

Socio-economic indicators at small-area level for disaster-risk management

WWW.GLOBALDATALAB.ORG

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Introduction

- Director Global Data Lab – Radboud University
- Professor of economic & human development
- Database building & comparative research

Global Data Lab

- Data and research center within Radboud University
- Focus on low and middle income countries (LMICs)

Global Data Lab

- Creating instruments for monitoring and understanding the status and progress of societies.
- Specialized databases, indicators, and web-based data tools.
- Core of Data Lab: *Database Developing World*
- One of the largest databases for LMICs.
- Data on 30+ million persons in 130+ LMICs.
- Website GDL: www.globaldatalab.org

Database Developing World

- Combines many harmonized household surveys for LMICs (400+)
 - *Demographic & Health Surveys (DHS-USAID)*
 - *Multiple Indicator Cluster Surveys (MICS-UNICEF)*
 - *Census datasets (IPUMS)*
 - *Other sources*
- Large surveys (30.000 – 100.000+ persons)
- Open infrastructure: Continuously updated with newly released datasets
- Data available for several years since 1990s (monitoring changes, impact evaluation)

GDL Area Database

GDL Area database

Contains 100+ subnational indicators for 1300+ subnational regions in 125+ countries.

Topics include:

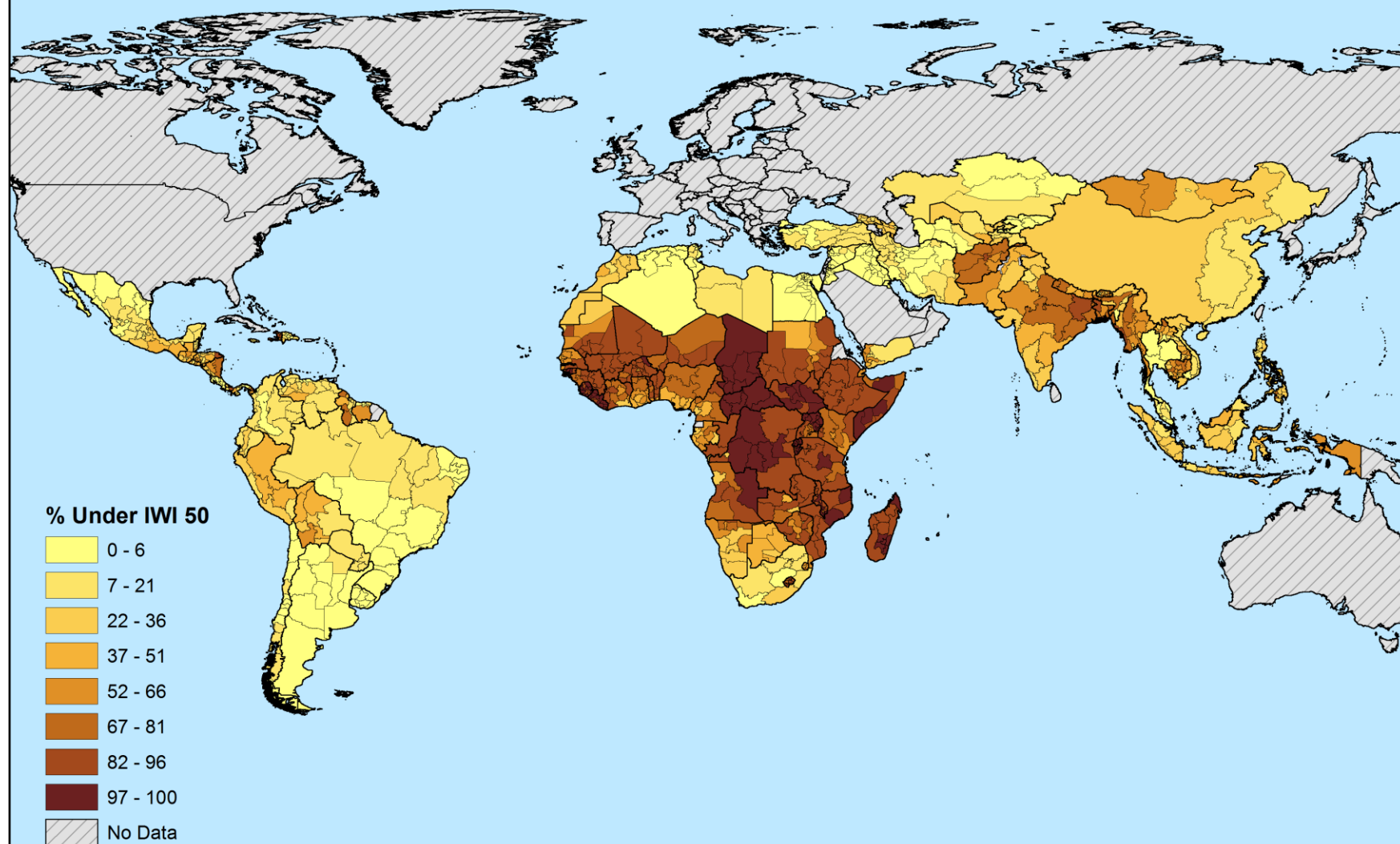
- *Wealth, poverty, asset ownership, housing quality*
- *Education, demographics, gender*
- *Fertility, child mortality, (reproductive) health*
- *Vaccinations, stunting, under/overweight, BMI*
- *Access to public services*

All these indicators can be freely downloaded from:

www.globaldatalab.org/areadata

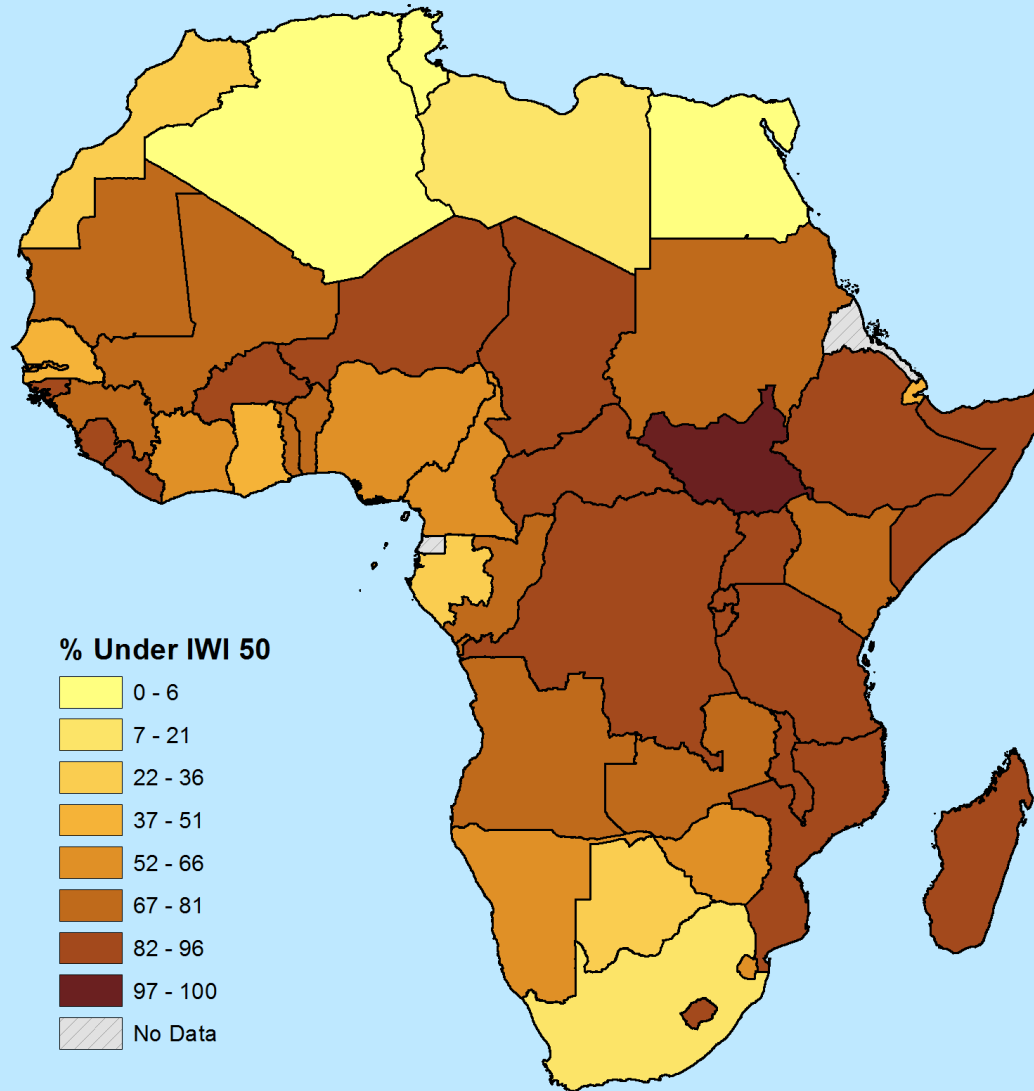
Household poverty in sub-national regions of LMICs

Based on the International Wealth Index (IWI)



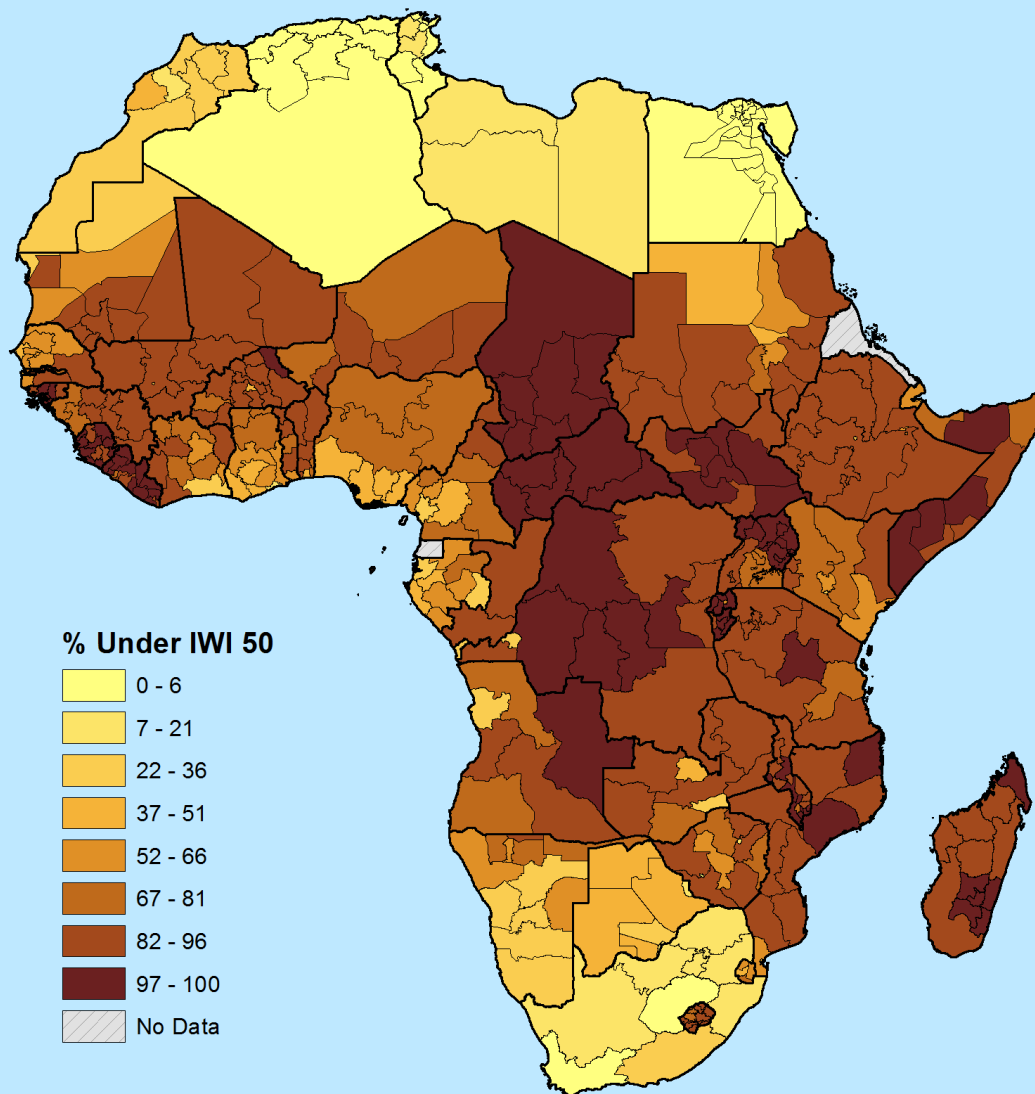
Household poverty in countries of Africa

Based on the International Wealth Index (IWI)

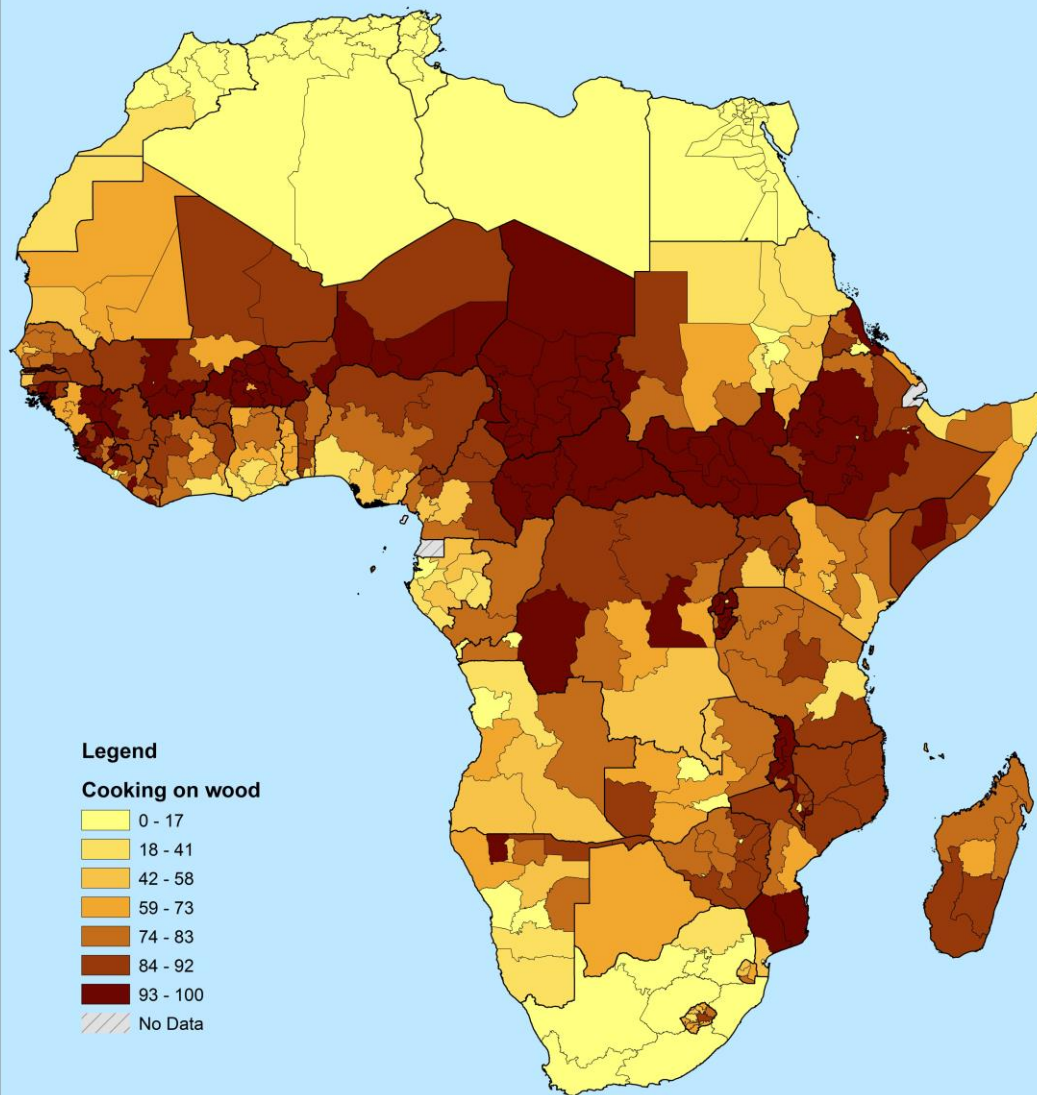


Household poverty in sub-national regions of Africa

Based on the International Wealth Index (IWI)



Percentage of households cooking on firewood



How created?

- We make them ourselves by aggregating information from the household surveys in our database
- Educational level of an area is the mean educational level of adults
- Level of development is mean household wealth
- Works very well (tests at national level)
- High potential (many different indicators and aggregation to other areas/groups possible)
- Regularly updated with newly released survey datasets
- Time series since the mid 1990s.

GDL Area Database (3.5.0)

Free Sub-National Development Indicators

120 indicators, 127 countries, 1237 sub-national regions
35.5 million persons, 8.0 million households

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Database History Maps Download About Publications

GDL Home

Category: Gender

Indicator: Mean age at first marriage of women aged 20-50

Years: All years

Countries: Ethiopia

Grouping: By name

One or more indicators: One indicator for multiple years

Levels to show: All levels

Values displayed: Interpolated and extrapolated to 3 years

Colour scales: No colour scales

Blue numbers are estimated

Mean age at first marriage of women aged 20-50

Download this

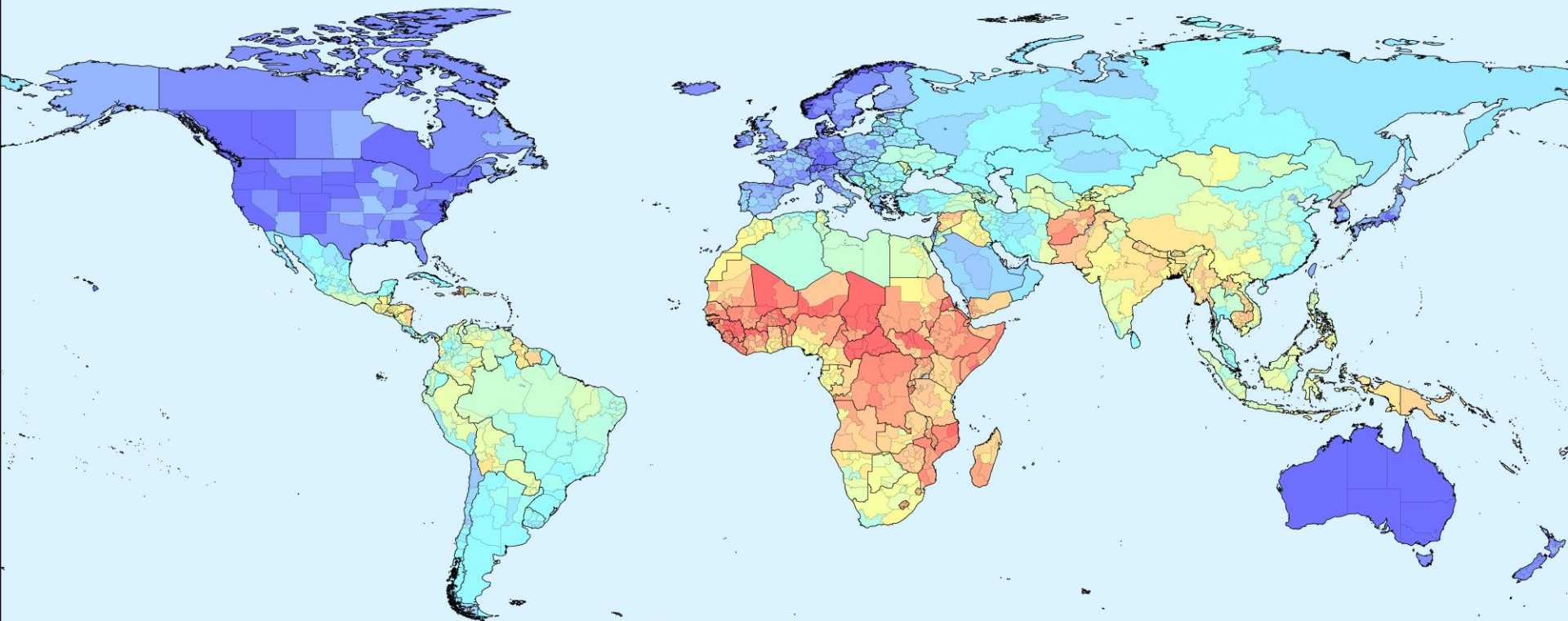
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Ethiopia (Africa)																											
	Dollar Street																										
Total							15.9	15.9	15.9	16.0	16.0	16.0	16.1	16.1	16.1	16.2	16.3	16.4	16.4	16.5	16.6	16.7	16.8	16.9	17.0	17.1	17.2
Urban							16.4	16.5	16.6	16.7	16.7	16.8	16.9	17.0	17.1	17.2	17.3	17.4	17.5	17.6	17.7	17.9	18.0	18.2	18.4	18.6	18.7
Rural							15.8	15.8	15.8	15.9	15.9	15.9	15.9	16.0	16.0	16.0	16.1	16.1	16.2	16.2	16.3	16.4	16.5	16.6	16.7	16.8	16.9
Poor							15.9	15.9	15.9	15.9	16.0	16.0	16.0	16.0	16.0	16.1	16.2	16.2	16.3	16.3	16.4	16.5	16.6	16.7	16.7	16.8	16.9
Nonpoor							18.2	18.2	18.2	18.2	18.2	18.2	18.2	18.2	18.2	18.3	18.4	18.5	18.5	18.6	18.7	18.8	18.9	19.0	19.2	19.3	19.4
Lowest 25%							15.2	15.3	15.5	15.6	15.7	15.8	15.9	16.1	16.2	16.2	16.2	16.3	16.3	16.3	16.3	16.4	16.5	16.6	16.7	16.8	16.9
Second 25%							16.1	16.1	16.0	16.0	16.0	15.9	15.9	15.9	15.9	15.9	16.0	16.1	16.1	16.2	16.3	16.3	16.4	16.5	16.5	16.6	16.7
Third 25%							16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.1	16.1	16.2	16.2	16.3	16.5	16.6	16.7	16.9	17.0
Highest 25%							16.4	16.4	16.5	16.5	16.5	16.5	16.5	16.5	16.6	16.7	16.9	17.1	17.3	17.5	17.7	17.8	17.9	18.0	18.1	18.2	18.3
Addis							17.3	17.4	17.6	17.8	17.9	18.1	18.2	18.4	18.6	18.7	18.8	18.9	19.0	19.1	19.2	19.5	19.8	20.1	20.4	20.7	21.0
Affar							14.6	14.9	15.1	15.4	15.7	16.0	16.3	16.5	16.8	16.8	16.8	16.8	16.8	16.8	16.8	16.7	16.6	16.6	16.5	16.5	16.4
Amhara							13.8	13.8	13.9	13.9	13.9	14.0	14.0	14.1	14.1	14.2	14.4	14.5	14.7	14.8	15.0	15.2	15.4	15.6	15.8	16.0	16.2
Ben-Gumz							15.8	15.7	15.7	15.6	15.6	15.5	15.4	15.4	15.3	15.4	15.6	15.7	15.8	15.9	16.0	16.2	16.3	16.5	16.6	16.7	16.9
Dire Dawa							19.3	19.1	18.8	18.6	18.4	18.1	17.9	17.7	17.5	17.6	17.8	17.9	18.1	18.2	18.4	18.3	18.2	18.1	18.0	17.9	17.8
Gambela							17.0	16.8	16.7	16.6	16.4	16.3	16.1	16.0	15.9	16.0	16.2	16.4	16.6	16.8	17.0	17.0	17.0	17.0	17.1	17.1	17.1
Harari							16.4	16.6	16.8	17.0	17.2	17.4	17.6	17.8	18.0	17.9	17.8	17.7	17.6	17.5	17.4	17.5	17.6	17.7	17.8	17.9	18.1
Oromiya							16.3	16.4	16.4	16.5	16.6	16.6	16.7	16.8	16.8	16.8	16.9	16.9	16.9	16.9	16.9	17.0	17.0	17.1	17.2	17.3	17.4
SNNP							17.8	17.7	17.6	17.5	17.4	17.3	17.2	17.1	17.0	17.1	17.2	17.3	17.3	17.4	17.5	17.5	17.5	17.5	17.5	17.5	17.5
Somali							17.2	17.2	17.3	17.3	17.4	17.4	17.5	17.5	17.6	17.5	17.5	17.5	17.5	17.4	17.4	17.5	17.6	17.6	17.7	17.8	17.8
Tigray							15.4	15.4	15.4	15.5	15.5	15.5	15.5	15.5	15.6	15.7	15.9	16.1	16.3	16.4	16.6	16.6	16.6	16.7	16.7	16.7	16.7

Subnational Human development Index (SHDI)

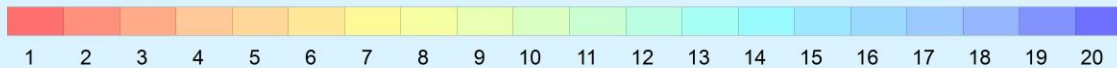
Subnational Human Development Index

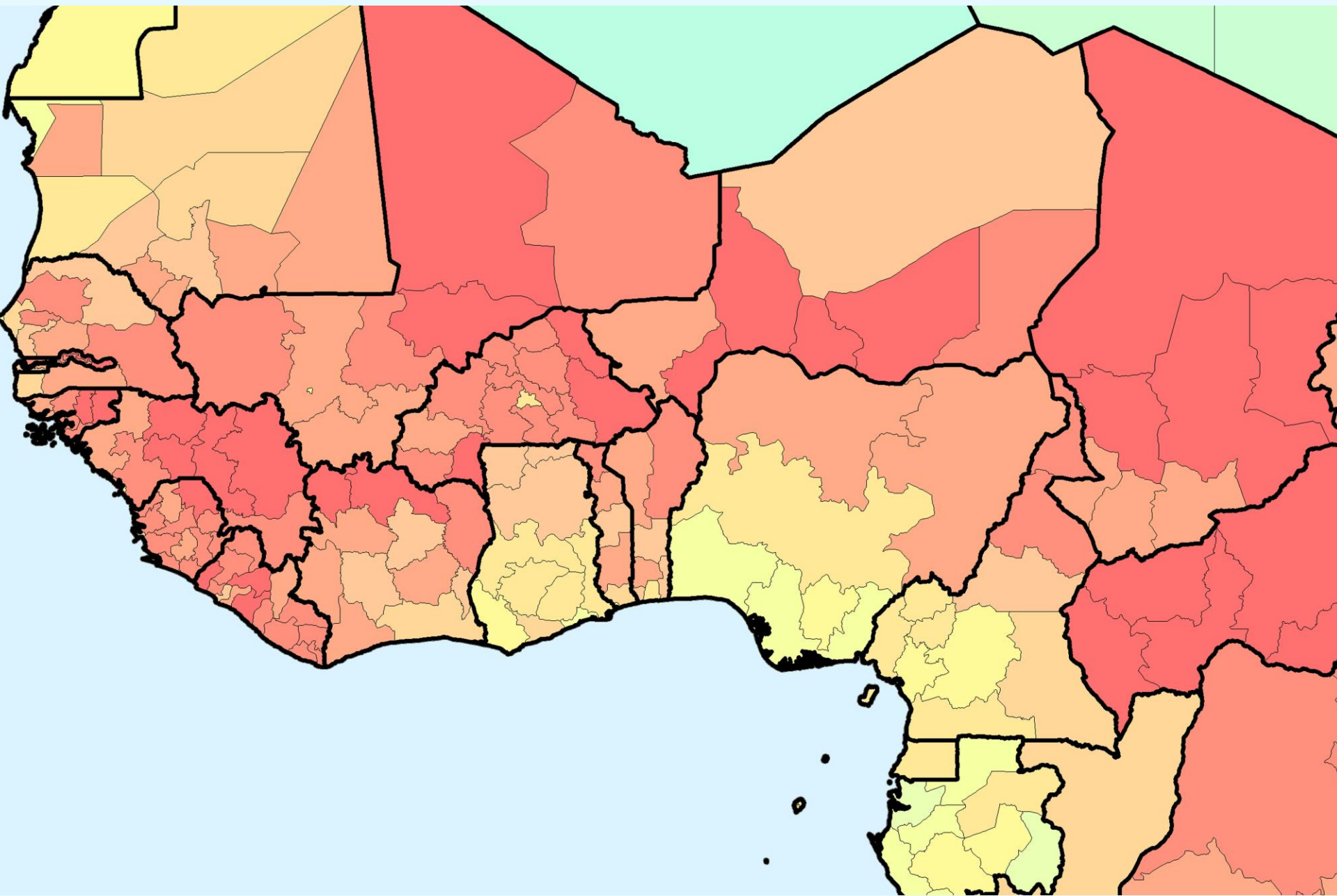
- The Human Development Index (HDI) indicates a country's achievement in education, health & income
- UNDP's flagship indicator and one of the most important indicators to assess countries' socio-economic development.
- Published yearly since 1990 by UNDP for almost all countries of the world (Human Development Reports)
- One great disadvantage: Only national values (whereas differences within LMICs are huge)
- GDL has created subnational versions of the HDI and its underlying indicators.
- Instead of 160+ countries, 1600+ subnational regions, hence 10 times more detail

Subnational Human Development Index



SHDI Ventile Groups





For SHDI new approach developed

- SHDI and underlying indicators differ from other indicators in GDL Area Database
- Standardized around official values in UNDP database
- Thus SHDI and indicators are at national level exactly equal to the UNDP values
- Only subnational variation derived from survey datasets (and statistical offices)
- Lower risk of measurement error
- Easily applicable to other indicators (e.g. poverty measures)

Details of approach:

- Nature “Scientific Data” www.nature.com/articles/sdata201938
- Blog on UNDP website: www.gdldat.org/blog-UNDP

Subnational Human Development Index (SD-2019)

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Category: Indices ▼

Indicator: Sub-national HDI ▼

Years: All years ▼

Countries: Belgium, Cameroon ▼

One or more indicators:

One indicator for multiple years ▼

Levels to show:

All levels ▼

Colour scales:

No colour scales ▼

Sub-national HDI

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	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Belgium																												
Total	0.806	0.811	0.825	0.839	0.846	0.852	0.857	0.861	0.866	0.868	0.873	0.877	0.879	0.882	0.885	0.890	0.896	0.899	0.900	0.899	0.903	0.904	0.905	0.907	0.909	0.913	0.914	0.916
Bruxelles - Brussel	0.864	0.869	0.884	0.895	0.897	0.896	0.902	0.903	0.907	0.910	0.913	0.914	0.916	0.918	0.921	0.925	0.930	0.931	0.929	0.932	0.933	0.936	0.934	0.936	0.937	0.941	0.943	0.944
Prov. Antwerpen	0.820	0.826	0.841	0.853	0.863	0.867	0.874	0.877	0.879	0.883	0.884	0.891	0.892	0.895	0.898	0.903	0.909	0.912	0.913	0.911	0.915	0.916	0.917	0.920	0.925	0.927	0.927	0.928
Prov. Brabant Wallon	0.792	0.796	0.810	0.823	0.831	0.834	0.838	0.843	0.847	0.852	0.856	0.865	0.869	0.869	0.873	0.883	0.890	0.893	0.894	0.896	0.904	0.905	0.902	0.910	0.913	0.920	0.920	0.923
Prov. Hainaut	0.766	0.770	0.782	0.796	0.803	0.807	0.812	0.814	0.820	0.822	0.825	0.833	0.835	0.840	0.840	0.846	0.852	0.857	0.859	0.856	0.862	0.862	0.864	0.867	0.868	0.870	0.872	0.872
Prov. Liege	0.765	0.770	0.783	0.796	0.803	0.808	0.813	0.817	0.822	0.824	0.828	0.835	0.838	0.844	0.845	0.852	0.860	0.862	0.864	0.863	0.866	0.867	0.869	0.874	0.878	0.881	0.883	0.884
Prov. Limburg	0.795	0.799	0.813	0.827	0.834	0.838	0.846	0.850	0.854	0.856	0.859	0.869	0.869	0.869	0.879	0.878	0.888	0.892	0.893	0.889	0.894	0.895	0.898	0.901	0.904	0.907	0.909	0.911
Prov. Luxembourg	0.771	0.773	0.788	0.798	0.807	0.812	0.816	0.819	0.824	0.827	0.834	0.838	0.842	0.845	0.846	0.852	0.863	0.864	0.862	0.864	0.866	0.868	0.872	0.871	0.880	0.884	0.881	0.883
Prov. Namur	0.773	0.774	0.793	0.803	0.809	0.813	0.823	0.825	0.831	0.833	0.836	0.843	0.845	0.851	0.851	0.860	0.869	0.873	0.872	0.873	0.877	0.877	0.877	0.878	0.881	0.885	0.885	0.888
Prov. Oost-Vlaanderen	0.819	0.824	0.837	0.846	0.852	0.851	0.855	0.857	0.861	0.865	0.868	0.871	0.875	0.877	0.879	0.885	0.891	0.892	0.896	0.896	0.900	0.901	0.902	0.907	0.908	0.912	0.917	0.918
Prov. Vlaams-Brabant	0.810	0.815	0.828	0.843	0.848	0.855	0.859	0.863	0.868	0.868	0.874	0.883	0.885	0.890	0.893	0.899	0.910	0.913	0.914	0.916	0.918	0.918	0.921	0.926	0.927	0.931	0.934	0.936
Prov. West-Vlaanderen	0.797	0.802	0.814	0.828	0.834	0.840	0.843	0.851	0.854	0.857	0.861	0.871	0.872	0.875	0.878	0.886	0.894	0.898	0.899	0.897	0.901	0.905	0.907	0.909	0.911	0.914	0.918	0.920
Cameroon																												
Total	0.440	0.436	0.431	0.426	0.423	0.423	0.421	0.422	0.429	0.426	0.430	0.449	0.452	0.458	0.464	0.466	0.473	0.484	0.491	0.499	0.506	0.515	0.526	0.536	0.544	0.548	0.553	0.557
Adamaoua	0.378	0.373	0.367	0.361	0.359	0.359	0.355	0.354	0.361	0.362	0.371	0.392	0.398	0.407	0.417	0.419	0.426	0.438	0.443	0.452	0.458	0.466	0.478	0.486	0.493	0.498	0.502	0.504
Centre (incl Yaounde)	0.496	0.491	0.486	0.479	0.478	0.479	0.476	0.477	0.485	0.483	0.491	0.511	0.518	0.527	0.535	0.539	0.549	0.562	0.572	0.582	0.590	0.603	0.615	0.626	0.635	0.640	0.647	0.650
Est	0.415	0.411	0.406	0.401	0.398	0.398	0.397	0.396	0.403	0.400	0.406	0.423	0.427	0.435	0.441	0.445	0.454	0.467	0.476	0.486	0.493	0.504	0.515	0.525	0.532	0.537	0.542	0.545
Extrême Nord	0.289	0.288	0.283	0.278	0.274	0.275	0.273	0.273	0.279	0.280	0.291	0.313	0.320	0.331	0.342	0.341	0.345	0.354	0.360	0.366	0.369	0.375	0.382	0.391	0.397	0.400	0.404	0.406
Littoral (incl Douala)	0.540	0.536	0.531	0.525	0.522	0.523	0.522	0.521	0.531	0.526	0.531	0.549	0.553	0.559	0.564	0.565	0.573	0.584	0.592	0.599	0.605	0.616	0.628	0.640	0.648	0.654	0.661	0.664
Nord	0.333	0.331	0.326	0.321	0.316	0.318	0.314	0.314	0.320	0.315	0.318	0.334	0.335	0.340	0.345	0.349	0.357	0.369	0.377	0.386	0.394	0.403	0.412	0.419	0.427	0.430	0.434	0.436
Nord Ouest	0.479	0.474	0.469	0.463	0.460	0.460	0.459	0.460	0.468	0.459	0.463	0.478	0.478	0.481	0.486	0.488	0.498	0.510	0.520	0.530	0.540	0.551	0.561	0.571	0.579	0.584	0.589	0.592
Ouest	0.500	0.495	0.489	0.482	0.480	0.478	0.477	0.477	0.485	0.475	0.474	0.489	0.487	0.488	0.488	0.490	0.501	0.515	0.525	0.534	0.544	0.554	0.565	0.576	0.584	0.589	0.595	0.599
Sud	0.467	0.462	0.458	0.450	0.447	0.448	0.446	0.447	0.454	0.451	0.456	0.476	0.480	0.487	0.494	0.497	0.507	0.520	0.530	0.538	0.548	0.559	0.571	0.580	0.590	0.595	0.602	0.604
Sud Ouest	0.495	0.492	0.487	0.481	0.479	0.480	0.478	0.480	0.488	0.482	0.483	0.500	0.501	0.505	0.509	0.508	0.515	0.525	0.531	0.539	0.544	0.553	0.565	0.574	0.584	0.589	0.595	0.598

Going gridded

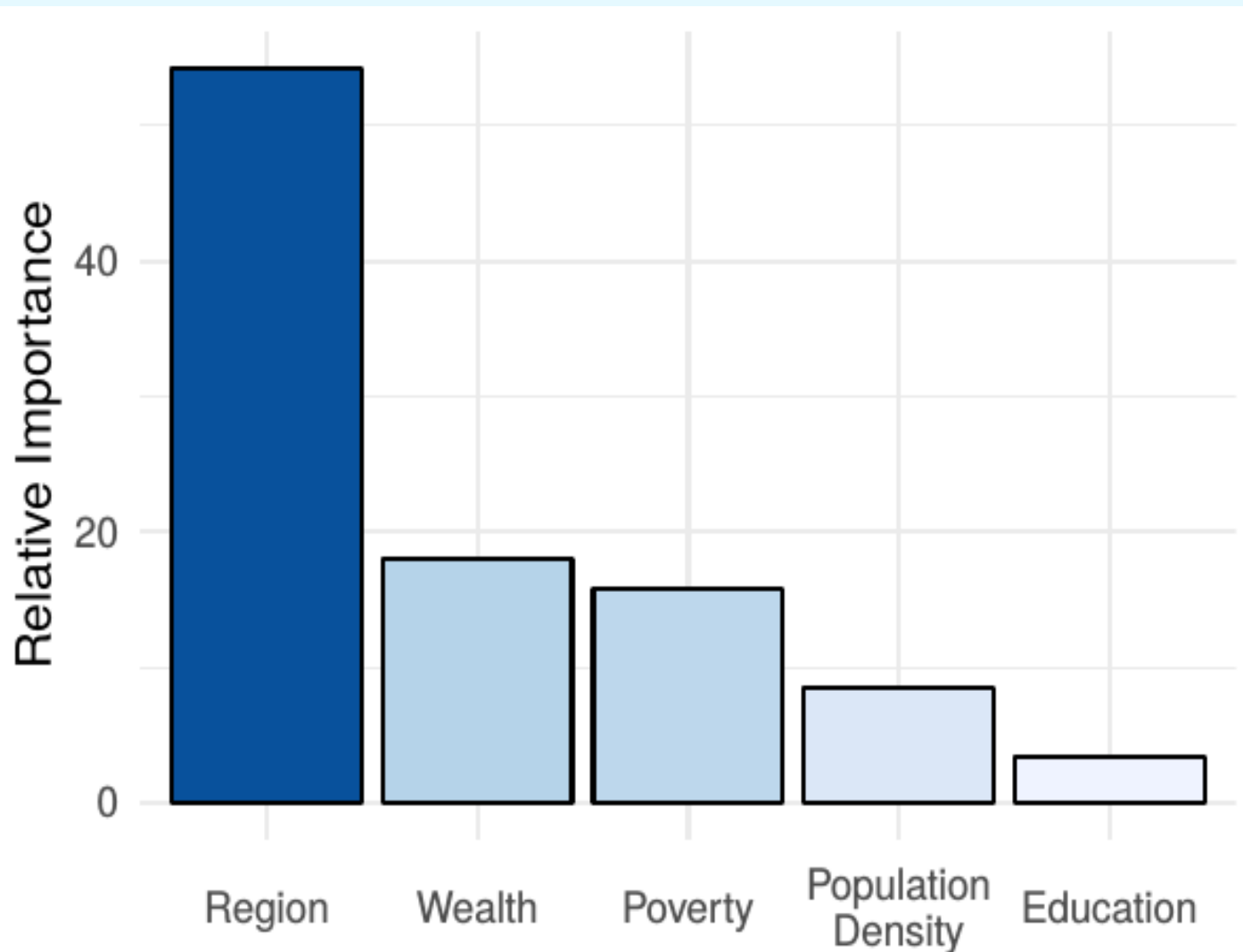
Making indicators fluid

- Increasing the degree of geographic detail
- Translating indicators to the level of small (1*1 km) grids, to make connections possible with any other regional division
- We know the values and distribution of our indicators for urban and rural areas of the regions
- By combining this information with population estimates of grids, we can create indicator estimates for these grids.
- This data can then subsequently be re-aggregated to any other regional subdivision we have information on
- Pilot study with Max Planck Institute for Biogeochemistry (Miguel Mahecha) and EM-Dat in Brussels (Debarati Guha) on this gridded approach

Pilot study

- To what extent do socio-economic and demographic characteristics of regions protect against impact of disasters
- Connect disaster data of the EM-Dat Database with data from MPI Biogeochemistry and indicators from GDL Area Database at the level of small area grids.
- Relative importance of household wealth, poverty, education and population density in explaining the fraction of people locally affected by climate disasters (droughts) since 2000.
- Method: Nonlinear boosted regression-tree approach

Gridded World population



Assets available

- GDL Area Database: www.globaldatalab.org/areadata/
- Subn. Human Development Index: www.globaldatalab.org/shdi/
- International Wealth Index: www.globaldatalab.org/iwi/
- Subnational Area Profiles: www.globaldatalab.org/profiles/
- Open for collaborations
- Twitter: @globaldatalab

Thank you very much for your attention!

www.globaldatalab.org