Office for National Statistics

Article

Using innovative methods to report against the Sustainable Development Goals

As part of the “Federated Information System for the Sustainable Development Goals" (FIS4SDGs) presented at the 49th Session of the UN Statistical Commission, the UN Statistics Division has launched an Open SDG Data Hub. ONS participated in an aspect of the project aimed at exploring new ways of producing and communicating geographical data.

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Correction

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A small error occurred in Proportion of the rural population living within two kilometres of an all-season road due to an error in the labelling for a small number of local authorities.

In addition, it was noted that the estimate for Northern Ireland should have read 99.67%. We have corrected this error. You can see all previous versions of this data on the previous versions page. We apologise for any inconvenience.

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1 . Introduction

The Sustainable Development Goals (SDGs) are a universal call to action to end poverty, tackle climate change and reduce inequalities world-wide by 2030. The golden thread of the SDGs agenda is the promise to leave no one behind. Without this commitment, history tells us that only pockets of our society will progress and often the poorest and most disadvantaged will fall further behind. To realise the 'leave no one behind' promise, we first need data that are timely, comprehensive and disaggregated – to better understand where these people are, their circumstances and how we can capture them in the data we collect.

The Office for National Statistics (ONS) is proud to have partnered with the Global Partnership for Sustainable Development Data (GPSDD) and its global network to reaffirm our commitment to improved and strengthened data disaggregation through the Inclusive Data Charter. Following an open public consultation last summer, a clear priority for our users was for more data disaggregated by geography.

2 . Collaboration

Office for National Statistics (ONS) and Ordnance Survey (OS) signed a Memorandum of Understanding (MoU) in February 2018. The MoU outlines a number of collaborative workstreams that form part of an ambitious partnership programme. As part of our partnership programme, this publication has been produced in partnership with OS.

3 . Focussing on Geography

To increase our focus on delivering geographical information we set up the "Geography Accelerator Project".

The project included:

- improving the geographic disaggregation of global Sustainable Development Goals (SDGs) indicators
- developing statistics for indicators 9.1.1 (Proportion of the rural population within 2km of an all-season road) and 11.3.1 (Rate of population growth rate versus land consumption rate), using geospatial data
- improving the mapping functionality for our National Reporting Platform (NRP)
- adding geocodes to data on the NRP, to ensure they are ready for mapping and geographical analysis

A research and learning exercise also arose as part of a UN Statistics Division initiative to develop an Open SDGs Data Hub. Office National Statistics participated in an aspect of the project aimed at exploring new ways of producing and communicating geographical data using Environmental Systems Research Institute (Esri) software, online tools and applications.

4 . Increasing geographical disaggregation

As geography was one of our priority disaggregation gaps, we have been sourcing more granular data to meet our user needs.

Back in March 2018, we reported that only two indicators held information on local authorities, now we report data for six indicators (including the experimental statistics outlined in this article) at this level. Most of these indicators were already reported on our platform at the headline level and we sourced additional data to report at a lower geographical level. For example, we've added new disaggregations for indicator 3.a.1 (Age-standardised prevalence of current tobacco use among persons aged 15 years and older).

In addition, we increased the number of indicators reported at a regional level from 15 to 25. A number of these indicators are newly-reported, such as indicator 16.b.1 (Proportion of population reporting having personally felt discriminated against or harassed in the previous 12 months on the ground of discrimination prohibited under international human rights law). For other indicators we have acquired additional breakdowns through a new project using data from the Labour Force Survey. We have developed new disaggregations including geography, ethnicity and disability for indicators mainly related to professions and the labour market. These disaggregations will be added to our National Reporting Platform shortly.

It is important to note that not all indicators can be disaggregated to local authority levels or below in this instance. This is because many of the statistics we report are based on survey data. Due to small sample sizes in local areas, data can become disclosive or unreliable. We will continue to work towards getting more local-level data reported on our National Reporting Platform where possible, using new sources and methods such as administrative data and Geographical Information Systems (GIS).

5 . Reporting geographical indicators against the SDGs

Our project aimed to fill some of our headline data gaps with the use of Geographical Information Systems (GIS). We worked together with the Environmental Systems Research Institute (Esri) and Ordnance Survey (OS) to develop methodologies to measure these indicators. We produced data for these indicators using both Arc GIS Pro and Arc Map software – both of which were provided to us by Esri UK. OS used an open source programme called PostGIS to run the analysis.

9.1.1: Proportion of the rural population that is living within two kilometres of an all-season road

Goal 9 is focused on building resilient infrastructure, promoting inclusive and sustainable industrialisation and fostering innovation. Target 9.1. aims to develop quality and reliable infrastructure, which is needed to support economic development and human well-being, with a focus on affordable and equal access for everyone.

The UN provides metadata for most indicators prescribing how they should be measured with definitions of concepts. Indicator 9.1.1 (Proportion of the rural population living within two kilometres of an all-season road) is a tier 3 indicator[1] and at the time of this report, no metadata were available. We had discussions with statisticians at the National Administrative Departments of Statistics (DANE), in Colombia, who had already been working on this indicator using Geographical Information Systems (GIS) and Earth Observation, to understand their methodology for reporting this indicator and determine if their methodology was applicable to the UK.

As the UN does not provide a definition for “all-season roads” and the UK’s climate is moderate, we assessed that most public roads are accessible in all seasons. We used OS Master Map Integrated Transport Network (ITN) Layer, produced by OS as a basis for our calculations together with a population grid based on the 2011 Census, and the Office for National Statistics' (ONS) Urban/Rural Classification to select rural areas. In the future we will move towards using the OS Master Map Highways Layer – which replaces the ITN.

We created a two kilometre buffer around all the roads in the UK and then calculated the percentage of the rural population within these buffers. The data show that more than 99% of people in the UK, living in rural areas, live within two kilometres of an all-season road. As we did not include private roads in our calculations because we cannot assess the quality and maintenance of these roads, the remaining 1% are likely to live on a private road that is attached to the main network. It must also be noted that distances were taken as the “crow flies”, meaning that for some, the access to a road could be further away than indicated by the data. The data also do not include information about the quality of the roads, other than that public roads are normally maintained by local government.

OS data were used to create the UK estimates for this project, however, these data are not available in other countries. We are now considering other potential data sources that could be used, such as Open Street Map and the Global Roads Inventory Project, to assess whether the methodology used for the UK could be scalable and therefore provide globally-consistent estimates for this indicator.

11.3.1 Ratio of land consumption rate to population growth rate

The aim of goal 11 is to make human settlements inclusive, safe, resilient and sustainable. Target 11.3 focuses on enhancing inclusive and sustainable growth of cities and the sustainable planning of human settlements in all countries by 2030. Indicator 11.3.1 (Ratio of land consumption rate to population growth rate) therefore measures sustainable growth of urban areas and populations.

OS provided analysis for this indicator using data on land-use, derived from the OS Master Map Topography Layer. The data distinguishes between natural and man-made features. We used the coverage of surfaces identified as man-made, to compute growth rates of land consumption between 2013 and 2016. The growth rate of man-made land was calculated for every Lower layer Super Output Area (LSOA), for the three countries in Great Britain (England, Scotland and Wales) and for the whole of Great Britain. Data were only produced for Great Britain, as the OS Land Use Layer is not available for Northern Ireland.

Population growth rates were calculated using the ONS mid-year population estimates for 2013 and 2016.

Rates were calculated using the formula in the UN metadata [2]. Data could not be calculated for all the LSOAs due to the population growth rates. In areas where population neither grew or declined, the formula could not be applied.

In Great Britain, land consumption grew faster than the population growth rate between 2013 and 2016. Land consumption grew by 4.3% and the population by 1.5%. Only in Wales did the population grow faster than the land consumption rate. Between 2013 and 2016, the population in Wales grew by 1.9% and the land consumption rate by 1.4%. Land consumption rate versus the population growth rate was the highest in Scotland, where the population grew by 1.4% and land consumption by 6.1%. In England, land consumption also grew faster than the population, with land consumption growing by 4.4% and the population by 2.3%. Scotland had the smallest population growth and the highest growth in land consumption, contributing to the high ratio.

The indicator metadata (PDF, 245KB) note that land consumption is more than the increase of buildings and cities, but also recognises the increase in farming, fishery and man-made forests as an increase in land consumption. The data reported for this indicator do not take this into account and therefore only includes man-made structures, such as buildings and roads. We hope to include information on the increase of land use for agriculture and forestry in later releases.

There is ongoing research within ONS Geography to provide a more scalable solution to the monitoring of land consumption rates, as OS data are only available for Great Britain. The aim is to use satellite imagery to examine the amount of built-up land, in the whole of the UK. We are currently still working to select the right methodologies and processes.

Notes for: Reporting geographical indicators against the Sustainable Development Goals

1. SDG indicators are divided into three tiers. Tier 1 indicators are conceptually and methodologically clear and have data available in many countries. Tier 2 indicators can be conceptually clear, but data are not collected routinely in most countries. Tier 3 indicators are indicators that are not yet methodologically and conceptually clear, and do not have data collected on a routine basis in most countries.

2. Population growth rate = LN ((population in 2016 divided by population in 2013) divided by (3)). Population growth rate versus land consumption rate = Land consumption rate divided by population growth rate.

6 . Introducing new maps to the UK's SDGs Reporting Platform

To ensure everyone can see the UK's progress towards the Sustainable Development Goals (SDGs), we developed an online Reporting Platform with our Data Science Campus. Rather than build something from scratch, we originally based ours on the open source platform developed by the United States. We have since introduced new features including the ability to display disaggregated data for indicators. Being an open source tool means it's free for other countries to reuse, the source code is available to everyone and is comprehensively documented.

To better communicate geographical data on our Reporting Platform, we are working towards adding new maps to indicators where data are disaggregated by geography. We have geo-coded all data on the platform, so that they are ready for geospatial analysis and mapping.

We will be using a template that provides a more detailed and interactive interface, and the ability to visualise disaggregations, allowing users to investigate spatial trends in more depth. New features will include a search function, a line chart displaying a time series of the selected area and a simple animation showing data changes through time.

As the SDGs are an international effort, we think it is important that our solutions are open source and usable by other countries. The map has shown to be easily adaptable and was used during a recent international workshop to display Rwandan and Ghanaian SDGs' data.

7 . Quality assurance

The data produced during this project are experimental in nature and the approach we have taken to produce these statistics may change over time as data sources, methodologies and software improve.

The data published have been quality assured in a variety of ways:

- input sources have been validated and checked; the data Ordnance Survey (OS) produces, which was used for the road network and the Land Use Layer, and Office for National Statistics (ONS) data undergo rigorous quality assurance procedures

- outcome data and methodologies were quality assured by geography experts within ONS; where errors or anomalies were found, data were discarded and the methodology re-evaluated

- work that ONS and OS produced independently were compared to see if outcomes were similar

8 . Next steps

We will continue to explore the use of Geographical Information Systems (GIS) and Earth Observation to report against the Sustainable Development Goals. We will also continue our efforts to further disaggregate the data that we currently report.

We are working towards making our methodology scalable to other countries, by investigating alternative open source data and software available in our African statistical partner countries (Ghana, Rwanda and Kenya). We are aiming to work together with others to ensure these methods are available to everyone in the future.

More information

If you have any further questions or comments, or would like to provide feedback on the produced statistics please contact sustainabledevelopment@ons.gov.uk