



**A Federated Information System for the SDGs**

United Nations Statistics Division



**CONTEXT**

# Multilevel SDG data reporting

- **National and subnational reporting** is the most significant level of the SDG review process
- The global SDG monitoring system **builds on national data reporting**
  - Data derived from **national sources** is the foundation for SDG reviews at all levels
  - It is crucial to create opportunities for countries to directly contribute to **global reporting**



# Decision by Statistical Commission

- At its 49<sup>th</sup> session in March 2018, the Statistical Commission welcomed the efforts to establish a federated system of national and global data hubs for the SDGs to:
  - facilitate **integration** of different data sources,
  - promote data **interoperability**
  - foster **collaboration** among partners from different stakeholder groups, including the geospatial community and other data providers,
  - improve data flows and **global reporting** of the SDGs.



# How does the Federated System work?

- It is a country-led “system of systems”
- Implemented through
  - Open standards and principles for data interoperability
  - Geospatial information systems (GIS) and data analytics capabilities
  - Web-based collaboration, communication and user engagement
- Supports NSOs in managing statistical and geospatial data, integrating new and innovative data sources with traditional ones
- Enables local/national decision makers to access, understand and use SDG data
- Empowers countries to directly contribute to global SDG reporting through innovative applications.



# Federated data governance model

- Based on the principle of national ownership,
- National Statistical Systems coordinate the implementation of a common set of global policies, standards and procedures around the production, dissemination and use of data to support the implementation of the 2030 Agenda, while addressing country-specific SDG data needs and priorities.
- Implementation of a multi-layered set of standards and procedures from local to national to global levels.



# Federated information systems architecture

- High-level conceptual and logical data models provide a consistent view of SDG-related data across countries and organizations.
- Common data models, data definitions and data flows allow for data interoperability and integration across multiple systems into a network of federated data hubs
  - Each hub independently publishes and shares authoritative data using a common schema, thus contributing to a global catalog of standardized open SDG data and information
  - Users can access the data they need while the traceability and accountability of the originating data sources is ensured.



# Interoperability and web-based collaboration

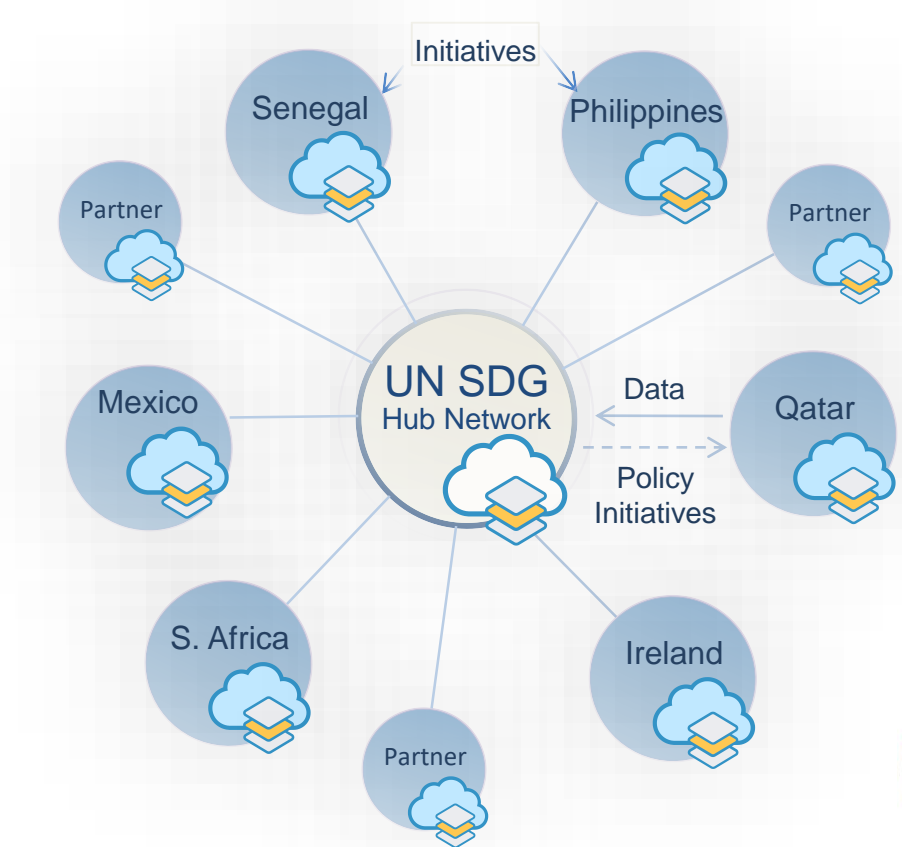
- The interface to each SDG data hub is based on **open standards** and the use of **common vocabularies** for describing and organizing data content.
- Web-based technology enables collaboration within and across organizations.
  - Anyone within and outside a data provider's organization can directly access data and applications made publicly available through the organization's open data hub
  - Users with proper credentials can access content shared with specific user groups.
  - Data providers document best practices and share them with other organizations providing a **collaborative environment for the entire SDG data life-cycle**





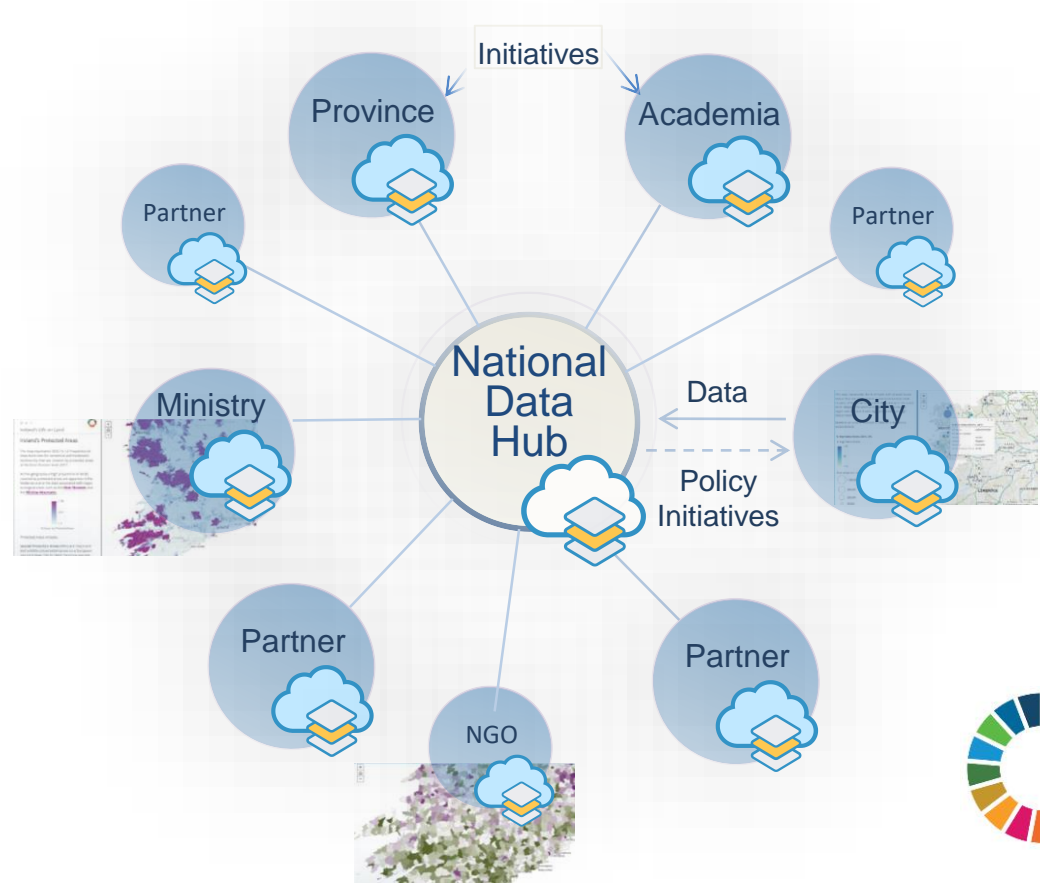
# UN SDG Data Hub

- Linked to a global network to share data, templates and common initiatives
- Enabled by Web GIS and open standards



# A network of national SDG Data Hubs

- Supporting national partnerships around data and policy initiatives
- Providing an inclusive and enabling environment for all stakeholders





Implementation

**GLOBAL UN SDG DATA HUB**



## Welcome to the Open SDG Data Hub

To fully implement and monitor progress on the Sustainable Development Goals, decision makers everywhere need data and statistics that are accurate, timely, sufficiently disaggregated, relevant, accessible and easy to use. The Open SDG Data Hub promotes the exploration, analysis, and use of authoritative SDG data sources for evidence-based decision-making and advocacy. Its goal is to enable data providers, managers and users to discover, understand, and communicate patterns and interrelationships in the wealth of SDG data and statistics that are now available.

# Initial setup

- Setup the technological platform
- Define an authoritative source of geometries that represent geographic location of each record in the data set.
- Define an authoritative source of statistical data and metadata on SDG indicators to be published.



# Preparation of datasets for publication

- Extract data for individual SDG indicators and join them with their corresponding geometries
  - The structure of the resulting datasets is designed to facilitate the representation of the data in maps (e.g., each row represents one geographic feature, and all areas are included, regardless of whether they have data or not)



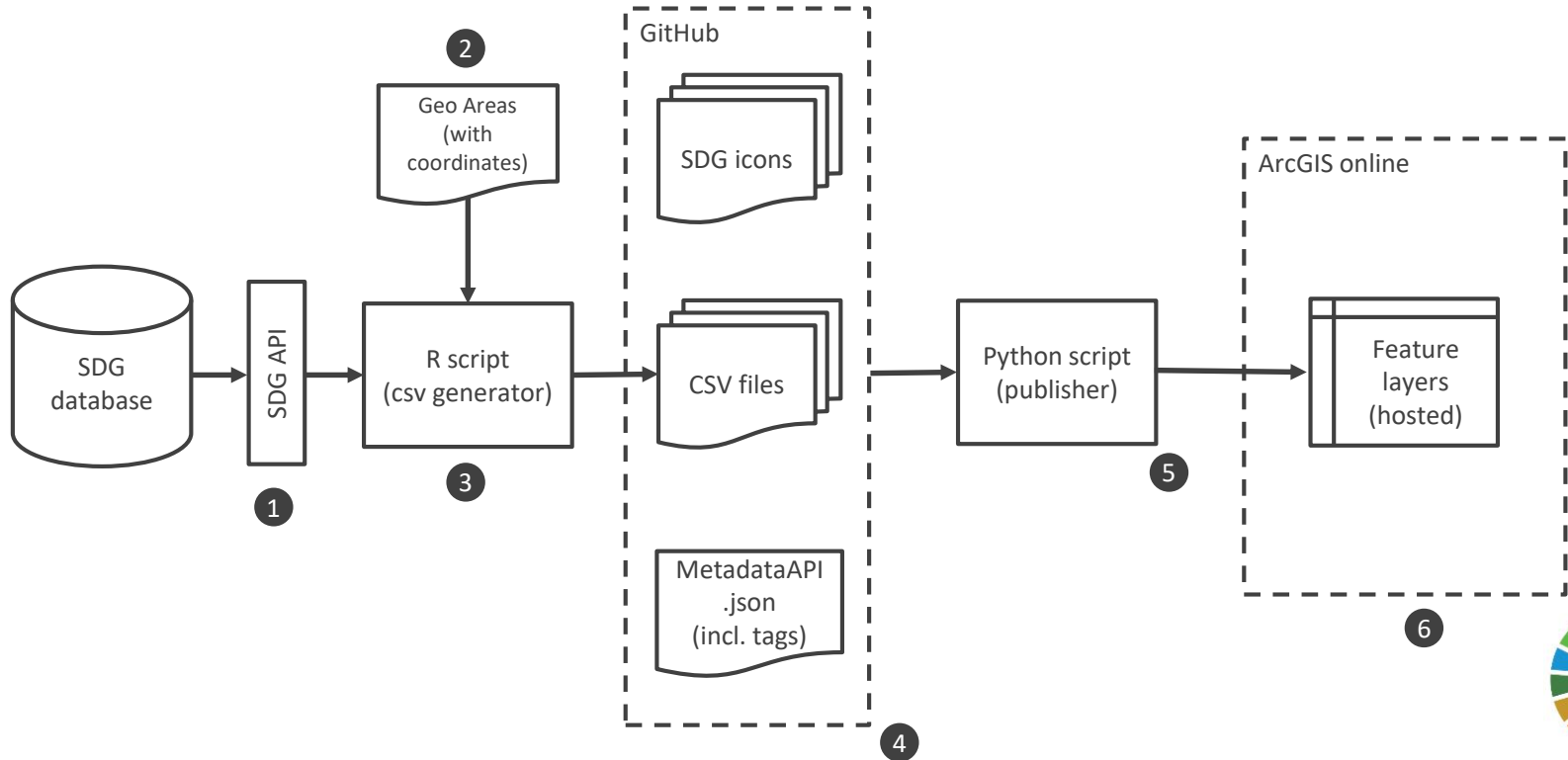
# Publication

- Collect information describing the nested structure and content of the global SDG indicator framework (code, title, and description of each node on the goal > target > indicator > series hierarchy)
- Collect the list of tags assigned to each series:
- Define renderer parameters for each item (i.e., data field to be mapped by default, color, max/min values, breaks, transparency, etc.)
- Upload each item as a data layer
- Share with open data sites, groups and applications



# Publication Process

<https://github.com/UNStats-SDGs/sdg-publisher>





# 1

# SDG API

SDGs API		https://unstats.un.org/SDGAPI/swagger/v1/swagger.json	UNSD API v1
<b>United Nations Statistics Division SDG API.</b> Welcome to the UNSD SDG API. In this API you will be able to explore the official SDG data reported by the custodian agencies.			
GeoArea <span>Show/Hide</span>   <span>List Operations</span>   <span>Expand Operations</span>			
GET	/v1/ndg/GeoArea/List	Returns a flat list with all the geographies: geoAreaCode is the MAG Code	
GET	/v1/ndg/GeoArea/Tree	Returns a tree of regions and countries	
GET	/v1/ndg/GeoArea/GeoAreaCode/List	Returns the list of Series available for that geoArea	
Goal <span>Show/Hide</span>   <span>List Operations</span>   <span>Expand Operations</span>			
GET	/v1/ndg/Goal/List	Returns the list of all Goals available	
GET	/v1/ndg/Goal/goalCode/Target/List	Returns the list of all Targets available for a Goal	
GET	/v1/ndg/Goal/Data	Returns a list of paginated observations	
GET	/v1/ndg/Goal/PivotData	Returns a list of paginated observations pivoted by year	
Indicator <span>Show/Hide</span>   <span>List Operations</span>   <span>Expand Operations</span>			
GET	/v1/ndg/Indicator/List	Returns the list of all Indicators available	
GET	/v1/ndg/Indicator/IndicatorCode/Series/List	Returns the list of all series for an indicator code	
GET	/v1/ndg/Indicator/Data	Returns a list of paginated observations	
GET	/v1/ndg/Indicator/PivotData	Returns a list of paginated observations pivoted by year	
Series <span>Show/Hide</span>   <span>List Operations</span>   <span>Expand Operations</span>			
GET	/v1/ndg/Series/List	Returns the list of all Series available	
GET	/v1/ndg/Series/SeriesCode/List	Returns the series information	
GET	/v1/ndg/Series/SeriesCode/GeoAreas	Returns a list of geographies that have values on that series	
GET	/v1/ndg/Series/SeriesCode/Dimensions	Returns a list of dimensions for a series	
GET	/v1/ndg/Series/SeriesCode/Attributes	Returns a list of attributes for a series	
GET	/v1/ndg/Series/SeriesCode/GeoArea/GeoAreaCode/DataSlice	Returns a timeseries for a specific geography (country / region)	
GET	/v1/ndg/Series/Data	Returns a list of paginated observations	
GET	/v1/ndg/Series/PivotData	Returns a list of paginated observations pivoted by year	
Target <span>Show/Hide</span>   <span>List Operations</span>   <span>Expand Operations</span>			
GET	/v1/ndg/Target/List	Returns the list of all Target available	
GET	/v1/ndg/Target/TargetCode/Indicator/List	Returns the list of all Indicators available for a Target	
GET	/v1/ndg/Target/Data	Returns a list of paginated observations	
GET	/v1/ndg/Target/PivotData	Returns a list of paginated observations pivoted by year	

<https://unstats.un.org/SDGAPI/swagger/>

GET /v1/sdg/Series/Data

- General info (size, pages)
- List of attributes (id, code lists)
- List of dimensions (id, code lists)
- Data records:
  - ✓ Goal, Target, Indicator
  - ✓ Series (code, description)
  - ✓ Geo Area (code, description)
  - ✓ Period
  - ✓ Value
  - ✓ Footnotes (time detail, source, other footnotes)
  - ✓ Attribute values
  - ✓ Dimension values

[https://unstats.un.org/SDGAPI/v1/sdg/Series/Data?seriesCode=AG\\_FPA\\_MILLET](https://unstats.un.org/SDGAPI/v1/sdg/Series/Data?seriesCode=AG_FPA_MILLET)



## 2

## Geo Areas

X	Y	OBJECTID	ISO3CD	geoAreaCode	geoAreaName
1	66.026882	33.8316020	2 AFG	4	Afghanistan
2	20.066609	41.1389701	6 ALB	8	Albania
3	21.475857	-80.4089766	13 ATA	10	Antarctica
4	2.678164	28.1594003	66 DZA	12	Algeria
5	-170.718727	-14.3058731	12 ASM	16	American Samoa
6	1.576257	42.5454861	7 AND	20	Andorra
7	17.578171	-12.3372475	3 AGO	24	Angola
8	-61.799976	17.0776147	15 ATG	28	Antigua and Barbuda
9	50.010647	40.3922954	19 AZE	31	Azerbaijan
10	-65.145633	-35.1944625	10 ARG	32	Argentina
11	134.349941	-25.5771720	17 AUS	36	Australia
12	14.141725	47.5870486	18 AUT	40	Austria
13	-78.051117	24.6954660	27 BHS	44	Bahamas
14	50.549075	26.0440775	26 BHR	48	Bahrain
15	89.176608	22.8696162	24 BGD	50	Bangladesh
16	44.938393	40.2949974	11 ARM	51	Armenia
17	-59.534649	13.1364827	35 BRB	52	Barbados
18	4.660976	50.6410498	21 BEL	56	Belgium
19	-64.781550	32.2788192	32 BMU	60	Bermuda
20	90.450985	27.3959857	37 BTN	64	Bhutan



3

# R script

Create “long” and “wide” views of a series data cube:

```
1 # countryListXV
2 library(jsonlite)
3 library(dplyr)
4 library(data.table)
5
6 setwd("C:/Users/L_GomezAndorales/Documents/REHub/F154506a/")
7
8
9
10 # -----
11 # # List of countries to be plotted on a map (with XY coordinates)
12 # -----
13
14 countryListXV <- as.data.frame(read.table("CountryListXV.txt",
15 header = TRUE,
16 sep = "\t",
17 quote = "\"",
18 as.is = TRUE,
19 stringsAsFactors = FALSE,
20 encoding = "UTF-8"))
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23 countryListXV[countryListXV$geoareaCode=="248", "geoareaname"] <- "Iceland Islands"
24 countryListXV[countryListXV$geoareaCode=="344", "geoareaname"] <- "Ile de l'Inoue"
25 countryListXV[countryListXV$geoareaCode=="311", "geoareaname"] <- "Curacao"
26 countryListXV[countryListXV$geoareaCode=="318", "geoareaname"] <- "Reunion"
27 countryListXV[countryListXV$geoareaCode=="652", "geoareaname"] <- "Saint Barthelmy"
28
29 # -----
30 # # List of all series available
31 # -----
32
33 seriesList <- as.data.table(fread("https://amstats.un.org/SOAP/VI/rdg/Series/List/allseriesIndex?][_c[&series_code"]_description"))
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Geographic Areas  
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unique dimension values (“slice”)

+ Values and attributes



# CSV file

geoAreaCode	X	Y	OBJECTID	ISO3CD	geoAreaName	years	sliceld	Age	Freq	Location	Sex	Units	Bounds	value	source	Nature
4	66.02688198	33.83160199	2	AFG	Afghanistan	2016	1	ALLAGE	ANNUAL	ALLAREA	BOTHSEX	INDEX	MP			
8	20.06660928	41.13897007	6	ALB	Albania	2016	1	ALLAGE	ANNUAL	ALLAREA	BOTHSEX	INDEX	MP			
10	21.47585697	-80.40897662	13	ATA	Antarctica	2016	1	ALLAGE	ANNUAL	ALLAREA	BOTHSEX	INDEX	MP			
12	2.678164227	28.15940032	66	DZA	Algeria	2016	1	ALLAGE	ANNUAL	ALLAREA	BOTHSEX	INDEX	MP			
16	-170.7187269	-14.30587306	12	ASM	American Samoa	2016	1	ALLAGE	ANNUAL	ALLAREA	BOTHSEX	INDEX	MP			
20	1.576257417	42.54548611	7	AND	Andorra	2016	1	ALLAGE	ANNUAL	ALLAREA	BOTHSEX	INDEX	MP			
24	17.57817062	-12.33724746	3	AGO	Angola	2016	1	ALLAGE	ANNUAL	ALLAREA	BOTHSEX	INDEX	MP			
28	-61.7999755	17.07761471	15	ATG	Antigua and Barbuda	2016	1	ALLAGE	ANNUAL	ALLAREA	BOTHSEX	INDEX	MP			
31	50.01064725	40.39229544	19	AZE	Azerbaijan	2016	1	ALLAGE	ANNUAL	ALLAREA	BOTHSEX	INDEX	MP			
32	-65.14563274	-35.19446255	10	ARG	Argentina	2016	1	ALLAGE	ANNUAL	ALLAREA	BOTHSEX	INDEX	MP	1.995815	FAO/GIEWS/FPMA-Tool	E
36	134.3499412	-25.57717202	17	AUS	Australia	2016	1	ALLAGE	ANNUAL	ALLAREA	BOTHSEX	INDEX	MP			
40	14.14172472	47.58704857	18	AUT	Austria	2016	1	ALLAGE	ANNUAL	ALLAREA	BOTHSEX	INDEX	MP			
44	-78.05111663	24.69546597	27	BHS	Bahamas	2016	1	ALLAGE	ANNUAL	ALLAREA	BOTHSEX	INDEX	MP			
48	50.5490754	26.04407747	26	BHR	Bahrain	2016	1	ALLAGE	ANNUAL	ALLAREA	BOTHSEX	INDEX	MP			
50	89.17660788	22.86961622	24	BGD	Bangladesh	2016	1	ALLAGE	ANNUAL	ALLAREA	BOTHSEX	INDEX	MP			
51	44.93839317	40.29499741	11	ARM	Armenia	2016	1	ALLAGE	ANNUAL	ALLAREA	BOTHSEX	INDEX	MP			
52	-59.5346489	13.13648273	35	BRB	Barbados	2016	1	ALLAGE	ANNUAL	ALLAREA	BOTHSEX	INDEX	MP			
56	4.660976456	50.64104975	21	BEL	Belgium	2016	1	ALLAGE	ANNUAL	ALLAREA	BOTHSEX	INDEX	MP			
60	-64.78155012	32.27881922	32	BMU	Bermuda	2016	1	ALLAGE	ANNUAL	ALLAREA	BOTHSEX	INDEX	MP			
64	90.45098484	27.39598568	37	BTN	Bhutan	2016	1	ALLAGE	ANNUAL	ALLAREA	BOTHSEX	INDEX	MP			
68	-64.66224284	-16.71273412	33	BOL	Bolivia (Plurinational State of)	2016	1	ALLAGE	ANNUAL	ALLAREA	BOTHSEX	INDEX	MP	1.2901458	FAO/GIEWS/FPMA-Tool	E
70	17.78584332	44.16845548	28	BIH	Bosnia and Herzegovina	2016	1	ALLAGE	ANNUAL	ALLAREA	BOTHSEX	INDEX	MP			
72	23.81380223	-22.18810073	39	BWA	Botswana	2016	1	ALLAGE	ANNUAL	ALLAREA	BOTHSEX	INDEX	MP			
74	3.410732868	-54.43295905	38	BVT	Bouvet Island	2016	1	ALLAGE	ANNUAL	ALLAREA	BOTHSEX	INDEX	MP			
76	-53.08432878	-10.77668561	34	BRA	Brazil	2016	1	ALLAGE	ANNUAL	ALLAREA	BOTHSEX	INDEX	MP	1.7999217	FAO/GIEWS/FPMA-Tool	E
84	-88.70199554	17.19965901	31	BLZ	Belize	2016	1	ALLAGE	ANNUAL	ALLAREA	BOTHSEX	INDEX	MP			
86	72.38715553	-7.299281071	107	IOT	British Indian Ocean Territory	2016	1	ALLAGE	ANNUAL	ALLAREA	BOTHSEX	INDEX	MP			
90	160.1584117	-9.622391719	204	SLB	Solomon Islands	2016	1	ALLAGE	ANNUAL	ALLAREA	BOTHSEX	INDEX	MP			
92	-64.63294223	18.42256578	254	VGB	British Virgin Islands	2016	1	ALLAGE	ANNUAL	ALLAREA	BOTHSEX	INDEX	MP			
96	114.6288563	4.49736984	36	BRN	Brunei Darussalam	2016	1	ALLAGE	ANNUAL	ALLAREA	BOTHSEX	INDEX	MP			
100	25.23763153	42.75731323	25	BGR	Bulgaria	2016	1	ALLAGE	ANNUAL	ALLAREA	BOTHSEX	INDEX	MP			
104	96.51752295	21.19332887	149	MMR	Myanmar	2016	1	ALLAGE	ANNUAL	ALLAREA	BOTHSEX	INDEX	MP			

