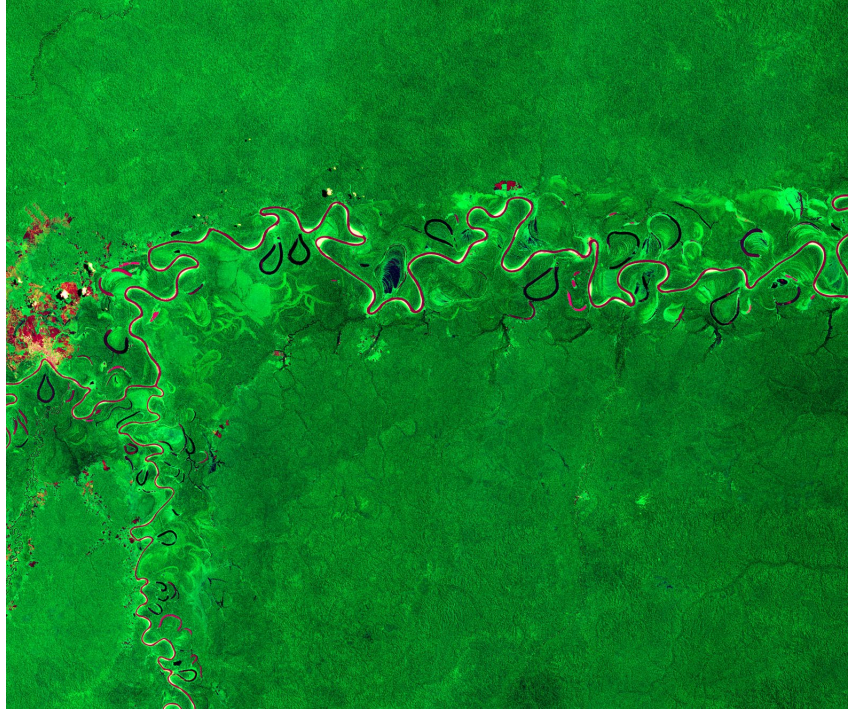
KRAAK ROTH RICKER KAGAWA LE SOURD

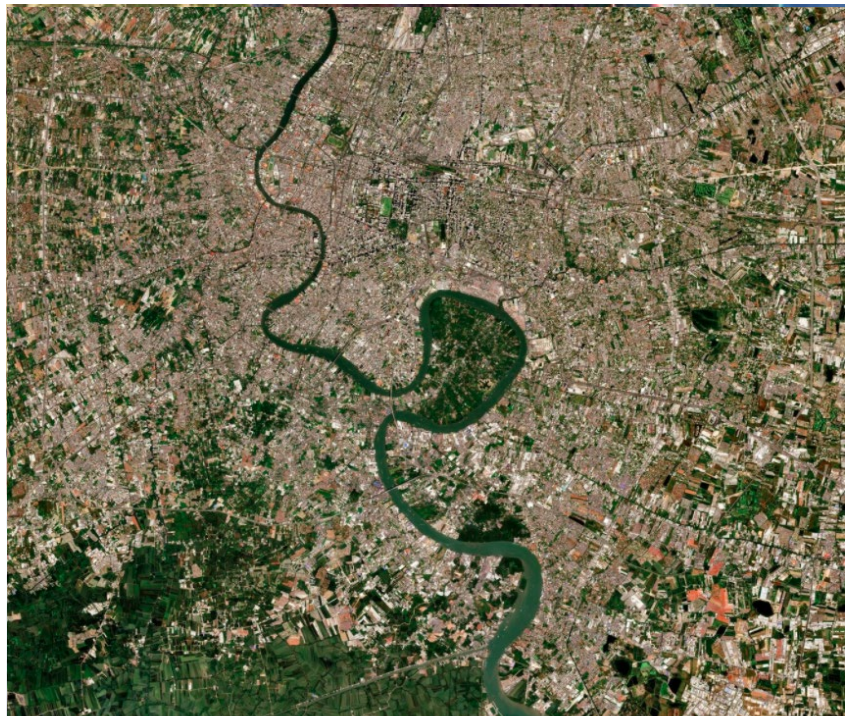
MAPPING FOR A SUSTAINABLE WORLD

United Nations

ICA ACI


Women in Politics: 2012






SUSTAINABLE DEVELOPMENT GOALS
17 GOALS TO TRANSFORM OUR WORLD
1 NO POVERTY
2 ZERO HUNGER
3 GOOD HEALTH AND WELL-BEING
4 QUALITY EDUCATION
5 GENDER EQUALITY
6 CLEAN WATER AND SANITATION
7 AFFORDABLE AND CLEAN ENERGY
8 DECENT WORK AND ECONOMIC GROWTH
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
10 REDUCED INEQUALITIES
11 SUSTAINABLE CITIES AND COMMUNITIES
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION
14 LIFE BELOW WATER
15 LIFE ON LAND
16 PEACE, JUSTICE AND STRONG INSTITUTIONS
17 PARTNERSHIPS FOR THE GOALS
SUSTAINABLE DEVELOPMENT GOALS

13 CLIMATE ACTION — TAKE URGENT ACTION TO COMBAT CLIMATE CHANGE AND ITS IMPACTS

THE GLOBAL MEAN TEMPERATURE IN 2018 IS APPROXIMATELY **1°C ABOVE** THE PRE-INDUSTRIAL BASELINE

186 PARTIES HAVE RATIFIED THE PARIS AGREEMENT

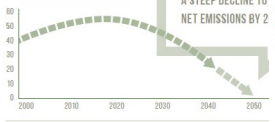
CLIMATE-RELATED AND GEOPHYSICAL DISASTERS **CLAIMED AN ESTIMATED 1.3 MILLION LIVES** BETWEEN 1998 AND 2017

DESPITE AN INCREASE IN GLOBAL CLIMATE FINANCE FLOWS OF 17% (2015–2016), COMPARED WITH 2013–2014,

INVESTMENT IN

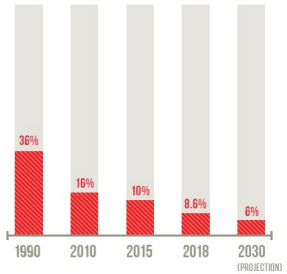
ATMOSPHERIC CO_2 CONCENTRATION IS **146% OF PRE-INDUSTRIAL LEVELS (2017)**

TO LIMIT GLOBAL WARMING TO 1.5°C, **GLOBAL CA EMISSIONS NEED TO TO 55% OF 2010 LEV** BY 2030 AND CONTI A STEEP DECLINE TO NET EMISSIONS BY 2



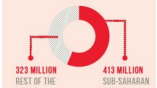
1 NO POVERTY — END POVERTY IN ALL ITS FORMS EVERYWHERE

THE WORLD **IS NOT ON TRACK TO END POVERTY BY 2030**



55% OF THE WORLD'S POPULATION HAVE NO ACCESS TO **SOCIAL PROTECTION**

736 MILLION PEOPLE LIVED IN EXTREME POVERTY IN 2015, **413 MILLION** IN SUB-SAHARAN AFRICA



MORE THAN 90% OF DEATHS DUE TO DISASTERS OCCUR IN LOW- AND MIDDLE-INCOME COUNTRIES

14 LIFE BELOW WATER — CONSERVE AND SUSTAINABLY USE THE OCEANS, SEA AND MARINE RESOURCES FOR SUSTAINABLE DEVELOPMENT

CO_2 CO_2 CO_2

OCEAN ACIDITY HAS INCREASED BY **26%** SINCE PRE-INDUSTRIAL TIMES

IT IS EXPECTED TO RAPIDLY INCREASE **BY 100–150% BY 2100**

THE INCREASE IN OCEAN ACIDITY IS A NEGATIVE PHENOMENON. IT IMPACTS THE ABILITY OF THE OCEAN TO ABSORB CO_2 AND ENDANGERS MARINE LIFE.

THE PROPORTION OF FISH STOCKS WITHIN **BIOLOGICALLY SUSTAINABLE LEVELS** DECLINED FROM

90% (1974) TO **67%** (2015)

87 COUNTRIES SIGNED THE AGREEMENT ON PORT STATE MEASURES, THE **FIRST BINDING** INTERNATIONAL AGREEMENT ON ILLEGAL, UNREPORTED AND UNREGULATED FISHING

104 OUT OF 220 COASTAL REGIONS IMPROVED THEIR **COASTAL WATER QUALITY** (2012–2018)

17% OF WATERS UNDER NATIONAL JURISDICTION ARE COVERED BY PROTECTED AREAS

MORE THAN **DOUBLE** THE 2010 COVERAGE LEVEL

5 GENDER EQUALITY — ACHIEVE GENDER EQUALITY AND EMPOWER ALL WOMEN AND GIRLS

18% OF EVER-PARTNERED WOMEN AND GIRLS AGED **15 TO 49 YEARS HAVE EXPERIENCED** PHYSICAL AND/OR SEXUAL **PARTNER VIOLENCE**

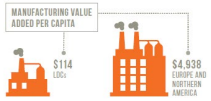
IN SOUTHERN ASIA, A GIRL'S RISK OF MARRYING IN CHILDHOOD HAS DECREASED BY **40%** SINCE 2000

STILL, **30%** OF WOMEN AGED 20 TO 24 YEARS WERE MARRIED BEFORE AGE 18 (2018)

24% OF NATIONAL PARLIAMENTARIANS ARE WOMEN AN INCREASE FROM 19% (2010)

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE — BUILD RESILIENT INFRASTRUCTURE, PROMOTE INCLUSIVE AND SUSTAINABLE INDUSTRIALIZATION AND FOSTER INNOVATION

INDUSTRIALIZATION IN LDCs **IS TOO SLOW** TO MEET THE 2030 AGENDA TARGET



MEDIUM-HIGH AND HIGH-TECH SECTORS ACCOUNT FOR 45% OF THE GLOBAL MANUFACTURING VALUE ADDED (2016), BUT THE SHARE IS ONLY 15% IN SUB-SAHARAN AFRICA

GLOBAL INVESTMENT IN RESEARCH AND DEVELOPMENT IS **$2 TRILLION** (2016), UP FROM **$739 BILLION** (2000)

90% OF PEOPLE LIVE WITHIN RANGE OF A 3G OR HIGHER QUALITY MOBILE NETWORK (2018), **BUT NOT ALL CAN AFFORD TO USE IT**

Source: https://www.un.org/geospatial/programmes

Programmes & Partnerships

Mapping for a Sustainable World

The United Nations and the International Cartographic Association (ICA) have a long-standing partnership in building awareness on the role of professions in cartography and geospatial information science and the use of maps for decision-making and raising awareness on global agendas.

On 24 January 2021, to celebrate the International Day of Education and to contribute to free and accessible education towards achieving the Sustainable Development Goals, the United Nations and the International Cartographic Association released a joint publication entitled Mapping for a Sustainable World (web version) (print version). The publication aims to share best practices, conventions, and explaining how different mapping techniques reveal spatio-temporal patterns, such as global population growth, socioeconomic disparities, and climate change, to understanding challenges and achievements towards the Sustainable Development Goals. By integrating geospatial and statistical data of the Global Sustainable Development Goals (SDGs) Indicator Database, cartography can support decision-making and promote public awareness on the Sustainable Goals. The publication introduces the SDGs and their relation to data, describes foundational design decisions in cartography, introduces common map types and diagrams for representing the SDG indicators and discusses consideration for map use environments. On 13 July 2021, a joint webinar was organised to share the editors' journey in the creation, the content and the use of the book, as well as sharing their experiences.

Previously, for the International Map Year (2015-2016), the International Cartographic Association invited the United Nations to contribute to their publication of The World of Maps on a chapter on Map use at the United Nations.

SALB programme

The Second Administrative Level Boundaries (SALB) programme goal is to avail publicly authoritative information on administrative units and names globally.

The Second Administrative Level Boundaries (SALB) programme aims at a working platform for the collection, compilation and management of a homogeneous global repository on administrative boundaries and their names from authoritative source such as the National Geospatial Information Authorities.

Content

Structure &

The book comprises four sections. Section 1 introduces the SDGs and their relation to geospatial data, describing SDG indicators and data transformations for mapping. Section 2 describes foundational design decisions in the cartographic workflow including projections, scale, generalization, symbolization, typography, and visual hierarchy among others. Section 3 introduces common map types (e.g., choropleth maps, proportional symbol maps, dasymetric maps, bivariate maps, cartograms) and diagrams (e.g., bar charts, scatterplots, timelines) for representing the SDG indicators. Finally, Section 4 discusses considerations for map use environments such as audiences, user interfaces and interaction operators, mobile and web media, storytelling versus exploration, and open access.

Table of Contents

1. SDGs & Geospatial Data

1 **Statistics**

Attributes					Location			Time						
Goal	Target	Indicator	SeriesCode	SeriesDescription	GeoArea	GeoAreaName	Location	Units	2000	2001	2002	2003	…	2017
6	6.1	6.1.1	SH_H2O_SAFE	Proportion of popu	112	Belarus	ALLAREA	PERCE	80.62	80.81	80.99	81.17	…	94.52
6	6.1	6.1.1	SH_H2O_SAFE	Proportion of popu	100	Bulgaria	ALLAREA	PERCE	96.84	96.84	96.84	96.81	…	96.95
			_SAFE	Proportion of popu	203	Czechia	ALLAREA	PERCE	96.32	96.32	96.44	96.55	…	97.88
			_SAFE	Proportion of popu	348	Hungary	ALLAREA	PERCE	50.51	50.51	50.51	50.51	…	89.57
6	6.1	6.1.1	SH_H2O_SAFE	Proportion of popu	616	Poland	ALLAREA	PERCE					…	99.16
6	6.1	6.1.1	SH_H2O_SAFE	Proportion of popu	498	Republic of Mold	ALLAREA	PERCE	40.42	42.32	44.27	46.26	…	72.88
6	6.1	6.1.1	SH_H2O_SAFE	Proportion of popu	642	Romania	ALLAREA	PERCE	81.65	81.61	81.59	81.63	…	81.92

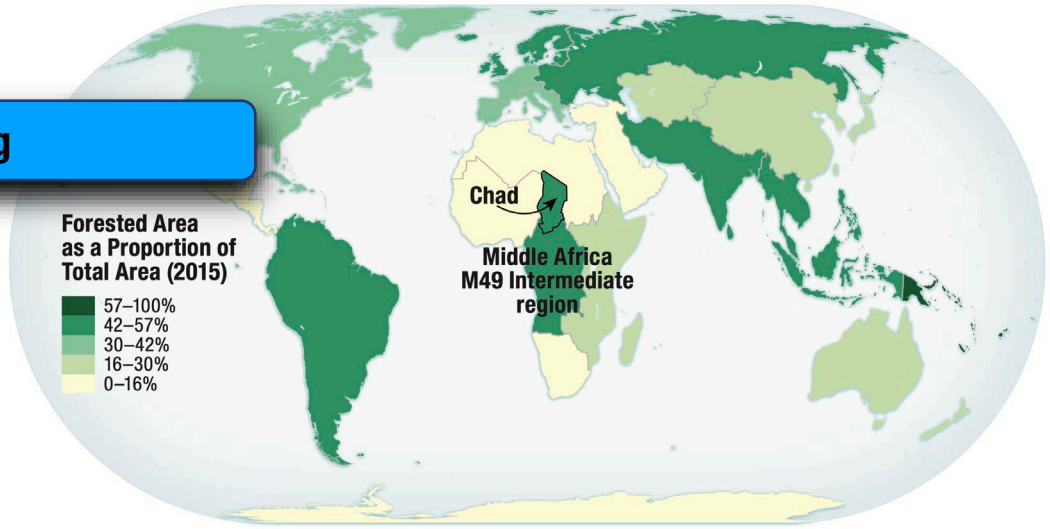
http://un-stats.un.org/sdgs/indicators/database/

Tier I Indicator Mappable Values

- Absolute value
- Proportion
- Rate
- Index
- Ordinal value
- Nominal value
- Tier II or Pending Indicator

2 **Data Analysis**

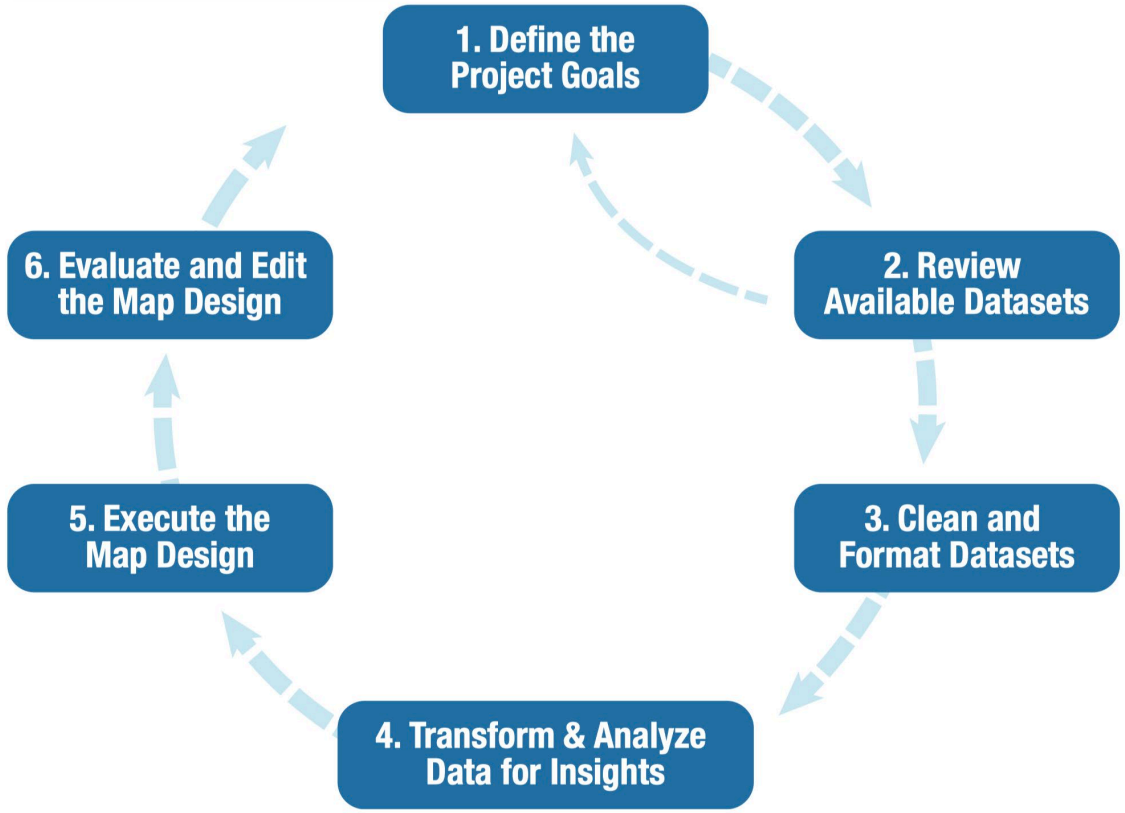
3 **Mapping**

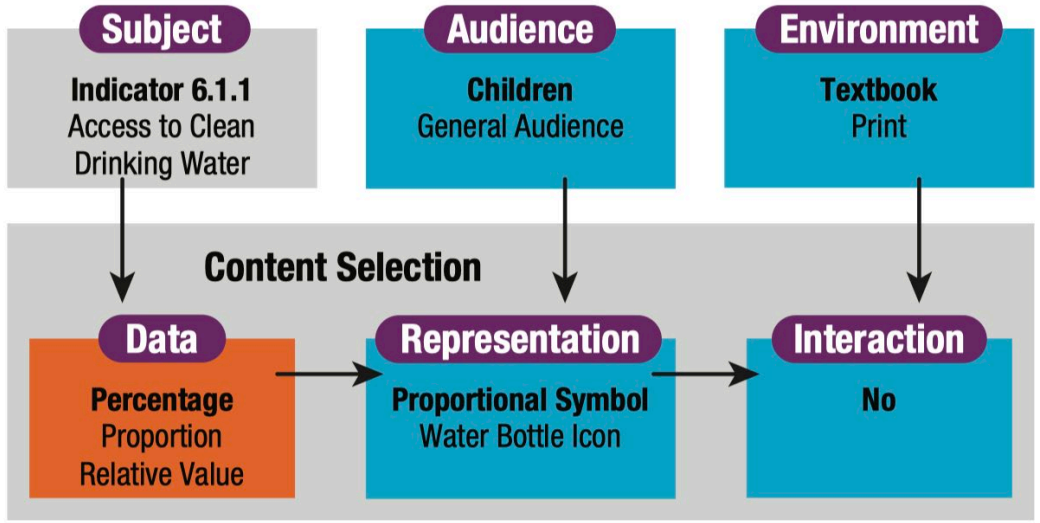


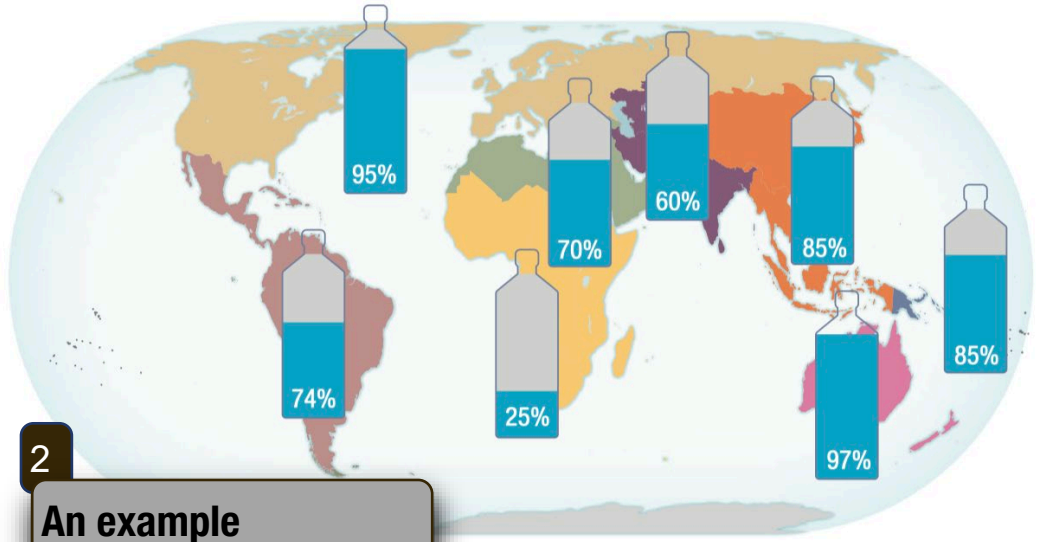
2. Map Design Considerations

1

The process



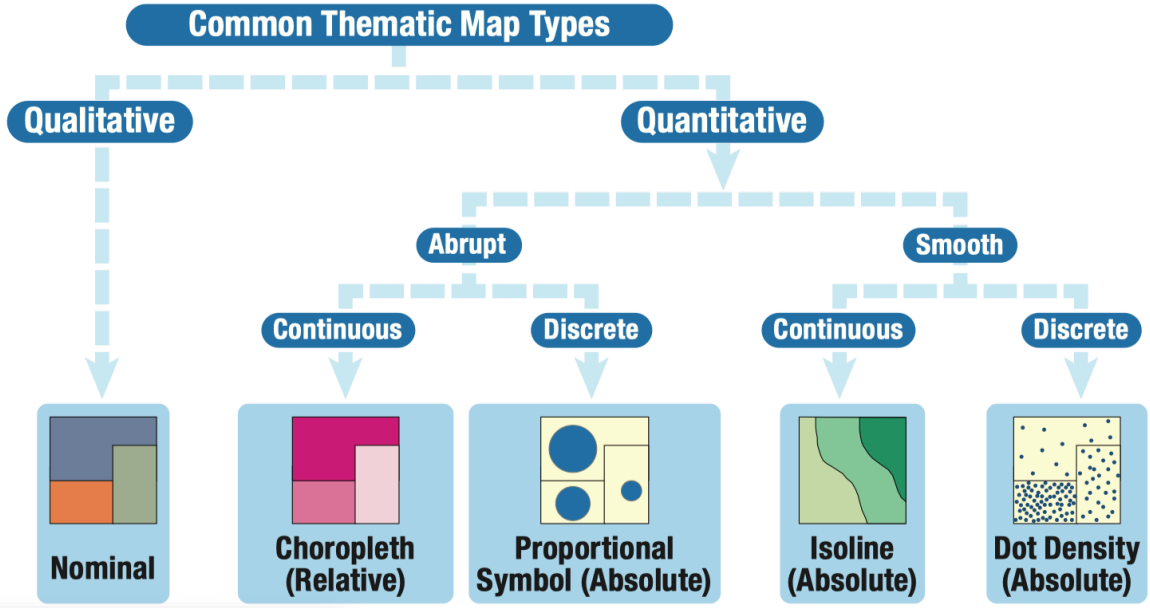




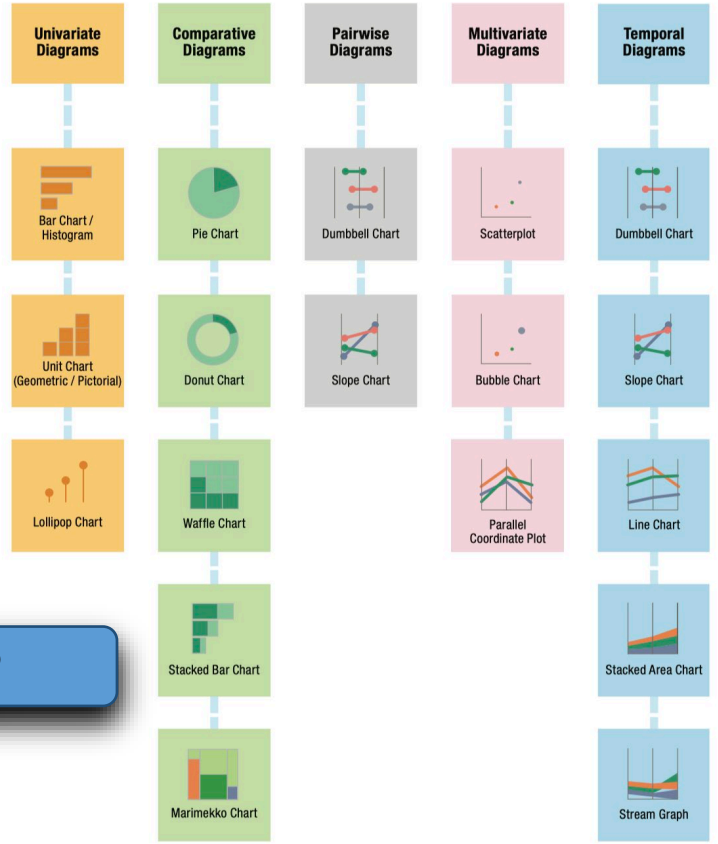
2

An example

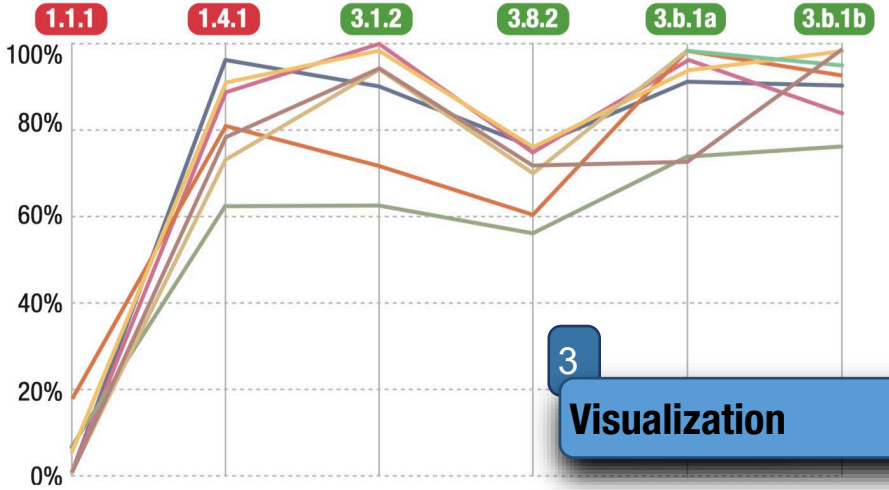
3. Maps & Diagrams



1 **Which map type?**

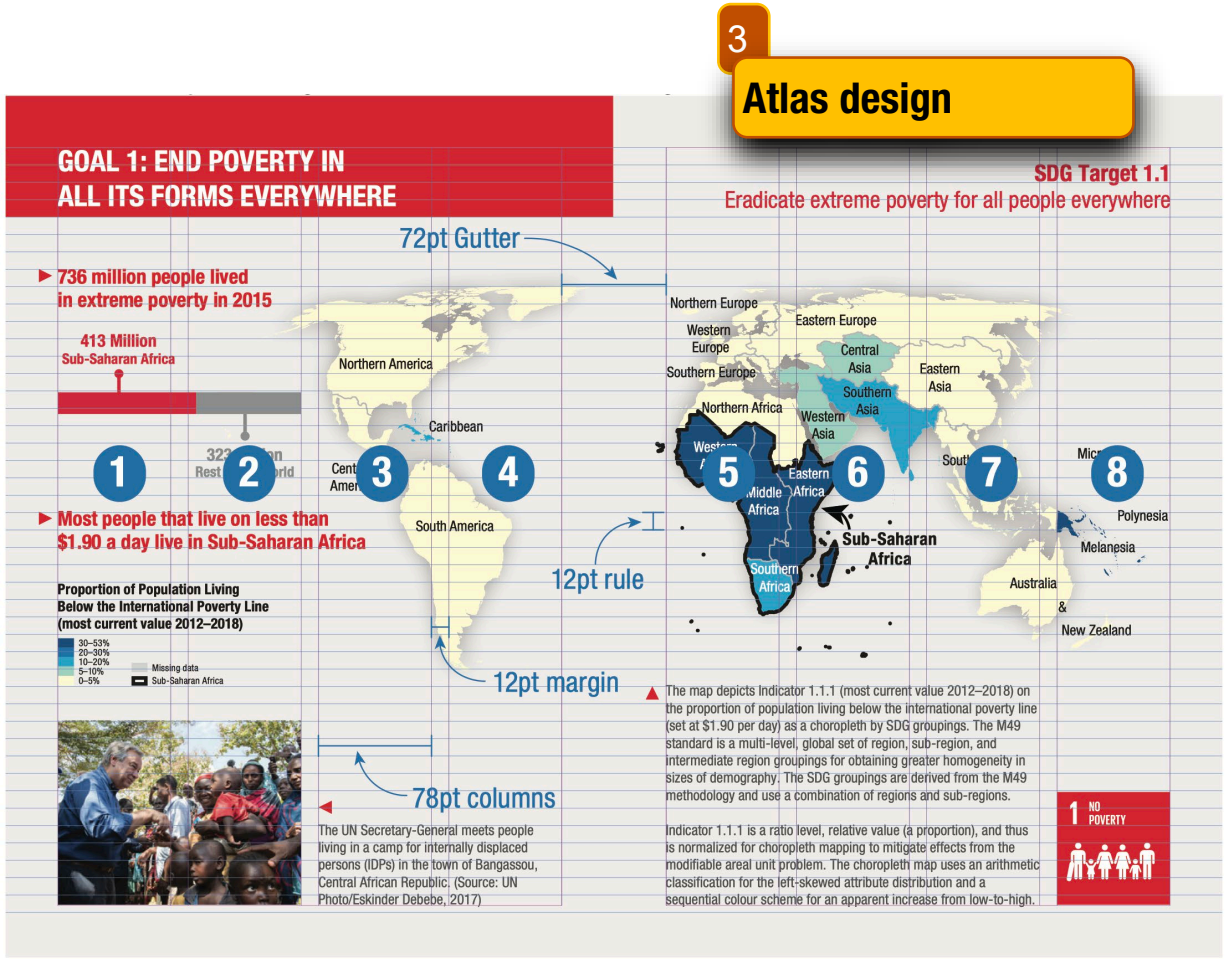


2 **Which diagram?**



3 **Visualization**

4. Map Use Environments



Concept

section
max 500 words

keyword
glossary

maps

atlas spread
78pt column
12pt margin
72pt gutter

diagrams

internal links

text
four columns

1.7 Data Transformation &

Data transformation describes the statistical conversion of an attribute, including a downgrade in level of measurement or normalization of absolute values into relative values (see Section 1.4). Data transformation is used to communicate a message in clearer statistical and visual ways. Data transformation also is useful for harmonizing multiple SDG indicators, allowing for their direct comparison in a bivariate map (see Section 3.7) or through a composite index. Figure 1.7-1 works through potential transformation options for enumerated, population-based attributes. Data transformation only is recommended downward in the flowchart: absolute values can be transformed into relative values, relative values (e.g., proportions, rates, indices) into ordinal or nominal values, and ordinal values into nominal values. Comparing a subset of the population to a count of the population results in a proportion (e.g., percentage of elderly). Comparing the same population attribute over time results in a change rate (e.g., percentage of increase or decrease). The combination of population and non-population attributes results in a per capita rate (e.g., hospitals per 100,000 inhabitants). Additionally, the combination of two non-population attributes results in other rates (e.g., number of cars per 100 km road). The combination of multiple attributes in a formula results in an index (e.g., gender inequality index based on health, empowerment, and labour-market

Each of the data transformation options in Figure 1.7-1 are acceptable ways

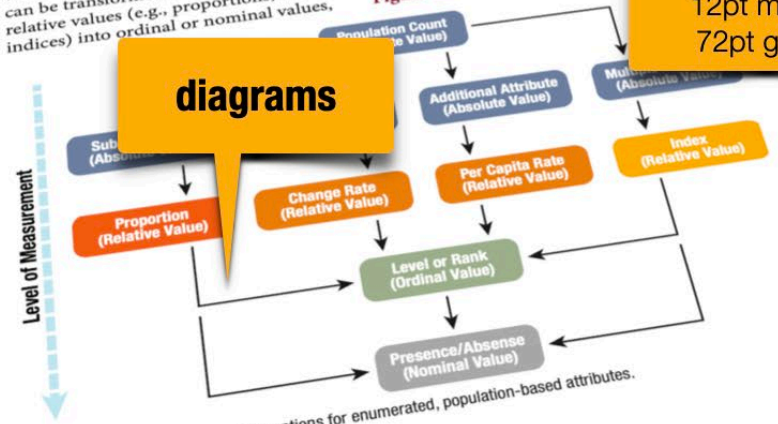


Figure 1.7-1: Data transformation options for enumerated, population-based attributes.

Figure 1.7-2: Data transformations for Indicator 9.1.2 (2015) on passenger rail volume. **Top-left:** Absolute values (passenger rail in km). **Top-right:** Normalized, relative values (passenger rail in km per the country's total km). **Bottom-right:** Ordinal values (rank relative to Norway). **Bottom-right:** Nominal values (presence or ab

normalize absolute values. However, simply downgrading an absolute ratio value to an ordinal or nominal value does not normalize the data for mapping, as a conversion to a relative value is first needed. Other methods of normalizing an attribute include calculating an internal (e.g., mean, median, mode) or external (e.g., percentage above/below overall average) summary value. Figure 1.7-2 shows the maps produced from transforming absolute ratio values to relative ratio, ordinal, and nominal values. As a result of the transformation, the recommended type switches from proportional to choropleth when converting solute to relative (as choropleth require normalized data), from a sequential colour scheme to a diverging one when converting from ratio to ordinal (given the focus on the centre of the ordinal scale), and from a diverging to a qualitative colour scheme when converting from ordinal to nominal (see Section 2.10).

2.7 Generalization

Generalization is the process of meaningfully removing detail from the map to support the map's purpose, audience, and use environment (see Section 2.1). Maps are useful not because they show all of reality in its entire complexity, but because they intentionally remove detail to make the subject as clear as possible. Generalization usually is applied when moving from larger to smaller cartographic scales (see Section 2.6), but also can be applied stylistically (see Section 2.14).

In digital mapping, generalization can be applied to the attribute, temporal, and, most commonly, location components of geospatial data. Some data sources already are generalized to multiple cartographic scales, such as the M49 hierarchy of enumeration units for reporting indicators.

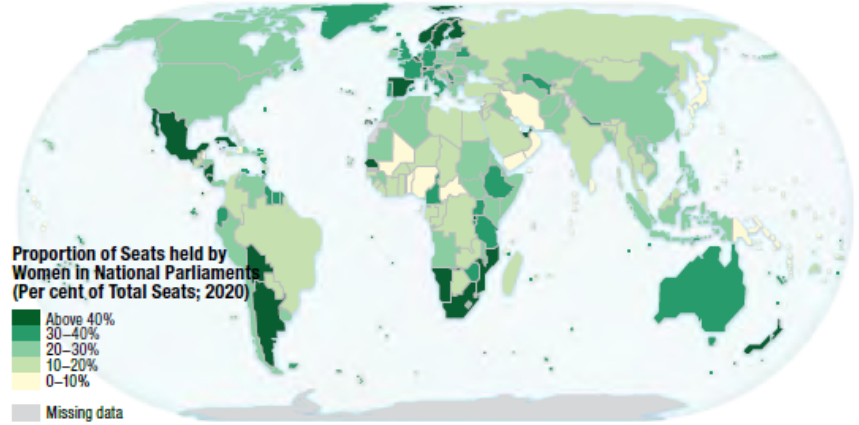
When geospatial datasets are not already generalized to the cartographic scale, ***generalization operators*** can be applied to the dataset to reduce complexity and maintain legibility for the resulting map design.

Selection is the first generalization operator to consider during map design. As introduced in Section 2.1, selection describes the retention or removal of different map feature types based on the map purpose, audience, and map use environment. With the possibility of interactive, online, and mobile maps, it can be helpful during project planning to organize content selection by the included datasets, appropriate representation techniques, and supported interactive functionality (see Figure 2.1-1).

Several generalization operators alter the vector geometry of the geospatial data used in the map (see Section 1.3). For instance, ***simplify*** reduces the number of nodes that constitute a feature, decreasing complexity in the geometry while losing absolute location accuracy deemed unnecessary for the given cartographic scale (Figure 2.7-1). Similarly, ***smooth*** removes small, often jagged variations in the nodes and arcs, using simple curves instead to improve the appearance of lines and polygon edges. ***Exaggerate*** amplifies a characteristic portion of a map feature when changing scale, such as exaggerating Cape Code in the United States or the Presqu'île de Crozon in France. ***Displace*** adjusts the location of a feature to avoid coalescence with adjacent features. Other operators that alter geometry by dimension include collapse, aggregate, and merge (see Section 2.8).

Resymbolize often is the final step in generalization and describes the visual styling of included map features (see Section 2.9). Symbolization can be as useful as other selection or geometry changes to maintain clarity in the map. Finally, ***enhance*** adds additional symbol embellishments around or within existing symbols to maintain relationships among symbols (Figure 2.7-2).

Figure 2.7-1: Simplification. Indicator 5.5.1 (2020) on the proportion of women in parliament is mapped in a simplified, angular basemap created by the United Nations to map the SDG indicators at a global scale.



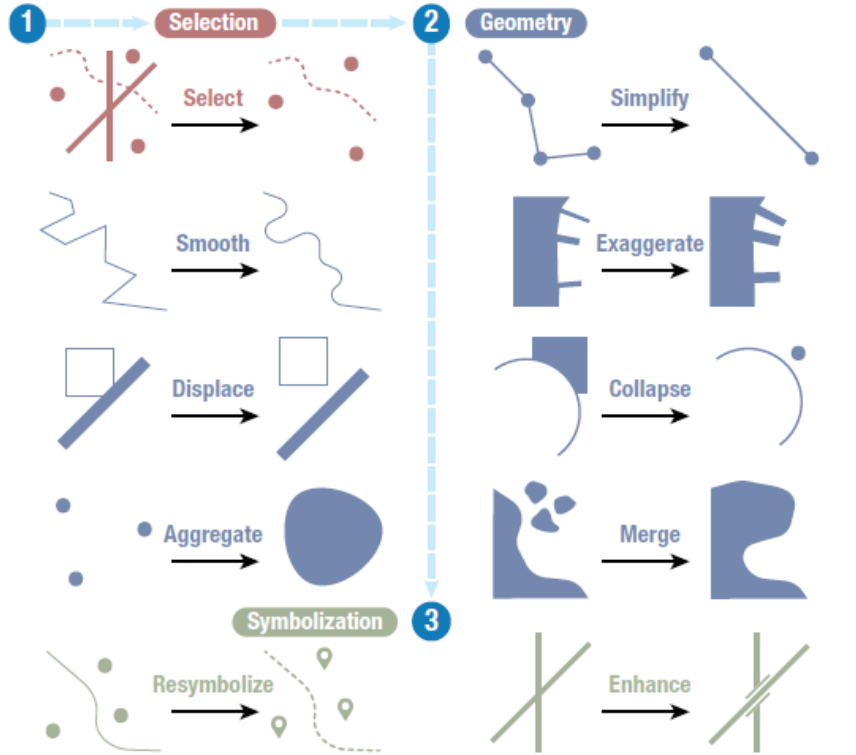


Figure 2.7-2: A typical generalization workflow. Generalization often begins with selection (1), shifts to geometry (2), and concludes with symbolization (3). In practice, generalization is highly iterative and may not include all operators.

4.11 Atlases

An ***atlas*** is an intentional sequence of maps, text, and other graphic elements depicting different dimensions of geographic phenomena and processes. Many atlases focus into a specific subject, such as a particular thematic domain (*who/what*), time period (*when*), or location (*where*) (see Section 2.1). Atlases serve a variety of purposes, including general reference or geographic education as well as awareness and outreach. An atlas's editorial board contributes to its authority, especially for national atlases.

Atlas design depends heavily on the presentation medium. Traditional atlases are published as printed books. Here, each map is arranged as a two-page layout for folded printing, called a ***spread***, with a vertical gap, or ***gutter***, in the centre to account for the book-fold (Figure 4.11-1). Projections should be centred so that the gutter slices the map in negative space (see Section 2.5), such as the ocean for a world map on land-based SDG indicators. The atlas spread also should be organized into a regular ***grid*** of columns and/or rows, such as the 8-column grid used in this smaller A5-size book or a 12-column grid for larger print publications and responsive design for mobile maps (see Section 4.6). Using a grid improves the layout and balance of maps, text, and negative space in more complex atlas spreads (see Section 2.13).

Figure 4.11-1: Traditional atlas spread. The 8-column grid used in this book is shown beneath the Section 1.3 two-page spread. Each column is 78pt with a 12pt margin, with a 72pt gutter expanding the Atlantic Ocean to account for the book-fold. Maps are designed as 2-, 3-, 4-, and 6-column figures, with text crossing 2-columns on a 12pt rule.

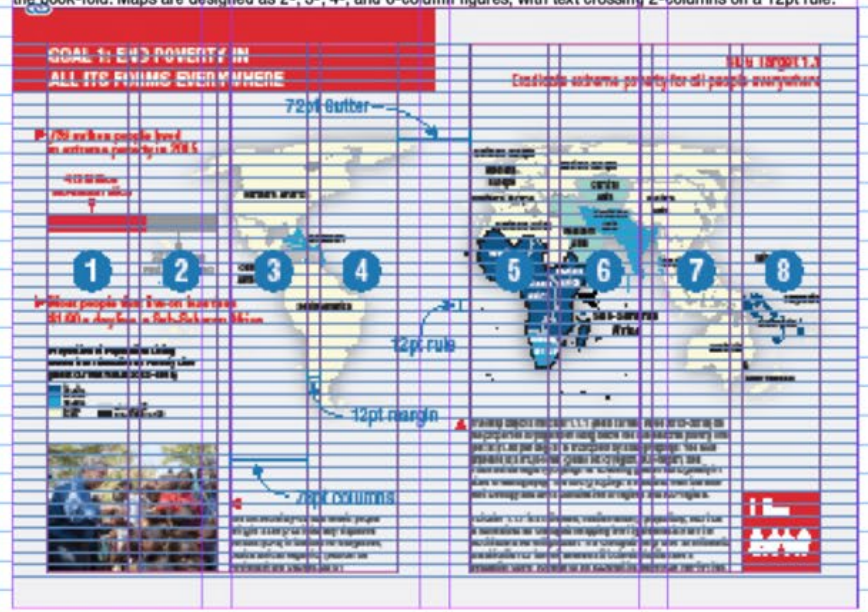


Figure 4.11-2: Interactive atlas. Like a traditional atlas, an interactive atlas organizes datasets and maps by themes, such as individual SDG indicators. The audience first selects an SDG (here, SDG 15, Life on Land) and then scrolls through a slideshow sequence of maps (here, the indicators that constitute SDG 15). Users can activate additional information about a specific indicator based on their interest. Because the atlas is interactive, users also can search for specific indicators or places as well as pan, zoom, retrieve details, and possibly perform additional operators.

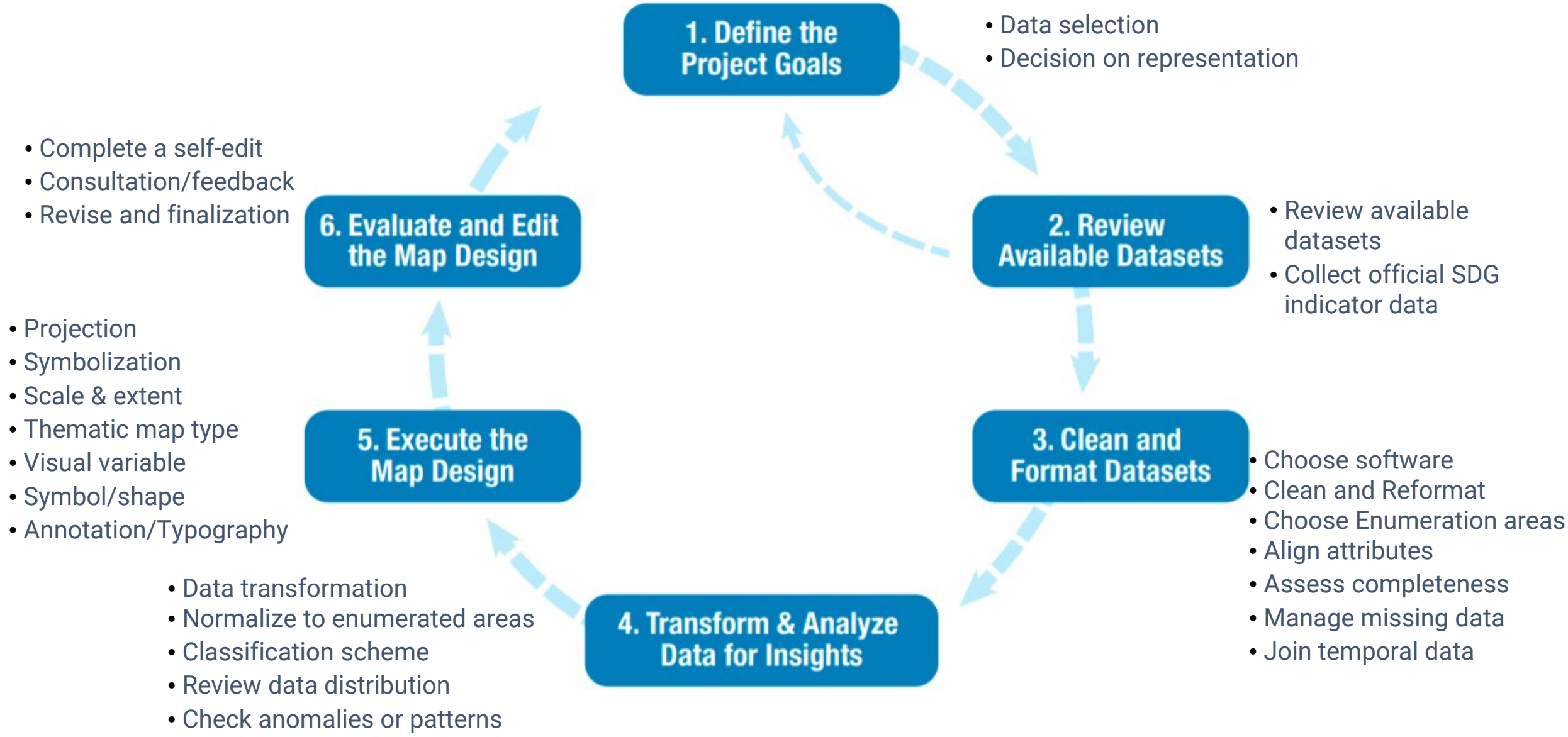
Digital atlases can take a number of alternative forms, such as a series of unique web pages hyperlinked from a table of contents or a set of map layers toggled onto the same central basemap. Digital atlases typically include interactivity, particularly the overlay, search, and sequence operators in addition to the more common pan, zoom, and retrieve operators (see Section 4.4). Digital atlases also can serve as the spatial catalogue to a rich array of multimedia about mapped topics, including text, photographs, animations, and videos.

The order of the atlas pages shapes the overall atlas narrative (see Section 4.7). A paper atlas has a fixed narrative, although users often browse pages out of this order. A digital atlas provides more opportunity for breaking from a pre-defined narrative path based on audience backgrounds and interests (see Section 4.1).

An interactive atlas of the SDGs is increasingly possible as more SDGs indicators attain Tier I status (Figure 4.11-2). The World Bank published an initial compendium on the SDGs using their world development indicators as proxies to the indicators. Creation of an atlas of the SDG indicators has many challenges, such as global distribution, multilingual translation, and regular updates. However, it could be a centerpiece for supporting local and national decision-making as well as public education and advocacy.

1

Mapping for the Goals

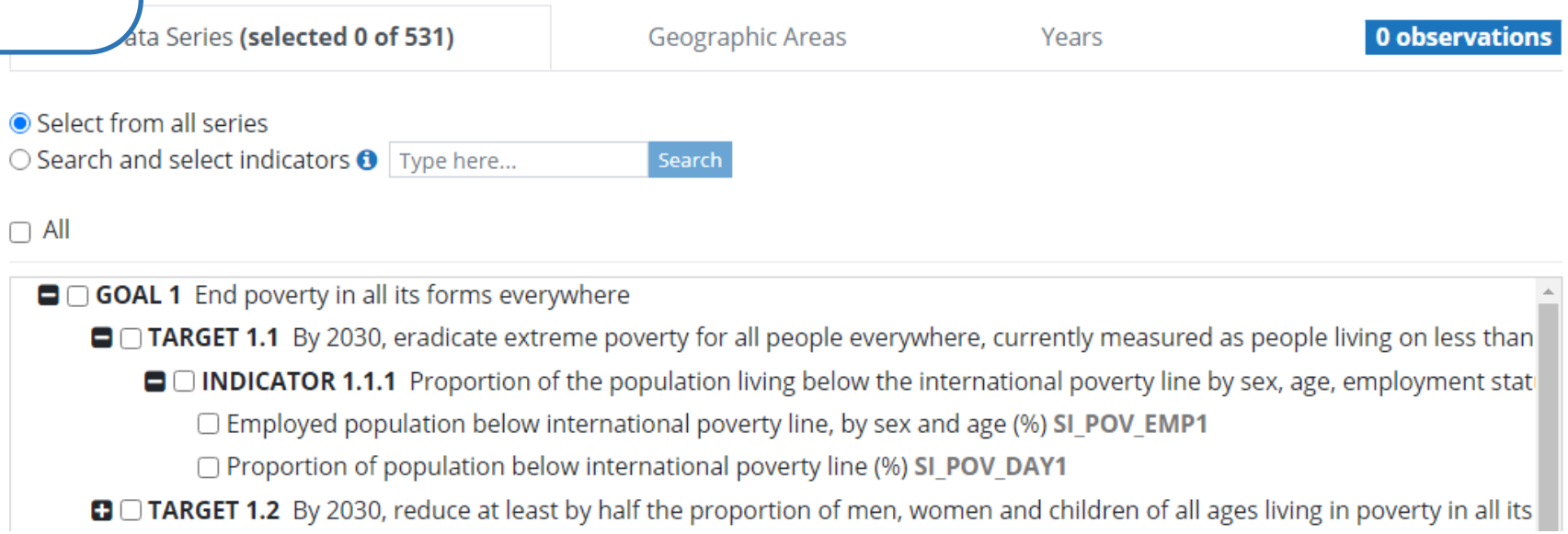


2

Statistical - SDG indicators

SDG indicators
United Nations Global SDG Database

https://unstats.un.org/sdgs/indicators/database/



SDG indicator data

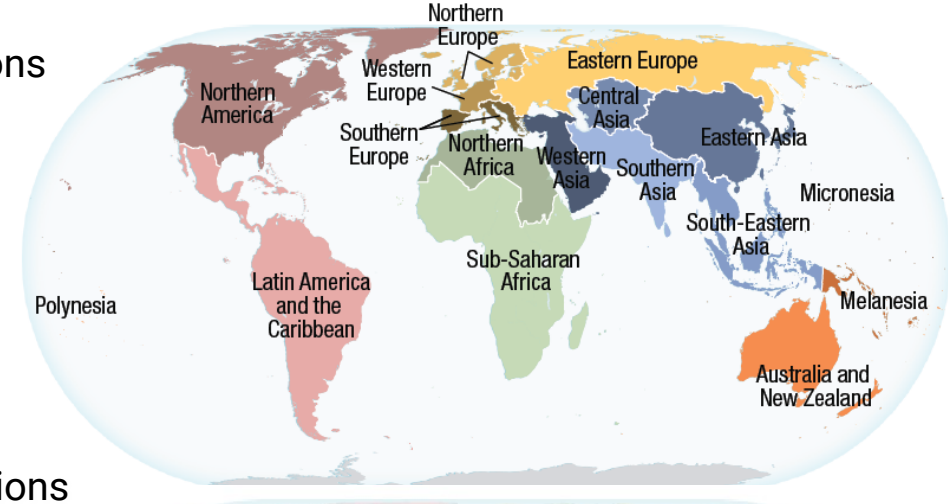
Goal	Target	Indicator	SeriesCode	SeriesDescription	GeoAre	GeoAreaName	Nature	Reporting Type	Units	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
1	1.1	1.1.1	SI_POV_DAY1	Proportion of population	2	Africa	G	G	PERCENT			47			43			41		39	38
1	1.1	1.1.1	SI_POV_DAY1	Proportion of population	8	Albania	G	G	PERCENT			2			1			0			
1	1.1	1.1.1	SI_POV_DAY1	Proportion of population	12	Algeria	G	G	PERCENT												1
1	1.1	1.1.1	SI_POV_DAY1	Proportion of population	19	Americas	G	G	PERCENT			8			7			5		4	4
1	1.1	1.1.1	SI_POV_DAY1	Proportion of population	24	Angola	G	G	PERCENT	32								30			
1	1.1	1.1.1	SI_POV_DAY1	Proportion of population	32	Argentina	G	G	PERCENT	6	9	14	7	5	4	3	3	3	3	2	1
1	1.1	1.1.1	SI_POV_DAY1	Proportion of population	51	Armenia	G	G	PERCENT		19	15	11	8	5	3	3	1	2	2	2
1	1.1	1.1.1	SI_POV_DAY1	Proportion of population	142	Asia	G	G	PERCENT			30			23			19		15	12
1	1.1	1.1.1	SI_POV_DAY1	Proportion of population	36	Australia	G	G	PERCENT		1		1	1				0		0	
1	1.1	1.1.1	SI_POV_DAY1	Proportion of population	53	Australia and New	G	G	PERCENT			1			1			0		0	0
1	1.1	1.1.1	SI_POV_DAY1	Proportion of population	40	Austria	G	G	PERCENT	0			0	0	0	0	0	1	1	1	0

3

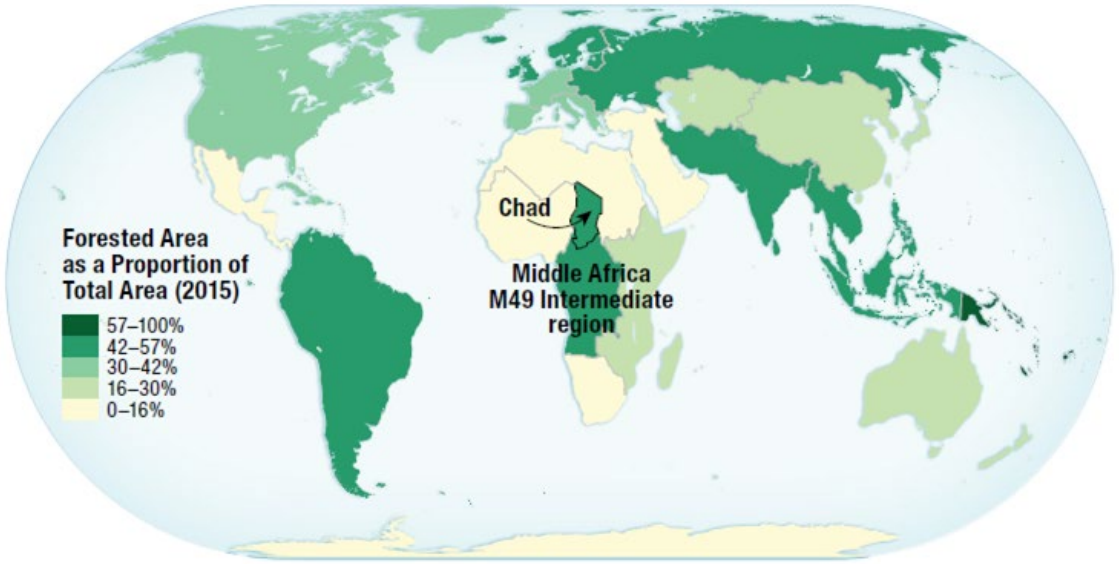
Enumeration areas

SDG groupings

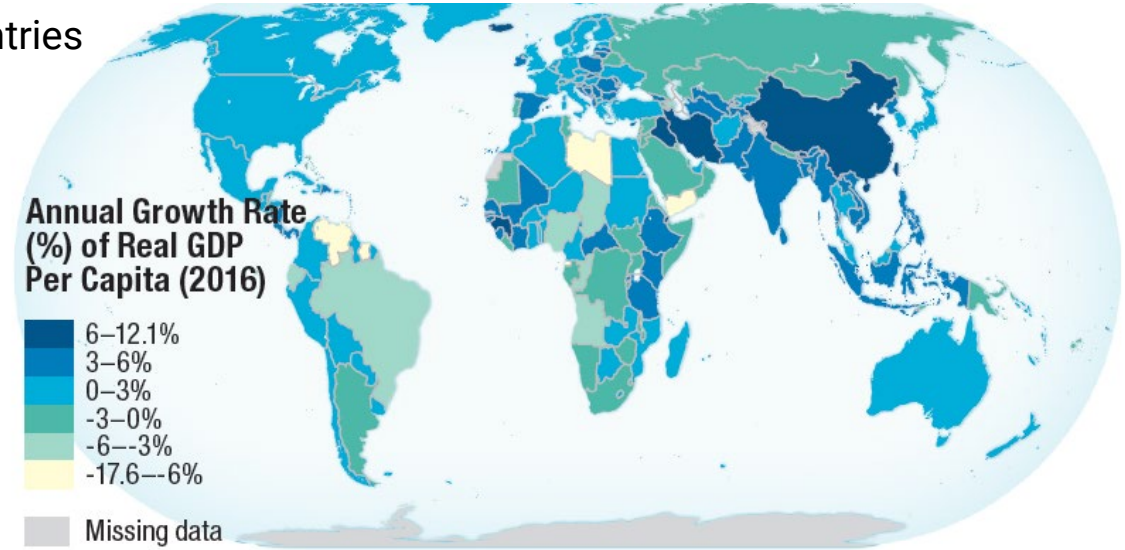
Sub-regions



Intermediary regions



Countries



4

Transform & Analyze stats/geo

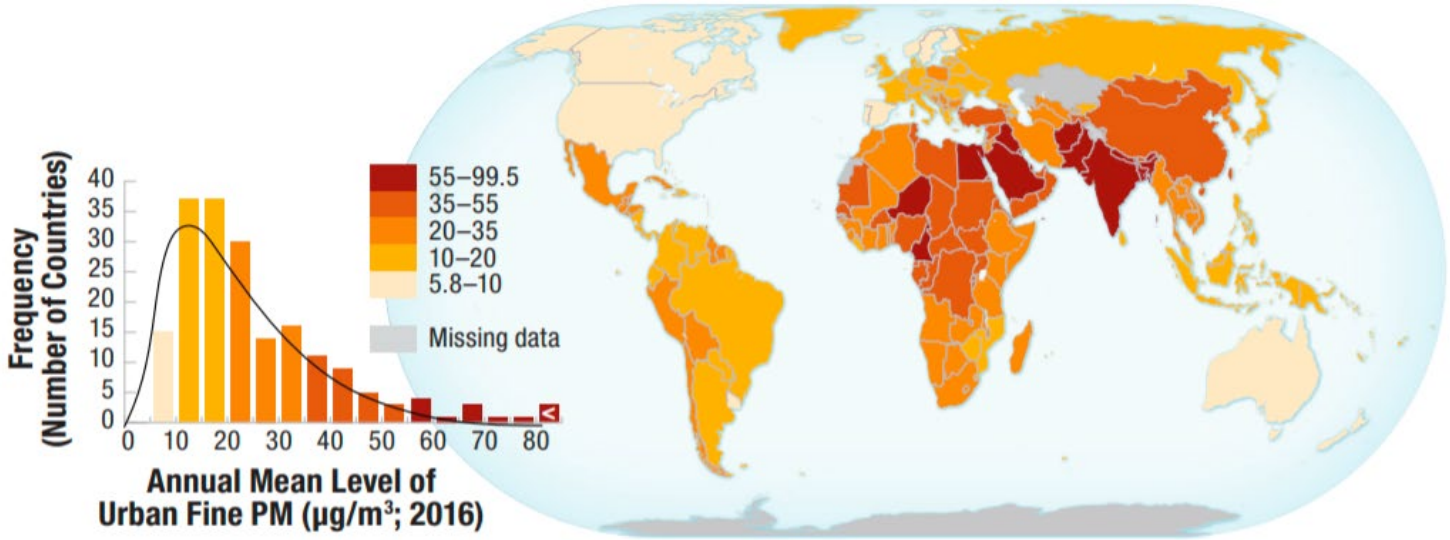


Figure 1.9-1: Data distributions and classification. **Left:** The histogram depicts the left-skewed attribute distribution for Indicator 11.6.2 (2016) on the annual mean levels of urban fine particulate matter. **Right:** The resulting arithmetic scheme increases distances between class breaks in a regular progression, here expanding each class width by 5 µg/m3 to provide more detail for features in the clustered side of the distribution rather than emphasizing outliers.

Statistical distribution analysis and classification

Geographic transformation

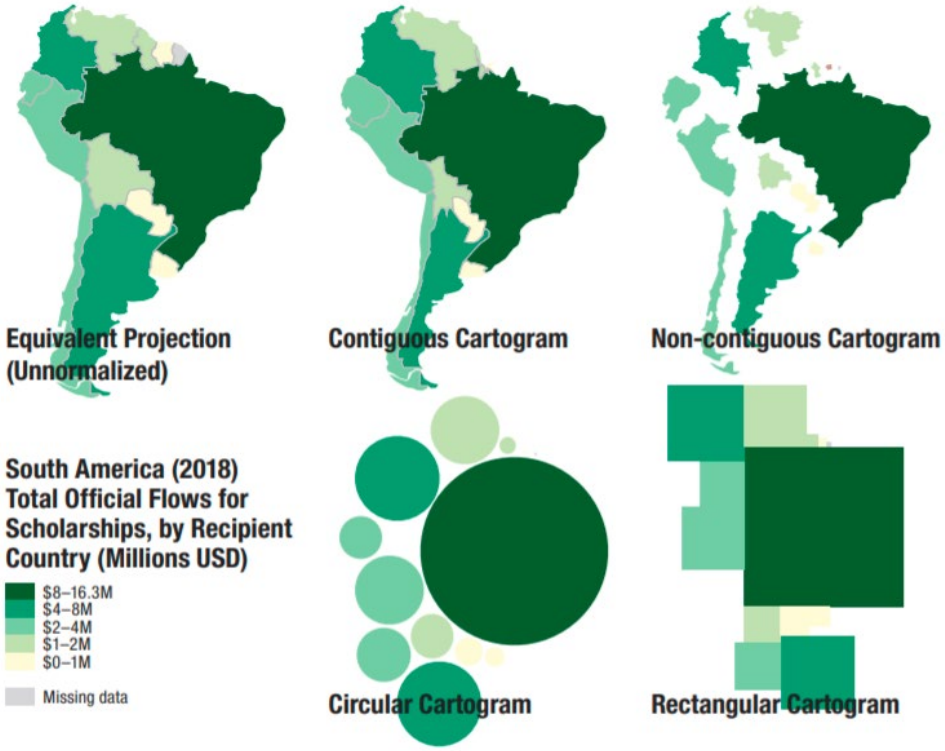


Figure 3-8.2: Types of cartograms. Indicator 4.b.1 (2018) on the total official flows for scholarships, by recipient country (Millions USD) is mapped for South American countries as a choropleth atop four different population-based cartograms. **Top-centre:** Contiguous. **Top-right:** Non-contiguous. **Bottom-left:** Circular. **Bottom-right:** Rectangular.

5

Execute integration and design

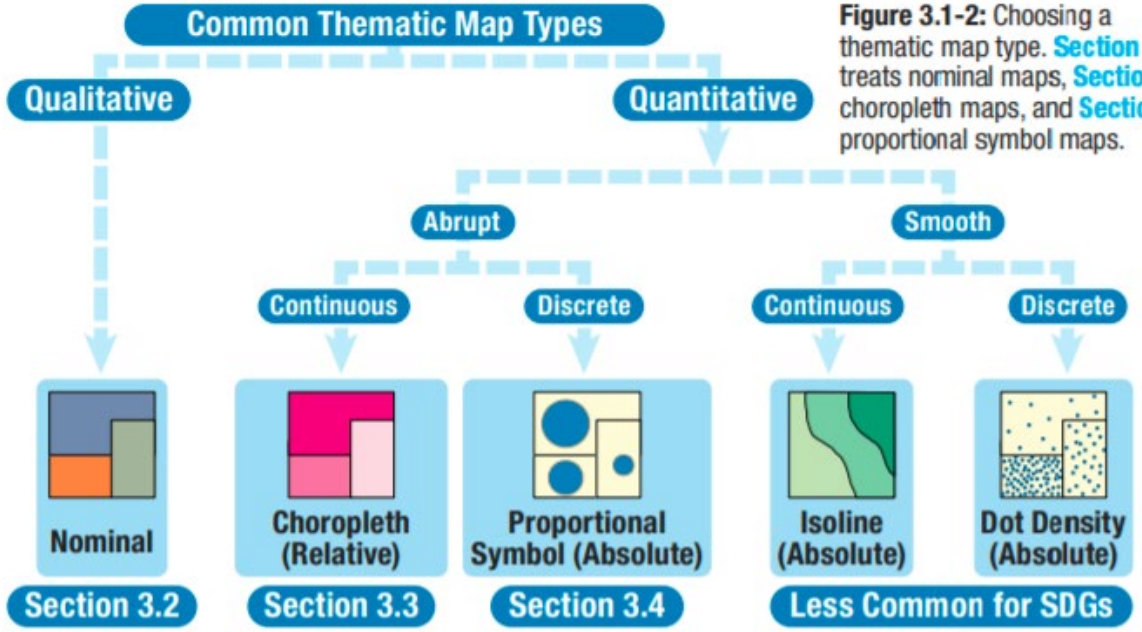


Figure 3.1-2: Choosing a thematic map type. Section 3.2 treats nominal maps, Section 3.3 choropleth maps, and Section 3.4 proportional symbol maps.

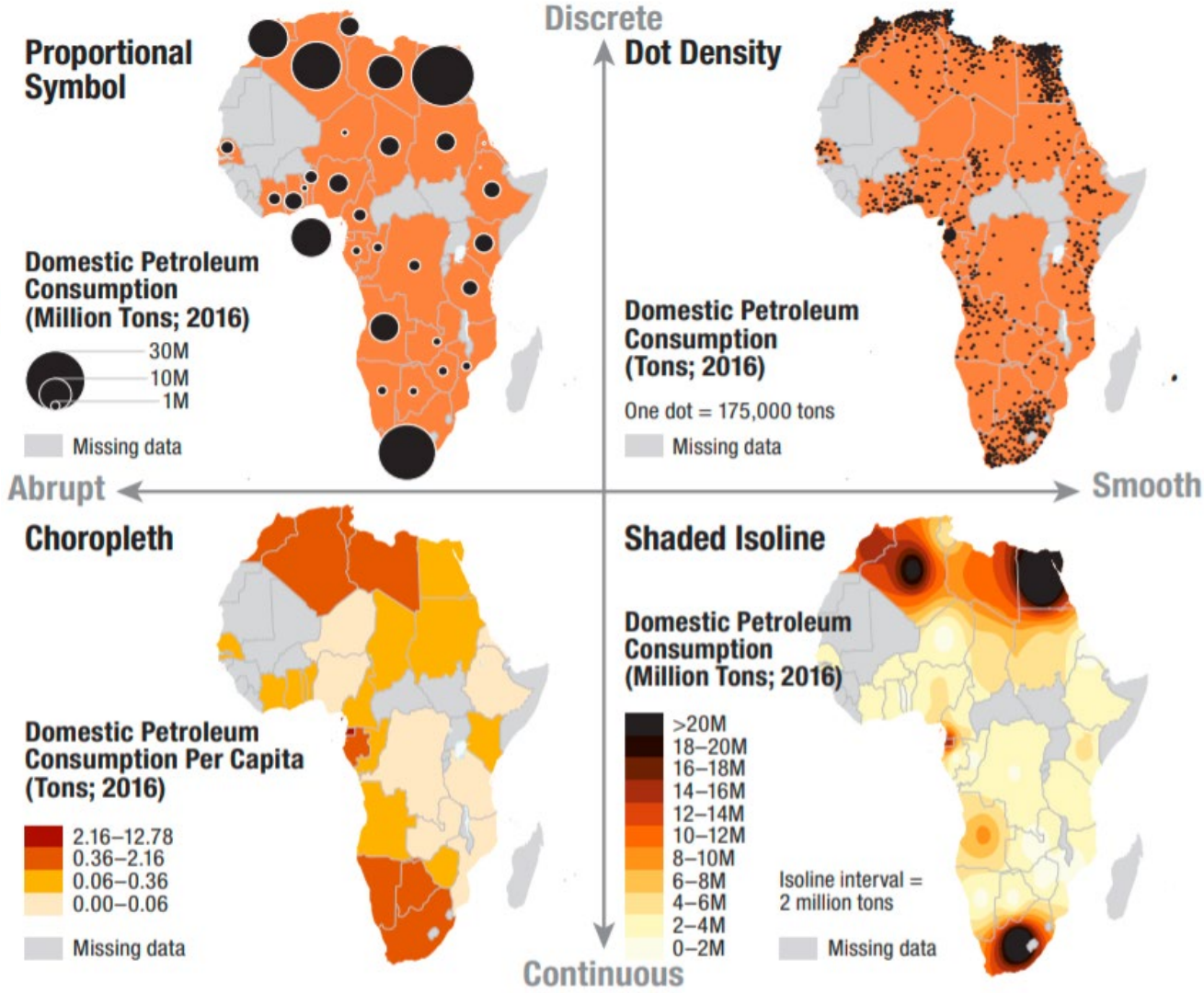


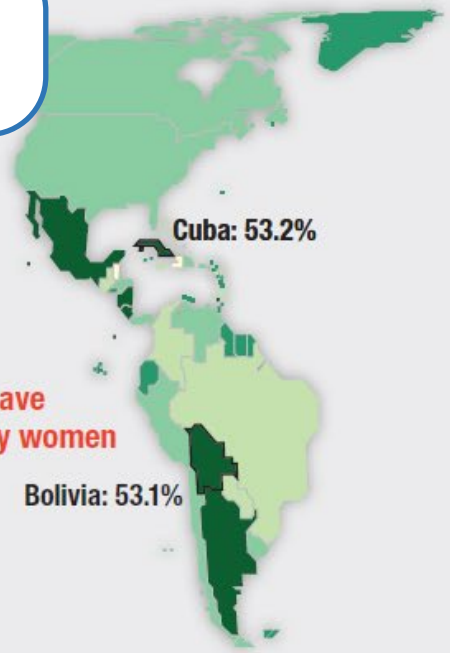
Figure 3.1-1: Thematic map types. The four maps depict Indicator 12.2.2 (2016) on domestic petroleum consumption. **Top-left:** Proportional Symbol. **Top-right:** Dot density. **Bottom-left:** Choropleth. **Bottom-right:** Shaded isoline.

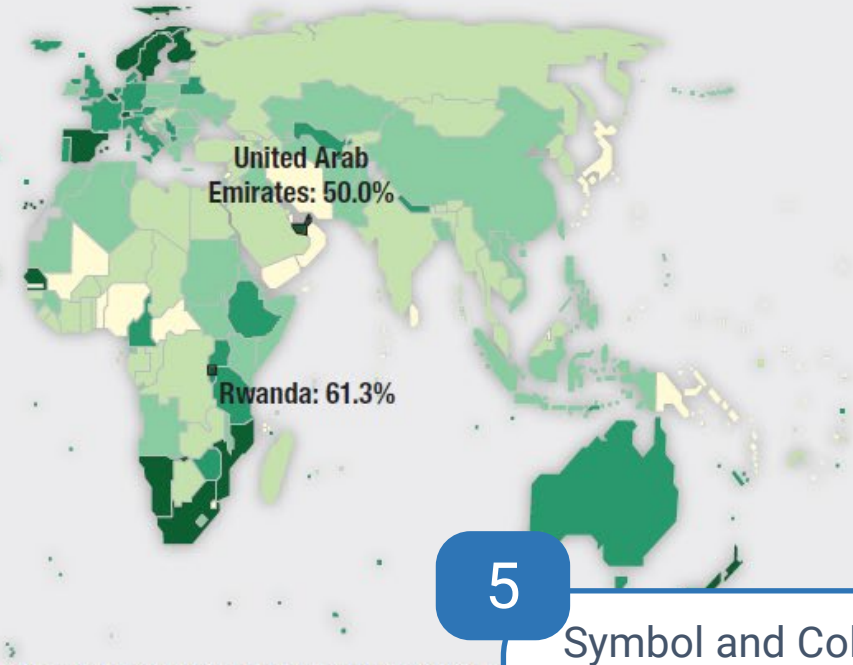
GOAL 5: ACHIEVE GENDER EQUALITY AND EMPOWER ALL WOMEN AND GIRLS

SDG Target 5.5

1 Mapping for the Goals
Publication
General public

2 Statistical - SDG indicators as:
Proportion of pop. living below poverty line (most current values)
UN Geodata





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

Proportion of Seats held by Women in National Parliaments (Per cent of Total Seats; 2020)

Above 40%
30–40%
20–30%
10–20%
0–10%
Missing data
50% or above

▲ The map depicts Indicator 5.5.1 (2020) on the proportio
held by women in national parliaments as a choropleth
re highly generalized
fying the message.
er nations. UN Women
Women in Politics."

ains projected in the Eckert IV equivalent projection used throughout the book, allowing for comparison of areas in the choropleth. The choro
an equal interval classification for the uniform attribu
sequential colour scheme that crosses yellow to g
but primarily relies on the ordered visual variable colou

3 Enumeration Areas as:
Sub- & intermediary regions

◀ Wide view of the opening
sixty-fourth session of th
the Status of Women (CS
adopted a political declarat
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)

4 Cloropleth
Classification schema
Review data distribution

5 Symbol and Color value
Scale and extent
Annotation and graphics

5 GENDER EQUALITY

6 Review

A5 layout: 148x210mm

GOAL 1: END POVERTY IN ALL ITS FORMS EVERYWHERE

SDG Target 1.1

Eradicate extreme poverty for all people everywhere

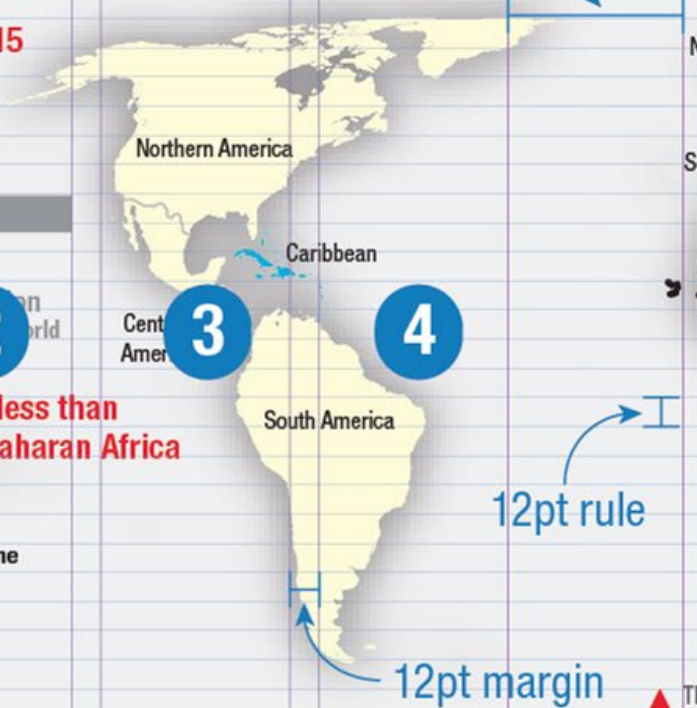
72pt Gutter

► 736 million people lived in extreme poverty in 2015

413 Million
Sub-Saharan Africa

1 2

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



12pt rule

12pt margin

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

30–53%
20–30%
10–20%
5–10%
0–5%
Missing data
Sub-Saharan Africa

Two-page Spread

78pt column

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)

The map depicts Indicator 1.1.1 (most current value 2012–2018) on the proportion of population living below the international poverty line (set at $1.90 per day) as a choropleth by SDG groupings. The M49 standard is a multi-level, global set of region, sub-region, and intermediate region groupings for obtaining greater homogeneity in sizes of demography. The SDG groupings are derived from the M49 methodology and use a combination of regions and sub-regions.

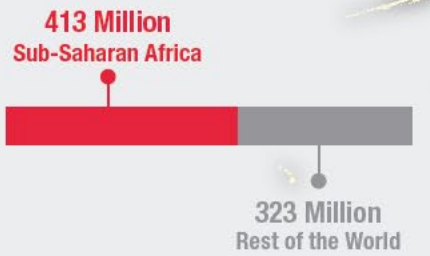
Indicator 1.1.1 is a ratio level, relative value (a proportion), and thus is normalized for choropleth mapping to mitigate effects from the modifiable areal unit problem. The choropleth map uses an arithmetic classification for the left-skewed attribute distribution and a sequential colour scheme for an apparent increase from low-to-high.

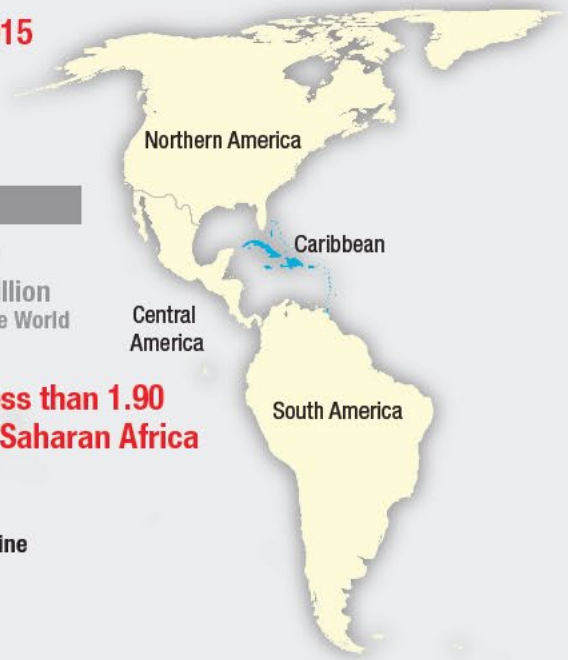
1 NO POVERTY

GOAL 1: END POVERTY IN ALL ITS FORMS EVERYWHERE

SDG Target 1.1
Eradicate extreme poverty for all people everywhere

► **736 million people lived in extreme poverty in 2015**





► **Most people that earn less than 1.90 USD per day live in Sub-Saharan Africa**

Proportion of Population Living Below the International Poverty Line (Most Current Value; 2012–2018)

30–53%
20–30%
10–20%
5–10%
0–5%
Missing data
Sub-Saharan Africa

◄ 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)

▲ The map depicts Indicator 1.1.1 (most current value for 2012–2018) on the proportion of population living below the international poverty line (set at 1.90 USD per day) as a choropleth by SDG groupings. The M49 standard is a multi-level, global set of region, sub-region, and intermediate region groupings for obtaining greater homogeneity in sizes of demography. The SDG groupings are derived from the M49 methodology and use a combination of regions and sub-regions.

Indicator 1.1.1 is a ratio level, relative value (a proportion) and, thus, is normalized for choropleth mapping to mitigate effects from the modifiable areal unit problem. The choropleth map uses an arithmetic classification for the left-skewed attribute distribution and a sequential colour scheme for an apparent increase from low to high.

United Nations | Geospatial

Create Your Own SDG Map!
Find our book on cartography online.

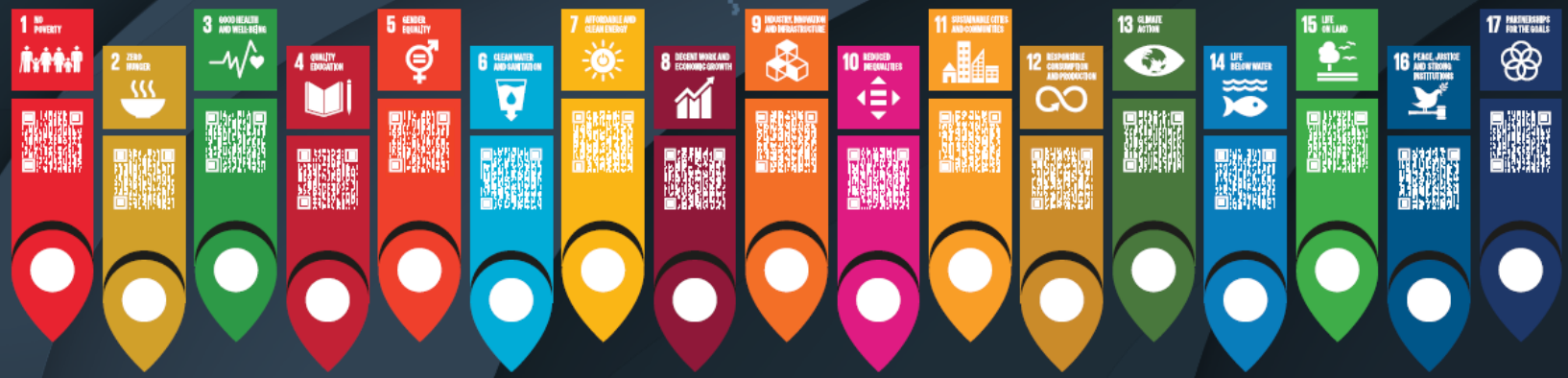
MAPPING 17 SUSTAINABLE DEVELOPMENT GOALS

A Showcase of the Power of Geospatial Data & Cartography

The **science** to analyze patterns and trends of our world

The **technology** to visualize the challenges of our time

The **art** to tell stories and advocate for our Goals



www.un.org/geospatial

Scan respective QR codes to look into the maps on each Sustainable Development Goals.

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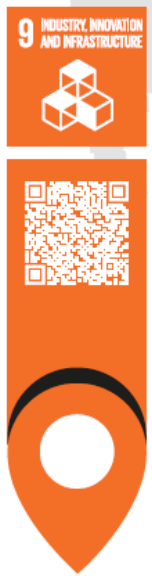
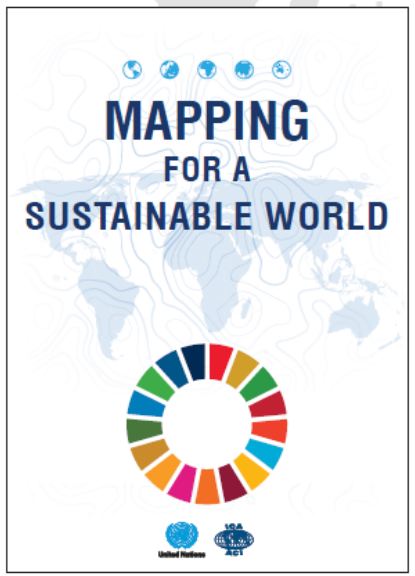
MAPPING 17 SUSTAINABLE DEVELOPMENT GOALS

A Showcase of the Power of Geospatial Data & Cartography

Scan respective **QR codes** to look into the maps on each of the Sustainable Development Goals





Create your own SDG map using our **our book online** on best practices and techniques in cartography

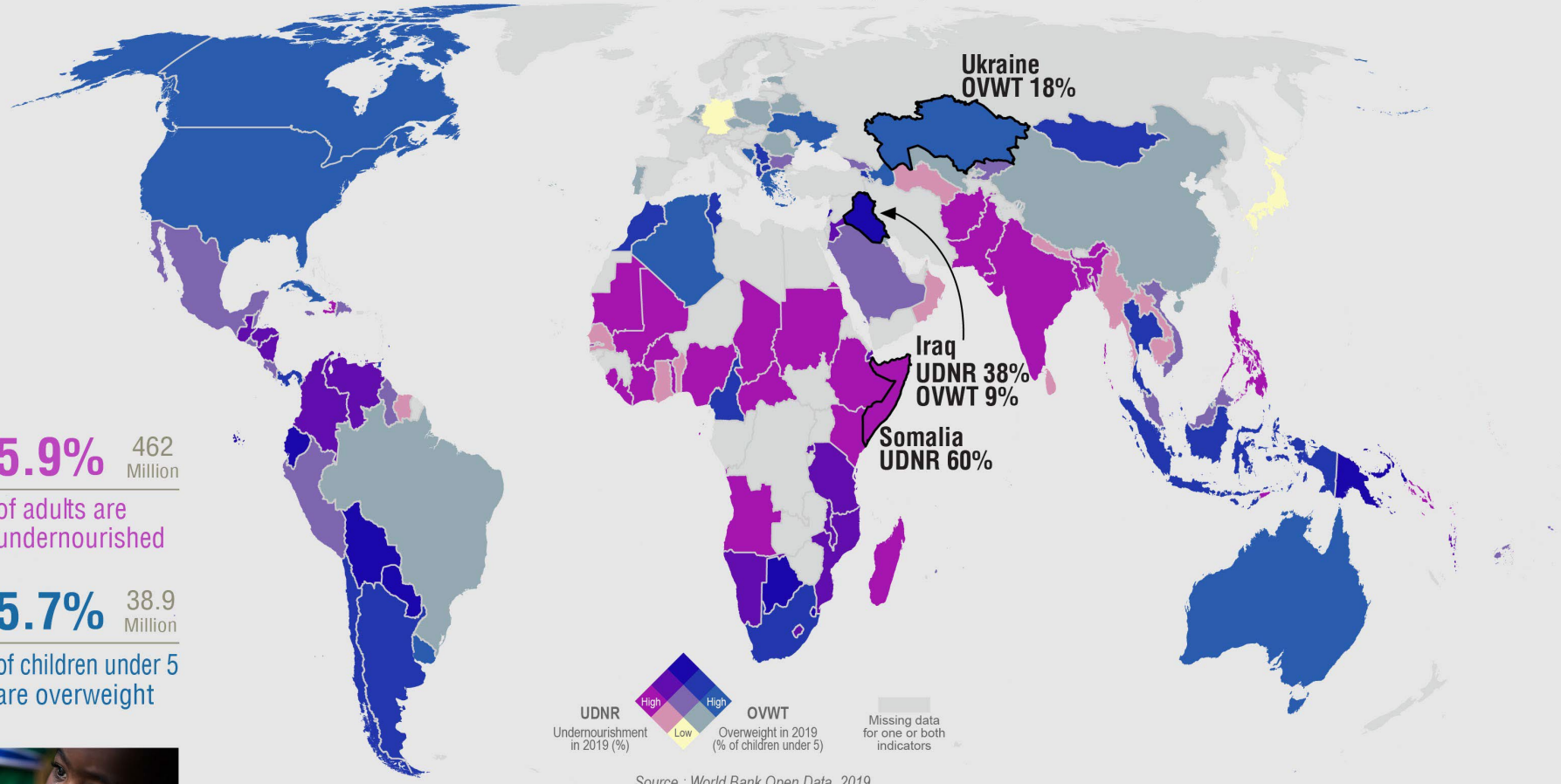
2 ZERO HUNGER

END HUNGER, ACHIEVE FOOD SECURITY AND IMPROVED NUTRITION

SUSTAINABLE DEVELOPMENT GOALS

By 2030, end all forms of malnutrition

Prevalence of undernourishment (%) and overweight (% of children under 5)



5.9% 462 Million
of adults are undernourished

5.7% 38.9 Million
of children under 5 are overweight

Source : World Bank Open Data, 2019

◀ A child eats at a camp for the internally displaced persons near Tawila, Darfur, where more than 8,000 women and children benefit from nutrition programmes.

UN Photo - Albert Gonzalez Farran, 2014

▲ Malnutrition refers to deficiencies, excesses or imbalances in a person's intake of energy and/or nutrients and SDG Target 2.2 aims to end all forms of malnutrition worldwide. The map combines two indicators from the World Bank Open Data on the prevalence of undernourishment (% of the population, in purple), and the prevalence of overweight (in % of children under 5, in blue) in 2019. This representation invites to consider the diverse forms and geographic distribution of malnutrition observed worldwide.

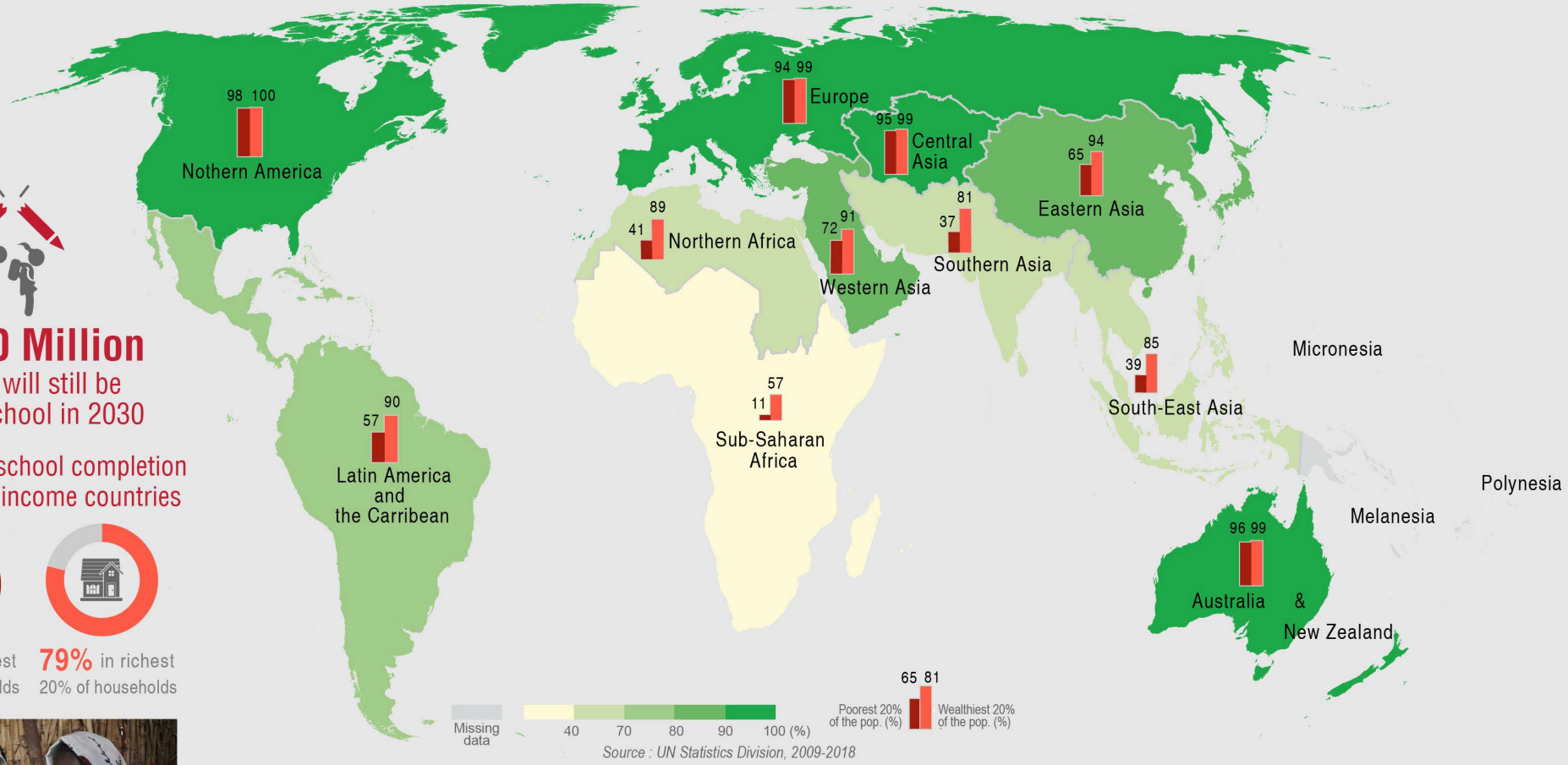
UNITED NATIONS Geospatial
Map No. 4635.02
Nov 2021

4 QUALITY EDUCATION — ENSURE INCLUSIVE AND EQUITABLE QUALITY EDUCATION FOR ALL

SUSTAINABLE DEVELOPMENT GOALS

By 2030, ensure quality education for all people everywhere

Completion rate of lower secondary educational level for decade 2009-2018 (%)



Source : UN Statistics Division, 2009-2018

Over **200 Million** children will still be out of school in 2030

Children's school completion rate in low-income countries

34% in poorest 20% of households

79% in richest 20% of households

◀ Children use their tablet and work with each other at the UNICEF supported Debate e-Learning Centre in a village on the outskirts of Kassala in Eastern Sudan.
UNICEF Photo - Noorani, 2020

▲ It is estimated that 101 million additional children and young people (from grades 1 to 8) fell below the minimum reading proficiency level in 2020 owing to the consequences of the pandemic, which wiped out the education gains achieved over the past 20 years. Just before the pandemic, 53 per cent of young people were completing secondary school globally, although the figure for sub-Saharan Africa was only 29 per cent. The map depicts indicator 4.1.2 (mean for decade 2009-2018) on the completion rate of lower secondary educational level by sub-regions.

UNITED NATIONS Geospatial
Map No. 4635.04
Nov 2021

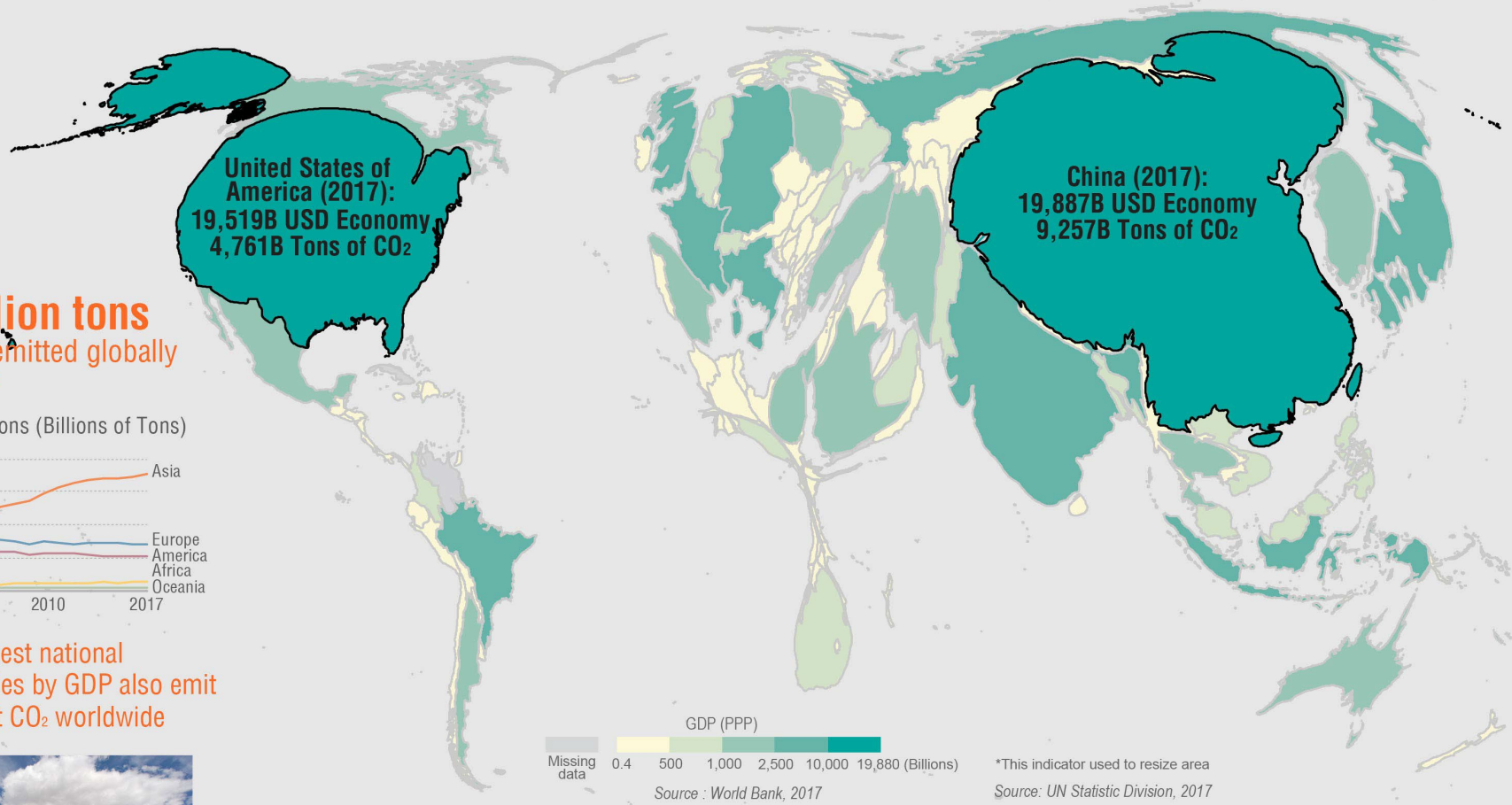
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

BUILD RESILIENT INFRASTRUCTURE, PROMOTE SUSTAINABLE INDUSTRIALIZATION, & FOSTER INNOVATION

SUSTAINABLE DEVELOPMENT GOALS

Upgrade infrastructure and retrofit industries to make them sustainable

CO_2 emissions from fuel combustion* and Gross Domestic Product Purchasing Power Parity (Billions of USD)



*This indicator used to resize area

Source: UN Statistic Division, 2017

Source : World Bank, 2017

32 Billion tons of CO_2 emitted globally in 2017

Two largest national economies by GDP also emit the most CO_2 worldwide

◀ Mongolian family uses solar panels, sponsored by the United Nations Development Fund, to generate power for their ger, a traditional Mongolian tent, in Tarialan in Mongolia.

UN Photo - Ekinder Debebe, 2009

▲ Estimates show the world is still heading toward a global temperature rise over 1.5°C by the end of the century despite commitments from countries to reduce CO_2 emissions. The cartogram, a type of map which has its geographic features altered based on a proportional value, shows total CO_2 emissions from fuel combustion by countries (indicator 9.4.1 of 2017). In addition, the colors represent the Gross Domestic Product Purchasing Power Parity. The cartogram reveals that the northern hemisphere has a disproportionate responsibility in reducing CO_2 emissions through sustainable infrastructure and industries.

UNITED NATIONS Geospatial
Map No. 4635.09
Nov 2021

13 CLIMATE ACTION

TAKE URGENT ACTION TO COMBAT CLIMATE CHANGE

SUSTAINABLE DEVELOPMENT GOALS

Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries

Number of people affected by disaster (number) and directly affected persons attributed to disasters per 100,000 population (number)

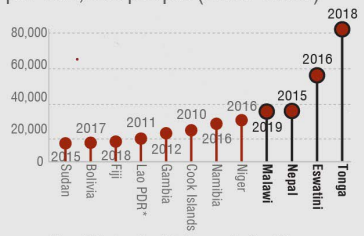
Climate change affected more than

39 million

people in 2018

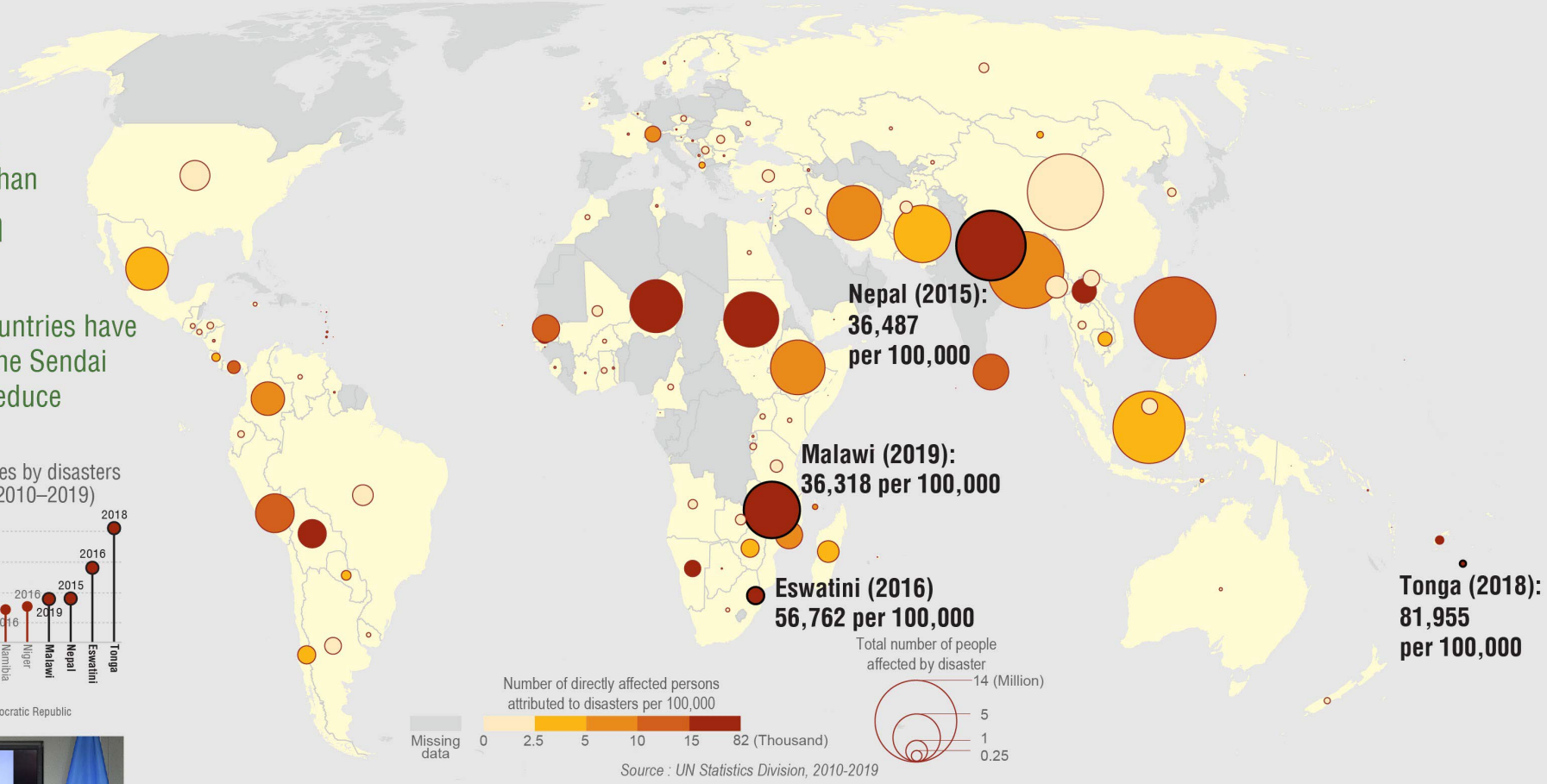
Only 85 countries have plans to meet the Sendai framework to reduce disaster risk

Most affected countries by disasters per 100,000 people (2010–2019)



* Lao PDR : Lao People's Democratic Republic

◀ Secretary-General of the World Meteorological Organization (WMO) briefs reporters on its State of the Climate 2019 Report. A world map of global temperature differences between 1981–2010 and 2019 is shown in the background. UN Photo - Manuel Elias, 2020



Source : UN Statistics Division, 2010-2019

▲ Climate change is affecting every country on every continent - weather patterns are changing, sea levels are rising, and weather events are becoming more extreme. Climate change affects everyone but developing countries and marginalized populations often shoulder a disproportionate burden from climate-related hazards such as severe weather, fires and flooding, and food and water scarcity. In recent years, indicator 13.1.1 (highest value between 2010–2019) shows that the top five countries of most affected persons attributed to disasters per 100,000 people include Tonga, Eswatini, Nepal, Malawi, and Niger.

UNITED NATIONS Geospatial
Map No. 4635.13
Nov 2021

14 LIFE BELOW WATER

CONSERVE AND SUSTAINABLY USE THE OCEANS, SEAS AND MARINE RESOURCES FOR SUSTAINABLE DEVELOPMENT

SUSTAINABLE DEVELOPMENT GOALS

By 2025, prevent and significantly reduce marine pollution of all kinds

8 Million tonnes
of **plastic** end up in oceans every year

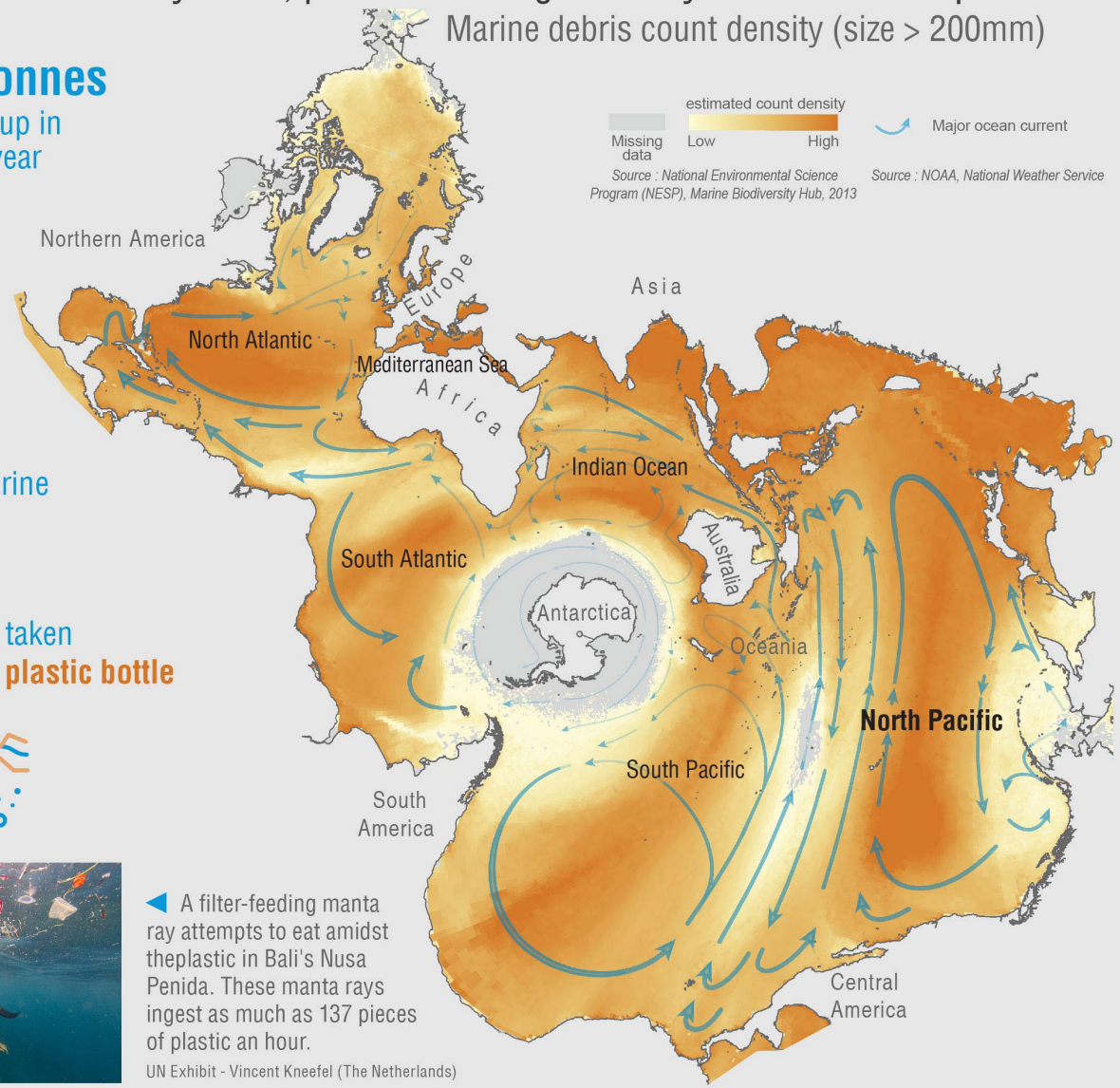
80% of all marine debris studied is **plastic**

450 years taken to disintegrate **plastic bottle**

◀ A filter-feeding manta ray attempts to eat amidst theplastic in Bali's Nusa Penida. These manta rays ingest as much as 137 pieces of plastic an hour.

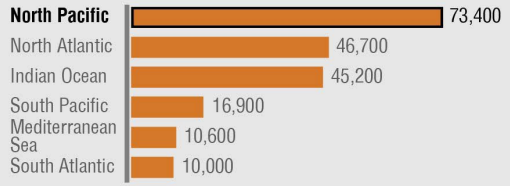
UN Exhibit - Vincent Kneefel (The Netherlands)

Marine debris count density (size > 200mm)



A total of **202,800 tonnes** of **plastic** pieces afloat at global ocean over 200mm surface

>200mm surface plastic mass by ocean basin in 2013 (Tonnes)



Source : Eriksen M, Lebreton LCM, Carson HS, Thiel M, Moore CJ, Borerro JC, et al. (2014) Plastic Pollution in the World's Oceans: More than 5 Trillion Plastic Pieces Weighing over 250,000 Tons Afloat at Sea. PLoS ONE 9(12): e111913. https://doi.org/10.1371/journal.pone.0111913

◀ The sustainability of our oceans is under sever threat as every year an estimated 5 to 12 million metric tons of plastic enter the ocean, costing roughly $13 billion per year – including clean-up costs and financial losses in fisheries and other industries. About 89% of plastic litter found on the ocean floor are single-use items like plastic bags. The estimated count density of marine debris bigger than 200mm shown on the map (2013) is based on an oceano-graphic model of floating debris by The National Environmental Science Program (NESP), Australia. Highest values can be observed close to the coastline as the main sources of marine plastics are land-based. The geospatial data on marine debris is shown using the Spilhaus projection which allows to show the ocean as a continuous body of water, and the main ocean currents represented as arrows are intended to emphasize the dynamic nature and movements that contribute to the concentration of the marine plastics in certain location.

UNITED NATIONS Geospatial
Map No. 4635.14
Nov 2021

KRAAK ROTH RICKER KAGAWA LE SOURD

MAPPING FOR A SUSTAINABLE WORLD

United Nations

ICA ACI