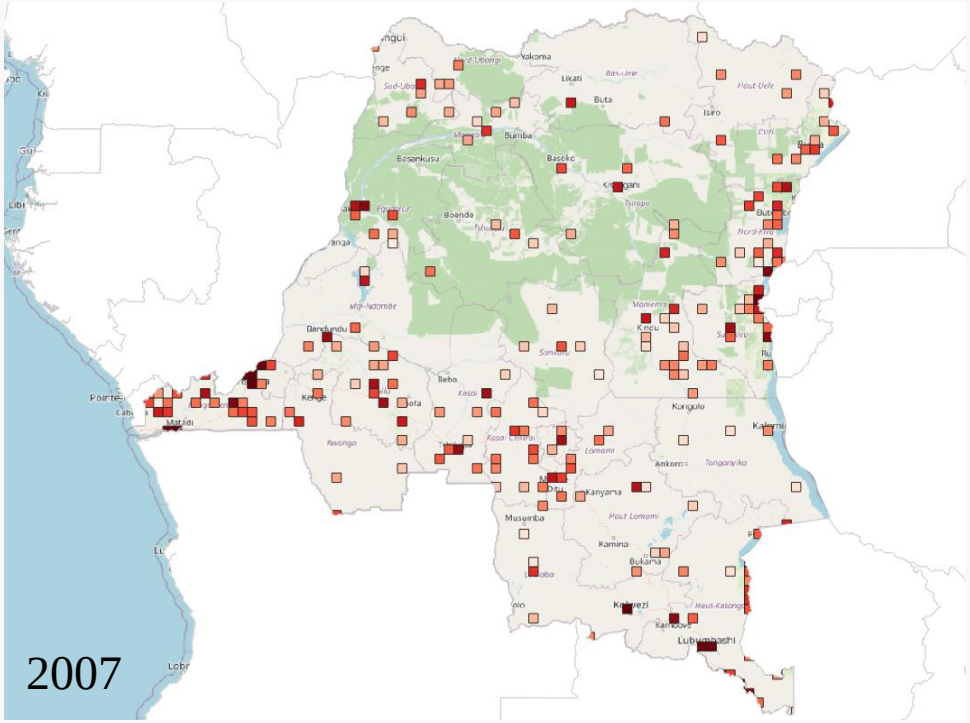


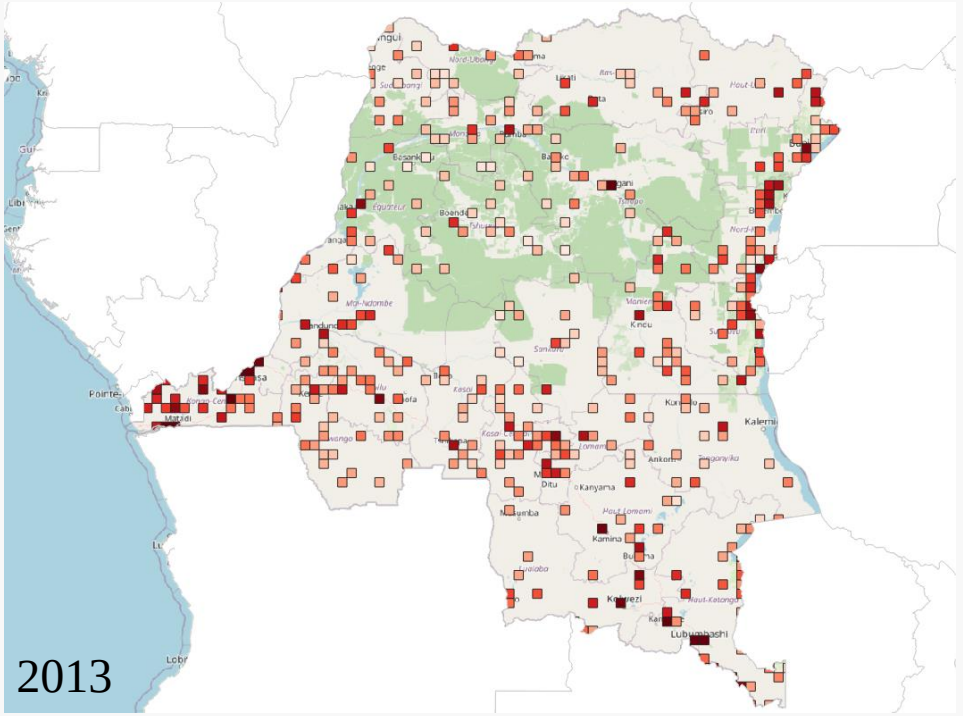


Surveys. Demographic and Health Survey (DHS).
Example 3. DRC coverage.



Surveys. Demographic and Health Survey (DHS).
Example 3. DRC Composite Wealth Index.





Surveys. Demographic and Health Survey (DHS). Applications

— Lowes, S., & Montero, E. (2021). Concessions, violence, and indirect rule: Evidence from the congo free state. *The Quarterly Journal of Economics*, *136*(4), 2047-2091. **week 9**

— Anderson, S. (2018). Legal origins and female HIV. *American Economic Review*, *108*(6), 1407-39.

— Michalopoulos, S., Putterman, L., & Weil, D. N. (2019). The influence of ancestral lifeways on individual economic outcomes in Sub-Saharan Africa. *Journal of the European Economic Association*, *17*(4), 1186-1231.

— Fenske, J. (2015). African polygamy: Past and present. *Journal of Development Economics*, *117*, 58-73.

— Young, A. (2012). The African growth miracle. *Journal of Political Economy*, *120*(4), 696-739.

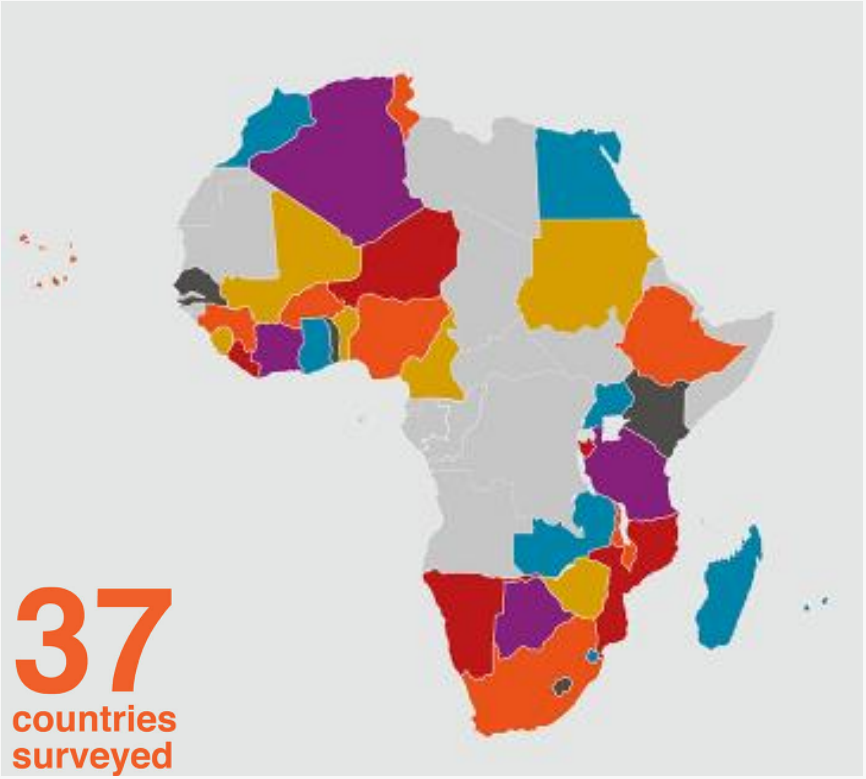
Surveys. Afrobarometer.
Overview

— **Aspects:**
  - priorities, preferences, experiences, and opinions of citizens

— **Coverage (see map)**

— **Seven rounds of samples [1999-2019]**

— **Source: Afrobarometer**
  - Download at Afrobarometer



Surveys. Afrobarometer.
Caveats

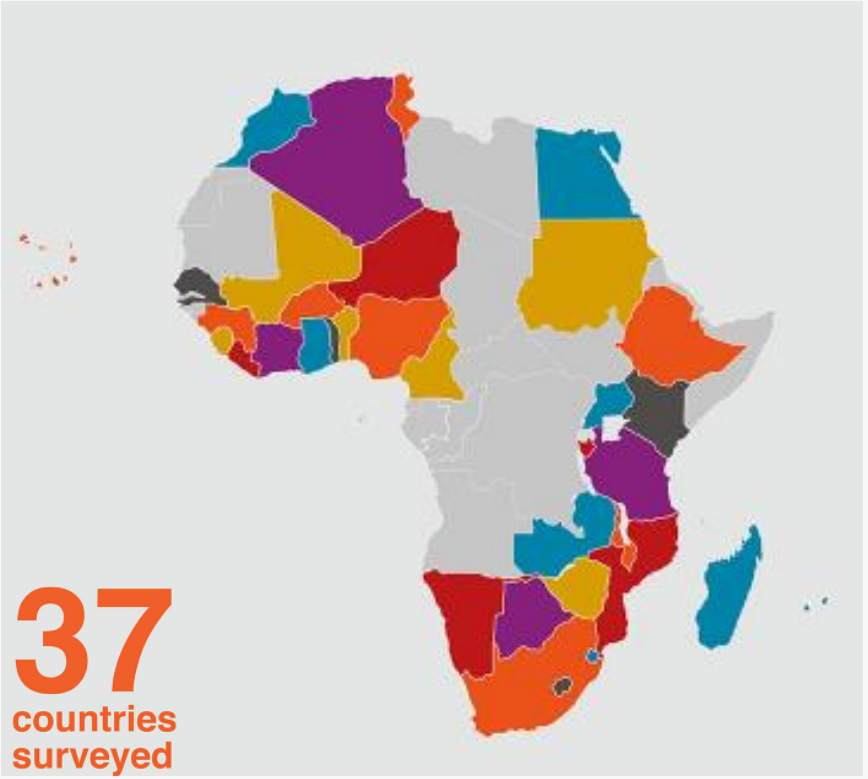
— **Representative at country level**
  - About 1,200-1,400 per sample

— **Coverage is sparse**

— **Same countries and areas not necessarily repeated over time**

— **Fewer countries as one goes back**

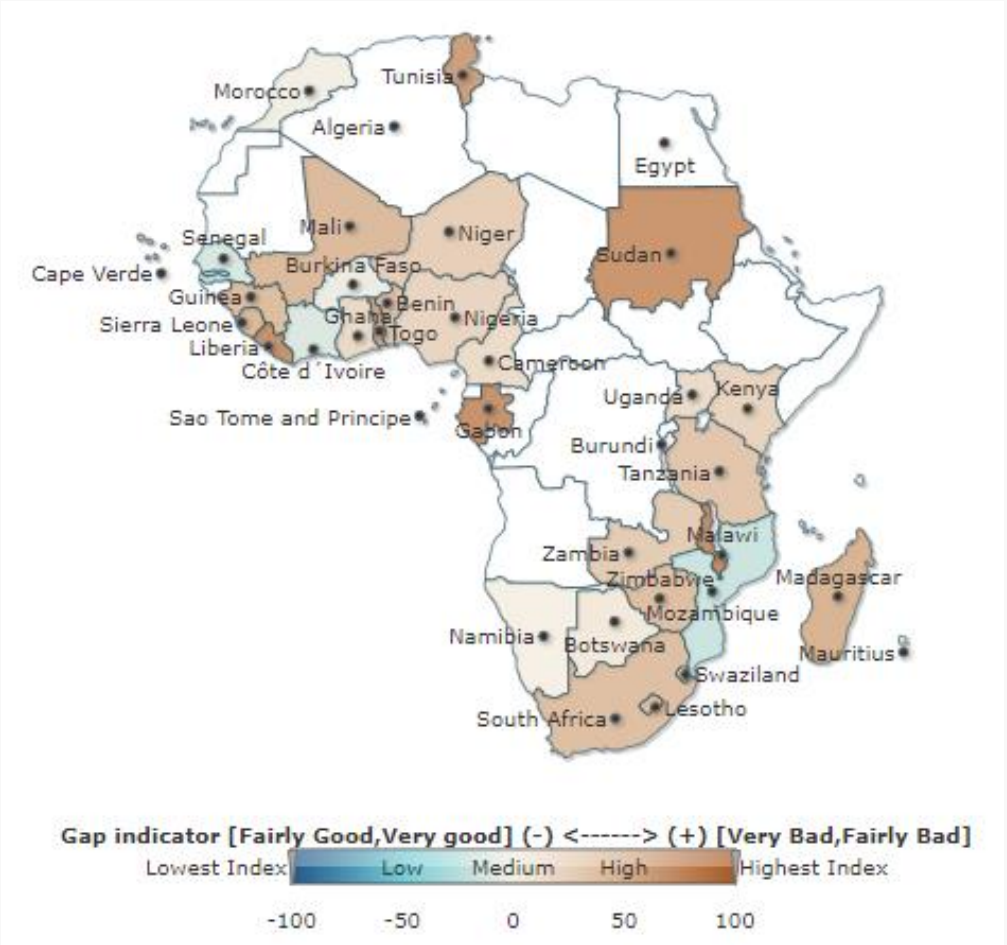
— **Incomplete coverage in conflict areas and countries**



Surveys. Afrobarometer.

Example 1. Pan-Africa.

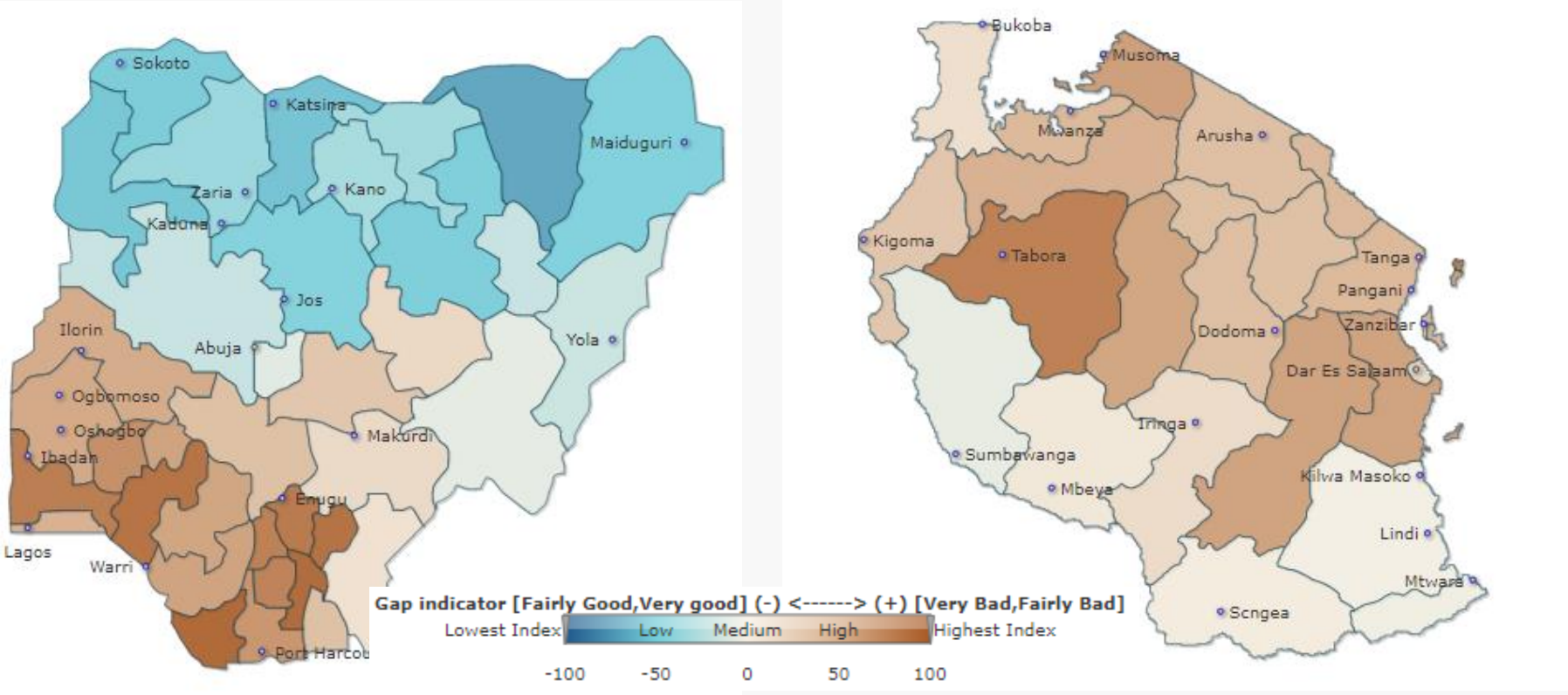
How would you describe the present economic condition of this country?



Surveys. Afrobarometer.

Example 2. Nigeria and Tanzania.

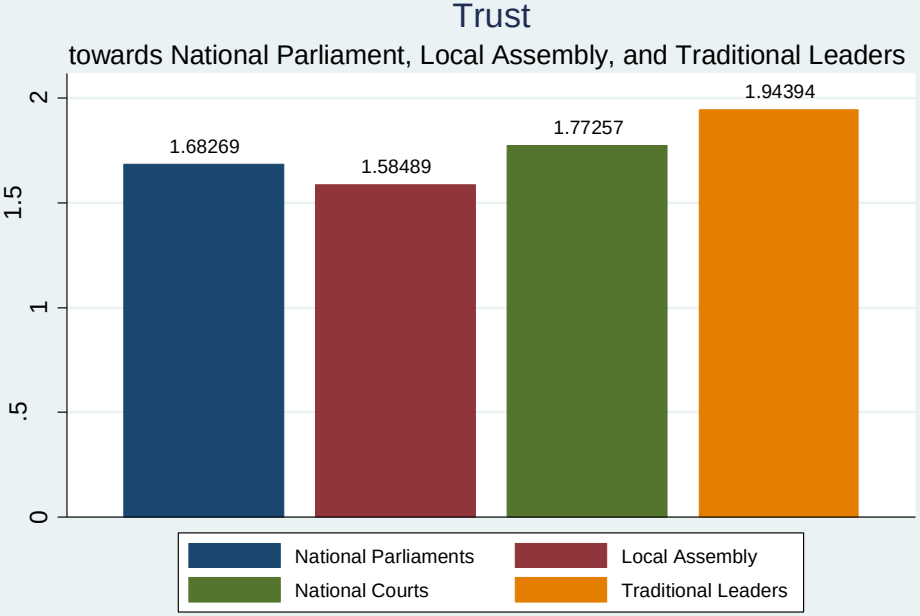
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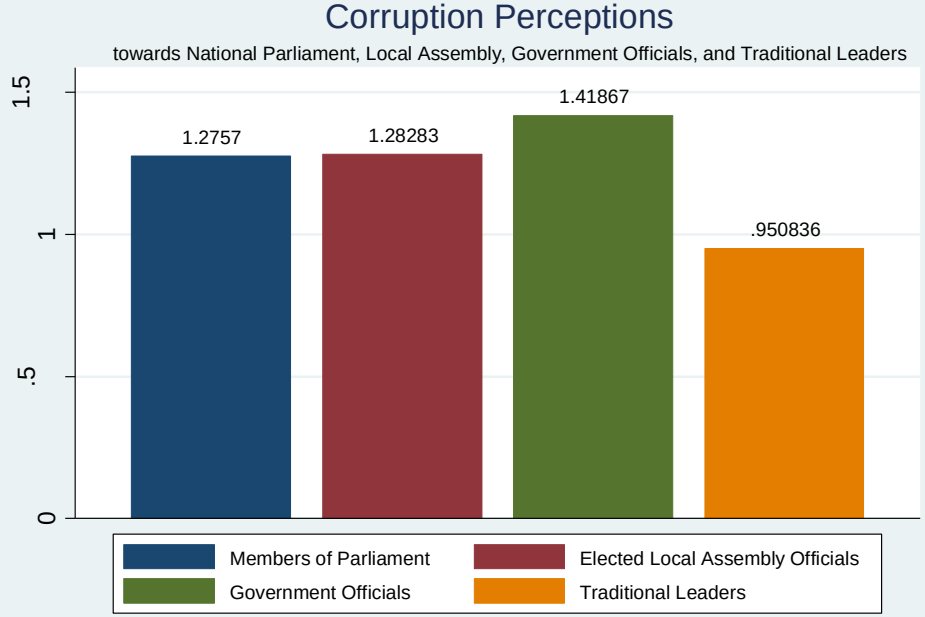


Surveys. Afrobarometer.

Example 3. Ethnicity or Nation?

Which Institutions are trusted? Which are perceived as less corrupt?





Source: Michalopoulos and Papaioannou (2014); Afrobarometer

Surveys. Afrobarometer. Applications

— Nunn, N., & Wantchekon, L. (2011). The slave trade and the origins of mistrust in Africa. *American Economic Review*, *101*(7), 3221-52. **week 4**

— Ali, M., Fjeldstad, O. H., Jiang, B., & Shifa, A. B. (2019). Colonial legacy, state-building and the salience of ethnicity in sub-Saharan Africa. *The Economic Journal*, *129*(619), 1048-1081.

— Depetris-Chauvin, E., Durante, R., & Campante, F. (2020). Building nations through shared experiences: Evidence from African football. *American Economic Review*, *110*(5), 1572-1602. **very topical**

— Michalopoulos, S., & Papaioannou, E. (2015). On the ethnic origins of African development: Chiefs and precolonial political centralization. *Academy of Management Perspectives*, *29*(1), 32-71.

— Rohner, D., Thoenig, M., & Zilibotti, F. (2013). Seeds of distrust: Conflict in Uganda. *Journal of Economic Growth*, *18*(3), 217-252.

Admin data. Country Censuses.
Overview

— **Aspects:**
  - Education, household structure, employment, birthplace and nativity, births and deaths, housing materials

— **Covers entire population**

— **Repeats every 10 years (typically)**

— **Source:**
  - Available through individual country statistics bureaus

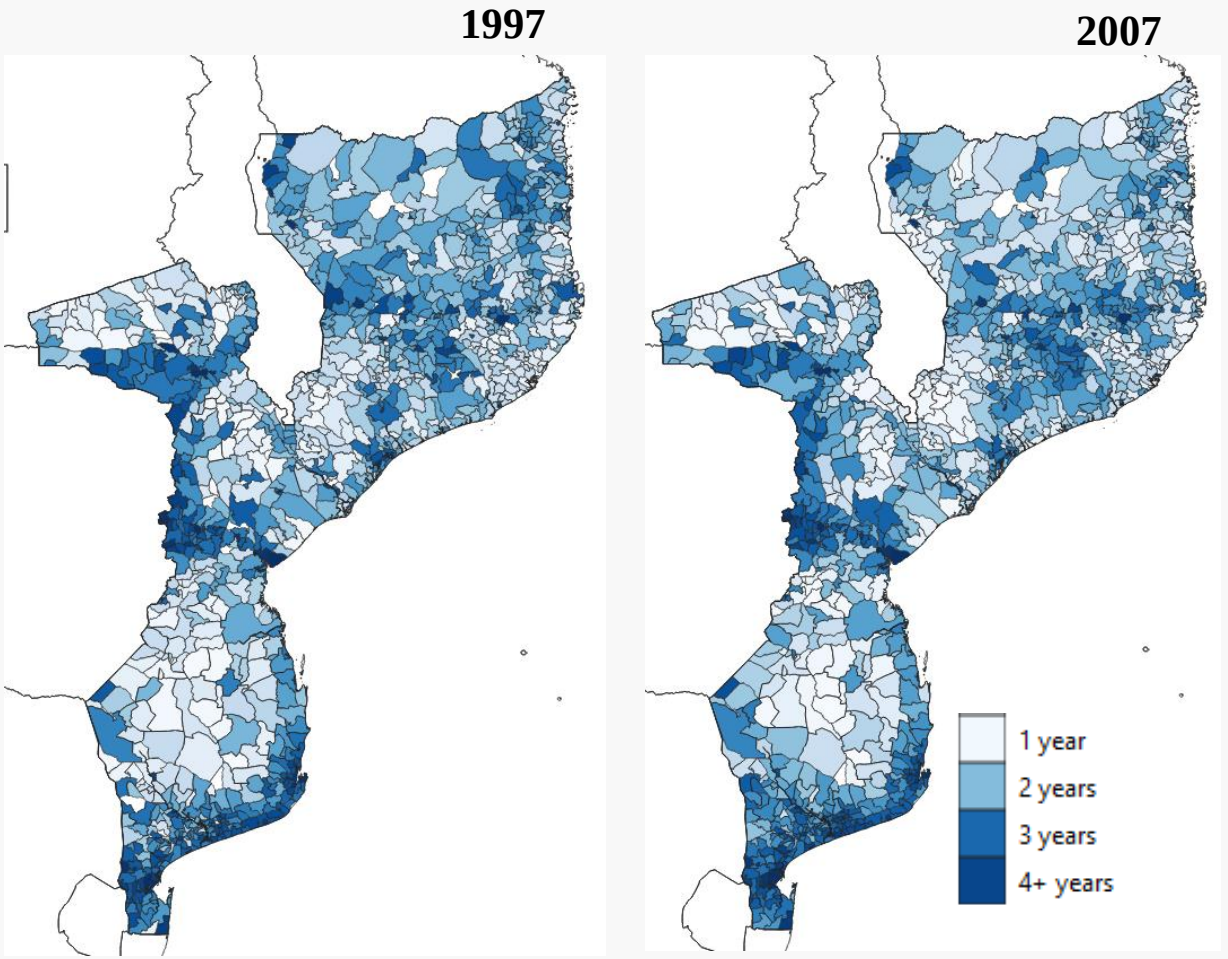


Admin data. Country Censuses.
Caveats

— Spatially coarse
— Infrequent (each 10 years)
— Not standardized across countries
— Can be difficult to gain access (not publicly available)



Admin data. Country Censuses.
Example 1. Education in Mozambique



— **Mean years of school for adults 15+**

— **Education is rising**

- Some areas gain
- Some losing

Admin data. Country Census
Applications

— Dupraz, Y. (2019). French and British colonial legacies in education: Evidence from the partition of Cameroon. *The Journal of Economic History*, *79*(3), 628-668. **week 6**

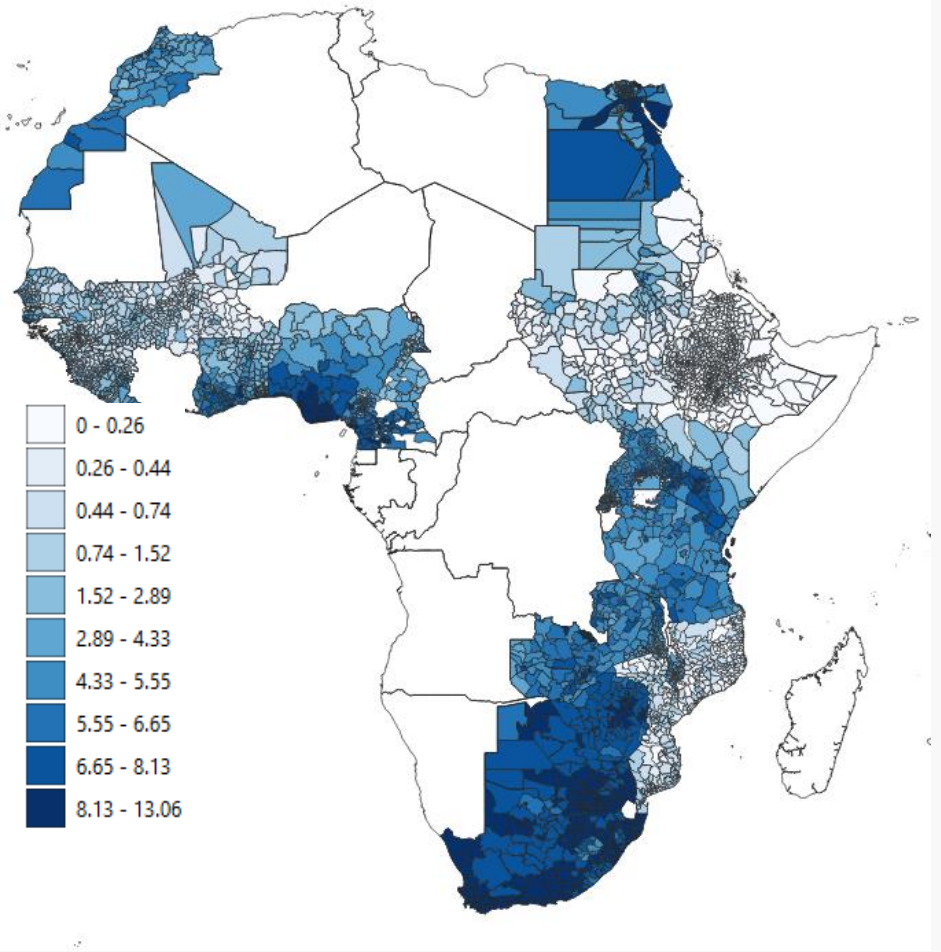
— Nunn, N., & Wantchekon, L. (2011). The slave trade and the origins of mistrust in Africa. *American Economic Review*, *101*(7), 3221-52. **week 4**

— Chiovelli, G., Michalopoulos, S., & Papaioannou, E. (2018). *Landmines and spatial development* (No. w24758). National Bureau of Economic Research.

— Acemoglu, D., Reed, T., & Robinson, J. A. (2014). Chiefs: Economic development and elite control of civil society in Sierra Leone. *Journal of Political Economy*, *122*(2), 319-368.

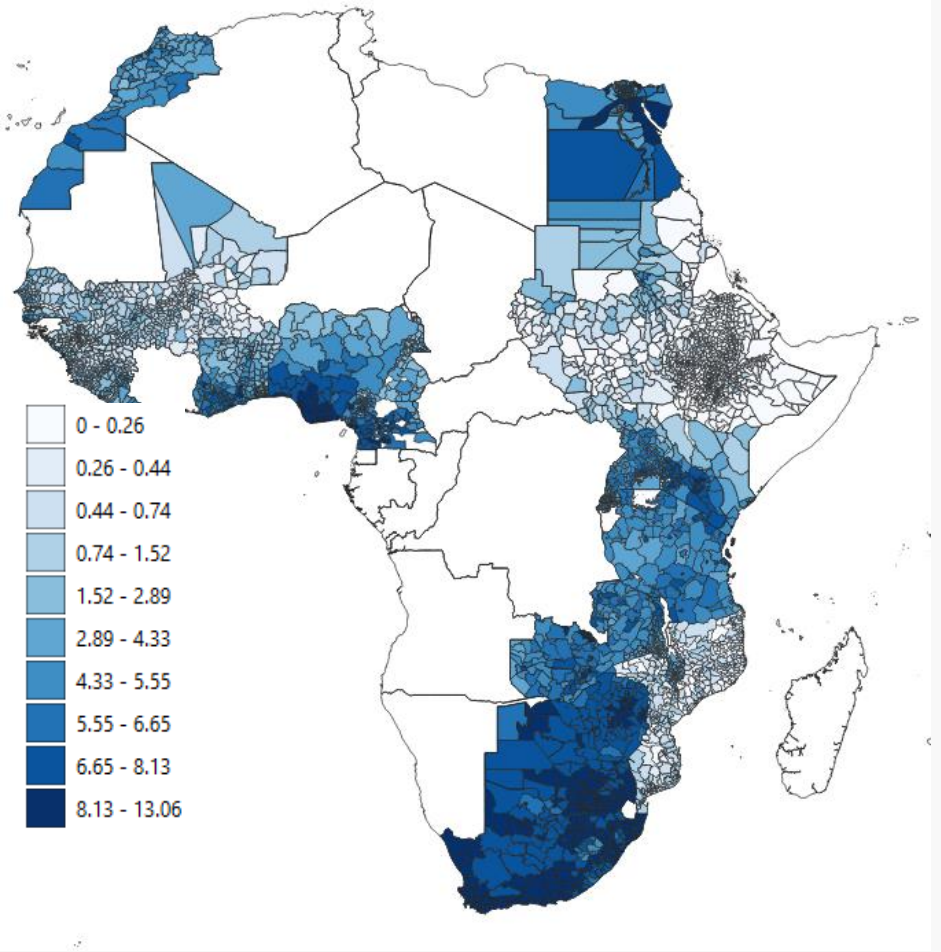
Admin data. IPUMS.
Overview

- **"Integrated Public Use Microdata Series"**
- **Standardized censuses from many countries**
- **Aspects:**
  - Education, household structure, employment, birthplace and nativity, births and deaths, housing materials.
- **Repeats every 10 years (typically)**
- **Source: University of Minnesota**
  - Download at IPUMS international



Admin data. IPUMS.
Caveats

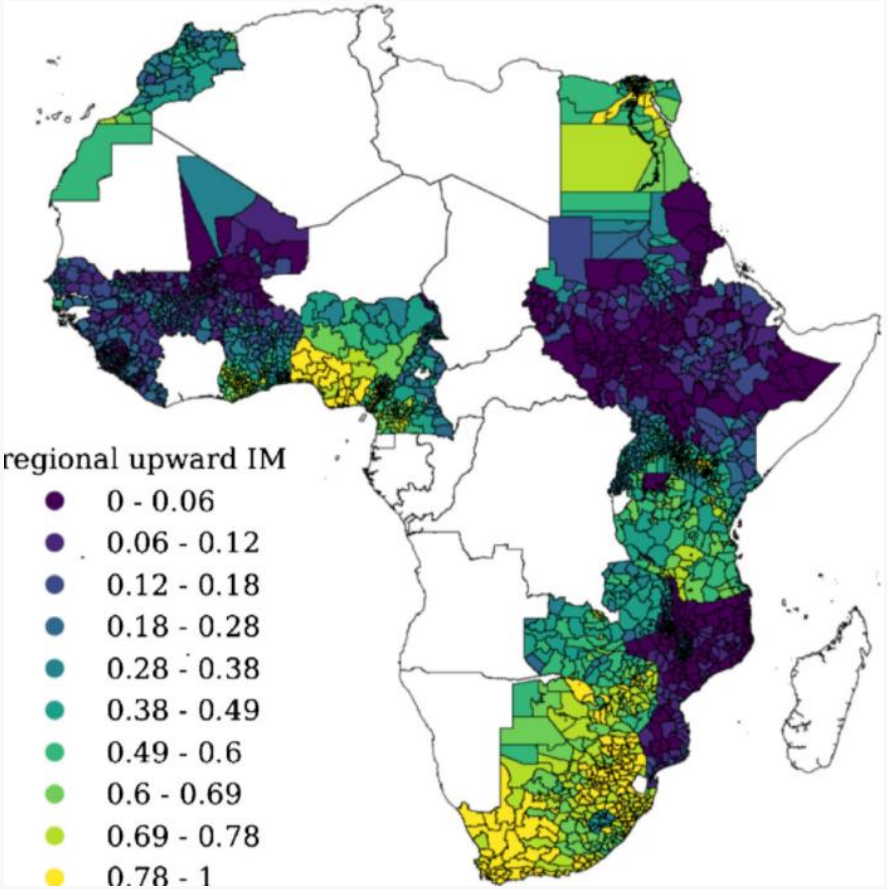
- **Sampled (~10%) from censuses**
- **Not many censuses for many countries**
- **Sometimes loses details from the country censuses**
  - E.g. location of household
- **Not *everything* is standardised**
  - E.g. locations and their geographical boundaries



Admin data. IPUMS.

Example 1. Intergenerational Mobility

["Intergenerational Mobility in Africa". Alesina, Hohmann, Michalopoulos, and Papaioannou. (2021).]



— **Intergenerational mobility in education**

- household structure → how well children do relative to their parents

— **Effect of places**

- Children of uneducated parents more likely to complete school if mobility in their region is high

Admin data. IPUMS.
Applications

— Alesina, Hohmann, Michalopoulos, & Papaioannou. (2021). Intergenerational Mobility in Africa. *Econometrica*, 89(1), 1-35. **week 10**

— Alesina, Hohmann, Michalopoulos, and Papaioannou. (2020). Religion and Educational Mobility in Africa. NBER Working Paper 28270.

— Storeygard. (2016). Farther on down the Road: Transport Costs, Trade and Urban Growth in Sub-Saharan Africa. *Review of Economic Studies*, 83(3):1263-1295.

— Adhvaryu, Fenske, and Nyshadham. (2019). Early Life Circumstance and Adult Mental Health. *Journal of Political Economy*, 127(4).

Admin data. Admin Boundaries (GADM).

Summary



— **Administrative boundaries**

- Worldwide
- One point in time

— **Variability in quality**

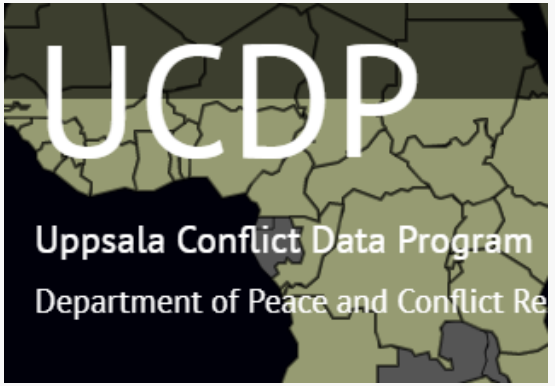
- Some countries highly localised boundaries, others not.

— **Source: GADM**

- Download from GADM

Other data. Conflict.
Overview

1. **UCDP-GED**
   - Major and minor civil wars, civilian violence. 1989-2019.
   - Standard definition of conflict
   - Number of casualties



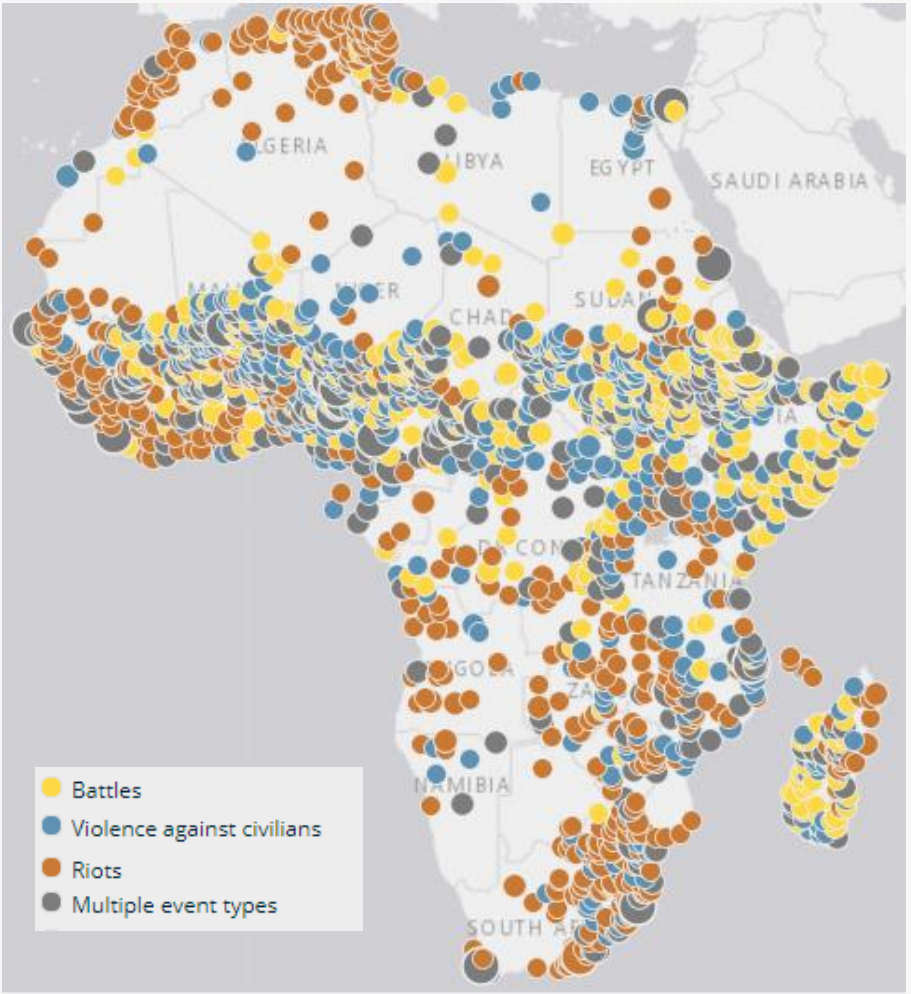
2. **ACLED**
   - Riots, protests, battles, etc. 1997-2022
   - Aggregation of news sources.



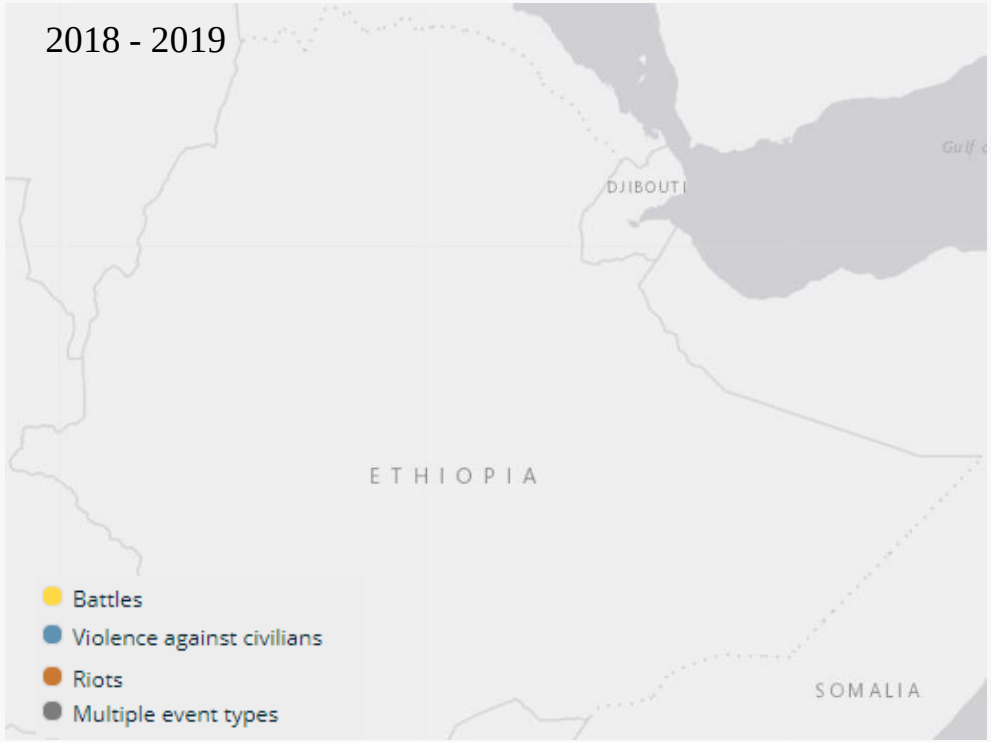
— **Source: Uppsala University & ACLED**
   - Download UCDP-GED
   - Download ACLED

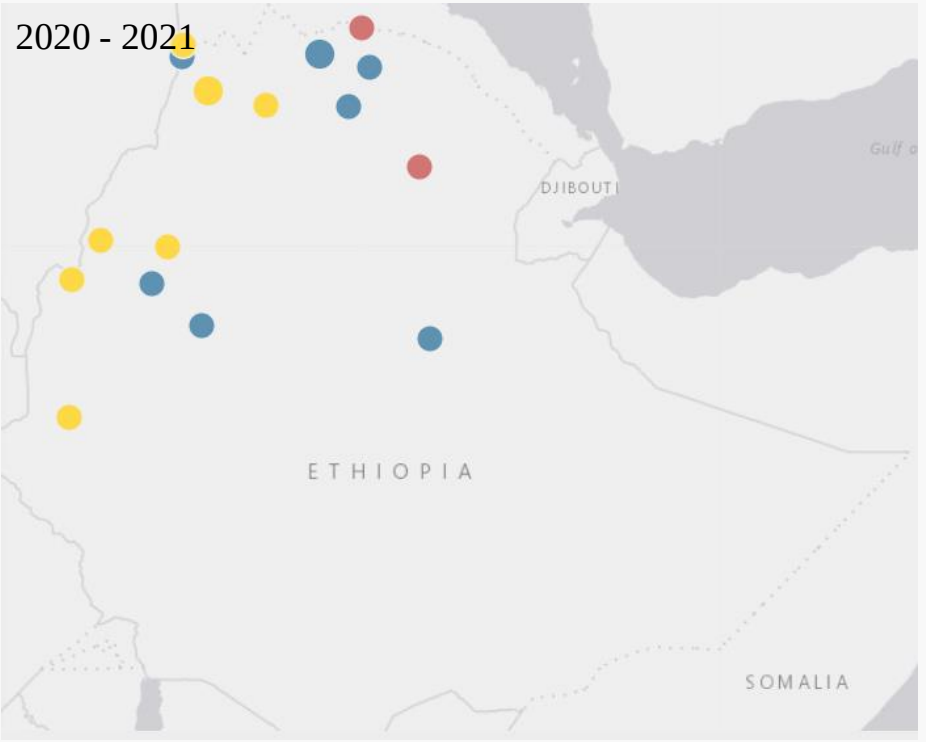
Other data. Conflict.

Example 1. ACLED conflict events



Other data. Conflict (ACLED).
Example 2. Ethiopia Recently





Other data. Conflict. Applications.

— Michalopoulos, S., & Papaioannou, E. (2016). The long-run effects of the scramble for Africa. *American Economic Review*, *106*(7), 1802-48. **week 5**

— Besley, T., & Reynal-Querol, M. (2014). The legacy of historical conflict: Evidence from Africa. *American Political Science Review*, *108*(2), 319-336.

— "Berman, N., Couttenier, M., Rohner, D., & Thoenig, M. (2017). This mine is mine! How minerals fuel conflicts in Africa. *American Economic Review*, *107*(6), 1564-1610.

— Depetris-Chauvin, E., Durante, R., & Campante, F. (2020). Building nations through shared experiences: Evidence from African football. *American Economic Review*, *110*(5), 1572-1602.

— Manacorda and Tesei. 2020. Liberation Technology: Mobile Phones and Political Mobilization in Africa. *Econometrica*, 88(2), 533-567.

Other data. High Resolution Satellite Images (VHR). Summary

Kibera, Nairobi VHR image for 2004 (left) and 2015 (right).



Kibera, Nairobi classified buildings for 2004 (left) and 2015 (right) - unchanged (blue), demolished (red), redeveloped (green).

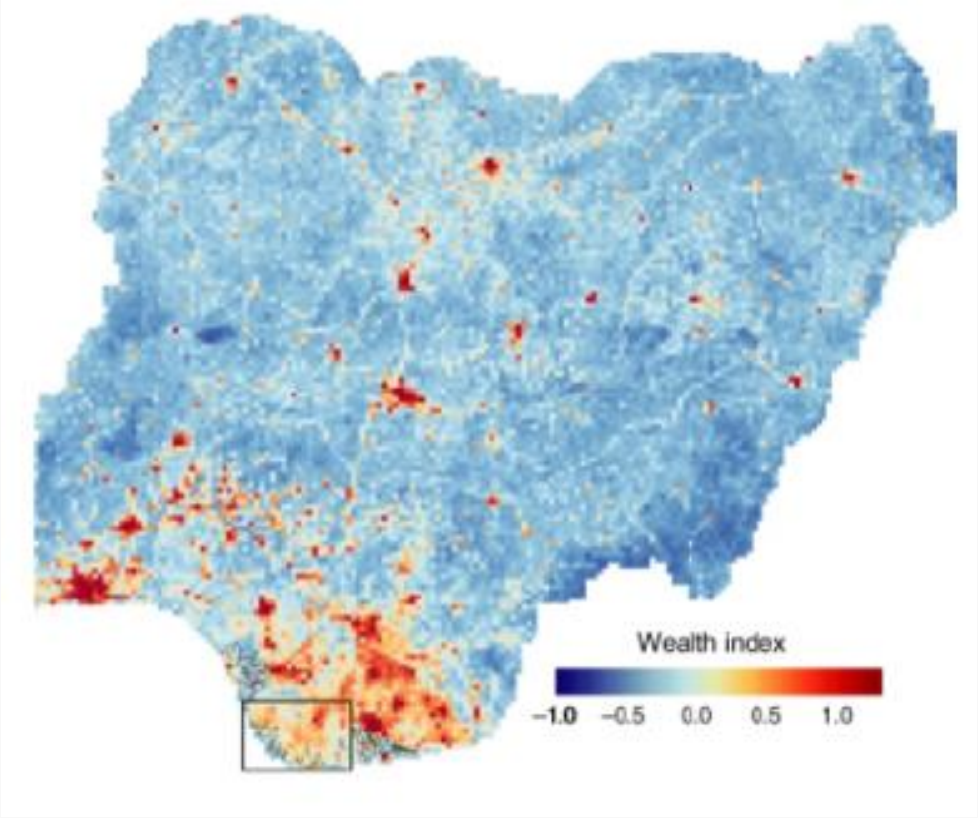


- **Modern satellites can take very accurate photos**
  - Measure build capital allocation at a very fine scale
- **Caveats**
  - Data is expensive
  - Difficult computationally to scale across broad areas
- **Application**
  - "Building the City: From Slums to a Modern Metropolis". Henderson, Regan and Venables (RES 2021).

Other data. Modelled wealth and income.

Summary

Predicted wealth across Nigeria



— **Machine learning + GIS + survey data**
- Complete coverage spatially and annually
- Asset wealth/Spending

— **Caveats**
- Proprietary data
- Not easily implementable from first principles

— **Implementation**
- "Using publicly available satellite imagery and deep learning to understand economic well-being in Africa". Yeh et al. (Nature 2020).

Summary

— **This has been an overview**

- GIS data [Luminosity/Landcover/Elevation]
- Surveys [DHS/Afrobarometer]
- Admin data [Censuses/IPUMS]
- Other [Conflict/Institutions/VHR/Modelled Wealth]

— **There are many data out there**

- Can you think of data sources not mentioned here?
- What kind of questions are poorly answered by typical data in Economics?
- Can you find novel data sources to fill that gap?

References

— Acemoglu, Naidu, Restrepo, and Robinson. (2019). Democracy Does Cause Growth. *Journal of Political Economy*, Acemoglu, D., T. Reed, and J. Robinson. (2014). "Chiefs: Elite Control of Civil Society and Economic Development in Sierra Leone," *Journal of Political Economy*, 122(2):319-368.

— Alesina, A., S. Michalopoulos, and E. Papaioannou. (2014). "Ethnic Inequality." *Journal of Political Economy*, 124(2):1-35.

— Alesina, A., S. Hohmann, S. Michalopoulos, and E. Papaioannou. (2021). "Intergenerational Mobility in Africa." *Econometrica*, 89(1):1-35.

— Alesina, Hohmann, Michalopoulos, and Papaioannou. (2020). "Religion and Educational Mobility in Africa". NBER Working Paper 28270.

— Ali, M., O.H. Fjeldstad, B. Jiang, and A.B. Shifa. (2019). "Colonial legacy, state-building and the salience of ethnicity in sub-Saharan Africa". *The Economic Journal*, 129(619):1048-1081.

— Amodio, F., G. Chiovelli, and S. Hohmann. (2021). "The Employment Effects of Ethnic Politics". CEPR Discussion Paper 14170.

— Adhvaryu, Fenske, and Nyshadham. (2019). "Early Life Circumstance and Adult Mental Health". *Journal of Political Economy*, 127(4).

— Baruah, Henderson, and Peng. (2017). "Colonial Legacies: Shaping African Cities". *Journal of Economic Geography*, 21(1):29-65.

— Berman, N., M. Couttenier, D. Rohner, and M. Thoenig. (2017). "This mine is mine! How minerals fuel conflicts in Africa". *American Economic Review*, 107(6):1564-1610.

— Besley, T. and M. Reynal-Querol. (2014). "The Legacy of Historical Conflict: Evidence from Africa". *American Political Science Review*, 108(2):319-336.

— Burgess, R., R. Jedwab, E. Miguel, A. Morjaria, and G. Padro I Miquel. (2015). "The Value of Democracy: Evidence from Road Building in Kenya". *American Economic Review*, 105(6):1817-1851.

References

— Chiovelli, G., S. Michalopoulos, and E. Papaioannou. (2018). "Landmines and spatial development". NBER working paper (no. w24758).

— Depetris-Chauvin, E., R. Durante, and F. Campante. (2020). "Building nations through shared experiences: Evidence from African football". *American Economic Review*, 110(5):1572-1602.

— Dupraz, Y. (2019). "French and British colonial legacies in education: Evidence from the partition of Cameroon". *The Journal of Economic History*, 79(3):628-668.

— Dickens, A. (2018). "Ethnolinguistic favoritism in african politics". *American Economic Journal: Applied Economics*, 10(3):370-402.

— Donaldson, D., and A. Storeygard. (2016). "The view from above: Applications of satellite data in economics". *Journal of Economic Perspectives*, 30(4):171-98.

— Easterly, W., R. Gatti and S. Kurlat. (2006). "Development, Democracy, and Mass Killings". *Journal of Economic Growth*, 11(2):129-156.

— Fenske, J. (2015). "African polygamy: Past and present". *Journal of Development Economics*, 117:58-73

— Franck, R. and I. Rainer. (2012). "Does the Leader's Ethnicity Matter? Ethnic Favoritism, Education, and Health in Sub-Saharan Africa". *Americal Political Science Review*, 106(2):294-325.

— Gisselquist, R., S. Leiderer, and M. Nino-Zarazua. (2015). "Ethnic Heterogeneity and Public Goods Provision in Zambia: Evidence of a Subnational Diversity Dividend". *World Development*, 78:308-323.

— Henderson, J.V., T. Regan and A. Venables. (2021). "Building the City: From Slums to a Modern Metropolis". *Review of Economic Studies*, 88(3).

— Henderson, J.V., A. Storeygard, and D. Weil. (2012). "Measuring Economic Growth from Outer Space". *American Economic Review*, 102(2):994-1028.

— Henderson, J.V., T. Squires, A. Storeygard, and D. Weil. (2018). "The Global Distribution of Economic Activity: Nature, History, and the Role of Trade". *Quarterly Journal of Economics*, 133(1):357–406.

References

— Hodler, R., and P.A. Raschky. (2014). "Regional Favoritism". *The Quarterly Journal of Economics*, 129(2):995-1033.

— Hohmann, S. (2018). "Natural Resources, Trade, and Structural Transformation in Africa", working paper.

— Jedwab, R., E. Kerby and A. Moradi. (2017). "History, Path Dependence and Development: Evidence from Colonial Railways, Settlers and Cities in Kenya". *Economic Journal*, 127(603):1467-1494.

— Kanbur, R. and A. Venables. (2005). "Spatial inequality and development". Oxford Scholarship Online.

— Lowes, S. and E. Montero. (2021). "The Legacy of Colonial Medicine in Central Africa." *American Economic Review*. 111(4):1284-1314.

— Lowes, S., and E. Montero. (2021). "Concessions, violence, and indirect rule: Evidence from the Congo Free State". *The Quarterly Journal of Economics*, 136(4), 2047-2091.

— Manacorda, M. and Tesei. 2020. "Liberation Technology: Mobile Phones and Political Mobilization in Africa". *Econometrica*, 88(2):533-567.

— Michalopoulos, S. and E. Papaioannou. (2013). "Pre-colonial Ethnic Institutions and Contemporary African Development", *Econometrica*, 81(1): 113-152.

— Michalopoulos, S., and E. Papaioannou. (2014). "National institutions and subnational development in Africa". *The Quarterly Journal of Economics*, 129(1), 151-213.

— Michalopoulos, S., and E. Papaioannou. (2015). "On the ethnic origins of African development: Chiefs and precolonial political centralization". *Academy of Management Perspectives*, 29(1), 32-71.

— Michalopoulos, S., and E. Papaioannou. (2016). "The Long-Run Effects of the Scramble of Africa," *American Economic Review*, 106(7): 1802-1848.

— Michalopoulos, S., L. Putterman, and D. Weil. (2019). "The influence of ancestral lifeways on individual economic outcomes in Sub-Saharan Africa". *Journal of the European Economic Association*, 17(4), 1186-1231.

References

— Nunn, N. (2008). "The Long-Term Effects of Africa's Slave Trades". *Quarterly Journal of Economics*, 123(1):139-176.

— Nunn, N. and D. Puga. (2012). "Ruggedness: The Blessing of Bad Geography in Africa". *The Review of Economics and Statistics*, 64(1):20-36.

— Nunn, N., and L. Wantchekon. (2011). "The Slave Trade and the Origins of Mistrust in Africa," *American Economic Review*, 101(6):3221–3252.

— Pinkovskiy, M., and X. Sala-i-Martin. (2016). "Lights, camera… income! Illuminating the national accounts-household surveys debate". *The Quarterly Journal of Economics*, 131(2):579-631.

— Rohner, D., M. Thoenig, and F. Zilibotti. (2013). "Seeds of distrust: Conflict in Uganda". *Journal of Economic Growth*, 18(3), 217-252.

— Storeygard, A. (2016). "Farther on down the Road: Transport Costs, Trade and Urban Growth in Sub-Saharan Africa". *Review of Economic Studies*, 83:1263-1295.

— Wantchekon, L., and O. Garcia-Ponce. (2021). "Critical Junctures: Independence Movements and Democracy in Africa". *American Journal of Political Science*, forthcoming.

— Wantchekon, L., M. Klasnja, and N. Novta. (2014). "Education and Human Capital Externalities: Evidence from Colonial Benin". *Quarterly Journal of Economicsm*, 130(2):703-757.

— Williamson, J. (1965). "Regional Inequality and the Process of National Development: A Description of the Patterns". *Economic Development and Cultural Change*, 13(4).

— Yeh, Perez, Driscoll, Azzari, Tang, Lobell, Ermon and Burke. (2020). "Using publicly available satellite imagery and deep learning to understand economic well-being in Africa". Nature Communications, 11(2583).

— Young, A. (2012). "The African Growth Miracle". *Journal of Political Economy*, 120(4):696-739.