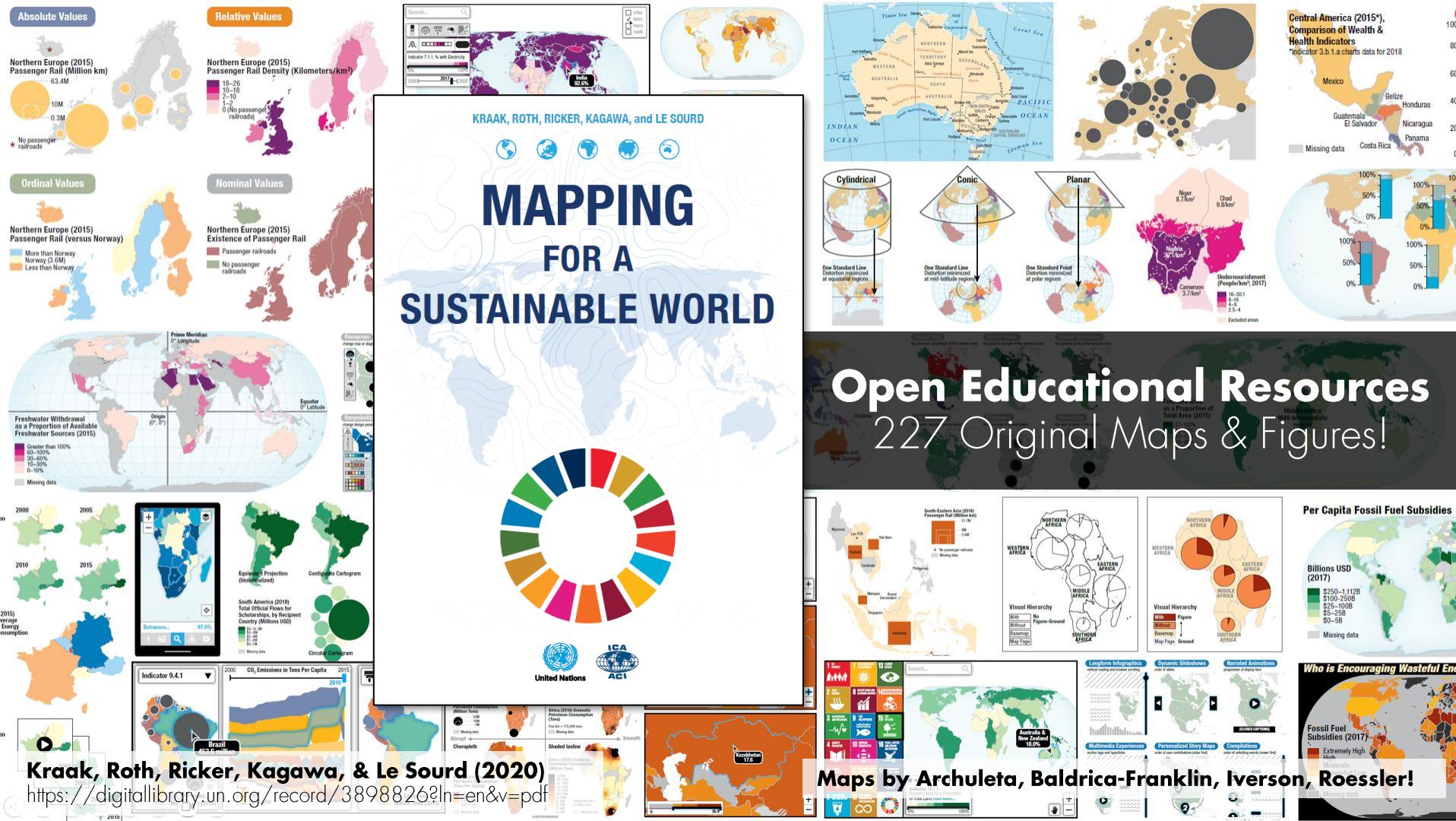


1.2: Lightning Talk 2 | Robert Roth, UW Cart Lab, UX Commission  
**Tips for Mapping the SDG Global Indicator Database**





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Global SDG Indicators Data Platform

 Select indicators and country or area

**SDG Global Database gives you access to data on more than 210 SDG indicators for countries across the globe**

by indicator, country, region or time period



Global Database

Country Profile

SDG Ai

<https://unstats.un.org/sdgs/dataportal/database>

## SDG Global Database indicators for countries

by indicator, country, region or

Global Database

### SDG Indicators

 Official list of SDG indicators

 Metadata Repository

<https://unstats.un.org/sdgs/dataportal/database>

 Tier Classification

Indicators (Selected 39 of 653 series)

Country or Area (Selected 301 of 301)

All

 Search

- ▼  **GOAL 6** Ensure availability and sustainable management of water and sanitation for all
  - ▼  **TARGET 6.1** By 2030, achieve universal and equitable access to safe and affordable drinking water for all
    - ▼  **INDICATOR 6.1.1** Proportion of population using safely managed drinking water services
      - Proportion of population using safely managed drinking water services, by urban/rural (%) **SH\_H2O\_SAFE**
  - ▶  **TARGET 6.2** By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations
  - ▶  **TARGET 6.3** By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally

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Advanced Access

### Resources

 Regional Groupings

 E-Handbook on SDG Indicators

 UNCT Toolkit

**17 Goals**  
**169 Targets**  
**239 Indicators**



- Data Series (*Selected 2 of 706*)

1.1.1 ×

• Countries, areas or regions (Selected 211 of 211) All Groupings Countries or areas

World (total) by SDG regions × World (total) by continental regions × Land Locked Developing Countries (LLDC) × + 3 ...

By default "All" is selected.

+ Select

● Period Range Years (25 of 62)

2000 × 2001 × 2002 × 2003 × 2004 × 2005 × 2006 × 2007 × 2008 × 2009 × 2010 × 2011 × 2012 × + 12

You can select single year or multiple years

- 21,834 observations

 Show Results



SI\_POV\_DAY1

SI\_POV\_EMP1

#### – Indicator 1.1.1. Series : Proportion of population below international poverty line (%) SI\_POV\_DAY1

Disaggregated by  Age  Location  Sex

Go to Metadata

 Search this table.

Select years to hide ▾



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**Data Series (Selected 2 of 706)**

1.1.1 [Select](#)

**Countries, areas or regions (Selected 211 of 211) [All Groupings](#) Countries or areas**

World (total) by SDG regions × World (total) by continental regions × Land Locked Developing Countries (LLDC) × + 3 ...  
By default "All" is selected.

[Select](#)

**Period** Range [Years](#) (25 of 62)

2000 × 2001 × 2002 × 2003 × 2004 × 2005 × 2006 × 2007 × 2008 × 2009 × 2010 × 2011 × 2012 × + 12 ...  
You can select single year or multiple years

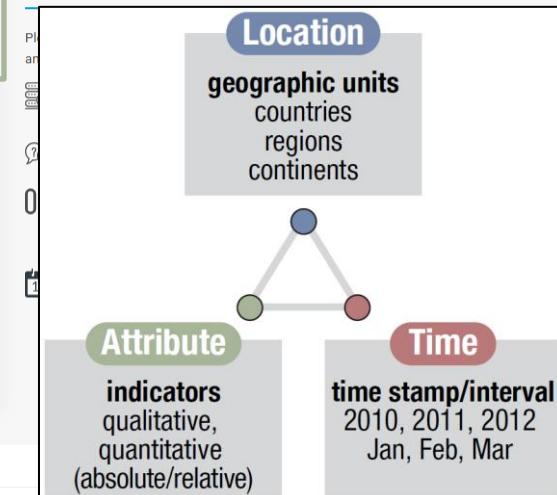
21,834 observations [Show Results](#)

[SI\\_POV\\_DAY1](#) [SI\\_POV\\_EMP1](#)
- Indicator 1.1.1, Series : Proportion of population below international poverty line (%) SI\_POV\_DAY1

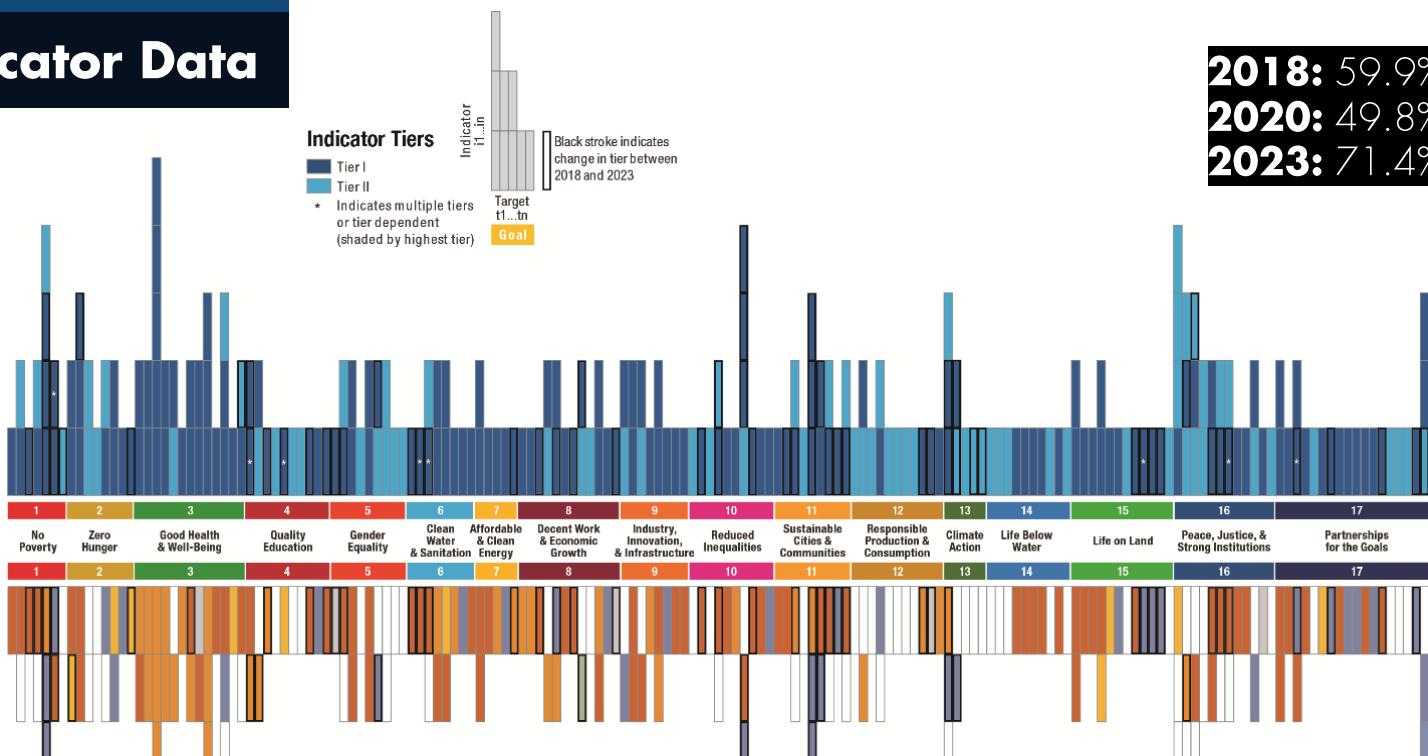
Disaggregated by  Age  Location  Sex
[Go to Metadata](#) Search this table...[Select years to hide](#)

Country	Age	Location	Sex	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Africa	ALLAGE	ALLAREA	BOTHSEX	46.7 <sup>fn,N</sup>	46 <sup>fn,N</sup>	46 <sup>fn,N</sup>	45 <sup>fn,N</sup>	42 <sup>fn,N</sup>	40.9 <sup>fn,N</sup>	40 <sup>fn,N</sup>	39 <sup>fn,N</sup>	38 <sup>fn,N</sup>	37 <sup>fn,N</sup>	35.5
Albania	<15Y	ALLAREA	BOTHSEX	-	-	-	-	-	-	-	-	-	-	-
Albania	15-64	ALLAREA	BOTHSEX	-	-	-	-	-	-	-	-	-	-	-
Albania	65+	ALLAREA	BOTHSEX	-	-	-	-	-	-	-	-	-	-	-
Albania	ALLAGE	ALLAREA	BOTHSEX	-	-	1 <sup>fn,G</sup>	-	-	0.6 <sup>fn,G</sup>	-	-	0 <sup>fn,G</sup>	-	-
Albania	ALLAGE	ALLAREA	FEMALE	-	-	-	-	-	-	-	-	-	-	-

### Important Information

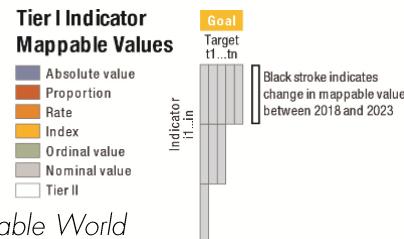


# SDG Indicator Data



**2018:** 59.9% (132/232)  
**2020:** 49.8% (115/231)  
**2023:** 71.4% (165/231)

Current as of Dec 2023





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• Data Series (Selected 2 of 706)

1.1.1 ×

[+ Select](#)

• Countries, areas or regions (Selected 211 of 211) [All Groupings](#) Countries or areas

World (total) by SDG regions × World (total) by continental regions × Land Locked Developing Countries (LLDC) × + 3 ...

By default "All" is selected.

[+ Select](#)

• Period Range [Years](#) (25 of 62)

2000 × 2001 × 2002 × 2003 × 2004 × 2005 × 2006 × 2007 × 2008 × 2009 × 2010 × 2011 × 2012 × + 12 ...

You can select single year or multiple years

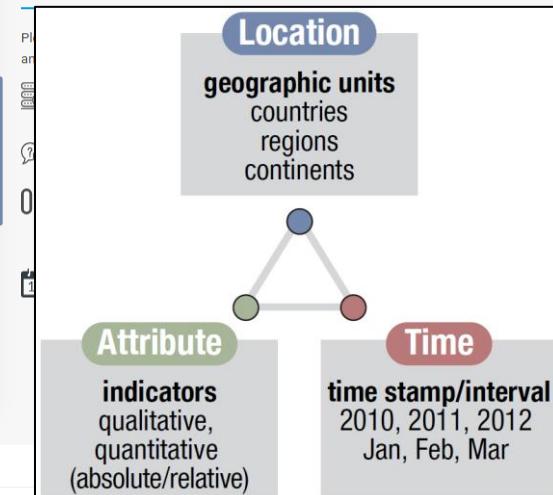
21,834 observations

[Show Results](#)
[SI\\_POV\\_DAY1](#)   [SI\\_POV\\_EMP1](#)
[Indicator 1.1.1, Series : Proportion of population below international poverty line \(%\) SI\\_POV\\_DAY1](#)

 Disaggregated by  Age  Location  Sex
[Go to Metadata](#) Search this table...[Select years to hide](#)

Country	Age	Location	Sex	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Africa	ALLAGE	ALLAREA	BOTHSEX	46.7 <sup>fn,N</sup>	46 <sup>fn,N</sup>	46 <sup>fn,N</sup>	45 <sup>fn,N</sup>	42 <sup>fn,N</sup>	40.9 <sup>fn,N</sup>	40 <sup>fn,N</sup>	39 <sup>fn,N</sup>	38 <sup>fn,N</sup>	37 <sup>fn,N</sup>	35.5
Albania	<15Y	ALLAREA	BOTHSEX	-	-	-	-	-	-	-	-	-	-	-
Albania	15-64	ALLAREA	BOTHSEX	-	-	-	-	-	-	-	-	-	-	-
Albania	65+	ALLAREA	BOTHSEX	-	-	-	-	-	-	-	-	-	-	-
Albania	ALLAGE	ALLAREA	BOTHSEX	-	-	1 <sup>fn,G</sup>	-	-	0.6 <sup>fn,G</sup>	-	-	0 <sup>fn,G</sup>	-	-
Albania	ALLAGE	ALLAREA	FEMALE	-	-	-	-	-	-	-	-	-	-	-

### Important Information



# "M49" Regional Groupings



**SDG Intermediate Regions**

or data model, used as nodes connected by coordinates between nodes. Vector data models (nodes only), *lines*, *polygons* (envelopes), and *volumes* (see Section 2.8). The choice for capturing location data depends

Finally, "(geo)spatial" is a "special" case in data science due to *spatial autocorrelation*: near locations are more likely to be similar in both attribute and time than distant locations. Thus, common techniques for data capture and statistical analysis do not always apply to location data given their topological relationships, therefore requiring special considerations.

M49 *regions* are major continental regions that are divided into *sub-regions* (Figure 1.3-1), with some sub-regions further divided into *intermediate regions* (Figure 1.3-2). These geographic regions are drawn to obtain greater homogeneity in sizes of population, demographic circumstances, and accuracy of demographic statistics. Finally, a *country* is a sovereign political and territorial entity acknowledged in the M49 standard.

For the purpose of presentation, the SDG regional groupings combine specific M49 geographic regions and sub-regions (Figure 1.3-3).

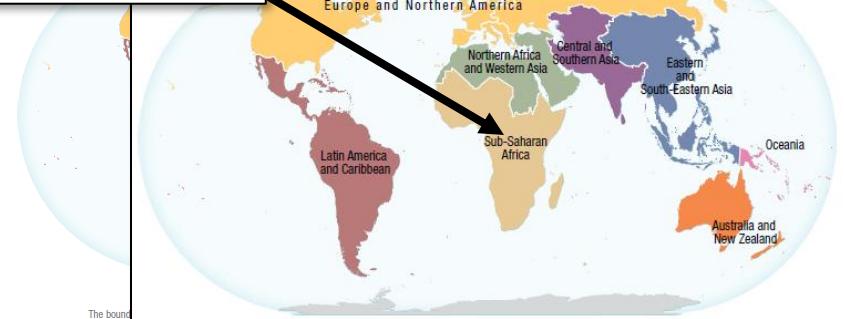
In addition, specific country group lists are also defined for Least Developed Countries (LDC), Landlocked Developing Countries (LLDC), and Small Island Developing States (SIDS). Lists for SDG regional groupings and specific country groups are detailed at: <https://unstats.un.org/>

SDG regional groupings used to compile and report indicator data.



**SDG Sub-regions**

Figure 1.3-2: M49 intermediate regions. Additional M49 intermediate regions used for greater specificity within some sub-regions. Colour hue again is used for the broader M49 regions for comparison to Figure 1.3-1.





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- Data Series (Selected 2 of 706)

1.1.1 ×

[+ Select](#)

- Countries, areas or regions (Selected 211 of 211) [All Groupings](#) Countries or areas

World (total) by SDG regions × World (total) by continental regions × Land Locked Developing Countries (LLDC) × + 3 ...

By default "All" is selected.

[+ Select](#)

- Period Range [Years](#) (25 of 62)

2000 × 2001 × 2002 × 2003 × 2004 × 2005 × 2006 × 2007 × 2008 × 2009 × 2010 × 2011 × 2012 × + 12 ...

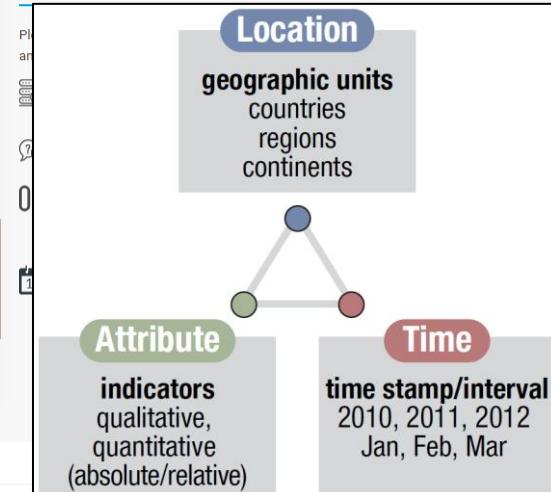
You can select single year or multiple years

21,834 observations

[Show Results](#)
[SI\\_POV\\_DAY1](#)   [SI\\_POV\\_EMP1](#)
- Indicator 1.1.1, Series : Proportion of population below international poverty line (%) SI\_POV\_DAY1
Disaggregated by  Age  Location  Sex[Go to Metadata](#)[Search this table...](#)[Select years to hide](#)

Country	Age	Location	Sex	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Africa	ALLAGE	ALLAREA	BOTHSEX	46.7 <sup>fn,N</sup>	46 <sup>fn,N</sup>	46 <sup>fn,N</sup>	45 <sup>fn,N</sup>	42 <sup>fn,N</sup>	40.9 <sup>fn,N</sup>	40 <sup>fn,N</sup>	39 <sup>fn,N</sup>	38 <sup>fn,N</sup>	37 <sup>fn,N</sup>	35.5
Albania	<15Y	ALLAREA	BOTHSEX	-	-	-	-	-	-	-	-	-	-	-
Albania	15-64	ALLAREA	BOTHSEX	-	-	-	-	-	-	-	-	-	-	-
Albania	65+	ALLAREA	BOTHSEX	-	-	-	-	-	-	-	-	-	-	-
Albania	ALLAGE	ALLAREA	BOTHSEX	-	-	1 <sup>fn,G</sup>	-	-	0.6 <sup>fn,G</sup>	-	-	0 <sup>fn,G</sup>	-	-
Albania	ALLAGE	ALLAREA	FEMALE	-	-	-	-	-	-	-	-	-	-	-

## Important Information





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• Data Series (Selected 2 of 706)

1.1.1 x

+ Select

• Countries, areas or regions (Selected 211 of 211) [All Groupings](#) Countries or areas

World (total) by SDG regions x World (total) by continental regions x Land Locked Developing Countries (LLDC) x + 3 ...

By default "All" is selected.

+ Select

• Period Range [Years](#) (25 of 62)

2000 x 2001 x 2002 x 2003 x 2004 x 2005 x 2006 x 2007 x 2008 x 2009 x 2010 x 2011 x 2012 x + 12 ...

You can select single year or multiple years

21,834 observations [Show Results](#)

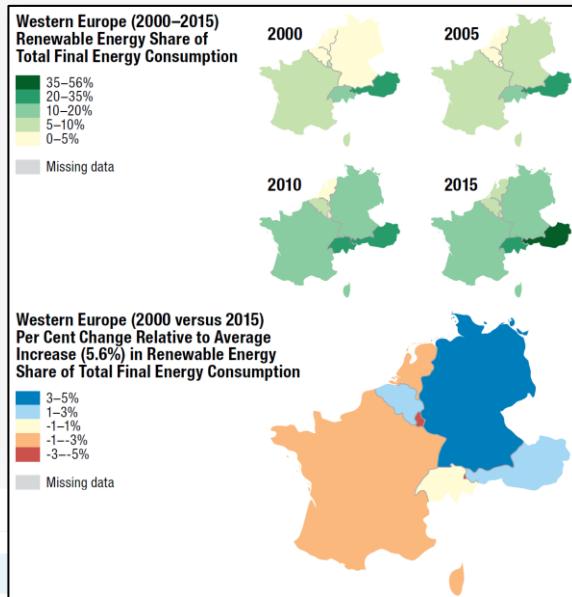
[SI\\_POV\\_DAY1](#) [SI\\_POV\\_EMP1](#)
- Indicator 1.1.1, Series : Proportion of population below international poverty line (%) SI\_POV\_DAY1

 Disaggregated by  Age  Location  Sex

[Go to Metadata](#)
 Search this table...

[Select years to hide](#)

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Albania	<15Y	ALLAREA	BOTHSEX	-	-	-	-	-	-	-	-	-	-	-
Albania	15-64	ALLAREA	BOTHSEX	-	-	-	-	-	-	-	-	-	-	-
Albania	65+	ALLAREA	BOTHSEX	-	-	-	-	-	-	-	-	-	-	-
Albania	ALLAGE	ALLAREA	BOTHSEX	-	-	1 <sup>fn,G</sup>	-	-	0.6 <sup>fn,G</sup>	-	-	0 <sup>fn,G</sup>	-	-
Albania	ALLAGE	ALLAREA	FEMALE	-	-	-	-	-	-	-	-	-	-	-





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Statistics • SDG Indicators Database



- Data Series (*Selected 2 of 706*)

1.1.1 ×

- Countries, areas or regions (Selected 211 of 211) All Groupings Countries or areas

World (total) by SDG regions × World (total) by continental regions × Land Locked Developing Countries (LLDC) × + 3 ...

By default "All" is selected

+ Select

- Period Range Years (25 of 62)

2000 × 2001 × 2002 × 2003 × 2004 × 2005 × 2006 × 2007 × 2008 × 2009 × 2010 × 2011 × 2012 × + 12

You can select single year or multiple years

- 21,834 observations

 Show Results

1

4

2

## Important Information

Please select parameters from each of the sections on the left and click on 'Show Results' to perform a search.



Database last updated on Tuesday, April 1, 2025. See History



If you need help using this site, [Read FAQs](#).



For latest reference metadata information for the Tier I and II indicators in the global indicator framework, explore the [Metadata Repository](#).



This new database interface has been launched on 15 September 2021. Please use the link below for questions and feedback. The old interface is still available for limited time at [https://unstats.un.org/sdgs/indicators/database\\_enacy](https://unstats.un.org/sdgs/indicators/database_enacy)

Indicator 1.1.1, Series : Proportion of population below international poverty line (%) SI_POV_DAY1																
Disaggregated by Age Location Sex														<a href="#">Go to Metadata</a>	<input type="text"/> Search this table...	Select years to hide ▾
Country	Age	Location	Sex	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010		
Africa	ALLAGE	ALLAREA	BOTHSEX	46.7 <sup>fn,N</sup>	46 <sup>fn,N</sup>	46 <sup>fn,N</sup>	45 <sup>fn,N</sup>	42 <sup>fn,N</sup>	40.9 <sup>fn,N</sup>	40 <sup>fn,N</sup>	39 <sup>fn,N</sup>	38 <sup>fn,N</sup>	37 <sup>fn,N</sup>	35.5 <sup>fn,N</sup>		
Albania	<15Y	ALLAREA	BOTHSEX	-	-	-	-	-	-	-	-	-	-	-		
Albania	15-64	ALLAREA	BOTHSEX	-	-	-	-	-	-	-	-	-	-	-		
Albania	65+	ALLAREA	BOTHSEX	-	-	-	-	-	-	-	-	-	-	-		
Albania	ALLAGE	ALLAREA	BOTHSEX	-	-	-	1 <sup>fn,G</sup>	-	-	-	-	0 <sup>fn,G</sup>	-	-		

# Tips for Mapping the SDGs

- 1. Generalization:** Use the UN Geodata Simplified boundary file for world and regional maps
- 2. Projections:** Use a recentered, equal area project for most thematic maps
- 3. Typography:** Visually accent critical places ("characters") to your message
- 4. Symbolization:** Consider the appropriate visual metaphor evoked by your thematic map
- 5. Normalization:** Ensure choropleth maps use normalized indicators
- 6. Classification:** Consider the attribute distribution when selecting a classification scheme
- 7. Layout:** Use the grid to inform layout, seeking balance but asymmetry





## UN Geodata simplified



United Nations Geospatial  
UN GeoPortal

[Download](#)

✓ Use the UN Geodata Simplified boundary file for world and regional maps

### Summary

#### UN Geodata simplified in GeoJSON

The United Nations Geospatial Data, or Geodata, is a worldwide geospatial dataset of the United Nations.

The United Nations Geodata is provided to facilitate the preparation of cartographic materials in the United Nations includes geometry, attributes and labels to facilitate the adequate depiction and naming of geographic features for the preparation of maps in accordance with United Nations policies and practices.

The geospatial datasets here included are referred to as UN Geodata simplified and are generalized based on UNGeodata 25 million scale.

The feature layers include polygons/areas of countries (BNDA\_simplified), lines for international boundaries and limits (BNDL\_simplified), and major water body (WBYA\_simplified). In addition, aggregated regional areas are available following M49 methodology (GEOA\_simplified, SUBA\_simplified, INTA\_simplified) and SDG regional grouping (SDGA\_simplified).

### Details

Content  
GeoJson

June 12, 2023  
Info Updated

June 12, 2023  
Data Updated

June 12, 2023  
Published Date

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# Generalization

# Projections

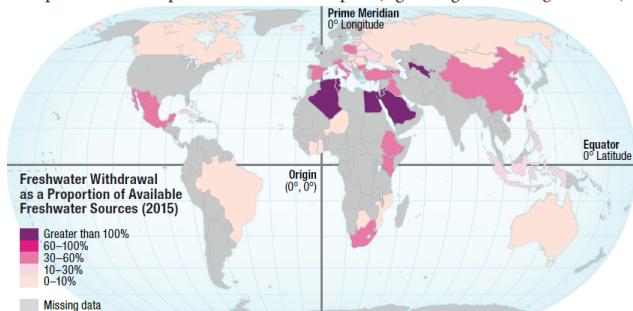
## Projection Centring

The **central meridian** of a map projection is the longitude along which the map surface of a projection is focused (see [Section 1.2](#)). A  $0^\circ$  central meridian at Greenwich, United Kingdom, often is selected for world maps since it is the zero reference, or **prime meridian**, for east-west notations of longitude. The **equator** is the zero reference for north-south

### ✓ Use a recentered, equal area project for most thematic maps

compare two perspectives on the same SDG indicator. These views tailor the map to more local audiences, placing China and Canada in the centre of the map, respectively, by changing the central meridian of the projection.

Choosing an alternative central meridian also clarifies map features and spatial relationships. For instance,



32 Mapping for a Sustainable World

**Figure 2.5-2** splits Canada, with part of the country at the far left of the map and part at the far right. Adjusting the central meridian slightly eastward into the Pacific Ocean maintains a general focus on China while also avoiding broken linework in other continents, improving map interpretation. The Eckert IV world map projection in this

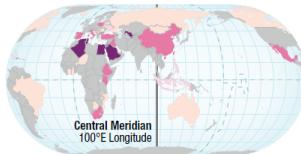


Figure 2.5-2: Centring on China. The map reprojects the [Figure 2.5-1](#) map of Indicator 6.4.2 (2015) using a central meridian of  $100^\circ$  E. Such map centring tailors the map to a local audience, here China, with the tradeoff of making the values of countries in North America, like Canada, more difficult to interpret.



Figure 2.5-3: Centring on Canada. The map reprojects the [Figure 2.5-1](#) map of Indicator 6.4.2 (2015) using a central meridian of  $100^\circ$  W, changing the focal perspective to Canada. Because [Figures 2.5-1, 2.5-2, and 2.5-3](#) use the equivalent Eckert IV projection, the sizes of China and Canada (and all other enumeration units) remain the same across the three maps, despite the shape of these countries changing dramatically when recentered.

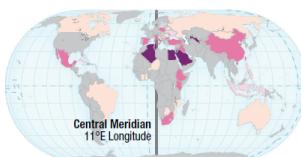
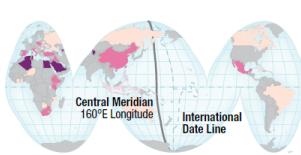


Figure 2.5-4: Centring on  $11^\circ$  E. When world SDG maps are made for a global audience, or when a local audience does not impact the purpose of the map, a normal, equivalent projection centred on  $11^\circ$  E is recommended. An  $11^\circ$  E centring splits the Pacific Ocean, resulting in improved visual balance of negative space for continental datasets. While an  $11^\circ$  E centring avoids breaking many country boundaries, some Small Island Developing States are impacted.



Rather than touching at a single **tangent** point (for planar projections) or line (for conic and cylindrical), the map surface also can slice into the globe. Such **secant** projections are common because they result in one standard line (for planar) or two standard lines (for conic and cylindrical), reducing distortion overall.

Finally, **interruptions** also can be

added to the projection to reduce local distortions in each resulting map lobe. Interruptions help to centre the map primarily on land versus ocean phenomena. [Figure 2.5-5](#) shows the world in the Interrupted Goode Homolosine projection, updating the [Figure 2.4-2](#) with a central meridian of  $160^\circ$  W to emphasize the Small Island Developing States.

# Typography

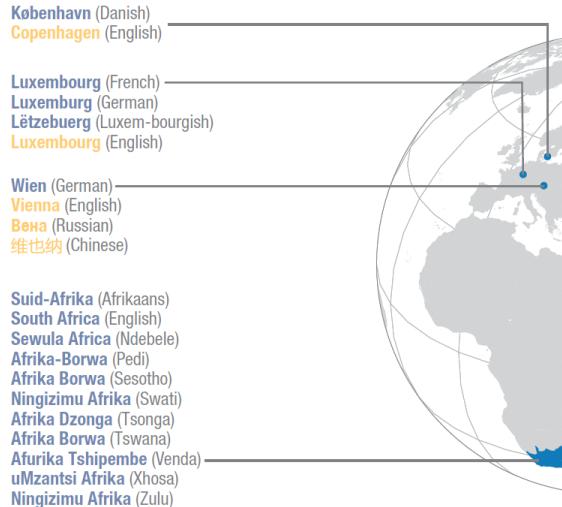
## Toponymy

**Toponymy** is the study of place names, their origins, meanings, and uses.

**Toponyms**, or geographic place names, reflect relationships among people and cultures across geography and history. A toponym may originate from within the named place (an *endonym*) or from outside of the named place (an *exonym*), with endonyms requiring *transliteration* to alternative languages and alphabets for global identification (Figure 2.12-1). Accordingly, there may be multiple accepted names for a single place, and Indigenous groups and local communities may

contest exonyms derived from colonial, racist, or otherwise culturally insensitive geopolitical and historical practices.

The United Nations leads national and international standardization and management of geographic names. Its mission on toponymy was articulated in 1959 by United Nations Economic and Social Council resolution 715A (XXVII), which established the *United Nations Group of Experts on Geographical Names (UNGEGN)* and led to the first meeting on toponyms in 1960. Today, the UNGEGN assists national place-name



efforts—particularly to involve Indigenous groups and local communities in the process—and facilitates discussion of

ical and historical implications of using exonyms versus endonyms. However, as cartography is transnational, selection

### ✓ Use English / Latin characters, but consider endonyms

tent of map labels (see [Section 2.11](#)) and, thus, serve as important reference information for clarifying locations significant to the map subject and purpose. Cartographers need to be aware of the geopolit-

ic names endorsed by the respective national authoritative bodies are recommended for labelling national-level maps.

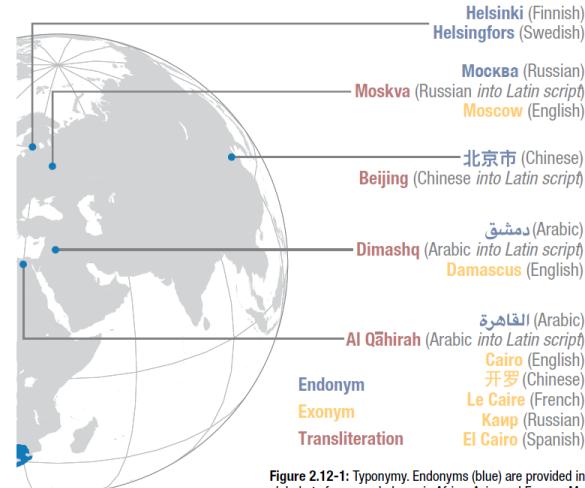
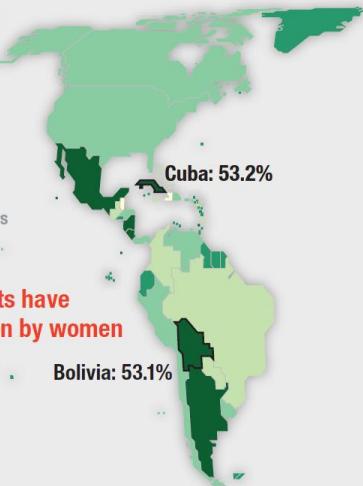
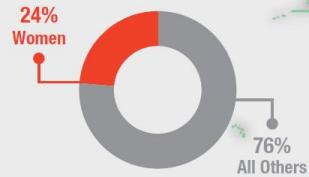


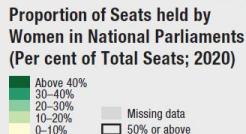
Figure 2.12-1: Typonymy. Endonyms (blue) are provided in local alphabets for several places in Africa, Asia, and Europe. Many places have multiple accepted endonyms. Exonyms (yellow) and transliteration (red) to Latin script are listed beneath each endonym.

## GOAL 5: ACHIEVE GENDER EQUALITY AND EMPOWER ALL WOMEN AND GIRLS

► Only 24% of parliamentary leaders were women in 2020



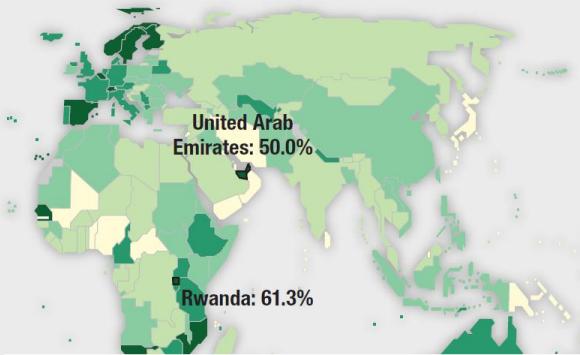
► Only four national parliaments have 50% or greater representation by women



◀ Wide view of the opening meeting of the sixty-fourth session of the Commission on the Status of Women (CSW). Member States adopted a political declaration in which they pledged to step up action to fully implement the landmark Beijing Declaration and Platform for Action on gender equality, agreed to 25 years ago. (Source: UN Photo/Loey Felipe, 2020)

### SDG Target 5.5

Ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making



✓ Visually accent critical places ("characters") to your message

► The map depicts Indicator 5.5.1 (2020) on the proportion of seats held by women in national parliaments as a choropleth map.

Countries for the choropleth map are highly generalized to show only the overall thematic patterns, simplifying the message. This style also increases the visual weight of smaller nations. UN Women promotes this basemap for its publication on "Women in Politics."

Although simplified, the map remains projected in the Eckert IV equivalent projection used throughout the book, allowing for comparison of areas in the choropleth. The choropleth map uses an equal interval classification for the uniform attribute distribution and a sequential colour scheme that crosses yellow to green colour hues but primarily relies on the ordered visual variable colour value.



## 3.1 Thematic Maps

A *thematic map* depicts the variation of one or sometimes several (see [Section 3.7](#)) geographic phenomena, mapping location and attribute information together. Meeting the SDGs

✓ Consider the visual metaphor evoked by your thematic map

attribute information that is enumerated within polygonal geographic units (see [Section 1.4](#)). Enumerated attributes

typically are mapped at an ordinal or numerical level of measurement, as enumeration results in quantitative counts or frequencies. Nominal differences can be represented in thematic maps, such

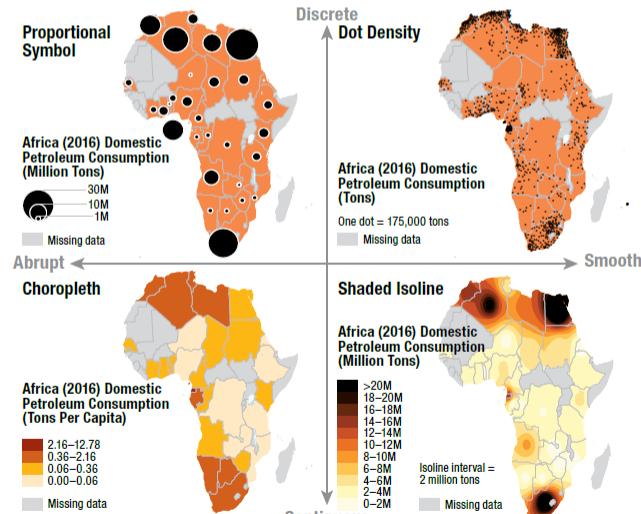


Figure 3.1-1: Thematic map types. The four maps depict Indicator 12.2.2 (2016) on domestic petroleum consumption. Top-left: Proportional symbol. Top-right: Dot density. Bottom-left: Choropleth. Bottom-right: Shaded isoline.

### Common Thematic Map Types

Figure 3.1-2: Choosing a thematic map type. [Section 3.2](#) treats nominal maps, [Section 3.3](#) choropleth maps, and [Section 3.4](#) proportion-

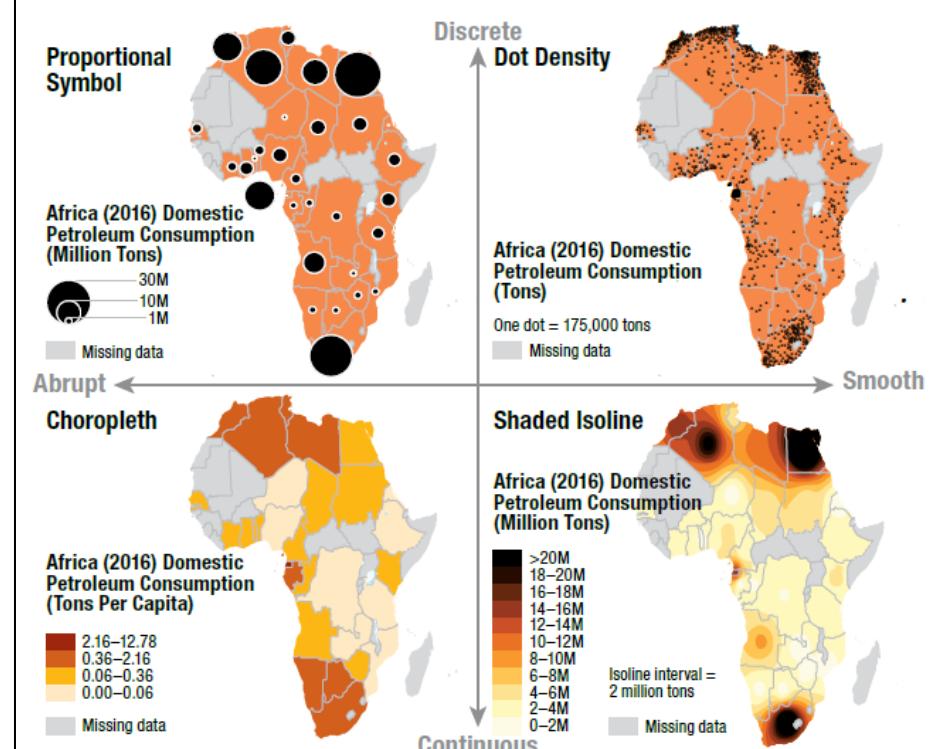


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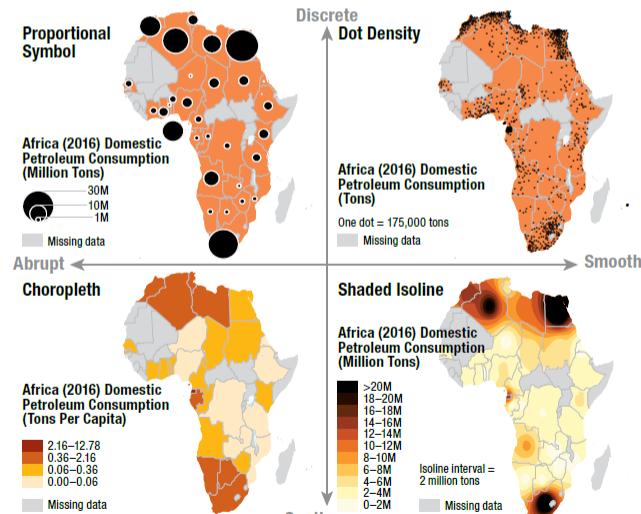


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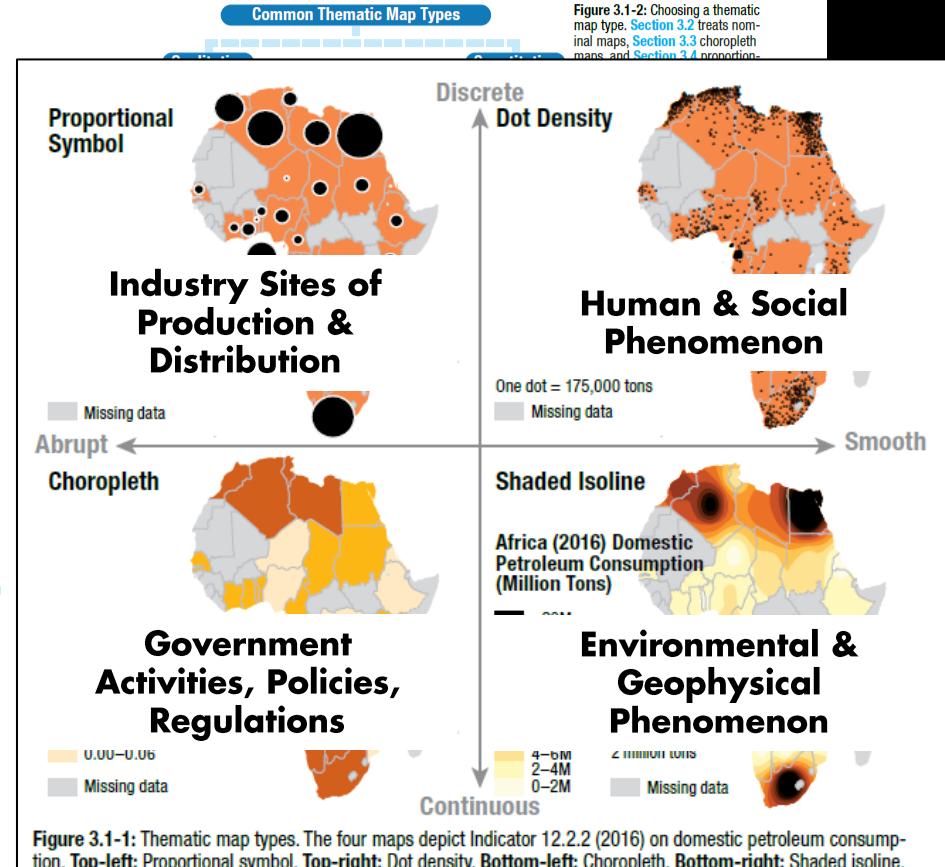


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## 1.8 The Modifiable Areal Unit Problem &

As introduced in [Section 1.4](#), most of the SDG indicator datasets contain enumerated attributes by country, making data transformation and normalization particularly important for mapping SDG indicator data.

individual-level data. Enumeration units sometimes follow regularly gridded boundaries (e.g., lines of latitude or longitude) in North America and South America but mostly have irregular boundaries in Europe and Africa.

### ✓ Ensure choropleth maps use normalized indicators

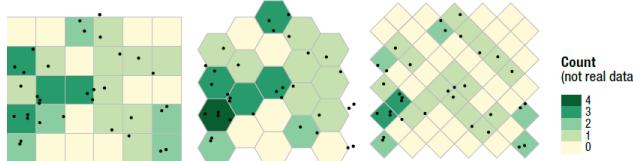
**areal unit problem (MAUP).** In other words, the same underlying individual-level data when enumerated by different boundaries may lead to different findings, conclusions, or decisions derived from the map ([Figure 1.8-1](#)).

The two active factors in MAUP are the zone of aggregation (i.e., the arrangement and shape of the enumeration units) and the geographic scale (i.e., the size of the enumeration unit).

The **zone of aggregation** describes the arrangement and shape of the polygonal boundaries used for enumerating

varying in arrangement, shape, and size.

The **geographic scale** refers to the size and extent of a geographic phenomenon, such as the political boundaries used as enumeration units for the SDG indicators (see [Section 2.6](#) for comparison of geographic to cartographic scale). The United Nations encourages collection of SDG indicator data at a local level, or **small geographic scale**, with fine enumeration units having a detailed zone of aggregation. The SDG indicator data then is aggregated upward to a national level, or **large geo-**



**Figure 1.8-1:** Understanding the modifiable areal unit problem (MAUP). The three images show the same, hypothetical point distribution enumerated by three sets of boundaries that differ in their arrangement, shape, and size. The shading shows the unnormalized count for each polygon unit, producing different visual patterns. Left: The pattern leans to the left. Centre: A clear cluster emerges in the bottom-left. Right: The pattern spreads more to the centre and right. Notably, choropleth maps require normalization (see [Section 3.3](#)) to reduce the visual impact of MAUP when shading the enumeration unit boundaries. Other thematic maps like dot density, isoline, and proportional symbol do not require normalization because their symbols are not tied directly to the enumeration unit boundaries. Example maps do not depict SDG indicators.



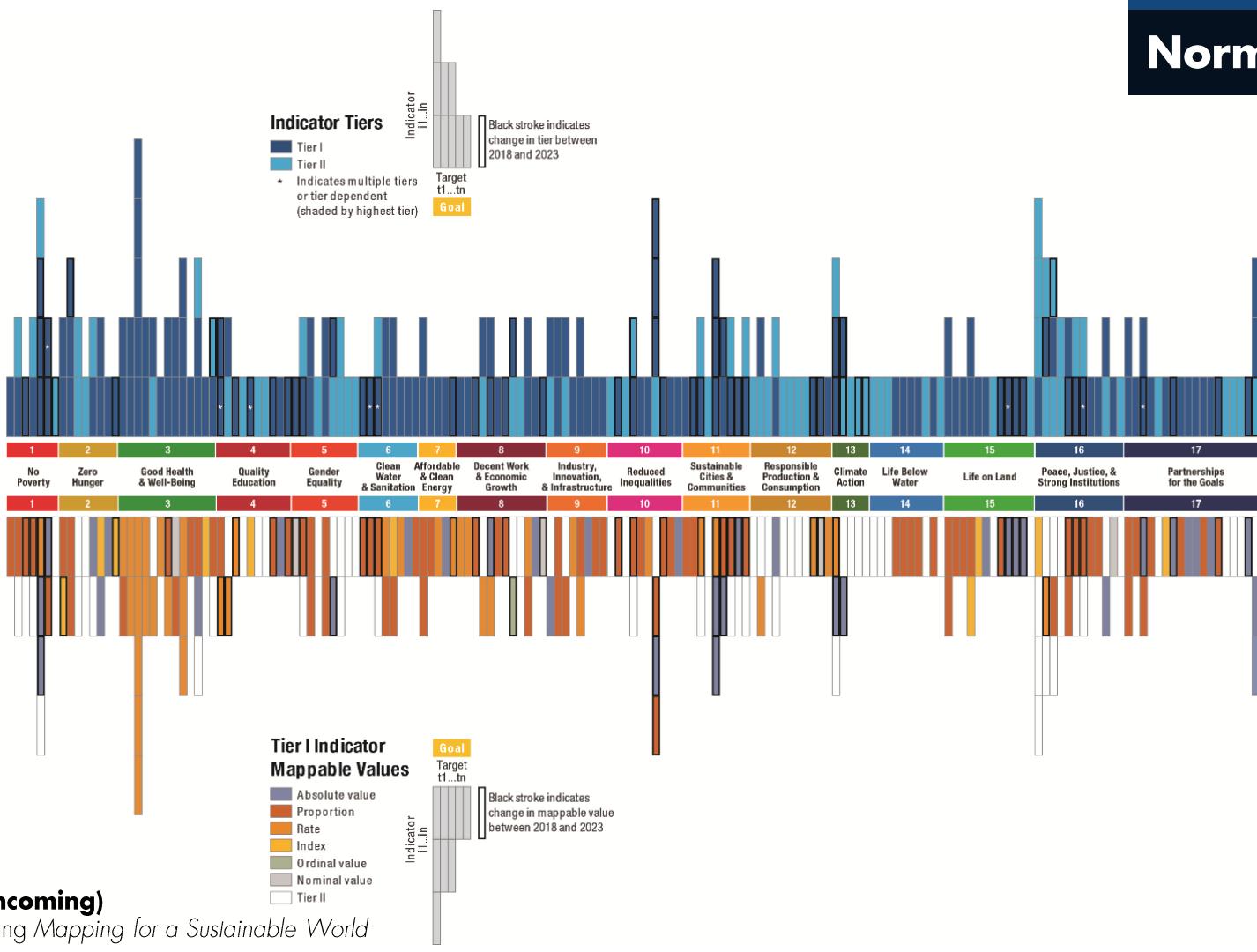
**Figure 1.8-2:** The effects of the modifiable areal unit problem and the ecological fallacy. Mapping Indicator 15.1.1 (2015) on forested area as a proportion of total area of the M49 sub-regions and intermediate regions rather than countries depicts an incorrect pattern of forestation in Middle Africa. Chad, an arid Sub-Saharan African country highlighted in the map, is only 5% forested but appears dark green in the resulting map given the tropic regions to the south also included within the “Middle Africa” intermediate region. In this case, the coarser resolution may lead to an incorrect understanding of forestation (and therefore deforestation) in Chad and the biogeography of Africa broadly. Unlike many of the SDG indicators, Indicator 15.1.1 has a multimodal rather than skewed distribution due to the high variability of precipitation by latitude. The resulting map uses an optimal breaks classification (see [Section 1.9](#)).

**graphic scale**, with coarse enumeration units combining adjacent boundaries from the detailed zones of aggregation. Disaggregation from national- to local-level enumeration requires sophisticated mapping techniques, such as dasymetric mapping (see [Section 3.5](#)), making it inappropriate to infer assumptions about local-level conditions from SDG indicator data on their own.

MAUP and geographic scale may result in the **ecological fallacy**: the same individual-level data enumerated at different boundary resolutions (i.e., geographic scales) results in different statistical relationships in the enumer-

ated attributes. Regarding the SDG indicators, perceived patterns across space for a given indicator and correlations between indicators may be an artefact of the arrangement, shape, and size of the enumeration units used to process and transform the data, not the actual geographic phenomenon the SDG indicator is designed to capture. For example, when aggregating SDG indicators from individual countries to M49 geographic regions, the resulting attribute data tells a different story about the region that some constituent countries may debate ([Figure 1.8-2](#)).

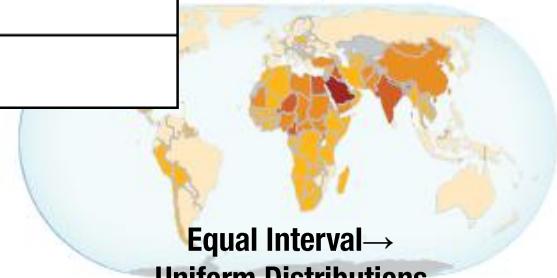
# Normalization



## 1.9 Data Classification

**Classification** describes the process of organizing map features into groups

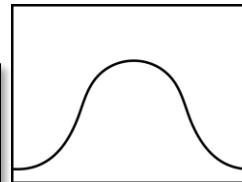
ations to arrive at an appropriate **classification scheme**, such as the portion of



**Annual Mean Level of Urban Fine PM ( $\mu\text{g}/\text{m}^3$ ; 2016)**

80–99.5
60–80
40–60
20–40
5.8–20

Missing data



for ordinal level  
-5). Figures 1.9-2,

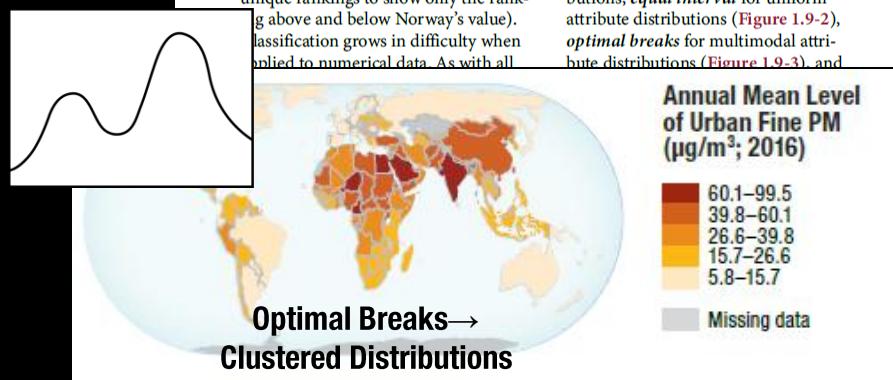
of the scale with several extreme outliers—the arithmetic scheme currently is



**Annual Mean Level of Urban Fine PM ( $\mu\text{g}/\text{m}^3$ ; 2016)**

59.4–99.5
42.9–59.4
25.7–42.9
9.2–25.7
5.8–9.2

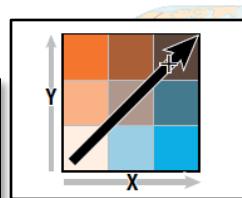
Missing data



**Annual Mean Level of Urban Fine PM ( $\mu\text{g}/\text{m}^3$ ; 2016)**

60.1–99.5
39.8–60.1
26.6–39.8
15.7–26.6
5.8–15.7

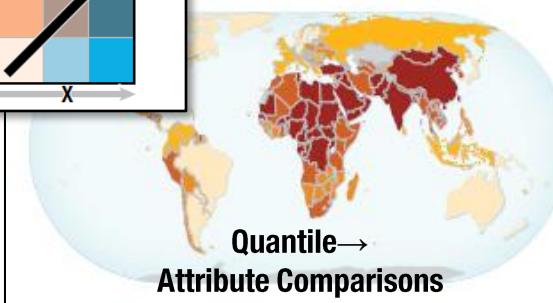
Missing data



**Annual Mean Level of Urban Fine PM ( $\mu\text{g}/\text{m}^3$ ; 2016)**

60.1–99.5
39.8–60.1

Figure 1.9-3: Optimal breaks. Optimal breaks treats classes like clusters, minimizing differences within the class while maximizing differences



**Annual Mean Level of Urban Fine PM ( $\mu\text{g}/\text{m}^3$ ; 2016)**

35.7–99.5
24.2–35.7
18.4–24.2
12.3–18.4
5.8–12.3

Missing data

✓ Consider the attribute distribution when selecting a classification scheme

Figure 1.9-1: Data distributions and classification. Left: The histogram depicts the left-skewed attribute distribution for Indicator 11.6.2 (2016) on the annual mean levels of urban fine particulate matter. Right: The resulting arithmetic scheme increases distances between class breaks in a regular progression, here expanding each class width by 5  $\mu\text{g}/\text{m}^3$  to provide more detail for features in the clustered side of the distribution rather than emphasizing outliers.

## 1.9 Data Classification

**Classification** describes the process of organizing map features into groups to improve legibility in the representation. Classification is one of the ways that cartographers generalize thematic maps, reducing attribute data to **Section 2.7**). It adds uncertainty **Section 2.15**), can be heavily dependent of **class labels** between classes.

Classification of all levels of ordinal and nominal data. **Figure 1.7-2** shows unique ranking above and below. Classification is applied to numerous aspects of cartography to effect classifications and cartographers.

ations to arrive at an appropriate **classification scheme**, such as the portion of the distribution the cartographer wishes to emphasize, the total number of classes (with most schemes using four to seven

on different scales or for ordinal level attributes (**Figure 1.9-5**). **Figures 1.9-2, 1.9-3, 1.9-4**, and **1.9-5** reclassify **Figure 1.9-1** data, showing how classification impacts the results.

of the scale with several extreme outliers—the arithmetic scheme currently is data. Schemes are uniform according to or interval. class from each interval for normal interval has advantage of being simple, easy-to-understand legends good audiences.

-3: Optimal breaks. Breaks treat classes as minimizing differences within the class maximizing differences between classes. Use optimal indicators with clustered in the distribution, **Figure 1.8-2** or size outliers.

-4: Mean & standard deviation. Mean & standard deviation is a variant of the mean in which the standard deviation is standard from the mean. Use standard deviation for a normal distribution or when the mean is meaningful.



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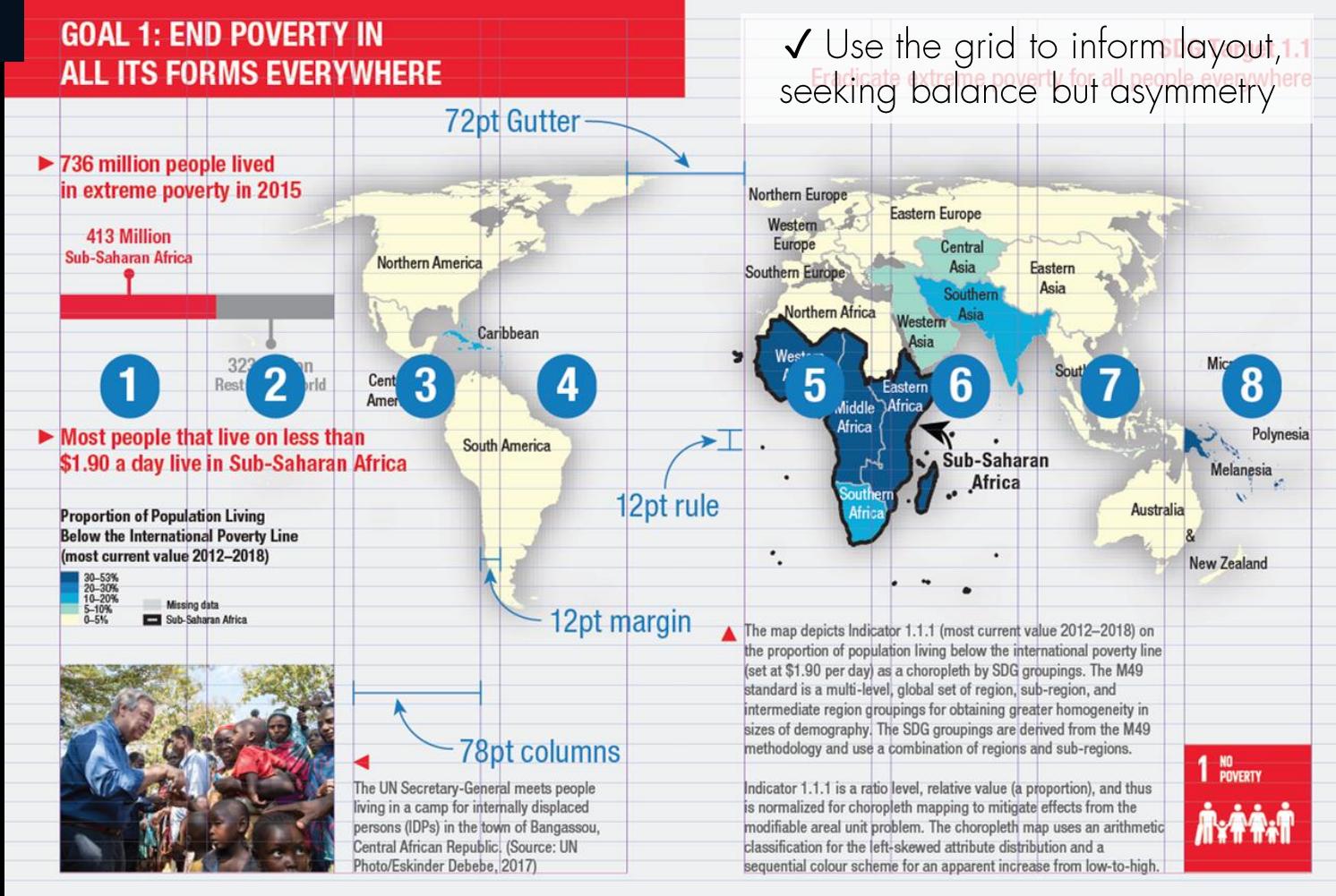


**Figure 1.9-5:** Quantile. Quantile places the same number of features into each class. Use quantile for side-by-side comparisons.

✓ Consider the attribute distribution when selecting a classification scheme

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# Layout



# Layout

## GOAL 1: END POVERTY IN ALL ITS FORMS EVERYWHERE

► 736 million people lived in extreme poverty in 2015

413 Million  
Sub-Saharan Africa

1

2  
323 million  
Rest of the world

72pt Gutter

► Most people that live on less than \$1.90 a day live in Sub-Saharan Africa

Proportion of Population Living Below the International Poverty Line (most current value 2012–2018)



The UN Secretary-General meets people living in a camp for internally displaced persons (IDPs) in the town of Bangassou, Central African Republic. (Source: UN Photo/Eskinder Debebe, 2017)

78pt columns

3 4

South America

Cent.  
Amer.

Northern America  
Caribbean

5 6

Eastern Africa

Southern Africa



12pt rule

12pt margin

✓ Use the grid to inform layout, seeking balance but asymmetry

Eradicate extreme poverty for all people everywhere

► The map depicts Indicator 1.1.1 (most of the proportion of population living below (set at \$1.90 per day) as a choropleth by standard is a multi-level, global set of intermediate region groupings for obtaining sizes of demography. The SDG grouping methodology and use a combination of

Indicator 1.1.1 is a ratio level, relative values is normalized for choropleth mapping to modifiable areal unit problem. The choropleth classification for the left-skewed attribute sequential colour scheme for an apparent

8-column grid:

