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# UNESCO SCIENCE REPORT

The race against  
time for smarter  
development

## STATISTICAL ANNEX



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# Technical and methodological notes on the statistical annex

## METHODOLOGICAL NOTE

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### **Bibliometric data**

Publication data have been compiled for UNESCO by Science-Metrix from the Scopus (Elsevier) database, excluding Arts, Humanities and Social Sciences.

Publications listed under the People's Republic of China do not include those for its Special Administrative Regions of Hong Kong and Macao, or the Taiwan Province of China.

### **Economic data**

Data on economic indicators, such as gross domestic product (GDP) and purchasing power parity (PPP), are based on the World Bank's economic data release of July 2020: <http://data.worldbank.org/products/wdi> (see the note on the cut-off date).

It should be noted that, since 2014, the UNESCO Institute for Statistics has used data on total general government expenditure (all sectors) from the International Monetary Fund's World Economic Outlook database as the denominator for its indicator, expenditure on education as a percentage of total government expenditure. For more information about the change in methodology, please visit: [www.uis.unesco.org/education](http://www.uis.unesco.org/education)

### **Education data**

The UNESCO Institute for Statistics (UIS) compiles education statistics, from official administrative sources at the national level, through its annual Survey of Formal Education.

The objective of this survey is to provide internationally comparable data on key aspects of education systems, such as access, participation, progression and completion, as well as the associated human and financial resources dedicated to them.

In addition to this survey, these data are also collected through a joint data collection mechanism involving UIS, the Organisation for Economic Co-operation and Development (OECD) and the Eurostat. The data collected are used to monitor and report on international development goals related to education, including the education goal of *The 2030 Agenda for Sustainable Development*.

For more information on the UIS Survey of Formal Education, please visit: <http://uis.unesco.org/en/uis-questionnaires>

### **GERD**

R&D expenditure in US dollars at the purchasing power parity (PPP) rate is presented in Table B1 using constant 2005 prices.

### **Innovation data**

The UNESCO Institute for Statistics collected data on innovation within the manufacturing industry every two years up to 2017 through its innovation data collection. In addition, the institute obtained innovation data directly from Eurostat and the African Science, Technology and Innovation Indicators (ASTII) Initiative of the African Union/NEPAD Planning and Coordinating Agency for countries which participate in the data collections of these organizations. With a few exceptions, innovation data refer to a three-year reference period that varies from one country to another. The data collected are featured in the institute's international database at: <http://data.uis.unesco.org>

### **Population data**

Population data were obtained from the World Bank's World Development Indicators (accessed September 2020). For Eritrea, data were available only for 2011 and this value was used for all years, which could lead to a slight overestimation of the number of publications per million inhabitants for later years. Population data for the Cook Islands and Niue were obtained directly from the national statistical service. Niue provided data for only 2011 and 2017; the remaining years were estimated based on the growth between 2011 and 2017.

### **Research and experimental development (R&D) data**

The UNESCO Institute for Statistics collects data on resources devoted to research and experimental development through its R&D statistics survey. In addition, it obtains data directly from the OECD, Eurostat, the Ibero-American and Inter-American Network on Science and Technology Indicators (RICYT) and the African Science, Technology and Innovation Indicators (ASTII) Initiative of the African Union/NEPAD Planning and Coordinating Agency for countries which participate in the data collections of these organizations. The data collected can be found at: <http://data.uis.unesco.org>

Data obtained from the OECD are based on the OECD's Research and Development Statistics database released in April 2020. Data obtained from Eurostat are based on the Eurostat Science and Technology database, as of April 2020. Data received from RICYT are as of July 2020. Data obtained from ASTII are based on the African Innovation Outlook III (2019).

### **Cut-off date for data in the statistical annex and chapters**

R&D and economic data presented in the regional/individual country chapters may not always correspond to the data given in the statistical annex or in Chapter 1. The reason for this is that the underlying economic data used to calculate R&D indicators are based on the World Bank's economic data release of July 2020 for the annex and Chapter 1, whereas data in the other chapters might come from a different release of economic data by the World Bank.

## TECHNICAL NOTE

### Bibliographic data

**Number of papers:** this is the number of peer-reviewed scientific publications (e.g. articles, reviews and notes only) indexed in the Scopus database. Publications are assigned to countries according to the author affiliation address on the publications. Double counting is avoided at both the national and regional levels. For instance, a paper co-authored by two researchers from Italy and one author from France is counted only once for France and once for Italy but also once for Europe and once for the world.

The regions were defined using a blend of geographic and economic groupings based on status in 2019. For example, the United Kingdom was included in the European Union region due to its membership in the period under study (2011 to 2019). The total for the People's Republic of China excludes its Special Administrative Regions of Hong Kong and Macao and the Taiwan Province of China.

**Number of international collaborations:** this is the number of publications involving authors from at least two different countries, counted once for each entity. For instance, if 13 authors from one organization collaborate with 1 author from another, that article counts as a co-publication, counting once for each organization. For the computation of international collaboration, territories were considered to be part of their respective mainland countries. Thus, collaboration between Guadeloupe and France would not be considered as international co-authorship. The international collaboration rate of a country is simply a measure of how many articles are co-published with international partners as a proportion of the given country's total output.

**Average of relative citations:** this is an indicator of the scientific impact of papers produced by a given entity (the world, a country, an institution) relative to the world average (i.e. the expected number of citations, set as 1). Citation scores for conference papers are not included in the citation analysis because citation patterns associated with them tend to distort impact measurements.

**Field classification of publications:** see Annex 2 for the broad fields of science used to prepare statistics at the level of scientific disciplines: agriculture, fisheries and forestry; animal and plant biology; built environment and design; chemistry; cross-cutting strategic technologies; engineering; environmental sciences; geosciences; health sciences; ICTs, mathematics and statistics; and physics and astronomy.

### Education data

The fields of study are defined as per the International Standard Classification of Education: *Fields of Education and Training* (ISCED-F 2013). Agriculture (includes agriculture, forestry, fisheries and veterinary); natural sciences (includes biological, environmental, geological and physical sciences), mathematics and statistics; engineering (includes engineering, manufacturing and construction);

Table 1: Levels of tertiary education

UNESCO Science Report term	ISCED 2011 equivalent
Short cycle	ISCED level 5 – short-cycle tertiary education
Bachelor's or equivalent	ISCED level 6 – bachelor's or equivalent level
Master's or equivalent	ISCED level 7 – master's or equivalent level
PhD or equivalent	ISCED level 8 – doctoral or equivalent level

ICTs (information and communication technologies); health (health and welfare); social sciences and journalism; business, administration and law; and arts and humanities (contains the ISCED-F 2013 broad fields of arts and humanities, education and services).

International classifications for the type of degree received follow the International Standard Classification of Education (ISCED 2011) of level of education (Table 1).

Data on internationally mobile students that are collected by the UNESCO Institute for Statistics (UIS), OECD and Eurostat encompass students who are pursuing a tertiary degree and thus exclude students on exchange programmes. Data on inbound internationally mobile students reported by host countries are used by the UIS to estimate the number of outbound internationally mobile students from a given country. As not all host countries report disaggregated data on internationally mobile students by country of origin, the number of outbound students from a given country may thus be underestimated.

### R&D data

The definitions and classifications used to collect R&D data are based on the *Frascati Manual: Proposed Standard Practice for Surveys on Research and Experimental Development* (OECD). Some of the key definitions related to R&D data are presented in the glossary of the present report.

Two types of R&D indicator are usually compiled: data on R&D personnel measure researchers, technicians & equivalent staff directly involved in R&D, as well as other support staff; data on R&D expenditure measure the total cost of carrying out the R&D activity concerned, including indirect support.

Global and regional estimates for R&D expenditure and researchers presented in Chapter 1 are calculated based on country-level data obtained from the UNESCO Institute for Statistics, accessed in August 2020.

### Patent data

**Number of granted patents:** this is the number of granted patents indexed in the PATSTAT database for five patent offices, namely the US Patent and Trademark Office (USPTO), European Patent Office (EPO), Japanese Patent Office (JPO), Korean Intellectual Property Office (KIPO) and State Intellectual Property Office of the People's Republic of China (CNIPA). Patents are assigned to countries according to the country of the inventors on the applications. Double counting is avoided at both the national and regional levels. For instance, a patent application submitted by two inventors from Italy and one inventor from France is counted

only once for France and once for Italy but also once for Europe and once for the world. Therefore, the sum across countries/regions is higher than the world total because of co-inventorship. The IP5 total is the sum across all five offices; therefore, some inventions are counted more than once because patents to protect them may have been granted in more than one market.

Data quality is high for the USPTO and EPO but information related to the country affiliation of inventors is often missing in PATSTAT for CNIPA, JPO and KIPO. To prevent underestimating output levels for countries with intensive patenting activity at these offices, methods based on patent families were implemented to reduce the number of unknown affiliations to a minimum (i.e., only a few percentage points). Caution is nonetheless advised because these methods do not make it possible to correct the data perfectly.

## TECHNICAL NOTE FOR THE BIBLIOMETRIC STUDY PERTAINING TO THE SUSTAINABLE DEVELOPMENT GOALS

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### **Bibliometric data**

Publication data were compiled for UNESCO by Science-Metrix using keyword searches of the complete Scopus (Elsevier) database, including Arts, Humanities and Social Sciences, for publications released from 2011 to 2019. In selected cases, a complementary search was conducted to include all of the content of selected relevant journals. For the list of specific keywords, see the *UNESCO Science Report* web portal.

### **Countries and regions**

As above, publications were assigned to countries according to the author affiliations listed on the publications. The regions were defined using a blend of geographic and economic groupings based on status in 2019. For example, the United Kingdom was included in the European Union region due to its membership in the period under study (2011 to 2019).

The total for the People's Republic of China excludes its Special Administrative Regions of Hong Kong and Macao and the Taiwan Province of China.

### **How publications are counted**

As above, publication counts of articles, reviews and conference papers are based on the full-counting method. Using this method, each country or research organization that has a researcher on the list of authors for a given paper gets a full count (1 publication) for that paper. Therefore, the sum across countries/regions is higher than the world total because of co-authorship. Different topics are not necessarily mutually exclusive and do not cover the entirety of science; therefore, the sum across topics is not expected to be equal to the total reported in Scopus.

### **Specialization Index**

The specialization index (SI) indicates how much output an entity produces in an area of research, adjusted for the entity's overall number of papers and relativized to the global average. Because countries or regions cannot be specialized in all areas of research by definition, fractional counting of publications is used instead of full counting. This avoids the overestimation of specialization in broad fields with high levels of international co-authorship, as the full counting method could lead to all countries being specialized in a given area simply because of these higher levels of collaboration. Fractional counting divides publications based on the proportion of authors from a country contributing to an article. For instance, if a paper lists two authors with addresses from the United Kingdom, one from Spain and one from Latvia, the publication is divided into four parts, with the United Kingdom receiving two of these parts (0.5 publication), Spain receiving one (0.25 publication) and Latvia receiving the fourth part (0.25 publication).

## METHODOLOGICAL NOTE FOR THE BIBLIOMETRIC STUDY PERTAINING TO THE SUSTAINABLE DEVELOPMENT GOALS

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### **Comprehensiveness**

The initial dataset for the SDG-related publications is global, including all publications indexed in the Scopus database with publication dates from 2011 to 2019.

The data cannot be considered comprehensive for all the Sustainable Development Goals or for an entire relevant body of research. Due to the indivisibility of the SDGs, there are many overlapping areas of importance. The topics are grouped by SDG in Tables F1 to F8 but the keyword searches were conducted using the full database and the findings may be relevant across multiple SDGs.

The document types included in the Scopus analysis are articles, reviews, short surveys and conference proceedings. An empirical approach has been developed by Science-Metrix to filter documents based on the source types and document types (Table 2) and to maximize the recall of peer-reviewed papers while minimizing the inclusion of non-peer-reviewed documents.

Science-Metrix used a systematic approach to remove low-quality journals from the analysis, primarily by excluding the list of journals removed by Elsevier from the Scopus database, as well as the excluded journals list from the Directory of Open Access Journals.

### Data analysis

The **specialization index** is measured as the proportion of output of a given country in a given topic, divided by the proportion observed at the world level. For example, a country with 2% of its output in a topic that represents 1% of all research at the world level would score 2.00 for this indicator because it has twice as much output as expected for this topic.

The **growth ratio** is calculated as the number of publications in 2012–2015 divided by the number of publications over 2016–2019.

Table 2: **Combinations of source types and document types used for the production of bibliometric indicators**

Source type	Documant type
Book series	Article, conference paper, review, short survey
Conference proceeding	Article, review, conference paper
Journal	Article, conference paper, review, short survey

Source: Prepared by Science-Metrix

# Broad fields of science

Adapted from the Science-Metrix Classification of Scientific Journals (v. 1.06)\*

In order to generate statistics on scientific publications by broad field of science, the existing Science-Metrix classification of 174 subfields was regrouped in the 11 broad fields listed on the following page.

Some 38 of Science-Metrix's subfields were discarded from the full bibliometric study conducted by Science-Metrix because they classified papers from social sciences and the humanities that included fields such as linguistics, law or business. These papers were not covered by the *UNESCO Science Report*, in order to ensure greater homogeneity within fields and, thereby, facilitate comparisons between countries.

The broad field of cross-cutting technologies has been split into 10 subcategories. The three categories of artificial intelligence and robotics, blockchain technology and the Internet of Things did not align with the existing subfields\* based on journal-level classification, so were created by manually assembling lists of journals principally covering those themes using a keyword-based approach. Journals identified as being mainly focused on one of these themes were removed from their original subfield to ensure that all broad fields were mutually exclusive.

It is important to note that all of these subfields are defined at the journal level. For example, this means that an article on robotics published in a more general journal on information and communication technologies would not be counted towards the AI and robotics dataset. The only exceptions are generalist journals, such as *Nature* or *Science*, which cannot be accurately assigned to a single subfield. Articles from such journals were instead assigned a subfield at the article level by using a machine-learning algorithm.

In graphics within chapters, percentage shares of broad fields of science have been rounded. This means that values of 0.5% and over have been rounded up to 1% and those accounting for less than 0.5% of total output have been excluded.

The composition of each broad field of science by subfield can be found on the following page.

For additional details of the bibliometric research, please see the methodological note at the end of Table E1.

\* Available at:

<https://www.science-metrix.com/?q=en/classification>

See also: Archambault, É.; Beaulac, O. H. and J. Caruso (2011) Towards a multilingual, comprehensive and open scientific journal ontology. In: E. Noyons, P. Ngulube and J. Leta (eds) *Proceedings of ISSI 2011 – the 13th International Conference of the International Society for Scientometrics and Informetrics*. ISSI, Leiden University and University of Auckland: <https://tinyurl.com/y2wkn4xv>

\*\* Topics related to social sciences were eliminated from this category.



Composition of each broad field of science by subfield

<b>Agricultural sciences</b>	Agronomy and agriculture Dairy and animal science Fisheries Food science Forestry Horticulture Veterinary sciences	<b>Geosciences</b>	Geology Geochemistry and geophysics Hydrogeology Palaeontology	<b>Health sciences (continued)</b>	Social psychology Speech-language pathology and audiology Sport sciences Substance abuse Surgery Toxicology Tropical medicine Urology and nephrology Virology
<b>Biological sciences</b>	Entomology Evolutionary biology Marine biology and hydrobiology Ornithology Plant biology and botany Zoology	<b>Health sciences</b>	Allergy Anatomy and morphology Anaesthesiology Arthritis and rheumatology Behavioural science and comparative psychology Biochemistry and molecular biology Biophysics Cardiovascular system and haematology Clinical psychology Complementary and alternative medicine Dentistry Dermatology and venereal diseases Developmental and child psychology Developmental biology Emergency and critical care medicine Endocrinology and metabolism Environmental and occupational health Epidemiology Experimental psychology Gastroenterology and hepatology General and internal medicine General clinical medicine General psychology and cognitive sciences Genetics and heredity Geriatrics Gerontology Health policy and services Human factors Immunology Legal and forensic medicine Microbiology Microscopy Mycology and parasitology Neurology and neurosurgery Nuclear medicine and medical imaging Nursing Nutrition and dietetics Obstetrics and reproductive medicine Oncology and carcinogenesis Ophthalmology and optometry Orthopaedics Otorhinolaryngology Pathology Paediatrics Pharmacology and pharmacy Physiology Psychiatry Psychoanalysis Public health Rehabilitation Respiratory system	<b>ICTs, maths and statistics</b>	Applied mathematics Computation theory and mathematics Computer hardware and architecture Distributed computing General mathematics Image processing Information systems Medical informatics Networking and telecommunications Numerical and computational mathematics Statistics and probability
<b>Built environment and design</b>	Architecture Building and construction Design practice and management Urban and regional planning			<b>Physics and astronomy</b>	Acoustics Applied physics Astronomy and astrophysics Chemical physics Fluids and plasmas General physics Mathematical physics Nuclear and particle physics Optics
<b>Chemistry</b>	Analytical chemistry General chemistry Inorganic and nuclear chemistry Medicinal and biomolecular chemistry Organic chemistry Physical chemistry Polymers				
<b>Cross-cutting strategic technologies</b>	Artificial intelligence and robotics Bioinformatics Biotechnology Blockchain technology Energy Internet of Things Materials Nanoscience and nanotechnology Optoelectronics and photonics Strategic, defence and security studies**				
<b>Engineering</b>	Aerospace and aeronautics Automobile design and engineering Biomedical engineering Chemical engineering Civil engineering Electrical and electronic engineering Environmental engineering Geological and geomatics engineering Industrial engineering and automation Mechanical engineering and transport Mining and metallurgy Operations research				
<b>Environmental sciences (excl. geosciences)</b>	Ecology Hydrology (excluding hydrobiology and hydrogeology) Meteorology and atmospheric sciences Oceanography				

# Background information on the bibliometric study of research trends on selected topics related to *The 2030 Agenda for Sustainable Development (Tables F1-F8)*

## OVERVIEW

In 2020, UNESCO commissioned a study from Science-Metrix of the volume of scientific publications advancing the sustainable development agenda at the global, regional and national levels between 2011 and 2019. The study was not designed to be exhaustive. Rather, it focused on 56 sample research topics identified by UNESCO that were of particular relevance to eight of the Sustainable Development Goals (SDGs).

The aim of the study was three-fold:

- **to assess the volume of articles published** by each country in the world between 2011 and 2019 on key topics of relevance to the SDGs;
- **to identify the degree of specialization on each topic**, by assessing the number of publications produced by a given country over the 2012–2019 period as a proportion of that country's total scientific output. This level of specialization was then compared with the global average to give the **specialization index**. For example, a country which produced 2% of its output on a specific topic accounting for 1% of all research on that same topic at the global level would score 2.00 on the specialization index for this indicator because it produced twice as many publications as would be expected on this topic (for further details of this analysis, see Annex 5); and
- **to identify the growth rate of each topic**, in order to monitor change in the priority accorded to these topics since the adoption of *Agenda 2030 for Sustainable Development* in 2015. In order to avoid annual fluctuations, the study compared scientific output between two periods: 2012–2015 and 2016–2019.

This bibliometric study was undertaken in June 2020. Science-Metrix identified publications on each topic through searches for keywords across the complete Scopus (Elsevier) database, including as concerns the Arts, Humanities and Social Sciences. The table that follows describes the scope of each topic. The specific keywords used for each topic are available on the open access *UNESCO Science Report* portal as an online supplement.

The selected topics are grouped by Sustainable Development Goal. In some cases, an individual topic may be relevant to more than one goal, such as that on traditional knowledge. Moreover, as the key words are not mutually exclusive, there may be occasions when the same article has been counted under more than one topic; for instance, an

article on the impact of radiation on human health (SDG3) may also be referenced under the topic on radioactive waste management (SDG9).

The complete datasets for this bibliometric study are available from the *UNESCO Science Report* portal. A summary of the key findings for individual countries and regions may be found in chapters 4–26 and a global summary in chapter 2 of the present report.

## SCOPE OF THE STUDY

### Topics relating to SDG2: Zero hunger

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The data are presented in Table F1 of the statistical annex, available online, along with the full dataset

#### **Pest-resistant crops**

This dataset includes articles on technology to activate or enhance plant resistance to pathogens. Articles on the genetic engineering of plants to resist pests, essentially *Bacillus thuringiensis (Bt)* crops, constitute a large share of the dataset.

#### **Help for smallholder food producers**

This dataset covers efforts to increase the agricultural productivity and income of smallholder food producers, including through value addition. The dataset includes articles on the productivity, sustainability, profitability and security of small-scale agriculture and farming, such as community agriculture/farming, family agriculture/farming, subsistence agriculture/farming and smallholders.

#### **Precision agriculture**

This dataset includes articles on precision agriculture, precision farming and other synonymous expressions. It also includes articles on data-monitoring technologies whenever articles also mention terms such as crops. Specific precision agriculture aspects such as precision irrigation, seed metering, variable-rate application, soil sensing, yield mapping, precision planting, site-specific management and the like have also been targeted.

#### **Agro-ecology**

This dataset focuses on agri-environmental practices and the impact of those practices, including environmentally promising agricultural practices such as reduced tillage, agroforestry, cover crops, crop rotation, low-input agriculture,

conservation agriculture, silvopastures, alley cropping, integrated crop-livestock and more. Publications measuring and comparing the environmental impact of conventional agriculture are included. The topic includes alternatives to chemical pesticides.

### **Maintain genetic diversity of food crops**

This dataset includes articles on maintaining the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species. Articles discussing the genetic diversity and use of wild or heirloom varieties are also included. All studies related to landraces, plant genetic resources, crop varieties, wild relative and germplasm conservation have been included, provided that they refer to agricultural plants or animals.

### **Traditional knowledge**

This dataset includes articles relating to the recording of knowledge from traditional, indigenous or local populations or derived technologies. This topic is grouped under SDG2 but extends to other SDGs. Ethno-disciplines such as ethno-agriculture, ethnomedicine, ethnobotany and ethnomycology are part of the dataset. About 700 indigenous population names from every continent were used to help build this dataset, combined with terms related to traditional knowledge. The keyword 'local knowledge' was used only in combination with 'indigenous'. Ancestral knowledge from very large populations is voluntarily excluded; for instance, traditional Chinese medicine is excluded.

## **Topics relating to SDG3: Good health and well-being**

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The data are presented in Table F2 of the Statistical Annex, available online, along with the full dataset.

### **Reproductive health and neonatology**

This dataset includes articles on reproductive health, neonatology and maternal health. It covers women's sexual health, in general. It does not extensively cover research on sexually transmitted diseases and excludes the human immunodeficiency virus, which is analysed as a separate topic.

### **Human immunodeficiency virus (HIV)**

This dataset includes all articles on research into HIV and acquired immune deficiency syndrome (AIDS). For example, this includes articles on the epidemiology, treatment and prevention of the disease and/or its social impact.

### **Tropical communicable diseases**

This dataset covers those diseases that figure in the list of neglected tropical diseases established by the World Health Organization, namely: Buruli ulcer; Chagas disease; dengue and chikungunya; dracunculiasis (Guinea-worm disease); echinococcosis; food-borne trematodiasis; human African trypanosomiasis (sleeping sickness); leishmaniasis; leprosy (Hansen's disease); lymphatic filariasis; mycetoma; chromoblastomycosis and other deep mycoses;

onchocerciasis (river blindness); rabies; scabies and other ectoparasites; schistosomiasis; soil-transmitted helminthiasis; snakebite envenoming; taeniasis/cysticercosis; trachoma; and yaws (endemic treponematoses). Malaria and water-borne diseases such as coliform-caused illness, giardiasis, cholera and norovirus are also included.

### **Human resistance to antibiotics**

This dataset covers all aspects of human resistance to antibiotics, with the exception of papers related to environmental aspects that were more difficult to identify.

### **Regenerative medicine**

This dataset covers articles on stem cell research, as well as on regenerative technologies and therapies such as tissue engineering, biomaterials and nanoscaffolds.

### **Impact on health of soil, freshwater and air pollution**

This dataset contains articles related to the assessment and mitigation of the impact of air, soil and freshwater pollution on the environmental health of humans. Topics covered include pollution monitoring, the assessment and effects of exposure to heavy metals, plastics, particulate matter, radiation and other pollutants.

### **Medicines and vaccines for tuberculosis**

This dataset includes all articles on tuberculosis, except bovine tuberculosis.

### **New or re-emerging viruses that can infect humans**

This dataset covers research on human resistance to new or re-emerging viruses that can infect humans. For example, this dataset includes articles on epidemiology, treatment, prevention and transmission vectors of emerging viruses such as Influenza A subtype H1N1, SARS-CoV, Ebola and hantaviruses. This topic excludes articles on HIV, which is treated separately. Also excluded are articles on SARS-CoV-2 (Covid-19), as it had not yet been identified in 2019.

### **Type 2 diabetes**

This dataset covers research on prevention, effects, treatment and epidemiology of type 2 diabetes, also known as non-insulin-dependent diabetes mellitus or adult-onset diabetes. Efforts were made to include articles which study the impact of socio-economic factors on the development of the disease, such as obesity, malnutrition, lack of education and a sedentary lifestyle. Articles about insulin resistance, prediabetes and maturity onset diabetes of the young were also included. Studies of the genetic factors that play a role in development of the disease were also included. Some articles on other health conditions for which diabetes may be an aggravating condition are included but are not the focus of this dataset. Articles about heart disease were removed, unless they contained diabetes-related terms in their title, as were papers which mentioned diabetes in the abstract when the topic was then found to be peripheral to the dataset. Articles that only addressed type I diabetes or were ambiguous about the type of diabetes studied were excluded.

Articles were included, on the other hand, if the particular type of diabetes was not indicated in the title, keywords or abstract but the publication mentioned risk factors like obesity that are more specific to type 2.

## Topics relating to SDG6: Clean water and sanitation

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The data are presented in Table F3 of the statistical annex, which is available online, along with the full dataset.

### **Sustainable withdrawal and supply of freshwater**

This dataset includes all articles pertaining to the sustainable governance, management and policy of withdrawal, supply and use of freshwater. Freshwater sources include groundwater, lakes and rivers.

### **Water harvesting**

This dataset includes articles on techniques for harvesting precipitation, stormwater, runoff and fog. It also includes articles on rainfed agriculture and irrigation.

### **Desalination**

This dataset includes articles related to desalination technologies, such as osmosis, membrane distillation, solar distillation and micro- and nanofiltration.

### **Wastewater treatment, recycling and re-use**

This dataset includes articles on the management and treatment of wastewater, sewage water, polluted water and greywater, as well as re-use and recycling techniques.

### **National integrated water resource management**

This dataset includes articles pertaining to the management of water resources and their allocation for domestic, agricultural and industrial use. It includes articles on policies and laws pertaining to water use and allocation (e.g. reservoir management), as well as system modelling (e.g. water use, reservoir or water quality) to enable strategic decision-making and the optimization of processes. Articles about management of water distribution networks or the smart water grid are also part of the dataset. Some articles may analyse the situation at local level, since the use of the key word 'national level' served, above all, to exclude articles on transboundary water resource management, as this topic is treated separately.

### **Transboundary water resource management**

This dataset includes articles on governance, management, co-operation, law, allocation and sharing of transboundary and international freshwater resources, as well as related conflicts and disputes. Water resources analysed encompass aquifers, groundwater, lakes and rivers.

## Topics relating to SDG7: Affordable and clean energy

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The data are presented in Table F4 of the statistical annex, which is available online, along with the full dataset

### **Cleaner fossil fuel technology**

This dataset includes articles on clean coal technology, integrated carbon capture and storage technology, carbon dioxide (CO<sub>2</sub>) capture from fossil fuel power plants, desulfurization of flue gases, the clean production of synthetic fuel, refinery processes to limit contaminants emitted, the clean synthesis of methanol and the conversion of CO<sub>2</sub> to hydrocarbons or fuel.

### **Photovoltaics**

This dataset includes articles relating to stationary hosts, namely, solar cells, solar panels and photovoltaic cells. It also includes larger-scale projects, such as solar farms. Articles about developing materials specifically for solar cells are included.

### **Hydropower**

This dataset includes articles relating to both large and small hydropower projects. It includes articles on the different types of dams but also on other hydropower methods (e.g. tidal and wave energy) and the development of specific hydropower station parts like hydroturbines.

### **Biofuels and biomass**

This dataset includes articles on the main biofuels, such as bioethanol, biomethane, biobutanol and biocrude, as well as their production in biorefineries. Articles on the processing of biomass to create biofuels are also included. Little content was found on the hydraulic head of such processes.

### **Wind turbine technologies**

This dataset includes articles about wind turbines and wind farms, with a focus on both their conception and their use. All main types of wind turbines are included, such as horizontal-axis, vertical-axis, offshore and floating wind turbines. Articles about the main types of generator used in the turbines are also part of this dataset, examples being doubly fed induction and Savonius.

### **Nuclear fusion**

This dataset includes articles relating to studies of nuclear fusion for energy purposes, as well as articles relating to the development of materials, parts and methods to build nuclear fusion reactors. It voluntarily excludes articles focused on nuclear fusion reactions in stars because those are mostly unrelated to energy production on Earth.

### **Geothermal energy**

This dataset contains articles on geothermal energy, the generation of electricity from geothermal energy and different techniques for harnessing this energy, most notably, enhanced geothermal systems and hydraulic stimulation. A small number of articles about the safe digging of wells to access this energy is also included.

### **Hydrogen energy**

This dataset contains articles on most aspects of hydrogen energy harnessing. Machines and systems designed to have hydrogen as their source of power, the industrial production and storage of hydrogen and hydrogen-based fuel cells (i.e. most fuel cells) are all included.

### **Smart-grid technology**

This dataset contains articles on smart grid technology and techniques and protocols to enable smarter, more reliable electrical networks. Articles are included on new devices such as smart power meters and grid-friendly appliances, as well as on protocols related to distributed grids and microgrids, such as islanding detection. Articles relating to the cybersecurity of smart grids are also included in the dataset. Furthermore, articles related to new challenges for the grid, such as electric vehicle (EV) charging on a national scale, are included because many of those articles advocate 'vehicle-to-grid' energy transfers and real-time pricing when mentioning EV charging. An effort was made to exclude papers specific to EVs that do not address the electrical grid. Some articles about renewable energy sources are part of the dataset but they only concern the integration of these new power sources in the grid.

## **Topics relating to SDG9: Industry, innovation and infrastructure**

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The data are presented in Table F5 of the statistical annex, which is available online, along with the full dataset

### **Carbon pricing**

This dataset includes articles related to all aspects of the taxation and trading of carbon and other greenhouse gas emissions (also known as cap and trade): the carbon market, carbon allowance, carbon credits, carbon trading, carbon pricing and carbon taxation.

### **Eco-industrial waste management**

This dataset includes articles on the safe treatment and disposal of waste chemicals and other industrial wastes, such as those from the construction, pharmaceutical and electronic industries, reactive waste and wastewater treatment. Articles are also included on the minimization of waste production, such as zero-waste manufacturing and waste-to-energy processes. Articles about remediation techniques for soils contaminated with industrial wastes (heavy metals, petroleum, etc.) are included but these exclude nuclear waste, since it is treated separately.

### **Radioactive waste management**

This dataset contains articles about radioactive waste management, storage and disposal. Articles about methods such as safe geological disposal, transmutation and vitrification of nuclear waste are included.

### **Eco-alternatives to plastics**

This dataset includes articles studying the synthesis, effects and potential applications of ecologically friendly

alternatives to traditional fossil fuel-derived plastics.

Articles on biodegradable plastics or alternatives based on cellulose, starch or banana fibres are included. Any articles containing terms such as 'sustainable alternative to plastics' or 'environmentally degradable plastics' are also included.

### **Eco-construction materials**

This dataset includes articles relating to 'eco-building', 'green building', 'sustainable construction', 'ecological housing', 'sustainable architecture' and other permutations of those terms. There is also a focus on low-energy and zero-energy buildings, sustainable building certifications (e.g. Leadership in Energy and Environmental Design [LEED] or Passivhaus) and environmentally friendly materials, sustainable materials and recycled materials. Articles on retrofitting buildings and infrastructure are included. The dataset is primarily focused on passive construction practices and materials, rather than active methods such as photovoltaic panels or wind generator integration, covered in other datasets (see Table F4). Sustainability here is almost always defined from an environmental standpoint but some articles are also focused on economic or social sustainability of buildings or infrastructure. For example, an article might tackle the health implications of using sustainable alternatives to traditional materials or designs for the occupants, or buildings that can better withstand the extreme conditions found in poorer countries or anticipated conditions relating to climate change.

### **Greater battery efficiency**

This dataset contains articles on battery efficiency, new battery technologies and battery design and optimization. Since most articles are written to report improvements on batteries, most rechargeable battery types were included as keywords in the dataset, with the greatest contributions coming from more recent battery types such as Li-ion. Articles concerning the recycling of spent batteries and battery integration in the electrical grid are also part of the dataset.

### **Sustainable transportation**

This database focuses on the development and use of sustainable means of transportation, including electric vehicles, solar vehicles, plug-in hybrid vehicles and hydrogen vehicles. Most articles indexed focus on cars but planes, boats, trains and trucks are all included. The dataset includes articles on self-driving cars and associated technologies, such as autonomous intersection management, lane detection and advanced driver assistance. This is because self-driving cars would achieve better fuel economy (or energy economy, if electric) and have the potential to reduce the number of road accidents. Articles are included on other methods of sustainable transportation and policies, such as carsharing, public bicycles, car-free cities and congestion pricing. 'Sustainable transport' is used as a keyword but, with the exception of publications using the terms 'solar boat' and 'electric boat', shipping is not explicitly included in this dataset.

## Topics relating to SDG13: Climate action

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The data are presented in Table F6 of the statistical annex, which is available online, along with the full dataset

### **National and urban greenhouse gas emissions**

This dataset includes articles on the measurement, assessment and estimation of greenhouse gas emissions at the national and urban levels. It includes articles on national and urban emission sources, such as agricultural, industrial and urban sources, including transportation.

### **Carbon capture and storage**

This dataset includes articles on carbon capture techniques, such as pre-, post- and oxyfuel combustion, direct air capture and carbon sequestration, which is the capture and storage of carbon through natural (biological, chemical and physical) processes that include photosynthesis, oceanic and geological capture. The publications refer to both natural sequestration and human attempts to enhance sequestration. This dataset is restricted to gaseous carbon; it excludes solid-state carbon, namely particulate matter.

### **Local impact of climate-related hazards and disasters**

This dataset focuses on articles assessing climate hazards and climate-related disasters and the impact of these on small and vulnerable communities. Examples are coastal erosion, sea level rise, droughts, floods and extreme weather events.

### **New technologies to protect from climate-related hazards**

This dataset focuses on any technology, innovation or tool that has the potential to mitigate the impact of climate change or climate-related disasters on communities. This includes publications on ways of building more resilient infrastructure, as well as those on better modelling tools to predict the risk of occurrence and consequences of catastrophic events, enabling better preparedness.

### **Local disaster risk reduction strategies**

This dataset focuses on planning processes and techniques that help to reduce the risk faced by local and vulnerable communities with respect to climate change and related disasters, such as drought, flooding, extreme storms and wildfires. The publications included consider communities' strategies, preparation and mitigation efforts as well as their capacity to recover and be resilient.

### **Climate-ready crops**

This dataset includes articles related to agriculture and crops that are tolerant of and resilient to salinity, flooding, drought and other climate-related stressors.

## Topics relating to SDG14: Life below water

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The data are presented in Table F7 of the statistical annex, which is available online, along with the full dataset

### **Coastal eutrophication**

This dataset includes all articles on coastal eutrophication, phosphorus removal and pollution, algal blooms, water nutrient dynamics and specific harmful algal species.

### **Floating plastic debris in the ocean**

This dataset includes articles related to plastic debris and plastic pollution in the ocean. Search terms cover plastic and plastic types in aquatic environments, plastic consumption by marine wildlife, as well as the identification of plastics and byproducts in marine and coastal environments and food chains.

### **Ocean acidification**

This dataset includes all articles on ocean acidification and seawater acidification, including those assessing the impact on species.

### **Sustainably manage marine tourism**

This dataset includes articles on tourism management and the effects of tourism on oceanic or coastal zones. Articles often focus on the environmental impact but the socio-economic impact is also covered. Whenever there was a focus on sustainability, cruises, diving, recreational fishing and sea animal tourism (watching, swimming and diving) were all specifically included as search terms.

### **Sustainably manage fisheries and aquaculture**

This dataset includes articles on fish farming and aquaculture, as well as commercial fishing as it relates to sustainable resource management. The dataset was constructed using key terms related to sustainable fisheries and aquaculture, as well as species and techniques commonly associated with these practices. When aquatic species names were used, this was done in conjunction with terms related to sustainability, to limit the dataset to the topic as much as possible.

### **Ecosystem-based approaches in marine environments**

This dataset contains articles relating to management of coastal zones using an ecosystem-based approach, meaning the ecosystem and its interactions are considered as a whole in management processes. The dataset includes articles on concepts like integrated coastal zone management, which is closely linked to ecosystem-based approaches. When the dataset was verified, no articles focusing on ecosystems in international waters were found.

## Topics relating to SDG15: Life on land

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The data are presented in Table F8 of the statistical annex, which is available online, along with the full dataset

### **Sustainable use of terrestrial ecosystems**

This broad dataset includes all papers on the conservation, preservation, restoration and sustainable use of terrestrial ecosystems: forest, habitat, land, wildlife, pond, freshwater, drylands, etc. It includes research on species richness, biodiversity, etc. It also includes articles on ecosystem services.

### **Status of terrestrial biodiversity**

This dataset includes articles on species with a defined conservation status, as well as more fundamental research needed to monitor, predict and protect those species. For example, articles on causes of species endangerment, such as habitat loss, are included.

### **Minimize poaching and trafficking of protected species**

This dataset includes articles on the Convention on the International Trade of Endangered Species (CITES), wildlife trade, poaching, illegal fishing, illegal harvesting, wildlife forensics, etc.

### **Tackle invasive alien species**

This dataset includes all articles related to biological invasions, alien species, invasive plants, etc. Basic research on invasive potential has also been included.

### **Use of ecosystem-based approaches in protected areas on land**

This dataset includes articles on ecosystem-based management of public and private land. An effort was made to exclude marine and freshwater ecosystems, to avoid overlap with other selected topics.

### **Extent of water-related ecosystems**

This dataset includes articles measuring the extent of water-related ecosystems (excluding oceans) such as wetlands, rivers, estuaries, lakes, aquifers, swamps, fens, peatlands, marshes, mangroves and artificial water bodies. It involves articles either measuring or improving delineation protocols of such systems, as well as estimating the water quantity

involved. Articles on disappearing systems are included, as well as articles on the inventory of water-based ecosystems. Some articles on ecosystems related to either the water quality or quantity found in ecosystems such as forests and mountains are also included when these are directly related to water.

### **Socio-ecological impact of terrestrial protected areas**

This dataset covers conservation planning, reserve selection and reserve design, as well as the prioritization of protected areas and the future habitat suitability under climate change. The negative and positive impact of protected areas on humans, such as human-wildlife conflict or valuation of ecosystem services, are also targeted.





# Statistical annex

**Table A1:** Socio-economic indicators, various years

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**Table B1:** Research expenditure as a share of GDP and in purchasing power parity dollars (PPPS), 2015 and 2018

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**Table B2:** Research expenditure by sector of performance and source of funds, 2015 and 2018 (%)

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**Table B3:** Public expenditure on higher education, 2015 and 2018

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**Table C1:** Tertiary graduates in 2015 and 2018 and STEM graduates by field in 2018

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**Table C2:** Total researchers and researchers per million inhabitants, 2015 and 2018

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**Table C3:** Researchers by field of science, 2018 (%)

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**Table D1:** Scientific publications by region and country, 2011–2019

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**Table D2:** Publications by broad field of science, 2014–2016 and 2017–2019

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**Table D3:** Scientific publications resulting from international collaboration, 2014–2016 and 2017–2019

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**Table D4:** Scientific publications on cross-cutting strategic technologies, 2015 and 2019

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**Table E1:** Number of patents granted by the top 5 patent offices (IP5), 2015–2019

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**Table F1:** Volume of publications on selected research topics relating to SDG2: zero hunger, 2012–2015 and 2016–2019

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**Table F2:** Volume of publications on selected research topics relating to SDG3: good health and well-being, 2012–2015 and 2016–2019

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**Table F3:** Volume of publications on selected research topics relating to SDG6: clean water and sanitation, 2012–2015 and 2016–2019.

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**Table F4:** Volume of publications on selected research topics relating to SDG7: affordable and clean energy, 2012–2015 and 2016–2019

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**Table F5:** Volume of publications on selected research topics relating to SDG9: industry, innovation and infrastructure, 2012–2015 and 2016–2019

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**Table F6:** Volume of publications on selected research topics relating to SDG13: climate action, 2012–2015 and 2016–2019.

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**Table F7:** Volume of publications on selected research topics relating to SDG14: life below water, 2012–2015 and 2016–2019

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**Table F8:** Volume of publications on selected research topics relating to SDG15: life on land, 2012–2015 and 2016–2019

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**Table A1: Socio-economic indicators, various years**

	Population (thousands)	Population growth (annual %)	Life expectancy at birth, total (years)	Unemployment, total (% of total labour force)	GDP (constant 2017 PPP\$ millions)		GDP per capita (constant 2017 PPP\$)		GDP growth (%)			
	2018	2018	2017	2019	2015	2018	2015	2018	2015	2016	2017	2018
<b>North America</b>												
Canada	37 075	1.41	82.25	5.56	1 705 543	1 813 029	47 770	48,924	0.66	1.00	3.17	2.01
United States of America	327 096	0.62	78.54	3.68	18 768 626	20 105 788	58 536	61,544	2.88	1.57	2.22	3.18
<b>Latin America</b>												
Argentina	44 361	1.02	76.37	9.79	1 032 325	1 012 068	23 934	22 746	2.73	-2.08	2.67	-2.48
Belize	383	1.92	74.37	6.41	2 620	2 727	7 259	7 119	2.85	0.09	1.87	2.09
Bolivia	11 353	1.42	70.95	3.50	86 788	98 267	7 984	8 656	4.86	4.26	4.20	4.22
Brazil	209 469	0.78	75.46	12.08	3 079 188	3 057 466	15 059	14 596	-3.55	-3.28	1.32	1.32
Chile	18 729	1.39	79.91	7.09	424 682	454 344	23 634	24 259	2.30	1.71	1.19	3.95
Colombia	49 661	1.52	76.93	9.71	676 579	717 701	14 238	14 456	2.96	2.09	1.36	2.52
Costa Rica	4 999	0.99	79.91	11.85	87 379	97 122	18 024	19 427	3.63	4.25	3.86	2.66
Ecuador	17 084	1.77	76.58	3.97	192 864	197 525	11 896	11 562	0.10	-1.23	2.37	1.29
El Salvador	6 421	0.51	72.87	4.11	51 506	55 318	8 143	8 616	2.40	2.55	2.25	2.43
Guatemala	17 248	1.95	73.81	2.46	126 491	138 107	8 125	8 448	4.09	2.68	3.02	3.21
Guyana	779	0.49	69.62	11.85	6 603	7 254	8 604	9 312	3.05	3.36	2.10	4.10
Honduras	9 588	1.67	74.90	5.39	48 147	54 383	5 283	5 672	3.84	3.89	4.84	3.70
Mexico	126 191	1.13	74.95	3.42	2 350 432	2 522 835	19 288	19 992	3.29	2.91	2.12	2.14
Nicaragua	6 466	1.26	74.07	6.84	35 039	36 820	5 630	5 695	4.79	4.56	4.63	-3.95
Panama	4 177	1.69	78.15	3.90	112 849	129 688	28 436	31 049	5.73	4.95	5.60	3.69
Paraguay	6 956	1.29	73.99	4.81	78 994	89 385	11 810	12 850	3.08	4.31	4.96	3.35
Peru	31 989	1.72	76.29	3.31	369 009	408 899	12 110	12 782	3.25	3.95	2.52	3.98
Suriname	576	0.96	71.46	7.33	9 701	9 567	17 349	16 609	-3.41	-5.56	1.76	2.62
Uruguay	3 449	0.37	77.63	8.73	70 248	74 473	20 588	21 591	0.37	1.69	2.59	1.62
Venezuela	28 887	-1.79	72.25	8.80	-	-	-	-	-	-	-	-
<b>Caribbean</b>												
Antigua & Barbuda	96	0.90	76.75	-	1 740	2 033	18 595	21 116	3.83	5.50	3.15	7.39
Bahamas	386	1.01	73.55	10.36	13 411	13 690	35 837	35 501	0.60	0.45	0.07	1.57
Barbados	287	0.14	78.98	10.33	4 389	4 493	15 383	15 675	2.45	2.48	0.48	-0.58
Cuba	11 338	-0.01	78.66	1.64	-	-	-	-	4.44	0.51	1.81	2.25
Dominica	72	0.23	-	-	845	826	11 872	11 533	-2.69	2.56	-6.80	2.26
Dominican Rep.	10 627	1.08	73.69	5.84	157 601	188 226	15 328	17 712	6.93	6.66	4.67	6.98
Grenada	111	0.52	72.39	-	1 660	1 873	15 143	16 801	6.44	3.74	4.44	4.14
Haiti	11 123	1.27	63.29	13.78	18 870	19 657	1 764	1 767	1.22	1.45	1.17	1.48
Jamaica	2 935	0.48	74.27	8.00	27 380	28 580	9 471	9 738	0.92	1.38	1.00	1.94
St Kitts & Nevis	52	0.76	-	-	1 309	1 358	25 569	25 900	1.03	2.83	-1.98	2.92
St Lucia	182	0.51	75.91	20.71	2 513	2 776	14 030	15 261	-1.36	3.99	3.49	2.64
St Vincent & Grenadines	110	0.35	72.30	18.88	1 307	1 374	11 972	12 466	1.33	1.90	1.00	2.16
Trinidad & Tobago	1 390	0.42	73.25	2.69	39 990	36 516	29 183	26 273	1.82	-6.30	-2.31	-0.25

GDP per economic sector (%)				Inflation, consumer prices (%)	Internet users per 100 inhabitants	Mobile phone subscriptions per 100 inhabitants	Human Development Index (rank)	Global Innovation Index (rank)	SDG7.2: Share of modern renewables in final energy consumption (%)	GDP per unit energy use (constant 2017 PPP\$, per kg of oil equivalent)	Sustainable Development Report (rank)	Global Health Security Index (rank)	SDG15.2: Direct economic loss from disasters as a share of GDP (%)	Current health expenditure as a share of GDP (%)	
Agriculture	Services	Industry	Manufacturing (subset of industry)												
2019				2019	2019	2018	2018	2019	2017	2014	2019	2019	2018	2017	
<b>North America</b>															
1.86 <sup>-3</sup>	67.96 <sup>-3</sup>	23.30 <sup>-3</sup>	9.93 <sup>-3</sup>	1.95	91.00 <sup>-2</sup>	89.58	13	17	23.2	6.26 <sup>+1</sup>	20	5	–	10.57	Canada
0.92 <sup>-2</sup>	77.37 <sup>-2</sup>	18.21 <sup>-2</sup>	11.15 <sup>-2</sup>	1.81	88.50 <sup>-1</sup>	129.01	15	3	9.9	8.60 <sup>+1</sup>	35	1	–	17.06	United States of America
<b>Latin America</b>															
7.20	53.63	23.13	12.84	53.55	74.29 <sup>-2</sup>	132.09	48	73	10.8	11.60	45	25	0.0004 <sup>-1</sup>	9.12	Argentina
9.56	65.51	11.96	5.57	–	47.08 <sup>-2</sup>	85.53	103	–	–	–	109	135	0.0000 <sup>-7</sup>	5.64	Belize
12.22	50.72	25.21	10.49	1.84	44.29 <sup>-1</sup>	100.82	114	110	10.8	9.93	80	102	0.0004 <sup>-3</sup>	6.44	Bolivia
4.44	63.25	17.92	9.44	3.73	70.43 <sup>-1</sup>	98.84	79	66	42.3	10.53	57	22	–	9.47	Brazil
3.54	58.71	29.33	10.04	2.56	82.33 <sup>-2</sup>	134.44	42	51	23.5	11.78 <sup>+1</sup>	31	27	0.0005 <sup>-1</sup>	8.98	Chile
6.74	57.53	26.27	10.94	3.53	65.00	129.91	79	67	20.7	19.32	67	65	0.1800	7.23	Colombia
4.25	69.60	18.47	11.49	2.10	81.20	169.93	68	55	33.7	17.19	33	62	0.0000	7.33	Costa Rica
9.00	51.85	32.27	14.01	0.27	54.06 <sup>-3</sup>	92.32	85	99	15.1	13.59	46	45	0.0000	8.26	Ecuador
5.08	59.93	25.63	15.77	0.08	33.82 <sup>-2</sup>	146.92	124	108	16.6	12.37	89	65	0.0001 <sup>-4</sup>	7.23	El Salvador
9.37	62.66	21.92	13.79	3.70	65.00 <sup>-2</sup>	118.67	126	107	6.7	9.19	122	125	0.0007 <sup>-1</sup>	5.81	Guatemala
12.37	38.43	34.71	–	2.09	37.33 <sup>-2</sup>	82.97 <sup>-1</sup>	123	–	–	–	114	137	0.0339 <sup>-5</sup>	4.95	Guyana
10.72	57.57	27.39	16.34	4.37	31.70 <sup>-2</sup>	79.15	132	104	16.8	8.66	107	156	0.0288 <sup>-3</sup>	7.86	Honduras
3.47	60.51	30.15	17.31	3.64	70.10	95.23	76	56	9.5	12.55 <sup>+1</sup>	78	28	0.0000	5.52	Mexico
15.41	49.69	25.07	14.15	5.38	27.86 <sup>-2</sup>	115.10	126	120	11.8	9.13	82	73	0.0085 <sup>-5</sup>	8.65	Nicaragua
2.13	64.97	29.52	5.62	-0.36	63.60	137.00	67	75	18.1	25.33	90	68	0.0000	7.32	Panama
10.08	50.42	32.24	18.30	2.76	68.50	106.95	98	95	39.8	14.83	86	103	0.0060	6.65	Paraguay
6.89 <sup>-1</sup>	53.66 <sup>-1</sup>	31.47 <sup>-1</sup>	12.94 <sup>-1</sup>	2.14	60.00	123.76 <sup>-1</sup>	82	69	17.4	15.03	51	49	0.0030	5	Peru
10.39	50.16	32.74	14.29	22.00 <sup>-2</sup>	48.95 <sup>-2</sup>	130.60	98	–	17.5	14.55	88	100	–	6.23	Suriname
5.90	60.91	24.18	11.74	7.88	76.90	149.90	57	62	53.9	14.85	43	81	0.0003 <sup>-4</sup>	9.3	Uruguay
5.03 <sup>-5</sup>	51.67 <sup>-5</sup>	37.24 <sup>-5</sup>	12.07 <sup>-5</sup>	254.95 <sup>-3</sup>	72.00 <sup>-2</sup>	71.77	96	–	14.0	–	108	176	0.0000 <sup>-3</sup>	1.18	Venezuela
<b>Caribbean</b>															
1.76	66.75	21.44	2.49	1.21 <sup>-1</sup>	76.00 <sup>-2</sup>	192.82 <sup>-1</sup>	74	–	–	–	–	147	0.0003 <sup>-4</sup>	4.53	Antigua & Barbuda
0.89 <sup>-1</sup>	74.20 <sup>-1</sup>	13.00 <sup>-1</sup>	2.95 <sup>-1</sup>	2.49	85.00 <sup>-2</sup>	98.95	60	–	–	–	–	142	–	5.76	Bahamas
–	–	–	–	4.10	81.76 <sup>-2</sup>	114.89	56	–	–	–	–	133	0.0000	6.78	Barbados
3.78 <sup>-1</sup>	69.97 <sup>-1</sup>	25.12 <sup>-1</sup>	13.05 <sup>-1</sup>	–	61.80	47.39	72	–	17.6	–	56	110	–	11.71	Cuba
12.58	52.48	16.27	2.18	0.99 <sup>-1</sup>	69.62 <sup>-2</sup>	105.79	98	–	–	–	–	172	0.0002 <sup>-4</sup>	5.88	Dominica
5.16	60.33	26.93	–	1.81	74.82 <sup>-1</sup>	84.10	89	87	8.5	19.29	64	91	–	6.14	Dominican Rep.
5.84	66.33	13.14	3.23	0.80 <sup>-1</sup>	59.07 <sup>-2</sup>	102.08 <sup>-1</sup>	78	–	–	–	–	157	0.0002 <sup>-7</sup>	4.76	Grenada
19.5	12.10	70.79	–	12.48 <sup>-1</sup>	32.47 <sup>-1</sup>	57.53	169	–	4.1	4.49	156	138	–	8.04	Haiti
6.60	59.33	20.25	7.67	3.91	55.07 <sup>-2</sup>	101.03	96	81	10.7	9.66	74	147	0.0000 <sup>-4</sup>	5.99	Jamaica
1.31	67.78	26.15	5.68	-2.04	80.71 <sup>-2</sup>	147.71 <sup>-1</sup>	73	–	–	–	–	163	0.0000 <sup>-5</sup>	5.04	St Kitts & Nevis
2.01	75.18	9.97	3.41	1.94 <sup>-1</sup>	50.82 <sup>-2</sup>	101.68	–	–	–	–	–	108	0.0001 <sup>-7</sup>	4.55	St Lucia
7.15	62.60	14.27	4.48	2.32 <sup>-1</sup>	20.69 <sup>-3</sup>	96.07	–	–	–	–	–	123	0.0001 <sup>-4</sup>	4.49	St Vincent & Grenadines
1.03 <sup>-1</sup>	55.11 <sup>-1</sup>	42.00 <sup>-1</sup>	18.87 <sup>-1</sup>	1.02 <sup>-1</sup>	77.33 <sup>-2</sup>	141.93	63	91	0	2.01	85	99	–	6.98	Trinidad & Tobago

**Table A1: Socio-economic indicators, various years**

	Population (thousands)	Population growth (annual %)	Life expectancy at birth, total (years)	Unemployment, total (% of total labour force)	GDP (constant 2017 PPP\$ millions)		GDP per capita (constant 2017 PPP\$)		GDP growth (%)			
	2018	2018	2017	2019	2015	2018	2015	2018	2015	2016	2017	2018
	<b>European Union</b>											
Austria	8 891	0.56	81.64	4.67	459 487	492 304	53 165	55 687	1.01	2.08	2.48	2.42
Belgium	11 482	0.41	81.44	5.59	557 978	585 591	49 492	51 246	2.03	1.48	1.90	1.49
Bulgaria	7 052	-0.73	74.81	4.34	140 680	155 826	19 599	22 181	3.99	3.81	3.51	3.08
Croatia	4 156	-0.86	77.83	6.93	102 776	112 651	24 449	27 558	2.44	3.48	3.14	2.69
Cyprus	1 189	0.81	80.67	7.27	29 139	33 778	34 376	38 822	3.37	6.75	4.36	4.06
Czech Rep.	10 666	0.29	79.48	1.93	381 419	419 380	36 167	39 453	5.31	2.45	4.35	2.85
Denmark	5 752	0.56	81.00	4.91	301 332	325 039	53 019	56 103	2.34	3.25	2.04	2.39
Estonia	1 323	0.27	77.64	5.11	41 053	46 676	31 209	35 308	1.84	2.63	5.75	4.76
Finland	5 523	0.18	81.43	6.59	246 978	265 800	45 073	48 191	0.54	2.71	3.10	1.63
France	64 991	0.18	82.52	8.43	2 898 403	3 051 034	43 553	45 561	1.11	1.10	2.29	1.79
Germany	83 124	0.33	80.99	3.04	4 183 097	4 448 723	51 209	53 660	1.74	2.23	2.47	1.53
Greece	10 522	-0.25	81.39	17.24	308 794	318 895	28 537	29 712	-0.44	-0.19	1.51	1.93
Hungary	9 708	-0.20	76.06	3.40	271 091	303 755	27 541	31 073	3.85	2.20	4.32	5.09
Ireland	4 819	0.95	81.96	4.93	334 984	406 278	71 243	83 471	25.16	3.68	8.15	8.17
Italy	60 627	-0.17	83.24	9.89	2 456 237	2 549 692	40 445	42 198	0.78	1.29	1.67	0.80
Latvia	1 928	-0.81	74.68	6.52	52 384	57 703	26 490	29 942	3.26	1.77	3.79	4.28
Lithuania	2 801	-1.38	74.67	6.35	89 475	99 147	30 801	35 390	2.03	2.56	4.25	3.64
Luxembourg	604	1.89	82.69	5.36	63 199	69 373	110 952	114 110	4.31	4.57	1.80	3.11
Malta	439	3.26	82.45	3.47	17 259	20 870	38 781	43 064	10.86	5.83	6.47	7.31
Netherlands	17 060	0.58	81.56	3.20	901 601	972 810	53 223	56 455	1.96	2.19	2.91	2.60
Poland	37 922	0.01	77.85	3.47	1 058 728	1 206 294	27 871	31 766	3.84	3.06	4.94	5.35
Portugal	10 256	-0.18	81.12	6.33	322 734	349 784	31 158	34 013	1.79	2.02	3.51	2.64
Romania	19 506	-0.58	75.31	3.98	474 471	556 242	23 944	28 565	3.87	4.80	7.11	4.44
Slovakia	5 453	0.14	77.17	5.56	159 751	174 664	29 454	32 067	4.82	2.12	3.05	3.90
Slovenia	2 078	0.05	81.18	4.20	70 056	78 854	33 950	38 022	2.21	3.12	4.83	4.12
Spain	46 693	0.28	83.33	13.96	1 739 402	1 887 304	37 451	40 329	3.84	3.03	2.89	2.35
Sweden	9 972	1.24	82.31	6.48	506 662	540 777	51 705	53 146	4.49	2.07	2.57	1.95
United Kingdom	67 142	0.65	81.16	3.85	2 924 553	3 077 765	44 913	46 310	2.36	1.92	1.89	1.34
<b>Southeast Europe</b>												
Albania	2 883	-0.25	78.33	12.33	34 931	38 986	12 126	13 601	2.22	3.31	3.80	4.07
Bosnia & Herzegovina	3 324	-0.83	77.13	18.42	43 874	47 930	12 794	14 420	3.09	3.15	2.12	3.72
Montenegro	628	-	76.67	14.88	11 331	12 836	18 212	20 629	3.39	2.95	4.72	5.08
North Macedonia	2 083	0.05	75.59	17.76	31 099	33 211	14 956	15 944	3.86	2.85	1.08	2.72
Serbia	8 803	-0.55	76.09	12.69	110 077	121 184	15 514	17 355	1.78	3.34	2.05	4.39
<b>European Free Trade Assoc.</b>												
Iceland	337	2.92	82.20	2.84	17 116	19 808	51 739	56 158	4.75	6.63	4.55	3.81
Liechtenstein	38	0.29	82.26	-	-	-	-	-	-	-	-	-
Norway	5 338	0.71	82.51	3.35	321 153	336 419	61 896	63 333	1.97	1.07	2.32	1.29
Switzerland	8 526	0.76	83.60	4.58	547 978	583 056	66 162	68 479	1.33	1.72	1.80	2.75

GDP per economic sector (%)				Inflation, consumer prices (%)	Internet users per 100 inhabitants	Mobile phone subscriptions per 100 inhabitants	Human Development Index (rank)	Global Innovation Index (rank)	SDG7.2: Share of modern renewables in final energy consumption (%)	GDP per unit energy use (constant 2017 PPP\$ per kg of oil equivalent)	Sustainable Development Report (rank)	Global Health Security Index (rank)	SDG15.2: Direct economic loss from disasters as a share of GDP (%)	Current health expenditure as a share of GDP (%)	
Agriculture	Services	Industry	Manufacturing (subset of industry)												
2019				2019	2019	2018	2018	2019	2017	2014	2019	2019	2018	2017	
<b>European Union</b>															
1.13	62.55	25.71	16.74	1.53	87.80	123.54	20	21	33.3	13.99 <sup>+1</sup>	5	26	–	10.4	Austria
0.43	69.74	19.03	12.00	1.44	90.40	99.70	17	23	9.6	10.56 <sup>+1</sup>	16	19	–	10.34	Belgium
3.19	60.68	22.30	–	3.10	67.90	118.94	52	40	17.1	7.56	36	61	0.0010	8.1	Bulgaria
2.78	59.09	20.17	12.02	0.77	79.10	105.58	46	44	29.8	12.47	22	38	0.0052 <sup>-1</sup>	6.79	Croatia
2.04	71.86	13.01	4.93	0.25	86.10	138.90	31	28	10.4	14.29	61	77	0.0000	6.68	Cyprus
1.88	56.21	31.99	22.42	2.85	80.90	119.11	26	26	14.5	9.37 <sup>+1</sup>	7	42	0.0014 <sup>-1</sup>	7.23	Czech Rep.
1.41	64.85	20.92	13.07	0.76	98.00	125.12	11	7	36.5	18.82 <sup>+1</sup>	1	8	–	10.11	Denmark
2.88	61.38	22.74	12.90	2.28	89.50	145.44	30	24	27.0	7.48 <sup>+1</sup>	10	29	0.0001 <sup>-1</sup>	6.43	Estonia
2.22	60.35	23.97	14.39	1.02	89.60	129.47	12	6	44.4	7.61 <sup>+1</sup>	3	10	0.0002 <sup>-1</sup>	9.21	Finland
1.60	70.19	17.14	9.82	1.11	83.30	108.36	26	16	14.5	11.80 <sup>+1</sup>	4	11	0.0003 <sup>-1</sup>	11.31	France
0.82	62.39	26.82	19.44	1.45	88.10	129.32	4	9	15.3	13.41 <sup>+1</sup>	6	14	–	11.25	Germany
3.65	68.07	15.28	9.52	0.25	75.70	115.67	32	41	16.1	13.08 <sup>+1</sup>	50	37	–	8.04	Greece
3.47	55.29	25.98	18.23	3.34	80.40	103.45	43	33	14.3	11.32 <sup>+1</sup>	25	35	–	6.88	Hungary
0.90	56.72	35.18	30.84	0.94	84.52 <sup>-1</sup>	103.17	3	12	10.2	25.26 <sup>+1</sup>	19	23	0.0000 <sup>-1</sup>	7.18	Ireland
1.93	66.27	21.42	14.91	0.61	74.39 <sup>-1</sup>	137.47	29	30	16.4	16.30 <sup>+1</sup>	30	31	–	8.84	Italy
3.72	64.09	19.21	10.18	2.81	86.10	107.35	39	34	42.6	11.69	24	17	–	5.96	Latvia
2.96	61.56	25.27	16.17	2.33	81.60	163.87	34	38	33.6	12.53	32	33	–	6.46	Lithuania
0.23	79.16	11.32	4.55	1.74	97.06 <sup>-1</sup>	132.16	21	18	15.4	16.94 <sup>+1</sup>	34	67	–	5.48	Luxembourg
0.80	75.79	12.11	7.18	1.64	85.80	140.20	28	27	7.4	20.11	28	98	–	9.34	Malta
1.66	69.75	17.80	10.96	2.63	93.30	123.73	10	4	6.5	12.57 <sup>+1</sup>	9	3	–	10.1	Netherlands
2.15	56.90	28.83	16.89	2.23	84.50	134.75	32	39	11.1	11.19 <sup>+1</sup>	29	32	–	6.54	Poland
2.07	65.52	18.89	11.69	0.34	75.30	115.63	40	32	24.4	14.62 <sup>+1</sup>	26	20	–	8.97	Portugal
4.10	58.16	28.16	16.98	3.83	73.70	116.25	52	50	23.4	14.41	42	60	0.0590	5.16	Romania
2.53	58.10	28.87	18.49	2.66	82.90	132.80	36	37	12.4	9.81 <sup>+1</sup>	27	52	–	6.74	Slovakia
1.98	56.87	28.40	20.22	1.63	83.10	118.67	24	31	20.4	10.69 <sup>+1</sup>	12	12	0.0010	8.19	Slovenia
2.65	67.87	20.20	11.11	0.70	90.70	115.99	25	29	15.6	14.56 <sup>+1</sup>	21	15	–	8.87	Spain
1.44	65.25	22.20	13.05	1.78	94.50	126.83	8	2	52.3	10.13 <sup>+1</sup>	2	7	0.0010	11.02	Sweden
0.61	71.26	17.41	8.60	1.74	92.50	118.37	15	5	10.0	16.25 <sup>+1</sup>	13	2	–	9.63	United Kingdom
<b>Southeast Europe</b>															
18.63	48.58	20.06	6.28	1.41	69.60	94.18	69	83	37.2	14.63	60	39	0.0000	–	Albania
6.10	55.49	23.74	12.70	0.56	69.90	104.13	75	76	18.8	5.44	69	79	–	8.93	Bosnia & Herzegovina
6.73 <sup>-1</sup>	59.17 <sup>-1</sup>	15.93 <sup>-1</sup>	3.98 <sup>-1</sup>	2.61 <sup>-1</sup>	73.50	180.69	52	45	38.1	11.46	87	68	0.0004 <sup>-3</sup>	–	Montenegro
8.77	54.58	23.95	–	0.77	79.17 <sup>-1</sup>	94.53	82	59	19.1	11.42	70	90	–	6.06	North Macedonia
6.16	51.21	25.65	–	1.85	77.40	95.78	63	57	19.9	8.16	44	41	0.0035 <sup>-2</sup>	8.43	Serbia
<b>European Free Trade Assoc.</b>															
4.34	65.50	19.39	8.68	3.01	99.01 <sup>-1</sup>	126.14	6	20	76.7	2.96 <sup>+1</sup>	14	58	–	8.33	Iceland
0.13 <sup>-2</sup>	51.01 <sup>-2</sup>	44.64 <sup>-2</sup>	39.36 <sup>-2</sup>	–	98.10 <sup>-2</sup>	124.70	18	–	–	–	–	71	–	–	Liechtenstein
1.93	57.72	29.10	6.25	2.17	98.00	107.17	1	19	61.2	10.64 <sup>+1</sup>	8	16	0.0003 <sup>-1</sup>	10.45	Norway
0.65	70.91	25.60	18.73	0.36	93.10	126.77	2	1	24.7	22.35 <sup>+1</sup>	17	13	0.0016 <sup>-1</sup>	12.35	Switzerland

**Table A1: Socio-economic indicators, various years**

	Population (thousands)	Population growth (annual %)	Life expectancy at birth, total (years)	Unemployment, total (% of total labour force)	GDP (constant 2017 PPP\$ millions)		GDP per capita (constant 2017 PPP\$)		GDP growth (%)			
	2018	2018	2017	2019	2015	2018	2015	2018	2015	2016	2017	2018
	<b>Eastern Europe &amp; West Asia</b>											
Armenia	2 952	0.24	74.80	16.99	33 121	37 532	11 321	12 715	3.20	0.20	7.50	5.20
Azerbaijan	9 950	0.89	72.69	5.51	143 330	141 241	14 854	14 210	1.05	-3.06	0.15	1.50
Belarus	9 453	-0.14	74.13	4.59	173 731	179 098	18 308	18 885	-3.83	-2.53	2.53	3.15
Georgia	4 003	0.08	73.41	14.40	46 958	53 130	12 605	14 257	3.02	2.91	4.84	4.87
Iran Islamic Rep.	81 800	1.39	76.27	11.38	996 703	–	12 698	–	-1.32	13.40	3.76	–
Israel	8 382	1.94	82.60	3.86	315 372	351 255	37 633	39 543	2.29	3.98	3.54	3.45
Moldova, Rep.	4 052	-0.09	71.72	5.47	29 368	33 482	10 361	12 373	-0.34	4.41	4.69	4.30
Russian Federation	145 734	-0.01	72.12	4.59	3 743 058	3 915 637	25 566	26 668	-1.97	0.19	1.83	2.54
Turkey	82 340	1.49	77.16	13.49	2 042 981	2 329 555	26 015	28 299	6.09	3.18	7.47	2.83
Ukraine	44 246	-0.47	71.78	8.88	481 451	521 525	11 237	12 338	-9.77	2.24	2.47	3.41
<b>Sub-Saharan Africa</b>												
Angola	30 810	3.28	60.38	6.89	224 090	213 620	8 036	6 934	0.94	-2.58	-0.15	-2.00
Benin	11 485	2.73	61.17	2.23	31 156	36 302	2 946	3 161	1.78	3.34	5.67	6.70
Botswana	2 254	2.20	68.81	18.19	35 446	39 750	16 714	17 634	-1.70	4.30	2.90	4.48
Burkina Faso	19 751	2.87	60.77	6.26	35 040	42 101	1 935	2 132	3.91	5.96	6.16	6.82
Burundi	11 175	3.17	60.90	1.43	8 384	8 510	825	762	-3.90	-0.60	0.50	1.61
Cameroon	25 216	2.61	58.51	3.38	80 582	90 868	3 459	3 604	5.65	4.65	3.55	4.06
Cabo Verde	544	1.16	72.57	12.25	3 288	3 732	6 267	6 864	1.01	4.71	3.70	4.53
Central African Rep.	4 666	1.52	52.24	3.68	3 832	4 354	853	933	4.34	4.75	4.53	3.79
Chad	15 478	3.02	53.71	1.89	26 206	24 398	1 857	1 576	2.77	-6.26	-2.99	2.37
Comoros	832	2.24	63.91	4.34	2 301	2 553	2 960	3 067	1.12	3.32	3.82	3.43
Congo	5 244	2.58	63.95	9.47	18 465	17 906	3 802	3 414	2.65	-2.80	-1.80	1.60
Côte d'Ivoire	25 069	2.55	57.02	3.32	102 593	126 071	4 417	5 029	8.84	7.18	7.36	6.79
Congo, Dem. Rep.	84 068	3.23	60.03	4.24	81 219	91 289	1 065	1 086	6.92	2.40	3.73	5.82
Djibouti	959	1.56	65.89	10.30	4 103	5 000	4 489	5 214	7.70	6.65	5.40	8.41
Equatorial Guinea	1 309	3.65	58.06	6.43	33 086	26 651	28 314	20 360	-9.11	-8.82	-5.67	-6.36
Eritrea	3 453	–	65.54	5.14	–	–	–	–	–	–	–	–
Eswatini	1 136	1.01	58.32	22.08	9 247	9 778	8 375	8 606	2.31	1.27	2.02	2.35
Ethiopia	109 224	2.62	65.87	2.08	179 395	229 755	1 779	2 104	10.39	9.43	9.56	6.82
Gabon	2 119	2.60	65.84	20.00	30 207	31 245	15 509	14 743	3.88	2.09	0.48	0.84
Gambia	2 280	2.95	61.44	9.06	4 294	4 889	2 059	2 144	4.06	1.94	4.82	6.55
Ghana	29 767	2.19	63.46	4.33	130 068	154 623	4 670	5 194	2.18	3.45	8.14	6.26
Guinea	12 414	2.83	60.71	4.30	23 889	31 016	2 090	2 498	3.83	10.82	10.34	6.18
Guinea-Bissau	1 874	2.49	57.67	2.47	3 127	3 653	1 800	1 949	6.13	6.26	5.92	3.80
Kenya	51 393	2.31	65.91	2.64	183 123	216 046	3 825	4 204	5.72	5.88	4.81	6.32
Lesotho	2 108	0.80	52.95	23.41	5 615	5 794	2 727	2 749	2.65	5.05	-1.32	-0.45
Liberia	4 819	2.45	63.30	2.81	7 068	7 214	1 580	1 497	0.00	-1.60	2.47	1.22
Madagascar	26 262	2.67	66.31	1.76	37 484	42 364	1 547	1 613	3.13	3.99	3.93	4.56
Malawi	18 143	2.64	63.28	5.65	17 201	18 915	1 027	1 043	2.80	2.48	4.00	3.17
Mali	19 078	3.01	58.45	7.22	37 330	43 556	2 141	2 283	6.17	5.76	5.42	4.65
Mauritius	1 267	0.05	74.51	6.67	25 123	28 100	19 897	22 208	3.55	3.84	3.81	3.76
Mozambique	29 496	2.91	59.31	3.24	34 144	38 036	1 263	1 290	6.72	3.82	3.74	3.43
Namibia	2 448	1.88	63.02	20.27	24 278	24 316	10 488	9 932	4.53	-0.28	-0.26	0.70
Niger	22 443	3.82	61.60	0.47	22 614	26 852	1 131	1 196	4.37	5.69	5.00	7.00
Nigeria	195 875	2.59	53.95	8.10	998 931	1 009 749	5 515	5 155	2.65	-1.62	0.81	1.92
Rwanda	12 302	2.64	68.34	1.03	21 474	25 693	1 889	2 089	8.87	5.98	3.99	8.57
Sao Tome & Principe	211	1.88	69.93	13.37	749	832	3 758	3 945	3.80	4.17	3.87	2.66

GDP per economic sector (%)				Inflation, consumer prices (%)	Internet users per 100 inhabitants	Mobile phone subscriptions per 100 inhabitants	Human Development Index (rank)	Global Innovation Index (rank)	SDG7.2: Share of modern renewables in final energy consumption (%)	GDP per unit energy use (constant 2017 PPP\$ per kg of oil equivalent)	Sustainable Development Report (rank)	Global Health Security Index (rank)	SDG15.2: Direct economic loss from disasters as a share of GDP (%)	Current health expenditure as a share of GDP (%)	
Agriculture	Services	Industry	Manufacturing (subset of industry)												
2019				2019	2019	2018	2018	2019	2017	2014	2019	2019	2018	2017	
Eastern Europe & West Asia															
11.99	54.23	24.29	11.74	1.44	68.20 <sup>-1</sup>	121.26	81	64	12.5	10.85	75	44	0.0012 <sup>-1</sup>	10.36	Armenia
5.72	37.36	48.69	5.01	2.61	79.80 <sup>-1</sup>	103.92	87	84	1.9	9.9	59	117	-	6.65	Azerbaijan
6.78	48.82	31.30	21.32	5.60	82.80	122.93	50	72	7.3	6.51	23	108	-	5.93	Belarus
6.22	60.45	19.96	8.79	4.85	68.80	136.38	70	48	28.7	10.38	73	42	0.0000 <sup>-1</sup>	7.6	Georgia
9.50 <sup>-2</sup>	54.35 <sup>-2</sup>	34.91 <sup>-2</sup>	11.99 <sup>-2</sup>	39.91	70.00 <sup>-1</sup>	108.46	65	61	0.8	4.26	58	97	0.0156 <sup>-7</sup>	8.66	Iran, Islamic Rep.
1.14 <sup>-1</sup>	69.77 <sup>-1</sup>	19.42 <sup>-1</sup>	11.96 <sup>-1</sup>	0.84	86.80	127.66	22	10	3.8	13.55 <sup>+1</sup>	49	54	-	7.41	Israel
9.86	54.25	22.80	10.89	4.84	71.00 <sup>-3</sup>	88.01	107	58	26.1	8.93	37	78	-	7.01	Moldova, Rep.
3.45	54.03	32.17	13.09	4.47	82.60	157.43	49	46	3.3	5.37	55	63	-	5.34	Russian Federation
6.43	55.91	27.71	18.96	15.18	74.00	97.30	59	49	11.4	15.75 <sup>+1</sup>	79	40	0.0000 <sup>-4</sup>	4.22	Turkey
9.01	54.43	22.56	10.84	7.89	62.55 <sup>-1</sup>	127.75	88	47	6.5	5.05	41	94	0.0000	7	Ukraine
Sub-Saharan Africa															
8.61 <sup>-1</sup>	43.21 <sup>-1</sup>	47.93 <sup>-1</sup>	6.06 <sup>-1</sup>	17.15	14.34 <sup>-2</sup>	43.13	149	-	7.2	15.13	149	170	0.0010	2.79	Angola
26.88	48.03	16.31	9.87	-0.92	20.00 <sup>-2</sup>	82.38	163	123	7.9	7.14	151	150	-	3.72	Benin
1.95	60.62	28.30	5.25	2.77	47.00 <sup>-2</sup>	150.01	94	93	0.0	13.27	120	139	0.0000	6.13	Botswana
20.30	43.96	22.36	9.91	-3.23	16.00 <sup>-2</sup>	97.91	182	117	-	-	141	145	0.0069 <sup>-3</sup>	6.92	Burkina Faso
28.90	47.94	10.96	-	-0.69	2.66 <sup>-2</sup>	56.53	185	128	-	-	145	177	0.0067 <sup>-1</sup>	7.52	Burundi
15.38	49.25	25.05	-	2.45	23.20 <sup>-2</sup>	73.19	150	115	18.3	10.03	127	115	-	4.67	Cameroon
4.80	61.39	19.61	6.64	1.11	57.16 <sup>-2</sup>	112.24	126	-	-	-	96	146	0.0000 <sup>-1</sup>	5.17	Cabo Verde
32.43	43.57	21.13	18.64	-	4.34 <sup>-2</sup>	27.41	188	-	-	-	162	159	-	5.82	Central African Rep.
42.59	40.47	14.27	2.85	-0.97	6.50 <sup>-2</sup>	45.12	187	-	-	-	161	150	-	4.49	Chad
32.64 <sup>-1</sup>	53.53 <sup>-1</sup>	8.86 <sup>-1</sup>	-	-10.29	8.48 <sup>-2</sup>	59.94	156	-	-	-	137	160	0.0000 <sup>-5</sup>	7.38	Comoros
6.32	35.42	58.25	-	2.21	8.65 <sup>-2</sup>	95.34	138	-	15.2	6.84	132	173	-	2.93	Congo
15.69	53.88	23.18	11.52	-1.11	36.50	134.86	165	103	8.1	6.79	129	105	-	4.45	Côte d'Ivoire
19.97	35.37	40.73	20.01	2.89 <sup>-3</sup>	8.62 <sup>-2</sup>	43.38	179	-	17.4	2.65	160	161	-	3.98	Congo, Dem. Rep.
1.43	75.20	17.09	3.35	3.32	55.68 <sup>-2</sup>	41.20	171	-	-	-	148	175	0.0001 <sup>-7</sup>	3.32	Djibouti
2.53	46.73	50.48	19.58	1.24	26.24 <sup>-2</sup>	45.17	144	-	-	-	-	195	0.0001 <sup>-1</sup>	3.11	Equatorial Guinea
-	-	-	-	-	1.31 <sup>-2</sup>	20.36 <sup>-1</sup>	182	-	4.3	-	-	178	-	2.87	Eritrea
8.77	53.15	33.80	29.39	4.81 <sup>-1</sup>	47.00 <sup>-2</sup>	93.53 <sup>-1</sup>	138	-	-	-	142	139	0.0035 <sup>-1</sup>	6.93	Eswatini
33.88	36.87	24.77	5.58	15.81	15.37 <sup>-3</sup>	37.22 <sup>-1</sup>	173	111	2.8	3.36	135	84	0.0000 <sup>-2</sup>	3.5	Ethiopia
5.71	40.11	48.47	19.02	2.46	62.00 <sup>-2</sup>	138.28	115	-	56.9	5.73	99	186	-	2.78	Gabon
16.79	58.52	16.35	4.37	7.12	19.84 <sup>-2</sup>	139.53	174	-	-	-	131	117	0.0070	3.28	Gambia
17.31	44.14	31.99	10.44	7.18	39.00 <sup>-2</sup>	137.52	142	106	14.0	14.09	104	105	0.0000	3.26	Ghana
20.34	41.54	21.02	-	9.47	21.80 <sup>-1</sup>	96.77	174	125	-	-	138	125	-	4.12	Guinea
52.54	37.17	13.20	-	-6.51	3.93 <sup>-2</sup>	78.99	178	-	-	-	-	186	0.0000	7.24	Guinea-Bissau
34.15	43.22	16.15	7.54	4.69 <sup>-1</sup>	22.60	96.32	147	77	3.5	7.33	125	55	0.0000 <sup>-1</sup>	4.8	Kenya
4.38	51.45	30.47	15.95	5.19	32.50 <sup>-3</sup>	113.83 <sup>-1</sup>	164	-	-	-	150	144	-	8.76	Lesotho
39.11	48.92	11.97	1.69	23.56 <sup>-1</sup>	7.98 <sup>-2</sup>	56.57 <sup>-1</sup>	176	-	-	-	157	111	-	8.16	Liberia
23.16	52.45	17.13	-	5.63	9.80 <sup>-2</sup>	40.57	162	121	-	-	158	86	0.0310	5.5	Madagascar
25.54	54.38	12.92	-	9.37	11.47 <sup>-3</sup>	39.01	172	118	-	-	146	154	0.0180	9.65	Malawi
37.32	33.12	20.84	3.01	-1.66	13.00 <sup>-2</sup>	115.08	184	112	-	-	152	147	0.0232 <sup>-1</sup>	3.79	Mali
2.86	67.25	17.37	11.03	0.41	64.00	151.36	66	82	9.1	17.31	105	114	0.0001 <sup>-4</sup>	5.72	Mauritius
24.04	43.17	23.59	-	2.78	10.00 <sup>-2</sup>	47.72	180	119	30.0	2.75	136	153	0.0230	4.94	Mozambique
6.61	59.31	26.59	11.74	3.73	51.00 <sup>-2</sup>	112.70	130	101	20.1	12.86	119	104	-	8.55	Namibia
38.18	38.07	18.44	6.18	-2.49	5.25 <sup>-1</sup>	40.64 <sup>-1</sup>	189	127	0.7	7.51	154	132	0.0230	7.74	Niger
21.91	49.73	27.38	11.52	11.40	7.50 <sup>-2</sup>	88.18	158	114	5.5	7.22	159	96	-	3.76	Nigeria
24.07	49.27	18.00	8.19	3.35	21.77 <sup>-2</sup>	78.85	157	94	-	-	126	117	0.0016 <sup>-2</sup>	6.57	Rwanda
11.35 <sup>-1</sup>	71.76 <sup>-1</sup>	14.77 <sup>-1</sup>	7.44 <sup>-1</sup>	7.86 <sup>-1</sup>	29.93 <sup>-2</sup>	77.06	137	-	-	-	95	192	-	6.23	Sao Tome & Principe

**Table A1: Socio-economic indicators, various years**

	Population (thousands)	Population growth (annual %)	Life expectancy at birth, total (years)	Unemployment, total (% of total labour force)	GDP (constant 2017 PPP\$ millions)		GDP per capita (constant 2017 PPP\$)		GDP growth (%)			
	2018	2018	2017	2019	2015	2018	2015	2018	2015	2016	2017	2018
Senegal	15 854	2.78	67.38	6.60	43 246	52 554	2 966	3 315	6.37	6.36	7.41	6.38
Seychelles	97	0.95	74.30	–	2 392	2 709	25 609	27 997	4.94	4.56	4.38	3.75
Sierra Leone	7 650	2.14	53.90	4.43	11 130	12 724	1 552	1 663	-20.60	6.06	4.21	3.45
Somalia	15 008	2.83	56.71	11.35	–	–	–	–	–	–	–	–
South Africa	57 793	1.36	63.54	28.18	711 163	729 800	12 840	12 631	1.19	0.40	1.41	0.79
South Sudan	10 976	0.60	57.37	12.24	–	–	–	–	-10.79	–	–	–
Togo	7 889	2.45	60.49	2.04	10 598	12 248	1 447	1 553	5.74	5.56	4.36	4.91
Uganda	42 729	3.72	62.52	1.84	78 452	90 663	2 052	2 122	5.19	4.78	3.90	6.16
Tanzania	56 313	2.98	64.48	1.98	117 662	141 586	2 354	2 590	6.16	6.87	6.79	5.44
Zambia	17 352	2.91	63.04	11.43	54 681	61 105	3 444	3 522	2.92	3.78	3.50	4.03
Zimbabwe	14 439	1.41	60.81	4.95	40 867	45 195	2 958	3 130	1.78	0.76	4.70	4.83
<b>Arab States</b>												
Algeria	42 228	2.01	76.50	11.70	457 300	484 761	11 511	11 479	3.70	3.20	1.30	1.40
Bahrain	1 569	4.92	77.03	0.71	66 266	72 574	48 304	46 242	2.86	3.47	3.81	1.96
Egypt	98 424	2.03	71.66	10.76	977 159	1 118 716	10 570	11 366	4.37	4.35	4.18	5.31
Iraq	38 434	2.32	70.29	12.82	366 774	409 706	10 311	10 660	2.48	15.21	-2.49	-0.56
Jordan	9 965	1.79	74.29	14.72	92 393	98 106	9 971	9 854	2.39	2.00	2.12	1.94
Kuwait	4 137	1.98	75.31	2.18	210 322	208 846	54 834	50 479	0.59	2.93	-4.71	1.25
Lebanon	6 859	0.54	78.83	6.23	106 478	106 926	16 299	15 612	0.21	1.53	0.85	-1.93
Libya	6 679	1.48	72.52	18.56	70 745	100 299	11 022	15 018	-8.86	-2.80	26.68	15.13
Mauritania	4 403	2.78	64.46	9.55	20 747	22 203	5 127	5 042	5.38	1.26	3.50	2.12
Morocco	36 029	1.25	76.22	9.02	250 892	272 192	7 130	7 438	4.54	1.06	4.23	2.99
Oman	4 829	3.45	77.39	2.67	128 842	138 093	30 193	28 594	4.68	4.96	0.35	1.76
Palestine	4 863	2.53	73.74	26.17	23 738	25 869	5 559	5 662	3.43	4.71	3.14	0.91
Qatar	2 782	2.07	79.98	0.09	249 659	262 876	97 306	94 503	3.66	2.13	1.58	1.49
Saudi Arabia	33 703	1.80	74.87	5.93	1 551 667	1 604 007	48 921	47 597	4.11	1.67	-0.74	2.43
Sudan	41 802	2.39	64.88	16.53	163 074	173 919	4 192	4 161	4.91	4.70	4.28	-2.32
Syrian Arab Rep.	16 945	-0.95	70.97	8.37	–	–	–	–	–	–	–	–
Tunisia	11 565	1.15	76.31	16.02	117 610	124 485	10 520	10 764	1.19	1.16	1.92	2.66
United Arab Emirates	9 631	1.50	77.65	2.35	604 115	644 969	65 219	66 968	5.11	3.06	2.37	1.19
Yemen	28 499	2.36	66.09	12.91	–	–	–	–	-27.99	-9.38	-5.07	0.75
<b>Central Asia</b>												
Kazakhstan	18 320	1.31	72.95	4.59	426 122	466 860	24 290	25 544	1.20	1.10	4.10	4.10
Kyrgyzstan	6 304	1.88	71.20	6.33	28 624	32 456	4 805	5 133	3.88	4.34	4.74	3.76
Mongolia	3 170	1.80	69.51	6.01	33 052	37 775	11 023	11 916	2.38	1.17	5.34	7.25
Tajikistan	9 101	2.45	70.65	11.02	23 854	29 439	2 822	3 235	6.01	6.87	7.62	7.30
Turkmenistan	5 851	1.61	67.96	3.91	72 313	86 859	12 994	14 845	6.50	6.20	6.50	6.20
Uzbekistan	32 476	1.73	71.39	5.92	190 508	222 634	6 087	6 755	7.45	6.09	4.46	5.45
<b>South Asia</b>												
Afghanistan	37 172	2.38	64.13	11.12	76 149	81 416	2 213	2 190	1.45	2.26	2.67	1.84
Bangladesh	161 377	1.05	72.05	4.19	578 165	716 651	3 700	4 441	6.55	7.11	7.28	7.86
Bhutan	754	1.18	71.13	2.34	7 342	8 559	10 086	11 345	6.64	8.13	4.65	3.03
India	1 352 642	1.04	69.17	5.36	7 146 026	8 787 694	5 454	6 497	8.00	8.26	7.04	6.12
Maldives	516	3.81	78.33	6.14	7 862	9 545	17 283	18 509	2.88	6.34	6.80	6.89
Nepal	28 096	1.65	70.17	1.41	78 656	91 363	2 912	3 253	3.32	0.59	8.22	6.70
Pakistan	212 228	2.06	66.95	4.45	853 218	1 005 850	4 278	4 740	4.73	5.53	5.55	5.84
Sri Lanka	21 229	1.05	76.65	4.20	249 344	278 776	11 891	12 865	5.01	4.49	3.58	3.31



GDP per economic sector (%)				Inflation, consumer prices (%)	Internet users per 100 inhabitants	Mobile phone subscriptions per 100 inhabitants	Human Development Index (rank)	Global Innovation Index (rank)	SDG7.2: Share of modern renewables in final energy consumption (%)	GDP per unit energy use (constant 2017 PPP\$ per kg of oil equivalent)	Sustainable Development Report (rank)	Global Health Security Index (rank)	SDG15.2: Direct economic loss from disasters as a share of GDP (%)	Current health expenditure as a share of GDP (%)	
Agriculture	Services	Industry	Manufacturing (subset of industry)												
2019				2019	2019	2018	2018	2019	2017	2014	2019	2019	2018	2017	
14.79	51.44	24.38	15.66	1.76	46.00 <sup>-2</sup>	104.45	166	96	2.3	10.27	124	95	0.0000 <sup>3</sup>	4.13	Senegal
2.32	72.06	11.14	6.18	1.81	58.77 <sup>-2</sup>	184.30	62	-	-	-	-	133	0.0001 <sup>4</sup>	5.01	Seychelles
57.40	32.78	5.60	1.91	14.80	9.00 <sup>-2</sup>	88.47 <sup>-1</sup>	181	-	-	-	155	92	0.0025 <sup>3</sup>	13.42	Sierra Leone
-	-	-	-	-	2.00 <sup>-2</sup>	50.99	-	-	-	-	-	194	-	-	Somalia
1.88	61.20	26.00	11.78	4.12	56.17 <sup>-2</sup>	159.93	113	63	3.7	4.78	113	34	0.0001 <sup>2</sup>	8.11	South Africa
10.36 <sup>-4</sup>	56.55 <sup>-4</sup>	33.09 <sup>-4</sup>	3.53 <sup>-4</sup>	187.85 <sup>-2</sup>	7.98 <sup>-2</sup>	33.46	186	-	1.3	-	-	180	0.0000 <sup>-2</sup>	9.76	South Sudan
22.82	28.62	15.54	6.57	0.67	12.36 <sup>-2</sup>	77.89	167	126	13.8	3.04	144	129	0.0010	6.2	Togo
21.92	43.32	27.07	15.45	2.87	23.71 <sup>-2</sup>	57.27	159	102	-	-	140	63	0.0080	6.19	Uganda
28.74 <sup>-2</sup>	37.92 <sup>-2</sup>	25.10 <sup>-2</sup>	7.66 <sup>-2</sup>	3.46	13.50 <sup>-3</sup>	77.24	159	97	15.5	4.46	128	101	0.0007 <sup>-1</sup>	3.65	Tanzania
2.74	50.03	42.12	-	9.15	14.30 <sup>-1</sup>	89.16	143	124	27.6	5.27 <sup>-1</sup>	139	152	0.0004 <sup>2</sup>	4.47	Zambia
8.30 <sup>-1</sup>	61.28 <sup>-1</sup>	20.64 <sup>-1</sup>	10.59 <sup>-1</sup>	0.91 <sup>-2</sup>	27.06 <sup>-2</sup>	89.40	150	122	9.4	3.48 <sup>-1</sup>	121	92	-	6.64	Zimbabwe
															<b>Arab States</b>
11.97	45.94	37.41	24.28	1.95	49.00 <sup>-1</sup>	111.66	82	113	0.1	8.53	53	173	-	6.37	Algeria
0.28	54.93	42.42	17.91	2.08 <sup>-1</sup>	99.70	133.34	45	78	0.0	4.55	76	88	-	4.75	Bahrain
11.05	50.47	35.62	15.91	14.40 <sup>-1</sup>	57.30	95.29	116	92	3.9	12.51	92	87	0.0000 <sup>-1</sup>	5.29	Egypt
2.00	42.20	55.80	-	0.37 <sup>-1</sup>	75.00 <sup>-1</sup>	95.04	120	-	0.4	7.23	117	167	-	4.17	Iraq
5.63 <sup>-1</sup>	61.84 <sup>-1</sup>	27.58 <sup>-1</sup>	19.01 <sup>-1</sup>	0.76	66.79 <sup>-2</sup>	87.62	102	86	4.8	11.03	81	80	0.0000 <sup>-1</sup>	8.12	Jordan
0.44	54.13	59.59 <sup>-1</sup>	6.84 <sup>-1</sup>	1.09	99.50	171.61	57	60	0.0	6.17	106	59	0.0001 <sup>-7</sup>	5.29	Kuwait
5.29	75.91	12.83	-	3.01	78.18 <sup>-2</sup>	64.50	93	88	1.2	14.18	94	73	0.0000	8.2	Lebanon
-	-	-	-	2.61 <sup>-6</sup>	21.76 <sup>-2</sup>	91.48 <sup>-1</sup>	110	-	0.0	4.34	-	168	-	-	Libya
18.72	45.74	25.39	-	2.30	20.80 <sup>-2</sup>	103.71	161	-	-	-	134	157	-	4.4	Mauritania
11.38	50.03	26.03	-	0.20	74.40	124.17	121	74	7.0	12.64	72	68	0.0000	5.25	Morocco
2.51	52.64	46.73	-	0.13	92.40	133.37	47	80	0.0	5.06	83	73	-	3.85	Oman
3.16 <sup>-3</sup>	63.36 <sup>-3</sup>	19.56 <sup>-3</sup>	10.99 <sup>-3</sup>	1.58	70.60	89.98	119	-	-	-	-	-	0.0000 <sup>-1</sup>	-	Palestine
0.18	46.47	57.68	8.60	-0.67	99.70	141.86	41	65	0.0	5.46	91	82	-	2.61	Qatar
2.23	50.44	47.43	12.54	-2.09	95.70	122.57	36	68	0.0	6.98	98	47	-	5.23	Saudi Arabia
28.41	32.34	30.77	11.72	50.99	14.10 <sup>3</sup>	72.01	168	-	23.2	10.37	147	163	0.0050	6.34	Sudan
-	-	-	-	36.70 <sup>-7</sup>	34.25 <sup>-2</sup>	101.09	154	-	1.1	-	123	188	-	3.57	Syrian Arab Rep.
10.40 <sup>-1</sup>	59.23 <sup>-1</sup>	22.74 <sup>-1</sup>	14.31 <sup>-1</sup>	6.72	66.70	127.71	91	70	1.3	11.05	63	122	0.0010	7.23	Tunisia
0.73	53.11	46.16	8.72	-1.93	99.10	208.50	35	36	0.2	8.16	65	56	-	3.33	United Arab Emirates
4.26 <sup>-1</sup>	14.28 <sup>-1</sup>	30.31 <sup>-1</sup>	-	8.10 <sup>-5</sup>	26.72 <sup>-2</sup>	53.68	177	129	4.9	-	133	190	-	4.23	Yemen
															<b>Central Asia</b>
4.44	55.47	33.05	11.38	5.25	81.90	142.28	50	79	1.6	5.49	77	83	0.0000	3.13	Kazakhstan
12.09	50.24	27.61	14.30	1.13	38.00 <sup>-2</sup>	138.57	122	90	24.5	7.26	48	47	0.0020	6.19	Kyrgyzstan
11.01	39.03	39.08	9.61	7.30	51.10	133.18	92	53	1.7	6.01	100	46	0.0131 <sup>-1</sup>	4	Mongolia
19.20 <sup>-1</sup>	42.10 <sup>-1</sup>	27.40 <sup>-1</sup>	10.50 <sup>-1</sup>	6.00 <sup>-3</sup>	21.96 <sup>-2</sup>	111.53 <sup>-1</sup>	125	100	41.7	8.02	71	130	0.0010	7.23	Tajikistan
9.30 <sup>-4</sup>	-	56.97 <sup>-4</sup>	-	-	21.25 <sup>-2</sup>	162.86 <sup>-1</sup>	108	-	0.1	2.54	101	135	-	6.93	Turkmenistan
25.52	32.25	33.16	19.57	-	55.20 <sup>-1</sup>	71.52	108	-	2.4	3.85 <sup>-1</sup>	52	116	-	6.41	Uzbekistan
															<b>South Asia</b>
21.13	52.08	22.09	-	2.30	42.30 <sup>-3</sup>	59.12	170	-	-	-	153	130	0.0027 <sup>-1</sup>	11.78	Afghanistan
12.68	52.85	29.65	18.93	5.59	12.90	100.24	135	116	0.3	15.32	116	113	-	2.27	Bangladesh
15.89 <sup>-1</sup>	39.93 <sup>-1</sup>	38.30 <sup>-1</sup>	7.53 <sup>-1</sup>	2.73	48.11 <sup>-2</sup>	93.26	134	-	-	-	84	85	0.0010	3.19	Bhutan
15.96	49.88	24.88	13.72	7.66	20.10 <sup>-1</sup>	86.94	129	52	10.5	8.02	115	57	-	3.53	India
5.59 <sup>-1</sup>	67.90 <sup>-1</sup>	12.92 <sup>-1</sup>	2.10 <sup>-1</sup>	0.22	63.19 <sup>-2</sup>	166.36	104	-	-	-	47	121	-	9.03	Maldives
24.26	50.61	13.30	4.98	5.57	34.00 <sup>-2</sup>	139.45	147	109	6.7	6.51	103	111	0.0010	5.55	Nepal
22.04	53.86	18.34	12.46	10.58	17.10	72.56	152	105	6.9	9.06	130	105	0.0000	2.9	Pakistan
7.42	58.24	27.40	16.36	3.53	34.11 <sup>-2</sup>	142.65	71	89	22.8	22.17	93	120	0.0030	3.81	Sri Lanka

**Table A1: Socio-economic indicators, various years**

	Population (thousands)	Population growth (annual %)	Life expectancy at birth, total (years)	Unemployment, total (% of total labour force)	GDP (constant 2017 PPP\$ millions)		GDP per capita (constant 2017 PPP\$)		GDP growth (%)			
	2018	2018	2017	2019	2015	2018	2015	2018	2015	2016	2017	2018
<b>Southeast Asia</b>												
Brunei Darussalam	429	1.05	75.59	9.12	26 201	25 905	63 149	60 389	-0.39	-2.48	1.33	0.05
Cambodia	16 250	1.49	69.29	0.68	55 003	67 588	3 544	4 159	7.04	7.03	6.83	7.47
China	1 427 648	0.46	76.47	4.32	17 403 447	21 229 728	12 692	15 243	7.04	6.85	6.95	6.75
China, Hong Kong SAR	7 372	0.80	84.68	3.63	417 179	455 047	57 216	61 072	2.39	2.17	3.79	2.86
China, Macao SAR	632	1.44	83.99	2.24	72 428	83 318	120 295	131 908	-21.59	-0.72	9.89	5.44
China, Taiwan Prov.	23 726	-	-	-	-	-	-	-	-	-	-	-
Indonesia	267 671	1.13	71.28	4.69	2 622 488	3 043 743	10 150	11 372	4.88	5.03	5.07	5.17
Japan	127 202	-0.20	84.10	2.29	5 044 058	5 197 069	39 673	41 074	1.22	0.52	2.17	0.32
Korea DPR	25 550	0.47	71.91	2.74	-	-	-	-	-	-	-	-
Korea Rep.	51 172	0.33	82.63	4.15	1 982 957	2 162 014	38 870	41 894	2.81	2.95	3.16	2.66
Lao PDR	7 061	1.55	67.28	0.63	44 112	53 617	6 544	7 593	7.27	7.02	6.89	6.25
Malaysia	31 528	1.35	75.83	3.32	750 492	868 200	24 792	27 537	5.09	4.45	5.74	4.74
Myanmar	53 708	0.61	66.56	1.58	224 868	270 109	4 269	5 029	6.99	5.75	6.40	6.75
Philippines	106 651	1.40	70.95	2.15	745 440	908 258	7 300	8 516	6.35	7.15	6.93	6.34
Singapore	5 758	0.47	82.90	4.11	494 643	551 152	89 366	97 745	2.99	3.24	4.34	3.44
Thailand	69 428	0.32	76.68	0.75	1 120 152	1 255 720	16 302	18 087	3.13	3.43	4.07	4.15
Timor-Leste	1 268	1.97	69.01	4.55	3 951	3 905	3 303	3 080	3.06	3.55	-3.80	-0.78
Viet Nam	95 546	0.99	75.24	2.01	596 679	724 806	6 438	7 586	6.68	6.21	6.81	7.08
<b>Oceania</b>												
Australia	24 898	1.57	82.50	5.27	1 143 650	1 238 541	48 020	49 576	2.19	2.77	2.37	2.94
New Zealand	4 743	1.89	81.66	4.07	185 975	206 397	40 467	42 635	3.62	3.68	3.16	3.76
Cook Islands	18	-	-	-	-	-	-	-	-	-	-	-
Fiji	883	0.68	67.25	4.10	10 904	12 199	12 553	13 808	4.66	2.51	5.43	3.53
Kiribati	116	1.47	67.85	-	241	262	2 174	2 259	10.41	5.14	0.89	2.31
Marshall Islands	58	0.61	-	-	208	227	3 625	3 894	1.59	1.31	4.06	3.62
Micronesia	538	1.05	67.62	-	376	391	3 456	3 469	4.62	0.90	2.68	0.21
Nauru	11	-1.34	-	-	141	146	11 295	11 487	3.70	3.57	-5.75	6.10
Niue	2	-0.12	-	-	-	-	-	-	-	-	-	-
Palau	18	0.55	-	-	327	324	18 520	18 070	10.08	0.80	-3.52	1.71
Papua New Guinea	8 606	1.97	64.01	2.46	34 088	36 456	4 204	4 236	9.48	4.08	3.54	-0.75
Samoa	196	0.40	73.05	8.36	1 163	1 241	6 007	6 329	4.27	8.05	1.02	-2.17
Solomon Islands	653	2.61	72.65	0.58	1 389	1 544	2 303	2 365	2.54	3.22	3.69	3.85
Tonga	103	1.17	70.70	1.12	607	647	6 026	6 267	3.71	3.38	2.70	0.30
Tuvalu	12	1.21	-	-	41	45	3 729	3 953	9.14	3.03	4.09	2.50
Vanuatu	293	2.48	70.17	4.39	825	916	3 042	3 130	0.16	3.47	4.41	2.80

KEY --: data unavailable | -n/+n: data refer to n years before or after reference year | 0: magnitude nil or negligible | a: not applicable

GDP: gross domestic product | PPP\$: purchasing power parity dollars

Source: World Bank's World Development Indicators, July 2020; for population: United Nations Department of Economic and Social Affairs, Population Division, 2019 Revision of World Population Prospects; for population growth and life expectancy: UNESCO Institute for Statistics; unemployment rates are modelled on International Labour Organization estimates; for Internet and mobile data: ITU World Telecommunication/ICT Indicators database, July 2020; for HDI: United Nations Development Programme (2019) Human Development Report 2019: Beyond income, beyond averages, beyond today: Inequalities in human development in the 21st century; for Global Innovation Index: Cornell University, INSEAD, WIPO (2019) Global Innovation Index 2019: Creating Healthy Lives — The Future of Medical Innovation; for the share of modern renewables: International Energy Agency (2019) SDG7: Data and Projections, November 2019, IEA: Paris; for Sustainable Development Report rank: Sustainable Development Report 2019; for Global Health Security Index: 2019 Global Health Security Index; for economic loss from disasters: United Nations Statistics Division (2020) Sustainable Development Goals 2019

GDP per economic sector (%)				Inflation, consumer prices (%)	Internet users per 100 inhabitants	Mobile phone subscriptions per 100 inhabitants	Human Development Index (rank)	Global Innovation Index (rank)	SDG7.2: Share of modern renewables in final energy consumption (%)	GDP per unit energy use (constant 2017 PPP\$ per kg of oil equivalent)	Sustainable Development Report (rank)	Global Health Security Index (rank)	SDG1.5.2: Direct economic loss from disasters as a share of GDP (%)	Current health expenditure as a share of GDP (%)	
Agriculture	Services	Industry	Manufacturing (subset of industry)												
2019				2019	2019	2018	2018	2019	2017	2014	2019	2019	2018	2017	
<b>Southeast Asia</b>															
0.99	38.18	62.52	13.60	-0.39	95.00	131.93	43	71	0.0	7.4	–	128	–	2.37	Brunei Darussalam
20.71	38.85	34.23	16.28	2.46 <sup>-1</sup>	40.50 <sup>-1</sup>	119.49	146	98	18.9	8.07	112	89	0.0028 <sup>-1</sup>	5.92	Cambodia
7.11	53.92	38.97	27.17	2.90	54.30 <sup>-2</sup>	115.53	85	14	8.9	5.33	39	51	–	5.15	China
0.06 <sup>-1</sup>	88.63 <sup>-1</sup>	6.50 <sup>-1</sup>	0.98 <sup>-1</sup>	2.86	91.70	269.98	4	13	0.2	28.6	–	–	–	–	China, Hong Kong SAR
–	94.20 <sup>-1</sup>	4.11 <sup>-1</sup>	0.54 <sup>-1</sup>	3.01 <sup>-1</sup>	86.50	345.32	–	–	–	–	–	–	–	–	China, Macao SAR
–	–	–	–	–	88.80	123.66	–	–	–	–	–	–	–	–	China, Taiwan Prov.
12.72	44.23	38.95	19.70	3.03	47.70	119.34	111	85	6.3	11.09	102	30	0.0010	2.99	Indonesia
1.24 <sup>-1</sup>	69.31 <sup>-1</sup>	29.07 <sup>-1</sup>	20.75 <sup>-1</sup>	0.48	91.28 <sup>-1</sup>	141.41	19	15	6.9	11.57 <sup>+1</sup>	15	21	–	10.94	Japan
–	–	–	–	–	–	14.98 <sup>-1</sup>	–	–	25.4	–	–	193	–	–	Korea DPR
1.69	56.77	32.97	25.38	0.38	96.20	129.67	22	11	2.8	7.18 <sup>+1</sup>	18	9	0.0001 <sup>-1</sup>	7.6	Korea Rep.
15.29	42.65	30.91	7.48	3.32	25.51 <sup>-2</sup>	51.86	140	–	–	–	111	73	0.0011 <sup>-6</sup>	2.53	Lao PDR
7.28	54.17	37.42	21.46	0.66	84.20	134.53	61	35	5.2	7.96	68	18	0.0010	3.86	Malaysia
21.35 <sup>-1</sup>	40.69 <sup>-1</sup>	37.96 <sup>-1</sup>	24.76 <sup>-1</sup>	8.83	23.60 <sup>-2</sup>	113.84	145	–	6.0	10.88	110	72	0.0186 <sup>-1</sup>	4.66	Myanmar
8.82	61.01	30.17	18.46	2.48	43.00	126.20	106	54	11.5	14.7	97	53	–	4.45	Philippines
0.03	70.38	24.49	19.80	0.57	88.90	148.82	9	8	0.7	17.14	66	24	–	4.44	Singapore
8.00	58.59	33.40	25.30	0.71	66.70	180.18	77	43	17.3	8.06	40	6	–	3.75	Thailand
17.45 <sup>-1</sup>	67.49 <sup>-1</sup>	16.36 <sup>-1</sup>	1.68 <sup>-1</sup>	2.64 <sup>-1</sup>	27.49 <sup>-2</sup>	115.81	131	–	–	–	–	166	0.0010 <sup>-2</sup>	3.88	Timor-Leste
13.96	41.64	34.49	16.48	2.80	68.70	147.20	118	42	25.7	8.81 <sup>-1</sup>	54	50	–	5.53	Viet Nam
<b>Oceania</b>															
2.09	66.15	25.20	5.65	1.61	86.55 <sup>-2</sup>	113.58	6	22	9.5	8.76 <sup>+1</sup>	38	4	0.0000	9.21	Australia
5.81 <sup>-2</sup>	65.18 <sup>-2</sup>	20.43 <sup>-2</sup>	10.24 <sup>-2</sup>	1.62	90.81 <sup>-2</sup>	134.93	14	25	30.4	9.10 <sup>+1</sup>	11	35	0.0010	9.17	New Zealand
–	–	–	–	–	–	–	–	–	–	–	–	185	–	–	Cook Islands
10.75 <sup>-1</sup>	53.91 <sup>-1</sup>	15.56 <sup>-1</sup>	10.42 <sup>-1</sup>	1.77	49.97 <sup>-2</sup>	117.83 <sup>-1</sup>	98	–	–	–	62	168	0.0100	3.5	Fiji
28.62 <sup>-1</sup>	63.26 <sup>-1</sup>	12.47 <sup>-1</sup>	4.08 <sup>-1</sup>	0.57 <sup>-4</sup>	14.58 <sup>-2</sup>	50.79	132	–	–	–	–	189	0.0014 <sup>-4</sup>	10.76	Kiribati
15.23 <sup>-1</sup>	71.11 <sup>-1</sup>	12.78 <sup>-1</sup>	4.03 <sup>-1</sup>	–	38.70 <sup>-2</sup>	27.56 <sup>-1</sup>	117	–	–	–	–	191	0.0024 <sup>-4</sup>	16.4	Marshall Islands
22.51 <sup>-1</sup>	66.76 <sup>-1</sup>	4.87 <sup>-1</sup>	0.49 <sup>-1</sup>	0.52 <sup>-2</sup>	35.30 <sup>-2</sup>	20.74 <sup>-1</sup>	135	–	–	–	–	124	–	12.35	Micronesia
4.20 <sup>-4</sup>	93.99 <sup>-4</sup>	6.33 <sup>-4</sup>	0.00 <sup>-4</sup>	–	57.00 <sup>-2</sup>	94.58 <sup>-1</sup>	–	–	–	–	–	182	–	11.02	Nauru
–	–	–	–	–	–	–	–	–	–	–	–	184	–	–	Niue
3.18 <sup>-1</sup>	78.95 <sup>-1</sup>	7.96 <sup>-1</sup>	1.01 <sup>-1</sup>	1.28 <sup>-2</sup>	–	134.41 <sup>-3</sup>	55	–	–	–	143	179	0.0262 <sup>-6</sup>	11.96	Palau
17.65 <sup>-2</sup>	41.50 <sup>-2</sup>	36.36 <sup>-2</sup>	1.95 <sup>-2</sup>	3.64	11.21 <sup>-2</sup>	47.62 <sup>-1</sup>	155	–	–	–	–	155	0.0001 <sup>-5</sup>	2.47	Papua New Guinea
9.77	74.78	15.45	6.05	0.98	33.61 <sup>-2</sup>	63.58 <sup>-1</sup>	111	–	–	–	–	162	–	5.48	Samoa
–	–	–	–	1.63	11.92 <sup>-2</sup>	73.83	153	–	–	–	–	183	0.0113 <sup>-5</sup>	4.68	Solomon Islands
17.21 <sup>-3</sup>	–	17.27 <sup>-3</sup>	6.21 <sup>-3</sup>	7.44 <sup>-2</sup>	41.25 <sup>-2</sup>	104.59	105	–	–	–	–	171	0.0190	5.27	Tonga
16.51 <sup>-4</sup>	–	7.28 <sup>-4</sup>	–	–	49.32 <sup>-2</sup>	70.36 <sup>-1</sup>	–	–	–	–	–	181	–	17.14	Tuvalu
25.84 <sup>-4</sup>	–	11.06 <sup>-4</sup>	3.49 <sup>-4</sup>	2.76	25.72 <sup>-2</sup>	85.91	141	–	–	–	118	165	0.0003 <sup>-4</sup>	3.32	Vanuatu

**Table B1:** Research expenditure as a share of GDP and in purchasing power parity dollars (PPP\$), 2015–2018

	Research expenditure as a share of GDP (%)				Research expenditure (constant PPP\$ thousands)	
	2015	2016	2017	2018	2015	2018
<b>North America</b>						
Canada	1.70	1.73	1.67	1.57	23 344 978	22 852 735
United States of America	2.72	2.76	2.82	2.84	413 036 238	460 577 897
<b>Latin America</b>						
Argentina	0.62	0.56	0.54	–	4 604 409	4 025 980 <sup>1</sup>
Belize	–	–	–	–	–	–
Bolivia	–	–	–	–	–	–
Brazil	1.34	1.26	1.26	–	36 218 571	33 301 461 <sup>1</sup>
Chile	0.38	0.37	0.36	–	1 143 742	1 098 704 <sup>1</sup>
Colombia	0.29	0.27	0.24	0.24	1 608 894	1 397 735
Costa Rica	0.45	0.43	0.42	–	284 066	288 102 <sup>1</sup>
Ecuador	–	–	–	–	–	–
El Salvador	0.14	0.15	0.18	–	56 431	74 717 <sup>1</sup>
Guatemala	0.03	0.02	0.03	–	31 553	31 324 <sup>1</sup>
Guyana	–	–	–	–	–	–
Honduras	0.01	–	0.04	–	5 162	15 018 <sup>1</sup>
Mexico	0.43	0.39	0.33	0.31	7 178 490	5 586 856
Nicaragua	0.11	–	–	–	28 860	–
Panama	0.12	0.14	0.15	–	88 590	119 634 <sup>1</sup>
Paraguay	0.10	0.12	0.15	–	63 825	107 364 <sup>1</sup>
Peru	0.12	0.12	0.12	0.13	385 178	463 250
Suriname	–	–	–	–	–	–
Uruguay	0.36	0.41	0.48	–	220 985	306 110 <sup>1</sup>
Venezuela	–	–	–	–	–	–
<b>Caribbean</b>						
Antigua & Barbuda	–	–	–	–	–	–
Bahamas	–	–	–	–	–	–
Barbados	–	–	–	–	–	–
Cuba	0.43	0.34	0.43	–	–	–
Dominica	–	–	–	–	–	–
Dominican Rep.	–	–	–	–	–	–
Grenada	–	–	–	–	–	–
Haiti	–	–	–	–	–	–
Jamaica	–	–	–	–	–	–
St Kitts & Nevis	–	–	–	–	–	–
St Lucia	–	–	–	–	–	–
St Vincent & Grenadines	–	–	–	–	–	–
Trinidad & Tobago	0.09	0.09	0.09	–	33 042	32 424 <sup>1</sup>
<b>European Union</b>						
Austria	3.05	3.13	3.05	3.17	9 893 205	11 060 402
Belgium	2.46	2.56	2.70	2.82	9 718 100	11 662 511
Bulgaria	0.96	0.78	0.75	0.77	963 232	856 968
Croatia	0.84	0.86	0.86	0.97	564 882	716 752
Cyprus	0.48	0.53	0.56	0.56	103 162	136 380
Czech Rep.	1.93	1.68	1.79	1.93	5 303 114	5 834 399
Denmark	3.05	3.10	3.05	3.06	6 091 761	6 493 408
Estonia	1.47	1.25	1.29	1.43	385 578	422 465
Finland	2.89	2.74	2.76	2.77	5 065 046	5 230 712
France	2.27	2.22	2.21	2.20	47 892 592	48 876 936
Germany	2.91	2.92	3.04	3.09	88 828 278	99 988 864
Greece	0.96	0.99	1.13	1.18	2 172 131	2 747 526
Hungary	1.36	1.20	1.35	1.55	2 557 281	3 262 016
Ireland	1.18	1.17	–	1.15	2 814 621	3 309 169
Italy	1.34	1.37	1.38	1.40	22 321 192	24 147 965
Latvia	0.63	0.44	0.51	0.63	225 279	253 859
Lithuania	1.04	0.84	0.90	0.94	641 140	642 045

Research expenditure per capita (constant PPP\$)		Research expenditure as a share of GDP by type of research (%)				
		Basic	Applied	Experimental development	Unspecified	
2015	2018	2018				
						<b>North America</b>
648.0	616.4	–	–	–	–	Canada
1 287.2	1 408.1	0.47	0.56	1.80	0.01	United States of America
						<b>Latin America</b>
106.9	91.6 <sup>-1</sup>	0.14 <sup>-1</sup>	0.27 <sup>-1</sup>	0.12 <sup>-1</sup>	0.00 <sup>-1</sup>	Argentina
–	–	–	–	–	–	Belize
–	–	–	–	–	–	Bolivia
177.1	160.2 <sup>-1</sup>	–	–	–	–	Brazil
63.6	59.5 <sup>-1</sup>	0.10 <sup>-1</sup>	0.14 <sup>-1</sup>	0.08 <sup>-1</sup>	0.03 <sup>-1</sup>	Chile
33.9	28.1	–	–	–	–	Colombia
58.6	58.2 <sup>-1</sup>	0.10 <sup>-1</sup>	0.07 <sup>-1</sup>	0.02 <sup>-1</sup>	0.23 <sup>-1</sup>	Costa Rica
–	–	–	–	–	–	Ecuador
8.9	11.7 <sup>-1</sup>	0.04 <sup>-1</sup>	0.07 <sup>-1</sup>	0.02 <sup>-1</sup>	0.06 <sup>-1</sup>	El Salvador
1.9	1.9 <sup>-1</sup>	0.00 <sup>-1</sup>	0.02 <sup>-1</sup>	0.00 <sup>-1</sup>	0.00 <sup>-1</sup>	Guatemala
–	–	–	–	–	–	Guyana
0.6	1.6 <sup>-1</sup>	0.00 <sup>-3</sup>	0.01 <sup>-3</sup>	0.00 <sup>-3</sup>	0.00 <sup>-3</sup>	Honduras
58.9	44.3	0.10	0.09	0.12	0.00	Mexico
4.6	–	–	–	–	–	Nicaragua
22.3	29.1 <sup>-1</sup>	–	–	–	–	Panama
9.5	15.6 <sup>-1</sup>	0.02 <sup>-1</sup>	0.11 <sup>-1</sup>	0.02 <sup>-1</sup>	0.00 <sup>-1</sup>	Paraguay
12.6	14.5	0.02 <sup>-3</sup>	0.05 <sup>-3</sup>	0.00 <sup>-3</sup>	0.05 <sup>-3</sup>	Peru
–	–	–	–	–	–	Suriname
64.8	89.1 <sup>-1</sup>	–	–	–	–	Uruguay
–	–	–	–	–	–	Venezuela
						<b>Caribbean</b>
–	–	–	–	–	–	Antigua & Barbuda
–	–	–	–	–	–	Bahamas
–	–	–	–	–	–	Barbados
–	–	0.09 <sup>-1</sup>	0.22 <sup>-1</sup>	0.13 <sup>-1</sup>	0.00 <sup>-1</sup>	Cuba
–	–	–	–	–	–	Dominica
–	–	–	–	–	–	Dominican Rep.
–	–	–	–	–	–	Grenada
–	–	–	–	–	–	Haiti
–	–	–	–	–	–	Jamaica
–	–	–	–	–	–	St Kitts & Nevis
–	–	–	–	–	–	St Lucia
–	–	–	–	–	–	St Vincent & Grenadines
24.1	23.4 <sup>-1</sup>	0.02 <sup>-1</sup>	0.05 <sup>-1</sup>	0.02 <sup>-1</sup>	0.00 <sup>-1</sup>	Trinidad & Tobago
						<b>European Union</b>
1 139.9	1 243.9	0.54 <sup>-1</sup>	1.00 <sup>-1</sup>	1.46 <sup>-1</sup>	0.00 <sup>-1</sup>	Austria
860.9	1 015.7	0.30 <sup>-1</sup>	1.24 <sup>-1</sup>	1.16 <sup>-1</sup>	0.00 <sup>-1</sup>	Belgium
133.8	121.5	0.08 <sup>-1</sup>	0.47 <sup>-1</sup>	0.20 <sup>-1</sup>	0.00 <sup>-1</sup>	Bulgaria
133.5	172.4	0.33 <sup>-1</sup>	0.28 <sup>-1</sup>	0.25 <sup>-1</sup>	0.00 <sup>-1</sup>	Croatia
121.6	155.7	0.08 <sup>-1</sup>	0.30 <sup>-1</sup>	0.18 <sup>-1</sup>	0.00 <sup>-1</sup>	Cyprus
500.2	547.0	0.50	0.77	0.66	0.00	Czech Rep.
1 070.9	1 128.9	0.56 <sup>-1</sup>	0.95 <sup>-1</sup>	1.54 <sup>-1</sup>	0.00 <sup>-1</sup>	Denmark
293.1	319.3	0.35 <sup>-1</sup>	0.28 <sup>-1</sup>	0.66 <sup>-1</sup>	0.00 <sup>-1</sup>	Estonia
924.1	947.2	–	–	–	–	Finland
743.1	752.1	0.50 <sup>-1</sup>	0.92 <sup>-1</sup>	0.78 <sup>-1</sup>	0.07 <sup>-1</sup>	France
1 086.1	1 202.9	–	–	–	–	Germany
203.8	261.1	0.35 <sup>-1</sup>	0.37 <sup>-1</sup>	0.41 <sup>-1</sup>	0.00 <sup>-1</sup>	Greece
261.5	336.0	0.26 <sup>-1</sup>	0.30 <sup>-1</sup>	0.78 <sup>-1</sup>	0.00 <sup>-1</sup>	Hungary
605.0	686.7	0.22 <sup>-3</sup>	0.42 <sup>-3</sup>	0.55 <sup>-3</sup>	0.00 <sup>-3</sup>	Ireland
368.5	398.3	0.31 <sup>-1</sup>	0.58 <sup>-1</sup>	0.49 <sup>-1</sup>	0.00 <sup>-1</sup>	Italy
112.8	131.6	0.16 <sup>-1</sup>	0.22 <sup>-1</sup>	0.13 <sup>-1</sup>	0.00 <sup>-1</sup>	Latvia
218.7	229.2	0.24 <sup>-1</sup>	0.38 <sup>-1</sup>	0.28 <sup>-1</sup>	0.00 <sup>-1</sup>	Lithuania

**Table B1:** Research expenditure as a share of GDP and in purchasing power parity dollars (PPP\$), 2015–2018

	Research expenditure as a share of GDP (%)				Research expenditure (constant PPP\$ thousands)	
	2015	2016	2017	2018	2015	2018
Luxembourg	1.28	1.30	1.30	1.24	527 777	541 902
Malta	0.74	0.57	0.58	0.57	96 042	89 527
Netherlands	1.98	2.00	1.98	2.16	13 547 890	15 935 206
Poland	1.00	0.96	1.03	1.21	7 794 755	10 698 552
Portugal	1.24	1.28	1.33	1.37	2 928 483	3 444 053
Romania	0.49	0.48	0.50	0.51	1 329 597	1 606 526
Slovakia	1.17	0.79	0.88	0.83	1 497 790	1 178 987
Slovenia	2.20	2.01	1.87	1.94	1 168 594	1 167 884
Spain	1.22	1.19	1.21	1.24	15 415 869	17 059 293
Sweden	3.26	3.27	3.40	3.34	12 044 598	13 223 821
United Kingdom	1.67	1.68	1.70	1.72	37 046 995	40 239 408
<b>Southeast Europe</b>						
Albania	–	–	–	–	–	–
Bosnia & Herzegovina	0.22	0.22	0.20	0.20	65 603	65 433
Montenegro	0.37	0.32	0.35	0.37	25 148	27 943
North Macedonia	0.44	0.44	0.36	0.36	97 427	84 514
Serbia	0.81	0.84	0.87	0.92	699 864	874 028
<b>European Free Trade Assoc.</b>						
Iceland	2.20	2.12	2.10	2.03	294 815	319 097
Liechtenstein	–	–	–	–	–	–
Norway	1.93	2.03	2.09	2.07	4 874 878	5 470 299
Switzerland	3.37	–	3.37	–	12 307 568	12 711 551 <sup>1</sup>
<b>Eastern Europe &amp; West Asia</b>						
Armenia	0.25	0.23	0.23	0.19	53 255	45 651
Azerbaijan	0.22	0.21	0.18	0.18	321 668	262 166
Belarus	0.50	0.50	0.58	0.61	727 929	911 892
Georgia	0.32	0.30	0.29	0.30	95 593	102 782
Iran Islamic Rep.	0.42	–	0.83	–	4 872 653	11 397 315 <sup>1</sup>
Israel	4.26	4.51	4.82	4.95	10 676 436	13 810 013
Moldova, Rep.	0.31	0.28	0.25	0.25	55 808	52 278
Russian Federation	1.10	1.10	1.11	0.99	24 072 776	22 571 015
Turkey	0.88	0.94	0.96	–	11 762 186	14 216 551 <sup>1</sup>
Ukraine	0.61	0.48	0.45	0.47	1 751 865	1 456 903
<b>Sub-Saharan Africa</b>						
Angola	–	0.03	–	–	–	51 935 <sup>2</sup>
Benin	–	–	–	–	–	–
Botswana	–	–	–	–	–	–
Burkina Faso	–	–	0.61	–	–	203 256 <sup>1</sup>
Burundi	–	–	–	0.21	–	13 824
Cameroon	–	–	–	–	–	–
Cabo Verde	–	–	–	–	–	–
Central African Rep.	–	–	–	–	–	–
Chad	–	0.30	–	–	–	72 683 <sup>2</sup>
Comoros	–	–	–	–	–	–
Congo	–	–	–	–	–	–
Côte d'Ivoire	–	0.10	–	–	–	68 889 <sup>2</sup>
Congo, Dem. Rep.	0.41	–	–	–	224 130	–
Djibouti	–	–	–	–	–	–
Equatorial Guinea	–	–	–	–	–	–
Eritrea	–	–	–	–	–	–
Eswatini	0.27	–	–	–	24 630	–
Ethiopia	–	–	0.27	–	–	448 600 <sup>1</sup>
Gabon	–	–	–	–	–	–
Gambia	–	–	–	0.07	–	2 197
Ghana	–	–	–	–	–	–
Guinea	–	–	–	–	–	–

Research expenditure per capita (constant PPP\$)		Research expenditure as a share of GDP by type of research (%)				
		Basic	Applied	Experimental development	Unspecified	
2015	2018	2018				
931.2	896.8	0.48 <sup>-1</sup>	0.49 <sup>-1</sup>	0.33 <sup>-1</sup>	0.00 <sup>-1</sup>	Luxembourg
221.5	203.8	0.30 <sup>-1</sup>	0.19 <sup>-1</sup>	0.09 <sup>-1</sup>	0.00 <sup>-1</sup>	Malta
799.8	934.1	0.52 <sup>-1</sup>	0.87 <sup>-1</sup>	0.60 <sup>-1</sup>	0.00 <sup>-1</sup>	Netherlands
204.9	282.1	0.30 <sup>-1</sup>	0.18 <sup>-1</sup>	0.55 <sup>-1</sup>	0.00 <sup>-1</sup>	Poland
282.4	335.8	0.29 <sup>-1</sup>	0.51 <sup>-1</sup>	0.53 <sup>-1</sup>	0.00 <sup>-1</sup>	Portugal
66.7	82.4	0.10 <sup>-1</sup>	0.31 <sup>-1</sup>	0.09 <sup>-1</sup>	0.00 <sup>-1</sup>	Romania
275.6	216.2	0.33	0.20	0.30	0.00	Slovakia
564.2	562.1	0.33 <sup>-1</sup>	0.82 <sup>-1</sup>	0.71 <sup>-1</sup>	0.00 <sup>-1</sup>	Slovenia
330.3	365.4	0.26 <sup>-1</sup>	0.50 <sup>-1</sup>	0.45 <sup>-1</sup>	0.00 <sup>-1</sup>	Spain
1 233.5	1 326.1	–	–	–	–	Sweden
562.5	599.3	0.30 <sup>-2</sup>	0.74 <sup>-2</sup>	0.64 <sup>-2</sup>	0.00 <sup>-2</sup>	United Kingdom
<b>Southeast Europe</b>						
–	–	–	–	–	–	Albania
19.1	19.7	0.06	0.06	0.05	0.02	Bosnia & Herzegovina
40.1	44.5	0.10 <sup>-1</sup>	0.21 <sup>-1</sup>	0.04 <sup>-1</sup>	0.00 <sup>-1</sup>	Montenegro
46.9	40.6	0.09	0.23	0.05	0.00	North Macedonia
98.9	125.5	0.29	0.34	0.29	0.00	Serbia
<b>European Free Trade Assoc.</b>						
892.7	947.7	0.43	0.95	0.66	0.00	Iceland
–	–	–	–	–	–	Liechtenstein
937.5	1 024.8	0.38 <sup>-1</sup>	0.79 <sup>-1</sup>	0.93 <sup>-1</sup>	0.00 <sup>-1</sup>	Norway
1 483.4	1 503.3 <sup>-1</sup>	1.41 <sup>-1</sup>	1.09 <sup>-1</sup>	0.88 <sup>-1</sup>	0.00 <sup>-1</sup>	Switzerland
<b>Eastern Europe &amp; West Asia</b>						
18.2	15.5	–	–	–	–	Armenia
33.4	26.3	0.10	0.04	0.01	0.04	Azerbaijan
77.1	96.5	–	–	–	–	Belarus
23.8	25.7	–	–	–	–	Georgia
62.1	141.3 <sup>-1</sup>	–	–	–	–	Iran, Islamic Rep.
1 338.2	1 647.7	0.52	0.51	3.93	0.00	Israel
15.7	14.8	–	–	–	–	Moldova, Rep.
166	154.9	0.15 <sup>-2</sup>	0.21 <sup>-2</sup>	0.65 <sup>-2</sup>	0.08 <sup>-2</sup>	Russian Federation
149.8	175.3 <sup>-1</sup>	–	–	–	–	Turkey
41.0	34.5	0.11	0.10	0.27	0.05	Ukraine
<b>Sub-Saharan Africa</b>						
–	1.8 <sup>-2</sup>	0.01 <sup>-2</sup>	0.02 <sup>-2</sup>	0.00 <sup>-2</sup>	0.00 <sup>-2</sup>	Angola
–	–	–	–	–	–	Benin
–	–	–	–	–	–	Botswana
–	10.6 <sup>-1</sup>	–	–	–	–	Burkina Faso
–	1.2	0.02	0.04	0.09	0.06	Burundi
–	–	–	–	–	–	Cameroon
–	–	–	–	–	–	Cabo Verde
–	–	–	–	–	–	Central African Rep.
–	5.0 <sup>-2</sup>	–	–	–	–	Chad
–	–	–	–	–	–	Comoros
–	–	–	–	–	–	Congo
–	2.9 <sup>-2</sup>	0.02 <sup>-2</sup>	0.00 <sup>-2</sup>	0.01 <sup>-2</sup>	0.06 <sup>-2</sup>	Côte d'Ivoire
2.9	–	–	–	–	–	Congo, Dem. Rep.
–	–	–	–	–	–	Djibouti
–	–	–	–	–	–	Equatorial Guinea
–	–	–	–	–	–	Eritrea
22.3	–	0.06 <sup>-3</sup>	0.18 <sup>-3</sup>	0.04 <sup>-3</sup>	0.00 <sup>-3</sup>	Eswatini
–	4.2 <sup>-1</sup>	0.09 <sup>-1</sup>	0.14 <sup>-1</sup>	0.05 <sup>-1</sup>	0.00 <sup>-1</sup>	Ethiopia
–	–	–	–	–	–	Gabon
–	1.0	–	–	–	–	Gambia
–	–	–	–	–	–	Ghana
–	–	–	–	–	–	Guinea

**Table B1:** Research expenditure as a share of GDP and in purchasing power parity dollars (PPP\$), 2015–2018

	Research expenditure as a share of GDP (%)				Research expenditure (constant PPP\$ thousands)	
	2015	2016	2017	2018	2015	2018
Guinea-Bissau	–	–	–	–	–	–
Kenya	–	–	–	–	–	–
Lesotho	0.05	–	–	–	2 522	–
Liberia	–	–	–	–	–	–
Madagascar	–	0.02	0.01	–	4 659 <sup>+1</sup>	4 733 <sup>-1</sup>
Malawi	–	–	–	–	–	–
Mali	0.31	–	0.29	–	93 977	97 180 <sup>-1</sup>
Mauritius	–	–	0.37	0.35	83 877 <sup>+2</sup>	82 199
Mozambique	0.34	–	–	–	94 189	–
Namibia	–	–	–	–	–	–
Niger	–	–	–	–	–	–
Nigeria	–	–	–	–	–	–
Rwanda	–	0.67	–	–	–	126 924 <sup>-2</sup>
Sao Tome & Principe	–	–	–	–	–	–
Senegal	0.58	–	–	–	225 054	–
Seychelles	–	0.22	–	–	–	4 792 <sup>-2</sup>
Sierra Leone	–	–	–	–	–	–
Somalia	–	–	–	–	–	–
South Africa	0.80	0.82	0.83	–	4 864 572	5 162 041 <sup>-1</sup>
South Sudan	–	–	–	–	–	–
Togo	–	–	–	–	–	–
Uganda	–	–	–	–	–	–
Tanzania	–	–	–	–	–	–
Zambia	–	–	–	–	–	–
Zimbabwe	–	–	–	–	–	–
<b>Arab States</b>						
Algeria	–	–	0.54	–	–	2 775 680 <sup>-1</sup>
Bahrain	–	–	–	–	–	–
Egypt	0.72	0.71	0.68	0.72	6 062 074	6 991 465
Iraq	0.04	0.04	0.04	0.04	179 022	229 528
Jordan	–	0.71	–	–	–	501 175 <sup>-2</sup>
Kuwait	0.10	0.08	0.08	0.06	231 971	149 551
Lebanon	–	–	–	–	–	–
Libya	–	–	–	–	–	–
Mauritania	–	–	–	0.01	–	2 073
Morocco	–	–	–	–	–	–
Oman	0.25	0.26	0.23	0.22	372 602	348 046
Palestine	–	–	–	–	–	–
Qatar	0.52	–	–	0.51	1 375 098	1 414 824
Saudi Arabia	–	–	–	–	–	–
Sudan	–	–	–	–	–	–
Syrian Arab Rep.	0.02	–	–	–	–	–
Tunisia	0.63	0.60	–	0.60	681 187	686 010
United Arab Emirates	0.90	0.96	–	1.30	4 859 690	7 449 241
Yemen	–	–	–	–	–	–
<b>Central Asia</b>						
Kazakhstan	0.17	0.14	0.13	0.12	623 266	494 928
Kyrgyzstan	0.12	0.11	0.11	–	20 428	20 067 <sup>-1</sup>
Mongolia	0.15	0.18	0.13	0.10	46 818	35 495
Tajikistan	0.11	0.11	0.12	0.10	21 899	24 084
Turkmenistan	–	–	–	–	–	–
Uzbekistan	0.17	0.18	0.16	0.13	273 209	237 754



Research expenditure per capita (constant PPP\$)		Research expenditure as a share of GDP by type of research (%)				
		Basic	Applied	Experimental development	Unspecified	
2015	2018	2018				
–	–	–	–	–	–	Guinea-Bissau
–	–	–	–	–	–	Kenya
1.2	–	0.02 <sup>3</sup>	0.02 <sup>3</sup>	0.01 <sup>3</sup>	0.00 <sup>3</sup>	Lesotho
–	–	–	–	–	–	Liberia
0.2 <sup>1</sup>	0.2 <sup>1</sup>	–	–	–	–	Madagascar
–	–	–	–	–	–	Malawi
5.4	5.2 <sup>1</sup>	0.07 <sup>1</sup>	0.19 <sup>1</sup>	0.03 <sup>1</sup>	0.00 <sup>1</sup>	Mali
66.3 <sup>2</sup>	64.9	0.03	0.12	0.02	0.17	Mauritius
3.5	–	0.09 <sup>3</sup>	0.17 <sup>3</sup>	0.07 <sup>3</sup>	0.00 <sup>3</sup>	Mozambique
–	–	–	–	–	–	Namibia
–	–	–	–	–	–	Niger
–	–	–	–	–	–	Nigeria
–	10.9 <sup>2</sup>	–	–	–	–	Rwanda
–	–	–	–	–	–	Sao Tome & Principe
15.4	–	–	–	–	–	Senegal
–	50.1 <sup>2</sup>	–	–	–	–	Seychelles
–	–	–	–	–	–	Sierra Leone
–	–	–	–	–	–	Somalia
87.8	90.5 <sup>1</sup>	0.22 <sup>1</sup>	0.44 <sup>1</sup>	0.17 <sup>1</sup>	0.00 <sup>1</sup>	South Africa
–	–	–	–	–	–	South Sudan
–	–	–	–	–	–	Togo
–	–	–	–	–	–	Uganda
–	–	–	–	–	–	Tanzania
–	–	–	–	–	–	Zambia
–	–	–	–	–	–	Zimbabwe
<b>Arab States</b>						
–	67.1 <sup>1</sup>	0.01 <sup>1</sup>	0.27 <sup>1</sup>	0.02 <sup>1</sup>	0.24 <sup>1</sup>	Algeria
–	–	–	–	–	–	Bahrain
65.6	71.0	–	–	–	–	Egypt
5.0	6.0	0.01	0.03	0.00	0.00	Iraq
–	52.5 <sup>2</sup>	–	–	–	–	Jordan
60.5	36.1	0.00	0.06	0.00	0.00	Kuwait
–	–	–	–	–	–	Lebanon
–	–	–	–	–	–	Libya
–	0.5	0.01	0.00	–	–	Mauritania
–	–	–	–	–	–	Morocco
87.3	72.1	0.11	0.09	0.02	0.00	Oman
–	–	–	–	–	–	Palestine
536	508.6	0.23	0.24	0.04	0.00	Qatar
–	–	–	–	–	–	Saudi Arabia
–	–	–	–	–	–	Sudan
–	–	–	–	–	–	Syrian Arab Rep.
60.9	59.3	–	–	–	–	Tunisia
524.6	773.5	–	–	–	–	United Arab Emirates
–	–	–	–	–	–	Yemen
<b>Central Asia</b>						
35.5	27.0	0.02	0.07	0.03	0.00	Kazakhstan
3.4	3.2 <sup>1</sup>	–	–	–	–	Kyrgyzstan
15.6	11.2	0.04	0.04	0.02	0.00	Mongolia
2.6	2.6	–	–	–	–	Tajikistan
–	–	–	–	–	–	Turkmenistan
8.8	7.3	0.03	0.04	0.03	0.04	Uzbekistan

**Table B1:** Research expenditure as a share of GDP and in purchasing power parity dollars (PPP\$), 2015–2018

	Research expenditure as a share of GDP (%)				Research expenditure (constant PPP\$ thousands)	
	2015	2016	2017	2018	2015	2018
<b>South Asia</b>						
Afghanistan	–	–	–	–	–	–
Bangladesh	–	–	–	–	–	–
Bhutan	–	–	–	–	–	–
India	0.69	0.67	0.67	0.65	46 467 797	54 043 359
Maldives	–	–	–	–	–	–
Nepal	–	–	–	–	–	–
Pakistan	0.25	–	0.24	–	1 949 534	2 085 430 <sup>1</sup>
Sri Lanka	0.11	–	–	–	224 990	–
<b>Southeast Asia</b>						
Brunei Darussalam	–	–	–	0.28	–	76 191
Cambodia	0.12	–	–	–	53 797	–
China	2.07	2.12	2.15	2.19	341 564 212	439 016 152
China, Hong Kong SAR	0.76	0.79	0.80	0.86	2 652 307	3 276 324
China, Macao SAR	0.14	0.23	0.17	0.20	72 895	124 645
China, Taiwan Prov.	–	–	–	–	–	–
Indonesia	–	0.25	0.24	0.23	6 145 412 <sup>+1</sup>	6 264 632
Japan	3.28	3.16	3.21	3.26	140 171 634	144 121 276
Korea DPR	–	–	–	–	–	–
Korea Rep.	3.98	3.99	4.29	4.53	69 721 964	86 615 298
Lao PDR	–	–	–	–	–	–
Malaysia	1.30	1.44	–	–	8 900 982	10 253 602 <sup>-2</sup>
Myanmar	–	–	0.03	–	–	85 007 <sup>-1</sup>
Philippines	0.16	–	–	–	1 022 711	–
Singapore	2.18	2.08	1.94	–	8 968 001	8 532 298 <sup>-1</sup>
Thailand	0.62	0.78	1.00	–	5 754 530	10 082 925 <sup>-1</sup>
Timor-Leste	–	–	–	–	–	–
Viet Nam	0.44	–	0.53	–	2 042 921	2 767 387 <sup>-1</sup>
<b>Oceania</b>						
Australia	1.92	–	1.87	–	16 834 226	17 297 100 <sup>-1</sup>
New Zealand	1.23	–	1.37	–	1 604 720	1 898 168 <sup>-1</sup>
Cook Islands	–	–	–	–	–	–
Fiji	–	–	–	–	–	–
Kiribati	–	–	–	–	–	–
Marshall Islands	–	–	–	–	–	–
Micronesia	–	–	–	–	–	–
Nauru	–	–	–	–	–	–
Niue	–	–	–	–	–	–
Palau	–	–	–	–	–	–
Papua New Guinea	–	0.03	–	–	–	9 074 <sup>-2</sup>
Samoa	–	–	–	–	–	–
Solomon Islands	–	–	–	–	–	–
Tonga	–	–	–	–	–	–
Tuvalu	–	–	–	–	–	–
Vanuatu	–	–	–	–	–	–

**KEY** –: data unavailable | -n/+n: data refer to n years before or after reference year | 0: magnitude nil or negligible | a: not applicable

GDP: gross domestic product | PPP\$: purchasing power parity dollars

Source: UNESCO Institute for Statistics, August 2020

Research expenditure per capita (constant PPP\$)		Research expenditure as a share of GDP by type of research (%)				
		Basic	Applied	Experimental development	Unspecified	
2015	2018	2018				
						<b>South Asia</b>
–	–	–	–	–	–	Afghanistan
–	–	–	–	–	–	Bangladesh
–	–	–	–	–	–	Bhutan
35.5	40.0	0.10 <sup>-1</sup>	0.15 <sup>-1</sup>	0.13 <sup>-1</sup>	0.29 <sup>-1</sup>	India
–	–	–	–	–	–	Maldives
–	–	–	–	–	–	Nepal
9.8	10.0 <sup>-1</sup>	–	–	–	–	Pakistan
10.8	–	0.02 <sup>-3</sup>	0.06 <sup>-3</sup>	0.03 <sup>-3</sup>	0.00 <sup>-3</sup>	Sri Lanka
						<b>Southeast Asia</b>
–	177.6	0.10	0.11	0.05	0.02	Brunei Darussalam
3.5	–	0.02 <sup>-3</sup>	0.08 <sup>-3</sup>	0.02 <sup>-3</sup>	0.00 <sup>-3</sup>	Cambodia
242.8	307.5	0.12	0.24	1.82	0.00	China
369.1	444.4	–	–	–	–	China, Hong Kong SAR
121.1	197.3	–	–	–	–	China, Macao SAR
–	–	–	–	–	–	China, Taiwan Prov.
23.5 <sup>-1</sup>	23.4	–	–	–	–	Indonesia
1 095.2	1 133.0	0.41	0.62	2.10	0.14	Japan
–	–	–	–	–	–	Korea DPR
1 371.9	1 692.6	0.68	1.06	3.07	0.00	Korea Rep.
–	–	–	–	–	–	Lao PDR
294	334.2 <sup>-2</sup>	0.42 <sup>-2</sup>	0.81 <sup>-2</sup>	0.21 <sup>-2</sup>	0.00 <sup>-2</sup>	Malaysia
–	1.6 <sup>-1</sup>	0.01 <sup>-1</sup>	0.01 <sup>-1</sup>	0.01 <sup>-1</sup>	0.00 <sup>-1</sup>	Myanmar
10.0	–	0.03 <sup>-3</sup>	0.04 <sup>-3</sup>	0.02 <sup>-3</sup>	0.07 <sup>-3</sup>	Philippines
1 603.7	1 494.8 <sup>-1</sup>	0.46 <sup>-1</sup>	0.61 <sup>-1</sup>	0.87 <sup>-1</sup>	0.00 <sup>-1</sup>	Singapore
83.7	145.7 <sup>-1</sup>	0.10 <sup>-1</sup>	0.27 <sup>-1</sup>	0.64 <sup>-1</sup>	0.07 <sup>-1</sup>	Thailand
–	–	–	–	–	–	Timor-Leste
22.0	29.3 <sup>-1</sup>	0.07 <sup>-3</sup>	0.30 <sup>-3</sup>	0.04 <sup>-3</sup>	0.02 <sup>-3</sup>	Viet Nam
						<b>Oceania</b>
703.4	703.6 <sup>-1</sup>	–	–	–	–	Australia
347.8	403.7 <sup>-1</sup>	0.34 <sup>-1</sup>	0.55 <sup>-1</sup>	0.48 <sup>-1</sup>	0.00 <sup>-1</sup>	New Zealand
–	–	–	–	–	–	Cook Islands
–	–	–	–	–	–	Fiji
–	–	–	–	–	–	Kiribati
–	–	–	–	–	–	Marshall Islands
–	–	–	–	–	–	Micronesia
–	–	–	–	–	–	Nauru
–	–	–	–	–	–	Niue
–	–	–	–	–	–	Palau
–	1.1 <sup>-2</sup>	0.01 <sup>-2</sup>	0.01 <sup>-2</sup>	0.01 <sup>-2</sup>	0.00 <sup>-2</sup>	Papua New Guinea
–	–	–	–	–	–	Samoa
–	–	–	–	–	–	Solomon Islands
–	–	–	–	–	–	Tonga
–	–	–	–	–	–	Tuvalu
–	–	–	–	–	–	Vanuatu

**Table B2:** Research expenditure by sector of performance and source of funds, 2015 and 2018 (%)

	R&D expenditure by sector of performance (%)									
	Business enterprise	Government	Higher education	Private non-profit	Not elsewhere classified	Business enterprise	Government	Higher education	Private non-profit	Not elsewhere classified
	2015					2018				
<b>North America</b>										
Canada	53.27	6.96	39.30	0.47	0.00	50.90	6.90	41.73	0.47	0.00
United States of America	71.87	11.04	13.05	4.04	0.00	72.58	10.36	12.85	4.21	0.00
<b>Latin America</b>										
Argentina	22.48	50.83	25.81	0.88	0.00	24.97 <sup>-1</sup>	48.16 <sup>-1</sup>	25.95 <sup>-1</sup>	0.92 <sup>-1</sup>	0.00 <sup>-1</sup>
Belize	-	-	-	-	-	-	-	-	-	-
Bolivia	-	-	-	-	-	-	-	-	-	-
Brazil	-	-	-	-	-	-	-	-	-	-
Chile	34.30	7.81	38.53	19.35	0.00	34.24 <sup>-1</sup>	13.11 <sup>-1</sup>	45.83 <sup>-1</sup>	6.82 <sup>-1</sup>	0.00 <sup>-1</sup>
Colombia	44.65	9.64	29.05	16.66	0.00	44.90	10.15	25.08	19.87	0.00
Costa Rica	26.62	23.62	49.29	0.47	0.00	30.82 <sup>-1</sup>	13.13 <sup>-1</sup>	55.84 <sup>-1</sup>	0.20 <sup>-1</sup>	0.00 <sup>-1</sup>
Ecuador	-	-	-	-	-	-	-	-	-	-
El Salvador	41.63	26.64	31.74	-	0.00	31.00 <sup>-1</sup>	39.31 <sup>-1</sup>	29.69 <sup>-1</sup>	-	0.00 <sup>-1</sup>
Guatemala	0.66	22.94	51.04	-	25.36	10.28 <sup>-1</sup>	10.20 <sup>-1</sup>	79.51 <sup>-1</sup>	-	0.00 <sup>-1</sup>
Guyana	-	-	-	-	-	-	-	-	-	-
Honduras	-	-	-	-	-	-	44.73 <sup>-1</sup>	30.22 <sup>-1</sup>	25.05 <sup>-1</sup>	0.00 <sup>-1</sup>
Mexico	18.60	30.12	50.34	0.93	0.00	22.11	26.19	50.56	1.15	0.00
Nicaragua	-	-	-	-	-	-	-	-	-	-
Panama	0.38	25.23	3.92	70.47	0.00	0.66 <sup>-1</sup>	27.74 <sup>-1</sup>	12.28 <sup>-1</sup>	59.32 <sup>-1</sup>	0.00 <sup>-1</sup>
Paraguay	-	39.62	42.83	17.55	0.00	-	35.66 <sup>-1</sup>	40.43 <sup>-1</sup>	23.90 <sup>-1</sup>	0.00 <sup>-1</sup>
Peru	-	30.45	34.23	8.37	26.95	-	-	-	-	-
Suriname	-	-	-	-	-	-	-	-	-	-
Uruguay	4.61	34.39	59.76	1.24	0.00	23.91 <sup>-1</sup>	35.64 <sup>-1</sup>	39.74 <sup>-1</sup>	0.71 <sup>-1</sup>	0.00 <sup>-1</sup>
Venezuela	-	-	-	-	-	-	-	-	-	-
<b>Caribbean</b>										
Antigua & Barbuda	-	-	-	-	-	-	-	-	-	-
Bahamas	-	-	-	-	-	-	-	-	-	-
Barbados	-	-	-	-	-	-	-	-	-	-
Cuba	-	-	-	-	-	-	-	-	-	-
Dominica	-	-	-	-	-	-	-	-	-	-
Dominican Rep.	-	-	-	-	-	-	-	-	-	-
Grenada	-	-	-	-	-	-	-	-	-	-
Haiti	-	-	-	-	-	-	-	-	-	-
Jamaica	-	-	-	-	-	-	-	-	-	-
St Kitts & Nevis	-	-	-	-	-	-	-	-	-	-
St Lucia	-	-	-	-	-	-	-	-	-	-
St Vincent & Grenadines	-	-	-	-	-	-	-	-	-	-
Trinidad & Tobago	-	78.29	21.69	-	0.01	8.21 <sup>-1</sup>	87.47 <sup>-1</sup>	4.32 <sup>-1</sup>	-	0.00 <sup>-1</sup>
<b>European Union</b>										
Austria	71.42	4.58	23.51	0.49	0.00	69.87	7.14	22.44	0.55	0.00
Belgium	69.94	9.19	20.33	0.55	0.00	70.54	9.50	19.38	0.59	0.00
Bulgaria	73.36	20.70	5.39	0.55	0.00	71.91	22.06	5.45	0.58	0.00
Croatia	51.23	24.53	24.24	-	0.00	48.03	19.93	32.04	-	0.00
Cyprus	22.84	12.99	49.92	14.26	0.00	36.87	9.59	41.88	11.66	0.00
Czech Rep.	54.30	20.40	24.91	0.39	0.00	61.95	16.35	21.48	0.22	0.00
Denmark	63.47	2.23	33.94	0.35	0.00	64.27	3.00	32.43	0.30	0.00
Estonia	46.05	10.80	41.35	1.80	0.00	42.35	11.43	44.54	1.68	0.00
Finland	66.67	8.17	24.39	0.77	0.00	65.66	8.31	25.22	0.81	0.00
France	63.72	12.76	21.99	1.54	0.00	65.41	12.50	20.50	1.59	0.00
Germany	68.65	14.06	17.28	-	0.00	68.82	13.46	17.72	-	0.00
Greece	32.96	28.13	37.78	1.12	0.00	48.26	22.30	28.44	1.00	0.00
Hungary	73.44	13.29	12.11	-	0.00	75.60	10.87	12.71	-	0.00
Ireland	71.84	4.38	23.79	-	0.00	74.78	4.28	20.94	-	0.00
Italy	58.16	13.14	25.51	3.19	0.00	62.06	12.67	23.52	1.76	0.00

R&D expenditure by source of funds (%)												
Business enterprise	Government	Higher education	Private non-profit	Abroad	Not elsewhere classified	Business	Government	Higher education	Private non-profit	Abroad	Not elsewhere classified	
2015						2018						
												<b>North America</b>
43.95	31.64	10.02	3.99	9.76	0.00	41.12	33.10	11.06	4.52	9.33	0.00	Canada
62.54	25.29	3.49	3.65	5.02	0.00	62.37	22.96	3.63	3.73	7.30	0.00	United States of America
												<b>Latin America</b>
19.15	74.79	1.99	0.53	3.53	0.00	16.52 <sup>-1</sup>	72.64 <sup>-1</sup>	1.75 <sup>-1</sup>	0.57 <sup>-1</sup>	8.52 <sup>-1</sup>	0.00 <sup>-1</sup>	Argentina
-	-	-	-	-	-	-	-	-	-	-	-	Belize
-	-	-	-	-	-	-	-	-	-	-	-	Bolivia
45.55	52.24	2.22	-	-	0.00	47.46 <sup>-1</sup>	49.72 <sup>-1</sup>	2.81 <sup>-1</sup>	-	-	0.00	Brazil
32.77	42.60	11.12	0.63	12.88	0.00	31.43 <sup>-1</sup>	47.01 <sup>-1</sup>	15.44 <sup>-1</sup>	1.67 <sup>-1</sup>	4.45 <sup>-1</sup>	0.00 <sup>-1</sup>	Chile
44.65	9.64	28.62	16.66	0.44	0.00	49.10 <sup>-1</sup>	8.17 <sup>-1</sup>	22.77 <sup>-1</sup>	19.09 <sup>-1</sup>	0.45 <sup>-1</sup>	0.41 <sup>-1</sup>	Colombia
4.71	57.43	-	2.93	3.69	31.23	3.65 <sup>-1</sup>	53.60 <sup>-1</sup>	-	0.03 <sup>-1</sup>	6.72 <sup>-1</sup>	35.99 <sup>-1</sup>	Costa Rica
-	-	-	-	-	-	-	-	-	-	-	-	Ecuador
41.91	29.01	21.19	1.09	6.80	0.00	31.18 <sup>-1</sup>	39.18 <sup>-1</sup>	20.64 <sup>-1</sup>	1.31 <sup>-1</sup>	7.68 <sup>-1</sup>	0.01 <sup>-1</sup>	El Salvador
-	27.79	28.18	-	44.02	0.02	10.28 <sup>-1</sup>	10.20 <sup>-1</sup>	79.51 <sup>-1</sup>	-	-	0.00 <sup>-1</sup>	Guatemala
-	-	-	-	-	-	-	-	-	-	-	-	Guyana
-	82.48	17.52	-	-	0.00	10.40 <sup>-1</sup>	44.88 <sup>-1</sup>	27.36 <sup>-1</sup>	13.84 <sup>-1</sup>	3.52 <sup>-1</sup>	0.00 <sup>-1</sup>	Honduras
17.38	79.70	1.74	0.55	0.63	0.00	18.58	76.85	2.83	0.84	0.91	0.00	Mexico
-	-	-	-	-	-	-	-	-	-	-	-	Nicaragua
0.86	26.39	0.77	14.79	57.17	0.02	1.54 <sup>-1</sup>	55.67 <sup>-1</sup>	-	8.02 <sup>-1</sup>	34.71 <sup>-1</sup>	0.05 <sup>-1</sup>	Panama
0.28	73.09	2.05	4.15	10.33	10.09	0.23 <sup>-1</sup>	77.39 <sup>-1</sup>	3.86 <sup>-1</sup>	2.76 <sup>-1</sup>	11.49 <sup>-1</sup>	4.26 <sup>-1</sup>	Paraguay
-	-	-	-	-	-	-	-	-	-	-	-	Peru
-	-	-	-	-	-	-	-	-	-	-	-	Suriname
4.57	28.63	59.16	0.27	7.38	0.00	4.59 <sup>-1</sup>	28.24 <sup>-1</sup>	59.48 <sup>-1</sup>	0.27 <sup>-1</sup>	7.42 <sup>-1</sup>	0.00 <sup>-1</sup>	Uruguay
-	89.13	10.87	-	-	0.00	-	91.06 <sup>-2</sup>	8.94 <sup>-2</sup>	-	-	0.00 <sup>-2</sup>	Venezuela
												<b>Caribbean</b>
-	-	-	-	-	-	-	-	-	-	-	-	Antigua & Barbuda
-	-	-	-	-	-	-	-	-	-	-	-	Bahamas
-	-	-	-	-	-	-	-	-	-	-	-	Barbados
40.01	55.01	-	-	4.98	0.00	42.00	56.38	-	-	1.61	0.00	Cuba
-	-	-	-	-	-	-	-	-	-	-	-	Dominica
-	-	-	-	-	-	-	-	-	-	-	-	Dominican Rep.
-	-	-	-	-	-	-	-	-	-	-	-	Grenada
-	-	-	-	-	-	-	-	-	-	-	-	Haiti
-	-	-	-	-	-	-	-	-	-	-	-	Jamaica
-	-	-	-	-	-	-	-	-	-	-	-	St Kitts & Nevis
-	-	-	-	-	-	-	-	-	-	-	-	St Lucia
-	-	-	-	-	-	-	-	-	-	-	-	St Vincent & Grenadines
-	-	-	-	-	-	8.23 <sup>-1</sup>	75.01 <sup>-1</sup>	-	-	16.75 <sup>-1</sup>	0.00 <sup>-1</sup>	Trinidad & Tobago
												<b>European Union</b>
49.74	32.59	0.60	0.52	16.55	0.00	54.43	29.37	-	0.58	15.63	0.00	Austria
58.60	22.51	1.99	0.36	16.55	0.00	63.49 <sup>-1</sup>	19.96 <sup>-1</sup>	2.99 <sup>-1</sup>	0.51 <sup>-1</sup>	13.04 <sup>-1</sup>	0.00 <sup>-1</sup>	Belgium
35.58	20.35	0.08	0.14	43.84	0.00	43.21 <sup>-1</sup>	24.33 <sup>-1</sup>	0.06 <sup>-1</sup>	0.22 <sup>-1</sup>	32.18 <sup>-1</sup>	0.00 <sup>-1</sup>	Bulgaria
46.64	36.36	2.03	0.49	14.48	0.00	42.58 <sup>-1</sup>	43.11 <sup>-1</sup>	3.49 <sup>-1</sup>	0.07 <sup>-1</sup>	10.75 <sup>-1</sup>	0.00 <sup>-1</sup>	Croatia
20.05	50.56	5.77	0.63	22.99	0.00	32.76 <sup>-1</sup>	38.48 <sup>-1</sup>	5.36 <sup>-1</sup>	0.88 <sup>-1</sup>	22.52 <sup>-1</sup>	0.00 <sup>-1</sup>	Cyprus
34.53	32.21	0.71	0.05	32.50	0.00	32.99	34.10	1.03	0.09	31.79	0.00	Czech Rep.
59.11	30.20	-	4.42	6.27	0.00	58.52 <sup>-1</sup>	27.21 <sup>-1</sup>	-	5.35 <sup>-1</sup>	8.92 <sup>-1</sup>	0.00 <sup>-1</sup>	Denmark
41.01	46.36	0.21	0.24	12.18	0.00	43.57 <sup>-1</sup>	40.19 <sup>-1</sup>	0.99 <sup>-1</sup>	0.27 <sup>-1</sup>	14.97 <sup>-1</sup>	0.00 <sup>-1</sup>	Estonia
54.76	28.89	0.30	1.53	14.52	0.00	58.01 <sup>-1</sup>	29.01 <sup>-1</sup>	0.52 <sup>-1</sup>	1.69 <sup>-1</sup>	10.77 <sup>-1</sup>	0.00 <sup>-1</sup>	Finland
54.04	34.81	2.60	0.93	7.62	0.00	56.08 <sup>-1</sup>	32.41 <sup>-1</sup>	2.73 <sup>-1</sup>	0.95 <sup>-1</sup>	7.82 <sup>-1</sup>	0.00 <sup>-1</sup>	France
65.58	27.90	-	0.36	6.15	0.00	66.18 <sup>-1</sup>	27.72 <sup>-1</sup>	-	0.35 <sup>-1</sup>	5.75 <sup>-1</sup>	0.00 <sup>-1</sup>	Germany
31.40	53.06	2.46	0.42	12.66	0.00	42.59	40.62	1.92	0.62	14.25	0.00	Greece
49.72	34.62	-	0.71	14.95	0.00	52.68 <sup>-1</sup>	31.89 <sup>-1</sup>	-	0.55 <sup>-1</sup>	14.88 <sup>-1</sup>	0.00 <sup>-1</sup>	Hungary
48.69	26.12	0.97	0.60	23.62	0.00	48.99 <sup>-2</sup>	25.83 <sup>-2</sup>	0.78 <sup>-2</sup>	0.77 <sup>-2</sup>	23.63 <sup>-2</sup>	0.00 <sup>-2</sup>	Ireland
49.99	37.98	0.99	2.73	8.30	0.00	53.68 <sup>-1</sup>	32.28 <sup>-1</sup>	0.79 <sup>-1</sup>	1.53 <sup>-1</sup>	11.73 <sup>-1</sup>	0.00 <sup>-1</sup>	Italy

**Table B2: Research expenditure by sector of performance and source of funds, 2015 and 2018 (%)**

	R&D expenditure by sector of performance (%)									
	Business enterprise	Government	Higher education	Private non-profit	Not elsewhere classified	Business enterprise	Government	Higher education	Private non-profit	Not elsewhere classified
	2015					2018				
Latvia	24.70	25.62	49.67	-	0.00	24.87	22.77	52.36	-	0.00
Lithuania	27.39	17.07	55.53	-	0.00	41.83	22.24	35.93	-	0.00
Luxembourg	51.61	29.81	18.60	-	0.00	55.82	23.82	20.36	-	0.00
Malta	51.38	16.51	32.12	-	0.00	60.89	1.29	37.82	-	0.00
Netherlands	56.00	11.93	32.08	-	0.00	67.05	5.78	27.17	-	0.00
Poland	46.57	24.39	28.88	0.16	0.00	66.09	1.94	31.67	0.30	0.00
Portugal	46.39	6.48	45.54	1.58	0.00	50.76	5.67	41.95	1.61	0.00
Romania	44.00	38.26	17.44	0.30	0.00	59.34	30.63	9.81	0.22	0.00
Slovakia	27.95	27.86	43.79	0.40	0.00	54.08	21.22	24.28	0.42	0.00
Slovenia	76.26	13.51	10.19	0.04	0.00	74.20	13.55	11.92	0.33	0.00
Spain	52.54	19.13	28.12	0.20	0.00	56.50	16.83	26.40	0.26	0.00
Sweden	69.69	3.42	26.71	0.19	0.00	70.88	3.63	25.38	0.11	0.00
United Kingdom	66.04	6.63	25.32	2.01	0.00	69.13	6.11	22.54	2.22	0.00
<b>Southeast Europe</b>										
Albania	-	-	-	-	-	-	-	-	-	-
Bosnia & Herzegovina	32.97	20.36	45.91	0.77	0.00	34.78	16.07	48.17	0.99	0.00
Montenegro	30.53	19.15	46.78	3.53	0.00	14.47	44.29	38.98	2.26	0.00
North Macedonia	17.27	13.97	67.89	0.86	0.00	30.57	9.82	58.01	1.61	0.00
Serbia	31.73	27.35	40.76	0.16	0.00	39.10	28.17	32.72	0.01	0.00
<b>European Free Trade Assoc.</b>										
Iceland	65.99	4.65	29.36	-	0.00	64.33	4.16	31.51	-	0.00
Liechtenstein	-	-	-	-	-	-	-	-	-	0.00
Norway	53.89	15.04	31.07	-	0.00	51.90	13.66	34.44	-	0.00
Switzerland	70.99	0.88	26.68	1.45	0.00	69.40 <sup>1</sup>	0.82 <sup>1</sup>	27.57 <sup>1</sup>	2.21 <sup>1</sup>	0.00 <sup>1</sup>
<b>Eastern Europe &amp; West Asia</b>										
Armenia	-	84.21	15.79	-	0.00	-	86.72	13.28	-	0.00
Azerbaijan	5.05	86.10	8.60	0.25	0.00	2.44	85.42	12.14	-	0.00
Belarus	65.62	23.57	10.80	0.01	0.00	68.74	21.65	9.61	-	0.00
Georgia	-	-	-	-	-	-	23.21	76.79	-	0.00
Iran Islamic Rep.	-	-	-	-	-	25.12 <sup>1</sup>	40.31 <sup>1</sup>	33.65 <sup>1</sup>	0.92 <sup>1</sup>	0.00 <sup>1</sup>
Israel	85.20	1.67	12.12	1.02	0.00	88.26	1.53	9.30	0.91	0.00
Moldova, Rep.	20.75	67.14	12.11	a	0.00	17.50	70.86	11.64	a	0.00
Russian Federation	59.21	31.07	9.59	0.14	0.00	55.59	34.43	9.68	0.30	0.00
Turkey	50.01	10.34	39.66	-	0.00	56.88 <sup>1</sup>	9.57 <sup>1</sup>	33.55 <sup>1</sup>	-	0.00 <sup>1</sup>
Ukraine	61.97	32.69	5.35	-	0.00	58.47	34.85	6.68	-	0.00
<b>Sub-Saharan Africa</b>										
Angola	-	-	-	-	-	-	50.92 <sup>2</sup>	49.08 <sup>2</sup>	-	0.00 <sup>2</sup>
Benin	-	-	-	-	-	-	-	-	-	-
Botswana	-	-	-	-	-	-	-	-	-	-
Burkina Faso	-	-	-	-	-	-	62.43 <sup>1</sup>	35.20 <sup>1</sup>	2.37 <sup>1</sup>	0.00
Burundi	-	-	-	-	-	8.81	53.45	11.31	26.43	0.00
Cameroon	-	-	-	-	-	-	-	-	-	-
Cabo Verde	-	-	-	-	-	-	-	-	-	-
Central African Rep.	-	-	-	-	-	-	-	-	-	-
Chad	-	-	-	-	-	-	12.85 <sup>2</sup>	87.15 <sup>2</sup>	-	0.00 <sup>2</sup>
Comoros	-	-	-	-	-	-	-	-	-	-
Congo	-	-	-	-	-	-	-	-	-	-
Côte d'Ivoire	-	-	-	-	-	-	76.72 <sup>2</sup>	21.59 <sup>2</sup>	1.69 <sup>2</sup>	0.00 <sup>2</sup>
Congo, Dem. Rep.	-	3.94	93.66	2.41	0.00	-	-	-	-	-
Djibouti	-	-	-	-	-	-	-	-	-	-
Equatorial Guinea	-	-	-	-	-	-	-	-	-	-
Eritrea	-	-	-	-	-	-	-	-	-	-
Eswatini	0.74	40.32	31.14	27.80	0.00	-	-	-	-	-
Ethiopia	-	-	-	-	-	2.32 <sup>1</sup>	65.91 <sup>1</sup>	27.89 <sup>1</sup>	3.88 <sup>1</sup>	0.00 <sup>1</sup>

R&D expenditure by source of funds (%)												
Business enterprise	Government	Higher education	Private non-profit	Abroad	Not elsewhere classified	Business	Government	Higher education	Private non-profit	Abroad	Not elsewhere classified	
2015						2018						
20.04	32.72	2.23	-	45.01	0.00	24.15 <sup>-1</sup>	43.58 <sup>-1</sup>	2.47 <sup>-1</sup>	-	29.80 <sup>-1</sup>	0.00 <sup>-1</sup>	Latvia
28.53	35.35	1.46	0.31	34.35	0.00	35.42 <sup>-1</sup>	36.36 <sup>-1</sup>	3.65 <sup>-1</sup>	0.14 <sup>-1</sup>	24.43 <sup>-1</sup>	0.00 <sup>-1</sup>	Lithuania
47.08	47.67	1.65	0.21	3.38	0.00	49.58 <sup>-1</sup>	43.07 <sup>-1</sup>	1.37 <sup>-1</sup>	0.26 <sup>-1</sup>	5.70 <sup>-1</sup>	0.00 <sup>-1</sup>	Luxembourg
45.63	32.81	1.10	0.06	20.40	0.00	56.36 <sup>-1</sup>	31.28 <sup>-1</sup>	1.31 <sup>-1</sup>	0.28 <sup>-1</sup>	10.76 <sup>-1</sup>	0.00 <sup>-1</sup>	Malta
48.65	33.13	0.16	2.56	15.51	0.00	51.63 <sup>-1</sup>	31.38 <sup>-1</sup>	0.22 <sup>-1</sup>	2.46 <sup>-1</sup>	14.31 <sup>-1</sup>	0.00 <sup>-1</sup>	Netherlands
39.00	41.82	2.20	0.23	16.74	0.00	52.54 <sup>-1</sup>	38.28 <sup>-1</sup>	2.96 <sup>-1</sup>	0.26 <sup>-1</sup>	5.95 <sup>-1</sup>	0.00 <sup>-1</sup>	Poland
42.65	44.30	4.39	1.28	7.37	0.00	46.51 <sup>-1</sup>	41.04 <sup>-1</sup>	3.91 <sup>-1</sup>	1.22 <sup>-1</sup>	7.32 <sup>-1</sup>	0.00 <sup>-1</sup>	Portugal
37.29	41.69	1.70	0.09	19.23	0.00	54.40 <sup>-1</sup>	35.93 <sup>-1</sup>	1.70 <sup>-1</sup>	0.04 <sup>-1</sup>	7.92 <sup>-1</sup>	0.00 <sup>-1</sup>	Romania
25.06	31.94	3.26	0.32	39.43	0.00	48.85	38.01	1.66	0.25	11.23	0.00	Slovakia
69.21	19.89	0.34	0.01	10.56	0.00	63.15 <sup>-1</sup>	22.85 <sup>-1</sup>	0.45 <sup>-1</sup>	0.44 <sup>-1</sup>	13.10 <sup>-1</sup>	0.00 <sup>-1</sup>	Slovenia
45.85	40.93	4.31	0.87	8.04	0.00	47.79 <sup>-1</sup>	38.90 <sup>-1</sup>	4.32 <sup>-1</sup>	0.78 <sup>-1</sup>	8.21 <sup>-1</sup>	0.00 <sup>-1</sup>	Spain
57.26	-	0.94	3.34	-	0.00	60.76 <sup>-1</sup>	25.02 <sup>-1</sup>	0.74 <sup>-1</sup>	3.29 <sup>-1</sup>	10.08 <sup>-1</sup>	0.00 <sup>-1</sup>	Sweden
48.96	27.67	1.37	4.91	17.09	0.00	53.72 <sup>-1</sup>	25.99 <sup>-1</sup>	0.69 <sup>-1</sup>	5.16 <sup>-1</sup>	14.43 <sup>-1</sup>	0.00 <sup>-1</sup>	United Kingdom
												<b>Southeast Europe</b>
-	-	-	-	-	-	-	-	-	-	-	-	Albania
31.39	37.60	14.07	0.03	16.90	0.00	28.94	40.91	9.78	0.01	20.37	0.00	Bosnia & Herzegovina
29.86	57.78	6.43	0.02	5.91	0.00	18.72 <sup>-1</sup>	64.13 <sup>-1</sup>	6.88 <sup>-1</sup>	-	10.28 <sup>-1</sup>	0.00 <sup>-1</sup>	Montenegro
16.78	52.86	24.98	0.15	5.24	0.00	30.05	45.24	20.22	0.20	4.29	0.00	North Macedonia
12.78	50.63	24.02	0.01	12.55	0.00	10.02	43.14	25.25	0.03	21.56	0.00	Serbia
												<b>European Free Trade Assoc.</b>
35.77	30.80	4.00	4.07	25.36	0.00	40.18	36.03	3.31	1.87	18.61	0.00	Iceland
-	-	-	-	-	-	-	-	-	-	-	-	Liechtenstein
44.23	44.92	0.43	1.20	9.20	0.00	42.83 <sup>-1</sup>	46.67 <sup>-1</sup>	0.44 <sup>-1</sup>	1.22 <sup>-1</sup>	8.84 <sup>-1</sup>	0.00 <sup>-1</sup>	Norway
63.48	24.37	1.48	0.47	10.21	0.00	67.04 <sup>-1</sup>	25.89 <sup>-1</sup>	1.39 <sup>-1</sup>	0.46 <sup>-1</sup>	5.22 <sup>-1</sup>	0.00 <sup>-1</sup>	Switzerland
												<b>Eastern Europe &amp; West Asia</b>
-	73.82	-	-	2.28	23.91	16.69	68.66	-	-	5.56	9.10	Armenia
32.18	65.76	0.41	1.65	-	0.00	30.78	68.68	-	0.54	-	0.00	Azerbaijan
41.31	45.97	-	-	12.72	0.00	44.99	41.84	-	-	13.17	0.00	Belarus
-	-	-	-	-	-	1.71	42.53	42.80	0.97	10.29	1.71	Georgia
-	-	-	-	-	-	-	-	-	-	-	-	Iran, Islamic Rep.
33.16	12.84	0.67	0.80	52.53	0.00	35.77 <sup>-1</sup>	10.64 <sup>-1</sup>	0.27 <sup>-1</sup>	0.77 <sup>-1</sup>	52.55 <sup>-1</sup>	0.00 <sup>-1</sup>	Israel
-	-	-	-	11.64	88.36	15.50	76.72	2.83	-	4.95	0.00	Moldova, Rep.
26.47	69.52	1.19	0.17	2.65	0.00	29.49	67.03	0.86	0.27	2.35	0.00	Russian Federation
44.57	38.47	15.00	0.04	1.92	0.00	49.45 <sup>-1</sup>	33.61 <sup>-1</sup>	13.32 <sup>-1</sup>	0.14 <sup>-1</sup>	3.48 <sup>-1</sup>	0.00 <sup>-1</sup>	Turkey
40.28	39.35	0.17	-	18.18	2.02	30.51	46.28	0.29	0.13	21.72	1.08	Ukraine
												<b>Sub-Saharan Africa</b>
-	-	-	-	-	-	-	100.00 <sup>-2</sup>	-	-	-	0.00 <sup>-2</sup>	Angola
-	-	-	-	-	-	-	-	-	-	-	-	Benin
-	-	-	-	-	-	-	-	-	-	-	-	Botswana
-	-	-	-	-	-	-	93.59 <sup>-1</sup>	1.57 <sup>-1</sup>	-	4.84 <sup>-1</sup>	0.00 <sup>-1</sup>	Burkina Faso
-	-	-	-	-	-	8.81	64.77	-	26.43	-	0.00	Burundi
-	-	-	-	-	-	-	-	-	-	-	-	Cameroon
-	-	-	-	-	-	-	-	-	-	-	-	Cabo Verde
-	-	-	-	-	-	-	-	-	-	-	-	Central African Rep.
-	-	-	-	-	-	-	100.00 <sup>-2</sup>	-	-	-	0.00 <sup>-2</sup>	Chad
-	-	-	-	-	-	-	-	-	-	-	-	Comoros
-	-	-	-	-	-	-	-	-	-	-	-	Congo
-	-	-	-	-	-	-	-	-	-	-	-	Côte d'Ivoire
0.04	34.51	63.75	0.25	1.45	0.00	-	-	-	-	-	-	Congo, Dem. Rep.
-	-	-	-	-	-	-	-	-	-	-	-	Djibouti
-	-	-	-	-	-	-	-	-	-	-	-	Equatorial Guinea
-	-	-	-	-	-	-	-	-	-	-	-	Eritrea
22.33	41.70	-	2.51	33.46	0.00	-	-	-	-	-	-	Eswatini
-	-	-	-	-	-	1.51 <sup>-1</sup>	73.39 <sup>-1</sup>	3.13 <sup>-1</sup>	1.47 <sup>-1</sup>	19.14 <sup>-1</sup>	1.36 <sup>-1</sup>	Ethiopia

**Table B2:** Research expenditure by sector of performance and source of funds, 2015 and 2018 (%)

	R&D expenditure by sector of performance (%)									
	Business enterprise	Government	Higher education	Private non-profit	Not elsewhere classified	Business enterprise	Government	Higher education	Private non-profit	Not elsewhere classified
	2015					2018				
Gabon	-	-	-	-	-	-	-	-	-	-
Gambia	-	-	-	-	-	1.62	98.38	-	-	0.00
Ghana	-	-	-	-	-	-	-	-	-	-
Guinea	-	-	-	-	-	-	-	-	-	-
Guinea-Bissau	-	-	-	-	-	-	-	-	-	-
Kenya	-	-	-	-	-	-	-	-	-	-
Lesotho	-	12.85	87.15	-	0.00	-	-	-	-	-
Liberia	-	-	-	-	-	-	-	-	-	-
Madagascar	-	100.00 <sup>-1</sup>	-	-	0.00 <sup>-1</sup>	-	100.00 <sup>-1</sup>	-	-	0.00 <sup>-1</sup>
Malawi	-	-	-	-	-	-	-	-	-	-
Mali	-	48.79	0.87	50.35	0.00	-	54.12 <sup>-1</sup>	0.66 <sup>-1</sup>	45.22 <sup>-1</sup>	0.00 <sup>-1</sup>
Mauritius	4.66 <sup>-2</sup>	74.67 <sup>-2</sup>	4.08 <sup>-2</sup>	-	16.59 <sup>-2</sup>	6.30	79.30	14.40	-	0.00
Mozambique	0.47	43.02	37.44	19.07	0.00	-	-	-	-	-
Namibia	-	-	-	-	-	-	-	-	-	-
Niger	-	-	-	-	-	-	-	-	-	-
Nigeria	-	-	-	-	-	-	-	-	-	-
Rwanda	-	-	-	-	-	6.83 <sup>-2</sup>	77.76 <sup>-2</sup>	7.88 <sup>-2</sup>	7.52 <sup>-2</sup>	0.00 <sup>-2</sup>
Sao Tome & Principe	-	-	-	-	-	-	-	-	-	-
Senegal	-	30.87	64.62	4.51	0.00	-	-	-	-	-
Seychelles	-	-	-	-	-	-	88.23 <sup>-2</sup>	4.75 <sup>-2</sup>	7.02 <sup>-2</sup>	0.00 <sup>-2</sup>
Sierra Leone	-	-	-	-	-	-	-	-	-	-
Somalia	-	-	-	-	-	-	-	-	-	-
South Africa	42.72	23.98	30.54	2.76	0.00	40.95 <sup>-1</sup>	22.31 <sup>-1</sup>	33.60 <sup>-1</sup>	3.14 <sup>-1</sup>	0.00 <sup>-1</sup>
South Sudan	-	-	-	-	-	-	-	-	-	-
Togo	-	-	-	-	-	-	-	-	-	-
Uganda	-	-	-	-	-	-	-	-	-	-
Tanzania	-	-	-	-	-	-	-	-	-	-
Zambia	-	-	-	-	-	-	-	-	-	-
Zimbabwe	-	-	-	-	-	-	-	-	-	-
<b>Arab States</b>										
Algeria	-	-	-	-	-	6.70 <sup>-1</sup>	50.10 <sup>-1</sup>	43.20 <sup>-1</sup>	-	0.00 <sup>-1</sup>
Bahrain	-	-	-	-	-	-	-	-	-	-
Egypt	6.21	32.97	60.75	0.06	0.00	3.89	28.04	68.04	0.03	0.00
Iraq	1.64	39.27	59.09	-	0.00	2.32	23.99	73.69	-	0.00
Jordan	-	-	-	-	-	-	-	-	-	-
Kuwait	-	94.32	0.47	-	5.21	-	99.41	0.59	-	0.00
Lebanon	-	-	-	-	-	-	-	-	-	-
Libya	-	-	-	-	-	-	-	-	-	-
Mauritania	-	-	-	-	-	-	-	100.00	-	0.00
Morocco	-	-	-	-	-	-	-	-	-	-
Oman	17.57	39.21	43.00	0.21	0.00	31.12	41.72	27.07	0.10	0.00
Palestine	-	-	-	-	-	-	-	-	-	-
Qatar	17.23	12.99	69.78	-	0.00	12.15	15.89	71.96	-	0.00
Saudi Arabia	-	-	-	-	-	-	-	-	-	-
Sudan	-	-	-	-	-	-	-	-	-	-
Syrian Arab Rep.	-	73.26	26.74	-	0.00	-	-	-	-	-
Tunisia	-	-	-	-	-	-	-	-	-	-
United Arab Emirates	47.32	41.06	11.62	-	0.00	61.93	25.42	12.65	-	0.00
Yemen	-	-	-	-	-	-	-	-	-	-



R&D expenditure by source of funds (%)

R&D expenditure by source of funds (%)												
Business enterprise	Government	Higher education	Private non-profit	Abroad	Not elsewhere classified	Business	Government	Higher education	Private non-profit	Abroad	Not elsewhere classified	
2015						2018						
-	-	-	-	-	-	-	-	-	-	-	-	Gabon
-	-	-	-	-	-	-	-	-	-	-	-	Gambia
-	-	-	-	-	-	-	-	-	-	-	-	Ghana
-	-	-	-	-	-	-	-	-	-	-	-	Guinea
-	-	-	-	-	-	-	-	-	-	-	-	Guinea-Bissau
-	-	-	-	-	-	-	-	-	-	-	-	Kenya
0.78	91.06	-	0.34	7.82	0.00	-	-	-	-	-	-	Lesotho
-	-	-	-	-	-	-	-	-	-	-	-	Liberia
-	-	-	-	-	-	-	-	-	-	-	-	Madagascar
-	-	-	-	-	-	-	-	-	-	-	-	Malawi
0.89	43.60	0.09	0.33	32.68	22.40	0.83 <sup>-1</sup>	45.99 <sup>-1</sup>	-	2.98 <sup>-1</sup>	50.21 <sup>-1</sup>	0.00 <sup>-1</sup>	Mali
4.66 <sup>-2</sup>	78.75 <sup>-2</sup>	-	-	12.30 <sup>-2</sup>	4.29 <sup>-2</sup>	4.10	79.45	4.42	-	1.03	11.01	Mauritius
0.47	43.49	13.32	-	39.88	2.84	-	-	-	-	-	-	Mozambique
-	-	-	-	-	-	-	-	-	-	-	-	Namibia
-	-	-	-	-	-	-	-	-	-	-	-	Niger
-	-	-	-	-	-	-	-	-	-	-	-	Nigeria
-	-	-	-	-	-	0.63 <sup>-2</sup>	64.54 <sup>-2</sup>	0.39 <sup>-2</sup>	0.69 <sup>-2</sup>	33.74 <sup>-2</sup>	0.00 <sup>-2</sup>	Rwanda
-	-	-	-	-	-	-	-	-	-	-	-	Sao Tome & Principe
2.09	85.44	0.10	4.48	7.89	0.00	-	-	-	-	-	-	Senegal
-	-	-	-	-	-	1.98 <sup>-2</sup>	56.09 <sup>-2</sup>	4.48 <sup>-2</sup>	3.22 <sup>-2</sup>	33.95 <sup>-2</sup>	0.28 <sup>-2</sup>	Seychelles
-	-	-	-	-	-	-	-	-	-	-	-	Sierra Leone
-	-	-	-	-	-	-	-	-	-	-	-	Somalia
38.90	44.61	0.14	3.33	13.02	0.00	41.49 <sup>-1</sup>	46.69 <sup>-1</sup>	0.18 <sup>-1</sup>	1.47 <sup>-1</sup>	10.17 <sup>-1</sup>	0.00 <sup>-1</sup>	South Africa
-	-	-	-	-	-	-	-	-	-	-	-	South Sudan
-	-	-	-	-	-	-	-	-	-	-	-	Togo
-	-	-	-	-	-	-	-	-	-	-	-	Uganda
-	-	-	-	-	-	-	-	-	-	-	-	Tanzania
-	-	-	-	-	-	-	-	-	-	-	-	Zambia
-	-	-	-	-	-	-	-	-	-	-	-	Zimbabwe
												<b>Arab States</b>
-	-	-	-	-	-	6.74 <sup>-1</sup>	93.13 <sup>-1</sup>	0.07 <sup>-1</sup>	-	0.02 <sup>-1</sup>	0.03 <sup>-1</sup>	Algeria
-	-	-	-	-	-	-	-	-	-	-	-	Bahrain
6.20	93.74	-	0.06	-	0.00	3.93	95.39	0.15	0.04	0.49	0.00	Egypt
1.10	96.42	2.09	0.30	0.09	0.00	1.85	97.27	0.55	0.32	-	0.00	Iraq
-	-	-	-	-	-	-	-	-	-	-	-	Jordan
-	-	-	-	-	-	-	-	-	-	-	-	Kuwait
-	-	-	-	-	-	-	-	-	-	-	-	Lebanon
-	-	-	-	-	-	-	-	-	-	-	-	Libya
-	-	-	-	-	-	-	92.79	-	7.21	-	0.00	Mauritania
-	-	-	-	-	-	-	-	-	-	-	-	Morocco
21.37	55.66	22.76	0.21	-	0.00	31.79	43.29	19.15	4.27	1.50	0.00	Oman
-	-	-	-	-	-	-	-	-	-	-	-	Palestine
7.06	42.61	20.60	27.84	1.85	0.04	9.25	32.41	45.12	12.67	0.51	0.03	Qatar
-	-	-	-	-	-	-	-	-	-	-	-	Saudi Arabia
-	-	-	-	-	-	-	-	-	-	-	-	Sudan
-	-	-	-	-	-	-	-	-	-	-	-	Syrian Arab Rep.
18.95	77.11	-	-	3.94	0.00	-	-	-	-	-	-	Tunisia
-	-	-	-	-	-	-	-	-	-	-	-	United Arab Emirates
-	-	-	-	-	-	-	-	-	-	-	-	Yemen

**Table B2: Research expenditure by sector of performance and source of funds, 2015 and 2018 (%)**

	R&D expenditure by sector of performance (%)									
	Business enterprise	Government	Higher education	Private non-profit	Not elsewhere classified	Business enterprise	Government	Higher education	Private non-profit	Not elsewhere classified
	2015					2018				
<b>Central Asia</b>										
Kazakhstan	40.10	29.33	19.46	11.11	0.00	42.92	30.59	15.94	10.55	0.00
Kyrgyzstan	14.00	71.45	14.55	–	0.00	29.26 <sup>1</sup>	58.82 <sup>1</sup>	11.92 <sup>1</sup>	–	0.00
Mongolia	7.35	80.06	9.68	–	2.91	8.56	60.19	31.26	–	0.00
Tajikistan	–	84.44	15.56	–	0.00	–	90.57	9.43	–	0.00
Turkmenistan	–	–	–	–	–	–	–	–	–	–
Uzbekistan	34.89	45.97	17.81	1.33	0.00	40.44	41.60	16.81	1.15	0.00
<b>South Asia</b>										
Afghanistan	–	–	–	–	–	–	–	–	–	–
Bangladesh	–	–	–	–	–	–	–	–	–	–
Bhutan	–	–	–	–	–	–	–	–	–	–
India	33.22	55.88	6.39	4.52	0.00	36.79	56.11	7.10	–	0.00
Maldives	–	–	–	–	–	–	–	–	–	–
Nepal	–	–	–	–	–	–	–	–	–	–
Pakistan	–	40.62	59.38	–	0.00	–	36.52 <sup>1</sup>	63.48 <sup>1</sup>	–	0.00 <sup>1</sup>
Sri Lanka	33.64	34.13	31.88	0.35	0.00	–	–	–	–	–
<b>Southeast Asia</b>										
Brunei Darussalam	–	–	–	–	–	–	–	100.00	–	0.00
Cambodia	13.51	31.19	18.22	37.08	0.00	–	–	–	–	–
China	76.79	16.16	7.05	–	0.00	77.42	15.18	7.41	–	0.00
China, Hong Kong SAR	43.75	3.97	52.27	–	0.00	44.87	4.69	50.44	–	0.00
China, Macao SAR	0.10	–	99.11	0.62	0.17	3.06	–	95.98	0.80	0.17
China, Taiwan Prov.	–	–	–	–	–	–	–	–	–	–
Indonesia	8.03 <sup>1</sup>	78.57 <sup>1</sup>	8.95 <sup>1</sup>	4.45 <sup>1</sup>	0.00 <sup>1</sup>	7.34	70.51	21.98	0.17	0.00
Japan	78.49	7.90	12.28	1.33	0.00	79.42	7.75	11.56	1.27	0.00
Korea DPR	–	–	–	–	–	–	–	–	–	–
Korea Rep.	77.53	11.74	9.09	1.64	0.00	80.29	10.07	8.22	1.41	0.00
Lao PDR	–	–	–	–	–	–	–	–	–	–
Malaysia	51.95	19.56	28.48	–	0.00	56.58 <sup>2</sup>	9.20 <sup>2</sup>	34.16 <sup>2</sup>	0.07 <sup>2</sup>	0.00 <sup>2</sup>
Myanmar	–	–	–	–	–	–	78.76 <sup>1</sup>	21.24 <sup>1</sup>	–	0.00 <sup>1</sup>
Philippines	36.88	24.25	36.74	2.13	0.00	–	–	–	–	–
Singapore	59.66	11.13	29.22	–	0.00	59.69 <sup>1</sup>	10.97 <sup>1</sup>	29.34 <sup>1</sup>	–	0.00 <sup>1</sup>
Thailand	70.20	9.95	18.89	0.96	0.00	80.00 <sup>1</sup>	5.44 <sup>1</sup>	13.85 <sup>1</sup>	0.71 <sup>1</sup>	0.00 <sup>1</sup>
Timor-Leste	–	–	–	–	–	–	–	–	–	–
Viet Nam	63.61	29.15	5.75	1.49	0.00	73.04 <sup>1</sup>	21.27 <sup>1</sup>	5.32 <sup>1</sup>	0.36 <sup>1</sup>	0.00 <sup>1</sup>
<b>Oceania</b>										
Australia	53.43	12.70	30.63	3.24	0.00	52.74 <sup>1</sup>	10.07 <sup>1</sup>	33.98 <sup>1</sup>	3.21 <sup>1</sup>	0.00 <sup>1</sup>
New Zealand	51.08	20.98	27.97	–	0.00	55.21 <sup>1</sup>	20.13 <sup>1</sup>	24.65 <sup>1</sup>	–	0.00 <sup>1</sup>
Cook Islands	–	–	–	–	–	–	–	–	–	–
Fiji	–	–	–	–	–	–	–	–	–	–
Kiribati	–	–	–	–	–	–	–	–	–	–
Marshall Islands	–	–	–	–	–	–	–	–	–	–
Micronesia	–	–	–	–	–	–	–	–	–	–
Nauru	–	–	–	–	–	–	–	–	–	–
Niue	–	–	–	–	–	–	–	–	–	–
Palau	–	–	–	–	–	–	–	–	–	–
Papua New Guinea	–	–	–	–	–	–	61.09 <sup>2</sup>	27.62 <sup>2</sup>	11.29 <sup>2</sup>	0.00 <sup>2</sup>
Samoa	–	–	–	–	–	–	–	–	–	–
Solomon Islands	–	–	–	–	–	–	–	–	–	–
Tonga	–	–	–	–	–	–	–	–	–	–
Tuvalu	–	–	–	–	–	–	–	–	–	–
Vanuatu	–	–	–	–	–	–	–	–	–	–

Source: UNESCO Institute for Statistics, August 2020.

R&D expenditure by source of funds (%)												
Business enterprise	Government	Higher education	Private non-profit	Abroad	Not elsewhere classified	Business	Government	Higher education	Private non-profit	Abroad	Not elsewhere classified	
2015						2018						
												<b>Central Asia</b>
36.59	58.76	-	-	1.81	2.85	47.42	44.51	-	-	2.66	5.41	Kazakhstan
8.67	89.25	0.25	-	1.00	0.83	6.43 <sup>-1</sup>	89.51 <sup>-1</sup>	0.25 <sup>-1</sup>	-	3.10 <sup>-1</sup>	0.72 <sup>-1</sup>	Kyrgyzstan
7.35	80.06	9.68	-	-	2.91	8.09	80.94	7.10	-	3.50	0.36	Mongolia
-	100.00	-	-	-	0.00	-	100.00	-	-	-	0.00	Tajikistan
-	-	-	-	-	-	-	-	-	-	-	-	Turkmenistan
38.93	56.96	-	a	1.19	2.92	42.43	54.31	-	a	0.30	2.96	Uzbekistan
												<b>South Asia</b>
-	-	-	-	-	-	-	-	-	-	-	-	Afghanistan
-	-	-	-	-	-	-	-	-	-	-	-	Bangladesh
-	-	-	-	-	-	-	-	-	-	-	-	Bhutan
-	-	-	-	-	-	36.77 <sup>-1</sup>	63.23 <sup>-1</sup>	-	-	-	0.00 <sup>-1</sup>	India
-	-	-	-	-	-	-	-	-	-	-	-	Maldives
-	-	-	-	-	-	-	-	-	-	-	-	Nepal
-	66.98	25.52	0.28	2.66	4.56	-	61.85 <sup>-1</sup>	35.06 <sup>-1</sup>	0.32 <sup>-1</sup>	1.33 <sup>-1</sup>	1.43 <sup>-1</sup>	Pakistan
34.44	59.64	-	2.33	1.48	2.11	-	-	-	-	-	-	Sri Lanka
												<b>Southeast Asia</b>
-	-	-	-	-	-	-	97.02	2.24	-	0.15	0.59	Brunei Darussalam
19.44	23.50	0.06	22.06	34.93	0.00	-	-	-	-	-	-	Cambodia
74.73	21.26	-	-	0.74	0.00	76.63	20.22	-	-	0.36	0.00	China
47.39	47.08	0.02	-	5.51	0.00	49.09	46.93	0.24	-	3.74	0.00	China, Hong Kong SAR
-	87.20	6.24	0.47	-	6.09	-	66.66	4.11	0.28	-	28.95	China, Macao SAR
-	-	-	-	-	-	-	-	-	-	-	-	China, Taiwan Prov.
7.55 <sup>-1</sup>	84.86 <sup>-1</sup>	-	-	-	7.59 <sup>-1</sup>	7.97	87.68	3.10	0.20	0.07	0.98	Indonesia
77.97	15.41	5.40	0.74	0.48	0.00	79.06	14.56	5.10	0.66	0.61	0.00	Japan
-	-	-	-	-	-	-	-	-	-	-	-	Korea DPR
74.55	23.66	0.64	0.40	0.75	0.00	76.64	20.53	0.58	0.31	1.94	0.00	Korea Rep.
-	-	-	-	-	-	-	-	-	-	-	-	Lao PDR
49.60	35.77	6.98	-	1.68	5.98	56.86 <sup>-2</sup>	28.77 <sup>-2</sup>	12.79 <sup>-2</sup>	-	0.90 <sup>-2</sup>	0.68 <sup>-2</sup>	Malaysia
-	-	-	-	-	-	-	77.40 <sup>-1</sup>	-	0.02 <sup>-1</sup>	22.52 <sup>-1</sup>	0.00 <sup>-1</sup>	Myanmar
37.96	49.44	9.93	0.43	1.80	0.43	-	-	-	-	-	-	Philippines
52.77	38.18	2.23	-	6.82	0.00	52.22 <sup>-1</sup>	37.40 <sup>-1</sup>	3.28 <sup>-1</sup>	-	7.09 <sup>-1</sup>	0.00 <sup>-1</sup>	Singapore
66.24	20.53	5.52	0.13	1.55	6.03	80.84 <sup>-1</sup>	12.18 <sup>-1</sup>	5.69 <sup>-1</sup>	0.50 <sup>-1</sup>	0.69 <sup>-1</sup>	0.10 <sup>-1</sup>	Thailand
-	-	-	-	-	-	-	-	-	-	-	-	Timor-Leste
58.09	33.03	0.95	-	2.89	5.04	64.12 <sup>-1</sup>	26.93 <sup>-1</sup>	1.40 <sup>-1</sup>	-	4.49 <sup>-1</sup>	3.05 <sup>-1</sup>	Viet Nam
												<b>Oceania</b>
-	-	-	-	-	-	-	-	-	-	-	-	Australia
43.75	37.09	8.29	3.09	7.75	0.00	46.40 <sup>-1</sup>	35.80 <sup>-1</sup>	7.55 <sup>-1</sup>	2.54 <sup>-1</sup>	7.70 <sup>-1</sup>	0.00 <sup>-1</sup>	New Zealand
-	-	-	-	-	-	-	-	-	-	-	-	Cook Islands
-	-	-	-	-	-	-	-	-	-	-	-	Fiji
-	-	-	-	-	-	-	-	-	-	-	-	Kiribati
-	-	-	-	-	-	-	-	-	-	-	-	Marshall Islands
-	-	-	-	-	-	-	-	-	-	-	-	Micronesia
-	-	-	-	-	-	-	-	-	-	-	-	Nauru
-	-	-	-	-	-	-	-	-	-	-	-	Niue
-	-	-	-	-	-	-	-	-	-	-	-	Palau
-	-	-	-	-	-	4.47 <sup>-2</sup>	38.69 <sup>-2</sup>	7.60 <sup>-2</sup>	0.75 <sup>-2</sup>	39.72 <sup>-2</sup>	8.77 <sup>-2</sup>	Papua New Guinea
-	-	-	-	-	-	-	-	-	-	-	-	Samoa
-	-	-	-	-	-	-	-	-	-	-	-	Solomon Islands
-	-	-	-	-	-	-	-	-	-	-	-	Tonga
-	-	-	-	-	-	-	-	-	-	-	-	Tuvalu
-	-	-	-	-	-	-	-	-	-	-	-	Vanuatu

**Table B3:** Public expenditure on higher education, 2015 and 2018

	Public expenditure on higher education					
	as a share of GDP (%)		as a share of GDP per capita (%)		as a share of total public expenditure on education (%)	
	2015	2018	2015	2018	2015	2018
<b>North America</b>						
Canada	1.63	1.62 <sup>2</sup>	36.93	31.44 <sup>2</sup>	–	–
United States of America	1.37	1.21 <sup>2</sup>	–	–	–	–
<b>Latin America</b>						
Argentina	1.19	1.21 <sup>1</sup>	17.25	16.91 <sup>1</sup>	20.54	22.08 <sup>1</sup>
Belize	0.80	0.70 <sup>1</sup>	32.99	27.32 <sup>1</sup>	11.81	9.47 <sup>1</sup>
Bolivia	1.34	–	33.04	–	21.45	–
Brazil	–	–	–	–	–	–
Chile	1.25	1.36 <sup>1</sup>	18.41	20.26 <sup>1</sup>	25.68	25.15 <sup>1</sup>
Colombia	0.96	1.05	19.80	21.64	21.38	23.31
Costa Rica	1.58	1.63	35.08	37.51	22.25	23.14
Ecuador	2.18	–	52.68	–	43.51	–
El Salvador	0.31	0.33	10.85	11.11	7.87	9.17
Guatemala	0.41	0.41	18.06	–	13.79	13.89
Guyana	–	–	–	–	–	–
Honduras	0.88	–	40.94	–	13.69	–
Mexico	1.12	1.04 <sup>2</sup>	36.38	29.63 <sup>2</sup>	21.48	21.09 <sup>2</sup>
Nicaragua	–	–	–	–	–	–
Panama	–	–	–	–	–	–
Paraguay	–	0.80 <sup>2</sup>	–	–	–	23.33 <sup>2</sup>
Peru	0.64	0.59	10.31 <sup>+1</sup>	10.80 <sup>1</sup>	16.08	15.77
Suriname	–	–	–	–	–	–
Uruguay	1.20 <sup>+1</sup>	1.20 <sup>1</sup>	25.20 <sup>+1</sup>	25.39 <sup>1</sup>	25.11 <sup>+1</sup>	24.80 <sup>1</sup>
Venezuela	–	–	–	–	–	–
<b>Caribbean</b>						
Antigua & Barbuda	–	–	–	–	–	–
Bahamas	–	–	–	–	–	–
Barbados	1.58 <sup>+1</sup>	1.33 <sup>1</sup>	–	–	31.09 <sup>+1</sup>	28.54 <sup>1</sup>
Cuba	–	–	–	–	–	–
Dominica	0.30	–	–	–	8.86	–
Dominican Rep.	–	–	–	–	–	–
Grenada	–	0.43 <sup>1</sup>	–	5.20 <sup>1</sup>	–	13.58 <sup>1</sup>
Haiti	–	–	–	–	–	–
Jamaica	0.95	1.06	36.00	–	17.39	19.60
St Kitts & Nevis	0.40	–	5.84	–	15.36	–
St Lucia	–	–	–	–	–	–
St Vincent & Grenadines	–	–	–	–	–	–
Trinidad & Tobago	–	–	–	–	–	–
<b>European Union</b>						
Austria	1.78	1.79 <sup>2</sup>	35.98	36.24 <sup>2</sup>	32.63	32.49 <sup>2</sup>
Belgium	1.45	1.46 <sup>2</sup>	32.25	32.14 <sup>2</sup>	22.13	22.28 <sup>2</sup>
Bulgaria	–	–	–	–	–	–
Croatia	–	–	–	–	–	–
Cyprus	1.32	1.31 <sup>2</sup>	29.27	26.52 <sup>2</sup>	20.70	20.78 <sup>2</sup>
Czech Rep.	0.77	0.70 <sup>2</sup>	20.99	20.34 <sup>2</sup>	13.33	12.60 <sup>2</sup>
Denmark	–	–	–	–	–	–
Estonia	1.39	1.40 <sup>2</sup>	33.11	35.92 <sup>2</sup>	27.04	27.12 <sup>2</sup>
Finland	1.89	1.83 <sup>2</sup>	34.49	33.93 <sup>2</sup>	26.70	26.54 <sup>2</sup>
France	–	–	–	–	–	–
Germany	1.25	1.25 <sup>2</sup>	33.96	33.58 <sup>2</sup>	25.95	25.99 <sup>2</sup>
Greece	0.72	–	9.15	–	–	–
Hungary	0.66	0.76 <sup>2</sup>	21.25	25.41 <sup>2</sup>	14.33	16.08 <sup>2</sup>
Ireland	0.88	0.73 <sup>2</sup>	18.37	15.49 <sup>2</sup>	23.35	19.58 <sup>2</sup>
Italy	0.76	0.73 <sup>2</sup>	25.27	24.33 <sup>2</sup>	18.60	19.12 <sup>2</sup>
Latvia	1.18	0.76 <sup>2</sup>	23.92	16.46 <sup>2</sup>	22.09	16.04 <sup>2</sup>
Lithuania	1.17	0.82 <sup>2</sup>	18.52	16.76 <sup>2</sup>	27.86	20.52 <sup>2</sup>

	Public expenditure on higher education					
	as a share of GDP (%)		as a share of GDP per capita (%)		as a share of total public expenditure on education (%)	
	2015	2018	2015	2018	2015	2018
Luxembourg	0.52	–	42.76	–	13.10	–
Malta	1.32	–	44.40	–	25.33	–
Netherlands	1.61	1.75 <sup>-2</sup>	33.04	35.78 <sup>-2</sup>	30.13	31.93 <sup>-2</sup>
Poland	1.22	1.06 <sup>-2</sup>	28.10	24.97 <sup>-2</sup>	25.28	22.84 <sup>-2</sup>
Portugal	0.89	–	26.48	–	18.30	–
Romania	0.66	0.71 <sup>-2</sup>	23.96	26.10 <sup>-2</sup>	21.16	23.78 <sup>-2</sup>
Slovakia	1.39	0.83 <sup>-2</sup>	26.71	25.88 <sup>-2</sup>	29.91	21.30 <sup>-2</sup>
Slovenia	0.98	0.95 <sup>-2</sup>	22.53	24.18 <sup>-2</sup>	19.87	19.74 <sup>-2</sup>
Spain	0.96	0.92 <sup>-2</sup>	22.92	21.82 <sup>-2</sup>	22.36	21.79 <sup>-2</sup>
Sweden	1.88	1.85 <sup>-2</sup>	43.12	43.25 <sup>-2</sup>	24.91	24.09 <sup>-2</sup>
United Kingdom	1.28	1.41 <sup>-2</sup>	35.35	37.99 <sup>-2</sup>	22.82	25.62 <sup>-2</sup>
<b>Southeast Europe</b>						
Albania	0.73	0.68 <sup>-1</sup>	12.88	13.79 <sup>-1</sup>	21.16	18.85 <sup>-1</sup>
Bosnia & Herzegovina	–	0.75 <sup>-2</sup>	–	23.73 <sup>-2</sup>	–	–
Montenegro	–	–	–	–	–	–
North Macedonia	–	–	–	–	–	–
Serbia	1.14	1.11 <sup>-1</sup>	33.59	29.78 <sup>-1</sup>	30.12	29.93 <sup>-1</sup>
<b>European Free Trade Assoc.</b>						
Iceland	1.42	1.49 <sup>-2</sup>	24.79	27.31 <sup>-2</sup>	18.89	19.91 <sup>-2</sup>
Liechtenstein	–	–	–	–	–	–
Norway	1.96	2.13 <sup>-2</sup>	37.31	39.82 <sup>-2</sup>	25.91	26.72 <sup>-2</sup>
Switzerland	1.34	1.33 <sup>-2</sup>	37.68	37.41 <sup>-2</sup>	26.26	26.00 <sup>-2</sup>
<b>Eastern Europe &amp; West Asia</b>						
Armenia	0.36	0.35 <sup>-1</sup>	9.84	9.88 <sup>-1</sup>	12.69	12.99 <sup>-1</sup>
Azerbaijan	0.38	0.41 <sup>-1</sup>	17.88	19.39 <sup>-1</sup>	12.82	16.40 <sup>-1</sup>
Belarus	0.80	0.79 <sup>-1</sup>	15.95	17.92 <sup>-1</sup>	16.76	16.48 <sup>-1</sup>
Georgia	0.42 <sup>+1</sup>	0.39 <sup>-1</sup>	11.44 <sup>+1</sup>	10.02 <sup>-1</sup>	11.09 <sup>-1</sup>	10.08 <sup>-1</sup>
Iran Islamic Rep.	0.82	1.12	18.12 <sup>+1</sup>	24.16 <sup>-1</sup>	29.39	28.24
Israel	0.95	0.89 <sup>-2</sup>	19.25	18.18 <sup>-2</sup>	16.23	15.16 <sup>-2</sup>
Moldova, Rep.	0.91 <sup>+1</sup>	0.66	31.48 <sup>+1</sup>	26.65	16.22 <sup>+1</sup>	11.90
Russian Federation	0.81	0.81 <sup>-2</sup>	18.78	19.82 <sup>-2</sup>	21.14	21.61 <sup>-2</sup>
Turkey	–	–	–	–	–	–
Ukraine	1.53 <sup>+1</sup>	1.35 <sup>-1</sup>	38.54 <sup>+1</sup>	34.47 <sup>-1</sup>	30.46 <sup>-1</sup>	24.99 <sup>-1</sup>
<b>Sub-Saharan Africa</b>						
Angola	–	–	–	–	–	–
Benin	0.96	–	72.98	–	22.15	–
Botswana	–	–	–	–	–	–
Burkina Faso	0.57	1.79 <sup>-2</sup>	123.22	351.31 <sup>-2</sup>	13.65	–
Burundi	–	–	–	–	–	–
Cameroon	–	–	–	–	–	–
Cabo Verde	0.97	0.89 <sup>-1</sup>	40.61	38.32 <sup>-1</sup>	18.42	17.15 <sup>-1</sup>
Central African Rep.	–	–	–	–	–	–
Chad	–	–	–	–	–	–
Comoros	0.26	–	–	–	10.41	–
Congo	–	–	–	–	–	–
Côte d'Ivoire	1.04	0.61	124.27	150.17 <sup>-1</sup>	21.44	14.03
Congo, Dem. Rep.	0.52	–	–	–	23.81	–
Djibouti	–	–	–	–	–	–
Equatorial Guinea	–	–	–	–	–	–
Eritrea	–	–	–	–	–	–
Eswatini	–	–	–	–	–	–
Ethiopia	2.27	–	–	–	47.85	–
Gabon	–	–	–	–	–	–
Gambia	0.24	–	–	–	11.33	–
Ghana	–	–	–	–	–	–
Guinea	0.98	0.44	–	–	39.12	17.30

**Table B3:** Public expenditure on higher education, 2015 and 2018

	Public expenditure on higher education					
	as a share of GDP (%)		as a share of GDP per capita (%)		as a share of total public expenditure on education (%)	
	2015	2018	2015	2018	2015	2018
Guinea-Bissau	–	–	–	–	–	–
Kenya	0.69	–	76.42	–	13.07	–
Lesotho	–	0.48	–	44.69	–	7.41
Liberia	–	–	–	–	–	–
Madagascar	–	–	0.03	0.04 <sup>2</sup>	0.01	0.01 <sup>1</sup>
Malawi	1.36	1.10 <sup>2</sup>	–	–	24.21	23.11 <sup>2</sup>
Mali	0.79	0.65 <sup>1</sup>	164.76	166.18 <sup>1</sup>	20.77	17.29 <sup>1</sup>
Mauritius	0.33	0.31	11.11	9.58 <sup>1</sup>	6.82	6.42
Mozambique	–	–	–	–	–	–
Namibia	–	–	–	–	–	–
Niger	0.81	0.82 <sup>1</sup>	306.74	260.16 <sup>1</sup>	13.50	23.26 <sup>1</sup>
Nigeria	–	–	–	–	–	–
Rwanda	0.78	0.62	107.96	97.66	20.86	19.82
Sao Tome & Principe	–	–	–	–	–	–
Senegal	1.75	1.53	176.36	131.01	32.11	32.84
Seychelles	–	0.96 <sup>2</sup>	–	70.71 <sup>2</sup>	–	21.64 <sup>2</sup>
Sierra Leone	1.60 <sup>1</sup>	3.31	–	–	52.15 <sup>1</sup>	46.36
Somalia	–	–	–	–	–	–
South Africa	0.75	0.94	40.02	47.98	12.55	15.25
South Sudan	0.43	0.31 <sup>1</sup>	–	–	27.61	31.46 <sup>1</sup>
Togo	0.89	0.89 <sup>1</sup>	91.10	77.17 <sup>1</sup>	17.33	17.74 <sup>1</sup>
Uganda	–	–	–	–	–	–
Tanzania	–	–	–	–	–	–
Zambia	0.55	0.33 <sup>1</sup>	–	–	11.84	8.92 <sup>1</sup>
Zimbabwe	–	–	–	–	–	–
<b>Arab States</b>						
Algeria	–	–	–	–	–	–
Bahrain	–	–	–	–	–	–
Egypt	–	–	–	–	–	–
Iraq	–	–	–	–	–	–
Jordan	0.77 <sup>1</sup>	0.82	23.18 <sup>1</sup>	25.33	19.94 <sup>1</sup>	22.75
Kuwait	–	–	–	–	–	–
Lebanon	–	–	–	–	–	–
Libya	–	–	–	–	–	–
Mauritania	0.48	0.47 <sup>2</sup>	92.78	95.78 <sup>2</sup>	–	17.73 <sup>2</sup>
Morocco	–	–	–	–	–	–
Oman	–	1.28 <sup>2</sup>	–	43.56 <sup>2</sup>	–	–
Palestine	–	–	–	–	–	–
Qatar	–	–	–	–	–	–
Saudi Arabia	–	–	–	–	–	–
Sudan	–	–	–	–	–	–
Syrian Arab Rep.	–	–	–	–	–	–
Tunisia	1.58	–	54.74	–	23.94	–
United Arab Emirates	–	–	–	–	–	–
Yemen	–	–	–	–	–	–
<b>Central Asia</b>						
Kazakhstan	0.43	0.26	11.34	7.46	15.26	9.38
Kyrgyzstan	0.20 <sup>1</sup>	0.18 <sup>1</sup>	4.84 <sup>1</sup>	4.90 <sup>1</sup>	3.02 <sup>1</sup>	3.03 <sup>1</sup>
Mongolia	0.48	0.26 <sup>1</sup>	7.98	3.17 <sup>1</sup>	11.45	6.41 <sup>1</sup>
Tajikistan	0.52	–	19.57	–	9.95	–
Turkmenistan	–	–	–	–	–	–
Uzbekistan	–	–	–	–	–	–

	Public expenditure on higher education					
	as a share of GDP (%)		as a share of GDP per capita (%)		as a share of total public expenditure on education (%)	
	2015	2018	2015	2018	2015	2018
<b>South Asia</b>						
Afghanistan	0.52	–	–	–	15.95	–
Bangladesh	–	0.51 <sup>-2</sup>	–	29.90 <sup>-2</sup>	–	33.28 <sup>-2</sup>
Bhutan	–	–	–	–	–	–
India	–	–	–	–	–	–
Maldives	0.56	0.84 <sup>-2</sup>	–	–	12.75	20.59 <sup>-2</sup>
Nepal	0.40	–	24.16	–	10.80	–
Pakistan	0.60	0.64 <sup>-1</sup>	63.02	67.24 <sup>-1</sup>	22.79	22.11 <sup>-1</sup>
Sri Lanka	0.43	0.44	27.44	28.13	19.38	20.74
<b>Southeast Asia</b>						
Brunei Darussalam	–	0.84 <sup>-2</sup>	–	31.93 <sup>-2</sup>	–	18.89 <sup>-2</sup>
Cambodia	–	–	–	–	–	–
China	–	–	–	–	–	–
China, Hong Kong SAR	0.96	0.98	23.32	24.20	29.53	29.39
China, Macao SAR	1.26	1.00 <sup>-1</sup>	24.62	19.05 <sup>-1</sup>	42.20	37.12 <sup>-1</sup>
China, Taiwan Prov.	–	–	–	–	–	–
Indonesia	0.57	–	20.77	–	15.80	–
Japan	–	0.63 <sup>-2</sup>	–	–	–	19.80 <sup>-2</sup>
Korea DPR	–	–	–	–	–	–
Korea Rep.	0.95	0.94 <sup>-2</sup>	14.76	15.02	–	20.45 <sup>-2</sup>
Lao PDR	–	–	–	–	–	–
Malaysia	1.13 <sup>+1</sup>	0.97	25.90 <sup>+1</sup>	23.75	23.39 <sup>+1</sup>	21.35
Myanmar	0.24 <sup>+2</sup>	0.29	–	16.69	11.28 <sup>+2</sup>	14.78
Philippines	–	–	–	–	–	–
Singapore	0.99 <sup>+1</sup>	0.82 <sup>-1</sup>	–	23.54 <sup>-1</sup>	–	–
Thailand	–	–	–	–	–	–
Timor-Leste	–	–	–	–	–	–
Viet Nam	–	–	–	–	–	–
<b>Oceania</b>						
Australia	1.53	1.41 <sup>-2</sup>	21.47	17.83 <sup>-2</sup>	28.86	26.82 <sup>-2</sup>
New Zealand	1.62	1.53 <sup>-2</sup>	26.93	25.26 <sup>-2</sup>	25.57	23.74 <sup>-2</sup>
Cook Islands	0.35	0.54 <sup>-2</sup>	–	–	8.92	11.55 <sup>-2</sup>
Fiji	–	–	–	–	–	–
Kiribati	–	–	–	–	–	–
Marshall Islands	–	–	–	–	–	–
Micronesia	–	–	–	–	–	–
Nauru	–	–	–	–	–	–
Niue	–	–	–	–	–	–
Palau	–	–	–	–	–	–
Papua New Guinea	–	–	–	–	–	–
Samoa	–	0.37 <sup>-2</sup>	–	–	–	9.18 <sup>-2</sup>
Solomon Islands	–	–	–	–	–	–
Tonga	–	–	–	–	–	–
Tuvalu	–	–	–	–	–	–
Vanuatu	–	–	–	–	–	–

**KEY** –: data unavailable | -n/+n: data refer to n years before or after reference year | 0: magnitude nil or negligible | a: not applicable

GDP: gross domestic product | PPP\$: purchasing power parity dollars

Source: UNESCO Institute for Statistics, August 2020

**Table C1: Tertiary graduates in 2015 and 2018 and STEM graduates by field in 2018**

	Tertiary graduates				Tertiary graduates by level of study, 2018				Tertiary graduates by field of study, 2018				
	MF (000s)	Females (%)	MF (000s)	Females (%)	Post-secondary diploma MF (000s)	Bachelor's degree MF (000s)	Master's degree MF (000s)	PhDs MF (000s)	Total graduates in science, technology, engineering and mathematics		Agriculture		
									MF (000s)	Females (%)	MF (000s)	Share of tertiary graduates (%)	Females (%)
	2015		2018		2018								
<b>North America</b>													
Canada	420.83	57.9	420.55 <sup>2</sup>	57.6 <sup>2</sup>	148.09 <sup>2</sup>	205.88 <sup>2</sup>	58.82 <sup>2</sup>	7.77 <sup>2</sup>	89.58 <sup>2</sup>	31.43 <sup>2</sup>	7.91 <sup>2</sup>	1.88 <sup>2</sup>	54.19 <sup>2</sup>
United States of America	3 855.10	58.4	3 903.54 <sup>2</sup>	58.4 <sup>2</sup>	1 011.78 <sup>2</sup>	1 922.71 <sup>2</sup>	899.53 <sup>2</sup>	69.53 <sup>2</sup>	699.52 <sup>2</sup>	33.99 <sup>2</sup>	34.60 <sup>2</sup>	0.89 <sup>2</sup>	52.03 <sup>2</sup>
<b>Latin America</b>													
Argentina	-	-	-	-	-	-	-	-	-	-	-	-	-
Belize	1.70	64.3	-	-	-	-	-	-	-	-	-	-	-
Bolivia	-	-	-	-	-	-	-	-	-	-	-	-	-
Brazil	1 226.21	61.1	1 284.43 <sup>1</sup>	60.7 <sup>1</sup>	1.38 <sup>1</sup>	1 199.77 <sup>1</sup>	61.67 <sup>1</sup>	21.61 <sup>1</sup>	227.77 <sup>1</sup>	36.64 <sup>1</sup>	33.07 <sup>1</sup>	2.57 <sup>1</sup>	49.48 <sup>1</sup>
Chile	211.64	56.0	235.71 <sup>1</sup>	57.0 <sup>1</sup>	78.95 <sup>1</sup>	118.17 <sup>1</sup>	37.89 <sup>1</sup>	0.70 <sup>1</sup>	48.24 <sup>1</sup>	18.83 <sup>1</sup>	4.12 <sup>1</sup>	1.75 <sup>1</sup>	47.24 <sup>1</sup>
Colombia	374.74	55.2	482.12	56.2	154.14	226.51	100.68	0.80	111.50	33.41	7.52	1.56	44.68
Costa Rica	49.78	62.9	46.64	61.6	3.75	38.10	4.69	0.11	7.21	32.20	0.68	1.45	42.69
Ecuador	145.06	56.5	152.28 <sup>2</sup>	57.7 <sup>2</sup>	19.73 <sup>2</sup>	110.87 <sup>2</sup>	21.66 <sup>2</sup>	0.02 <sup>2</sup>	24.12 <sup>2</sup>	29.23 <sup>2</sup>	4.67 <sup>2</sup>	3.07 <sup>2</sup>	35.01 <sup>2</sup>
El Salvador	22.99	56.7	23.94	55.5	5.56	16.29	2.07	0.02	5.13	23.14	0.45	1.87	30.13
Guatemala	33.68	62.4	-	-	-	-	-	-	-	-	-	-	-
Guyana	-	-	-	-	-	-	-	-	-	-	-	-	-
Honduras	21.48	64.5	24.42	62.8	2.65	18.58	3.03	0.17	3.71	37.79	0.91	3.73	24.73
Mexico	615.11	52.8	783.97 <sup>1</sup>	53.5 <sup>1</sup>	53.80 <sup>1</sup>	605.58 <sup>1</sup>	115.28 <sup>1</sup>	9.31 <sup>1</sup>	197.87 <sup>1</sup>	30.63 <sup>1</sup>	15.10 <sup>1</sup>	1.93 <sup>1</sup>	36.78 <sup>1</sup>
Nicaragua	-	-	-	-	-	-	-	-	-	-	-	-	-
Panama	26.03	66.4	29.37 <sup>2</sup>	65.0 <sup>2</sup>	3.69 <sup>2</sup>	16.57 <sup>2</sup>	9.07 <sup>2</sup>	0.04 <sup>2</sup>	4.53 <sup>2</sup>	43.22 <sup>2</sup>	0.20 <sup>2</sup>	0.67 <sup>2</sup>	42.86 <sup>2</sup>
Paraguay	-	-	-	-	-	-	-	-	-	-	-	-	-
Peru	238.24	56.2	241.14 <sup>1</sup>	58.0 <sup>1</sup>	-	-	-	-	71.48 <sup>1</sup>	47.81 <sup>1</sup>	5.99 <sup>1</sup>	2.48 <sup>1</sup>	40.60 <sup>1</sup>
Suriname	-	-	-	-	-	-	-	-	-	-	-	-	-
Uruguay	-	-	15.09 <sup>1</sup>	63.0 <sup>1</sup>	2.27 <sup>1</sup>	10.06 <sup>1</sup>	2.68 <sup>1</sup>	0.07 <sup>1</sup>	2.63 <sup>1</sup>	43.96 <sup>1</sup>	0.56 <sup>1</sup>	3.69 <sup>1</sup>	39.68 <sup>1</sup>
Venezuela	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Caribbean</b>													
Antigua & Barbuda	-	-	-	-	-	-	-	-	-	-	-	-	-
Bahamas	-	-	-	-	-	-	-	-	-	-	-	-	-
Barbados	-	-	-	-	-	-	-	-	-	-	-	-	-
Cuba	84.14	60.8	61.60 <sup>2</sup>	56.8 <sup>2</sup>	a <sup>2</sup>	36.26 <sup>2</sup>	24.32 <sup>2</sup>	1.02 <sup>2</sup>	5.39 <sup>2</sup>	39.89 <sup>2</sup>	1.15 <sup>2</sup>	1.86 <sup>2</sup>	38.95 <sup>2</sup>
Dominica	-	-	-	-	-	-	-	-	-	-	-	-	-
Dominican Rep.	42.98	63.2	59.53 <sup>1</sup>	65.8 <sup>1</sup>	2.47 <sup>1</sup>	45.72 <sup>1</sup>	11.35 <sup>1</sup>	0.00 <sup>1</sup>	6.88 <sup>1</sup>	39.99 <sup>1</sup>	0.88 <sup>1</sup>	1.48 <sup>1</sup>	28.96 <sup>1</sup>
Grenada	2.11	57.5	2.43	55.4	0.86	1.44	0.14	0.00	0.38	40.94	0.18	7.41	77.22
Haiti	-	-	-	-	-	-	-	-	-	-	-	-	-
Jamaica	-	-	-	-	-	-	-	-	-	-	-	-	-
St Kitts & Nevis	-	-	-	-	-	-	-	-	-	-	-	-	-
St Lucia	0.94	68.4	0.86 <sup>2</sup>	65.2 <sup>2</sup>	0.64 <sup>2</sup>	0.20 <sup>2</sup>	0.02 <sup>2</sup>	a <sup>2</sup>	-	-	-	-	-
St Vincent & Grenadines	-	-	-	-	-	-	-	-	-	-	-	-	-
Trinidad & Tobago	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>European Union</b>													
Austria	83.59	55.3	83.40 <sup>2</sup>	54.9	24.94 <sup>2</sup>	30.05	26.17 <sup>2</sup>	2.24 <sup>2</sup>	25.26 <sup>2</sup>	25.90 <sup>2</sup>	1.37 <sup>2</sup>	1.65 <sup>2</sup>	46.92 <sup>2</sup>
Belgium	112.41	59.5	115.87 <sup>1</sup>	59.7	2.92 <sup>1</sup>	69.36	40.67 <sup>1</sup>	2.92 <sup>1</sup>	19.35 <sup>1</sup>	25.83 <sup>1</sup>	2.46 <sup>1</sup>	2.12 <sup>1</sup>	62.13 <sup>1</sup>
Bulgaria	62.72	60.1	56.85 <sup>1</sup>	60.7	a <sup>1</sup>	31.10	24.33 <sup>1</sup>	1.42 <sup>1</sup>	11.66 <sup>1</sup>	36.87 <sup>1</sup>	1.04 <sup>1</sup>	1.83 <sup>1</sup>	46.21 <sup>1</sup>
Croatia	36.14	59.6	33.99 <sup>1</sup>	59.6	0.02 <sup>1</sup>	18.21	15.04 <sup>1</sup>	0.72 <sup>1</sup>	9.18 <sup>1</sup>	38.91 <sup>1</sup>	1.44 <sup>1</sup>	4.25 <sup>1</sup>	56.30 <sup>1</sup>
Cyprus	7.94	63.7	9.30 <sup>1</sup>	64.0	0.88 <sup>1</sup>	3.54	4.79 <sup>1</sup>	0.09 <sup>1</sup>	1.39 <sup>1</sup>	38.26 <sup>1</sup>	0.09 <sup>1</sup>	0.94 <sup>1</sup>	34.48 <sup>1</sup>
Czech Rep.	98.12	60.5	87.13 <sup>1</sup>	61.2	0.39 <sup>1</sup>	44.72	39.58 <sup>1</sup>	2.44 <sup>1</sup>	20.79 <sup>1</sup>	35.57 <sup>1</sup>	2.62 <sup>1</sup>	3.00 <sup>1</sup>	63.18 <sup>1</sup>
Denmark	74.43	57.6	82.58 <sup>1</sup>	56.4	10.54 <sup>1</sup>	43.67	26.14 <sup>1</sup>	2.23 <sup>1</sup>	17.32 <sup>1</sup>	34.25 <sup>1</sup>	0.99 <sup>1</sup>	1.20 <sup>1</sup>	64.31 <sup>1</sup>
Estonia	10.49	66.0	9.58 <sup>1</sup>	63.1	a <sup>1</sup>	6.06	3.27 <sup>1</sup>	0.25 <sup>1</sup>	2.76 <sup>1</sup>	38.38 <sup>1</sup>	0.19 <sup>1</sup>	1.98 <sup>1</sup>	57.89 <sup>1</sup>
Finland	56.83	59.9	56.14 <sup>1</sup>	60.3	a <sup>1</sup>	36.48	17.81 <sup>1</sup>	1.85 <sup>1</sup>	15.30 <sup>1</sup>	27.40 <sup>1</sup>	1.27 <sup>1</sup>	2.25 <sup>1</sup>	61.11 <sup>1</sup>



Tertiary graduates by field of study, 2018												
Engineering			Health and Welfare			Natural Sciences			ICTs			
MF (000s)	Share of tertiary graduates (%)	Females (%)	MF (000s)	Share of tertiary graduates (%)	Females (%)	MF (000s)	Share of tertiary graduates (%)	Females (%)	MF (000s)	Share of tertiary graduates (%)	Females (%)	
												<b>North America</b>
50.15 <sup>-2</sup>	11.92 <sup>-2</sup>	19.67 <sup>-2</sup>	58.39 <sup>-2</sup>	13.88 <sup>-2</sup>	76.47 <sup>-2</sup>	27.21 <sup>-2</sup>	6.47 <sup>-2</sup>	53.76 <sup>-2</sup>	12.23 <sup>-2</sup>	2.91 <sup>-2</sup>	29.97 <sup>-2</sup>	Canada
270.47 <sup>-2</sup>	6.93 <sup>-2</sup>	20.44 <sup>-2</sup>	663.99 <sup>-2</sup>	17.01 <sup>-2</sup>	81.40 <sup>-2</sup>	281.41 <sup>-2</sup>	7.21 <sup>-2</sup>	52.45 <sup>-2</sup>	147.64 <sup>-2</sup>	3.78 <sup>-2</sup>	23.61 <sup>-2</sup>	United States of America
												<b>Latin America</b>
-	-	-	-	-	-	-	-	-	-	-	-	Argentina
-	-	-	-	-	-	-	-	-	-	-	-	Belize
-	-	-	-	-	-	-	-	-	-	-	-	Bolivia
153.67 <sup>-1</sup>	11.96 <sup>-1</sup>	36.66 <sup>-1</sup>	188.59 <sup>-1</sup>	14.68 <sup>-1</sup>	75.69 <sup>-1</sup>	36.37 <sup>-1</sup>	2.83 <sup>-1</sup>	59.49 <sup>-1</sup>	37.74 <sup>-1</sup>	2.94 <sup>-1</sup>	14.55 <sup>-1</sup>	Brazil
38.34 <sup>-1</sup>	16.27 <sup>-1</sup>	17.74 <sup>-1</sup>	51.07 <sup>-1</sup>	21.67 <sup>-1</sup>	78.01 <sup>-1</sup>	3.02 <sup>-1</sup>	1.28 <sup>-1</sup>	46.46 <sup>-1</sup>	6.87 <sup>-1</sup>	2.92 <sup>-1</sup>	12.74 <sup>-1</sup>	Chile
81.58	16.92	34.60	30.90	6.41	72.06	6.66	1.38	54.17	23.26	4.82	23.31	Colombia
3.58	7.67	35.37	6.98	14.96	76.00	1.01	2.18	51.72	2.62	5.61	20.29	Costa Rica
13.76 <sup>-2</sup>	9.04 <sup>-2</sup>	20.66 <sup>-2</sup>	19.29 <sup>-2</sup>	12.67 <sup>-2</sup>	71.30 <sup>-2</sup>	3.55 <sup>-2</sup>	2.33 <sup>-2</sup>	47.86 <sup>-2</sup>	6.80 <sup>-2</sup>	4.47 <sup>-2</sup>	36.82 <sup>-2</sup>	Ecuador
2.72	11.38	18.66	3.86	16.11	74.40	0.21	0.86	50.24	2.20	9.20	26.16	El Salvador
-	-	-	-	-	-	-	-	-	-	-	-	Guatemala
-	-	-	-	-	-	-	-	-	-	-	-	Guyana
2.55	10.45	38.50	3.24	13.27	73.47	0.38	1.55	54.88	0.78	3.20	27.14	Honduras
136.77 <sup>-1</sup>	17.45 <sup>-1</sup>	28.47 <sup>-1</sup>	85.91 <sup>-1</sup>	10.96 <sup>-1</sup>	68.16 <sup>-1</sup>	18.91 <sup>-1</sup>	2.41 <sup>-1</sup>	51.14 <sup>-1</sup>	42.18 <sup>-1</sup>	5.38 <sup>-1</sup>	28.44 <sup>-1</sup>	Mexico
-	-	-	-	-	-	-	-	-	-	-	-	Nicaragua
2.64 <sup>-2</sup>	8.98 <sup>-2</sup>	40.01 <sup>-2</sup>	2.32 <sup>-2</sup>	7.91 <sup>-2</sup>	76.68 <sup>-2</sup>	0.45 <sup>-2</sup>	1.53 <sup>-2</sup>	59.91 <sup>-2</sup>	1.44 <sup>-2</sup>	4.92 <sup>-2</sup>	43.91 <sup>-2</sup>	Panama
-	-	-	-	-	-	-	-	-	-	-	-	Paraguay
53.66 <sup>-1</sup>	22.25 <sup>-1</sup>	47.49 <sup>-1</sup>	40.26 <sup>-1</sup>	16.69 <sup>-1</sup>	78.84 <sup>-1</sup>	3.86 <sup>-1</sup>	1.60 <sup>-1</sup>	45.97 <sup>-1</sup>	13.97 <sup>-1</sup>	5.79 <sup>-1</sup>	49.56 <sup>-1</sup>	Peru
-	-	-	-	-	-	-	-	-	-	-	-	Suriname
1.69 <sup>-1</sup>	11.20 <sup>-1</sup>	45.92 <sup>-1</sup>	2.78 <sup>-1</sup>	18.41 <sup>-1</sup>	77.54 <sup>-1</sup>	0.41 <sup>-1</sup>	2.69 <sup>-1</sup>	70.69 <sup>-1</sup>	0.54 <sup>-1</sup>	3.57 <sup>-1</sup>	17.66 <sup>-1</sup>	Uruguay
-	-	-	-	-	-	-	-	-	-	-	-	Venezuela
												<b>Caribbean</b>
-	-	-	-	-	-	-	-	-	-	-	-	Antigua & Barbuda
-	-	-	-	-	-	-	-	-	-	-	-	Bahamas
-	-	-	-	-	-	-	-	-	-	-	-	Barbados
3.20 <sup>-2</sup>	5.19 <sup>-2</sup>	41.65 <sup>-2</sup>	16.23 <sup>-2</sup>	26.34 <sup>-2</sup>	59.51 <sup>-2</sup>	0.48 <sup>-2</sup>	0.77 <sup>-2</sup>	52.20 <sup>-2</sup>	1.72 <sup>-2</sup>	2.79 <sup>-2</sup>	33.2 <sup>-2</sup>	Cuba
-	-	-	-	-	-	-	-	-	-	-	-	Dominica
4.11 <sup>-1</sup>	6.90 <sup>-1</sup>	38.40 <sup>-1</sup>	8.75 <sup>-1</sup>	14.70 <sup>-1</sup>	79.70 <sup>-1</sup>	0.55 <sup>-1</sup>	0.93 <sup>-1</sup>	54.07 <sup>-1</sup>	2.21 <sup>-1</sup>	3.72 <sup>-1</sup>	39.41 <sup>-1</sup>	Dominican Rep.
0.11	4.53	12.73	1.18	48.64	47.55	0.19	7.74	64.89	0.08	3.42	24.10	Grenada
-	-	-	-	-	-	-	-	-	-	-	-	Haiti
-	-	-	-	-	-	-	-	-	-	-	-	Jamaica
-	-	-	-	-	-	-	-	-	-	-	-	St Kitts & Nevis
-	-	-	-	-	-	-	-	-	-	-	-	St Lucia
-	-	-	-	-	-	-	-	-	-	-	-	St Vincent & Grenadines
-	-	-	-	-	-	-	-	-	-	-	-	Trinidad & Tobago
												<b>European Union</b>
17.09 <sup>-2</sup>	20.49 <sup>-2</sup>	21.54 <sup>-2</sup>	6.13 <sup>-2</sup>	7.35 <sup>-2</sup>	69.31 <sup>-2</sup>	4.80 <sup>-2</sup>	5.75 <sup>-2</sup>	49.59 <sup>-2</sup>	3.38 <sup>-2</sup>	4.05 <sup>-2</sup>	14.30 <sup>-2</sup>	Austria
12.98 <sup>-1</sup>	11.20 <sup>-1</sup>	23.40 <sup>-1</sup>	31.45 <sup>-1</sup>	27.14 <sup>-1</sup>	75.63 <sup>-1</sup>	4.23 <sup>-1</sup>	3.65 <sup>-1</sup>	41.40 <sup>-1</sup>	2.15 <sup>-1</sup>	1.85 <sup>-1</sup>	9.88 <sup>-1</sup>	Belgium
7.65 <sup>-1</sup>	13.46 <sup>-1</sup>	28.67 <sup>-1</sup>	4.76 <sup>-1</sup>	8.37 <sup>-1</sup>	70.34 <sup>-1</sup>	1.88 <sup>-1</sup>	3.31 <sup>-1</sup>	68.08 <sup>-1</sup>	2.13 <sup>-1</sup>	3.74 <sup>-1</sup>	38.74 <sup>-1</sup>	Bulgaria
5.56 <sup>-1</sup>	16.36 <sup>-1</sup>	35.65 <sup>-1</sup>	3.53 <sup>-1</sup>	10.38 <sup>-1</sup>	79.77 <sup>-1</sup>	1.74 <sup>-1</sup>	5.13 <sup>-1</sup>	68.58 <sup>-1</sup>	1.88 <sup>-1</sup>	5.52 <sup>-1</sup>	21.00 <sup>-1</sup>	Croatia
0.90 <sup>-1</sup>	9.72 <sup>-1</sup>	32.85 <sup>-1</sup>	0.51 <sup>-1</sup>	5.47 <sup>-1</sup>	76.42 <sup>-1</sup>	0.24 <sup>-1</sup>	2.54 <sup>-1</sup>	69.49 <sup>-1</sup>	0.25 <sup>-1</sup>	2.72 <sup>-1</sup>	28.46 <sup>-1</sup>	Cyprus
12.57 <sup>-1</sup>	14.43 <sup>-1</sup>	33.65 <sup>-1</sup>	9.72 <sup>-1</sup>	11.16 <sup>-1</sup>	82.38 <sup>-1</sup>	4.25 <sup>-1</sup>	4.88 <sup>-1</sup>	59.87 <sup>-1</sup>	3.96 <sup>-1</sup>	4.55 <sup>-1</sup>	15.57 <sup>-1</sup>	Czech Rep.
9.05 <sup>-1</sup>	10.96 <sup>-1</sup>	29.04 <sup>-1</sup>	17.23 <sup>-1</sup>	20.86 <sup>-1</sup>	75.58 <sup>-1</sup>	4.35 <sup>-1</sup>	5.26 <sup>-1</sup>	54.36 <sup>-1</sup>	3.93 <sup>-1</sup>	4.76 <sup>-1</sup>	24.00 <sup>-1</sup>	Denmark
1.43 <sup>-1</sup>	14.95 <sup>-1</sup>	32.12 <sup>-1</sup>	1.25 <sup>-1</sup>	13.00 <sup>-1</sup>	88.67 <sup>-1</sup>	0.62 <sup>-1</sup>	6.44 <sup>-1</sup>	63.86 <sup>-1</sup>	0.71 <sup>-1</sup>	7.44 <sup>-1</sup>	28.89 <sup>-1</sup>	Estonia
9.07 <sup>-1</sup>	16.16 <sup>-1</sup>	22.16 <sup>-1</sup>	12.03 <sup>-1</sup>	21.43 <sup>-1</sup>	84.99 <sup>-1</sup>	2.69 <sup>-1</sup>	4.79 <sup>-1</sup>	53.83 <sup>-1</sup>	3.54 <sup>-1</sup>	6.30 <sup>-1</sup>	20.75 <sup>-1</sup>	Finland

**Table C1: Tertiary graduates in 2015 and 2018 and STEM graduates by field in 2018**

	Tertiary graduates				Tertiary graduates by level of study, 2018				Tertiary graduates by field of study, 2018				
	MF (000s)	Females (%)	MF (000s)	Females (%)	Post-secondary diploma MF (000s)	Bachelor's degree MF (000s)	Master's degree MF (000s)	PhDs MF (000s)	Total graduates in science, technology, engineering and mathematics		Agriculture		
									MF (000s)	Females (%)	MF (000s)	Share of tertiary graduates (%)	Females (%)
	2015		2018		2018								
France	752.07	56.0	772.78 <sup>2</sup>	56.1	212.84 <sup>2</sup>	260.59 <sup>2</sup>	286.34 <sup>2</sup>	13.02 <sup>2</sup>	197.53 <sup>2</sup>	31.81 <sup>2</sup>	11.40 <sup>2</sup>	1.47 <sup>2</sup>	43.19 <sup>2</sup>
Germany	544.74	50.1	569.15 <sup>1</sup>	51.1	0.21 <sup>1</sup>	327.69	212.85 <sup>1</sup>	28.40 <sup>1</sup>	202.35 <sup>1</sup>	27.56 <sup>1</sup>	10.52 <sup>1</sup>	1.85 <sup>1</sup>	42.32 <sup>1</sup>
Greece	69.93 <sup>+1</sup>	59.3 <sup>+1</sup>	69.13 <sup>-1</sup>	58.3	a <sup>1</sup>	50.13	17.12 <sup>-1</sup>	1.88 <sup>-1</sup>	20.33 <sup>-1</sup>	40.09 <sup>-1</sup>	1.70 <sup>-1</sup>	2.46 <sup>-1</sup>	47.79 <sup>-1</sup>
Hungary	68.49	61.0	63.11 <sup>-1</sup>	60.5	2.84 <sup>-1</sup>	39.34	19.75 <sup>-1</sup>	1.18 <sup>-1</sup>	14.68 <sup>-1</sup>	31.68 <sup>-1</sup>	2.46 <sup>-1</sup>	3.90 <sup>-1</sup>	48.35 <sup>-1</sup>
Ireland	67.30	52.2	65.30 <sup>-2</sup>	51.9	7.52 <sup>-2</sup>	39.94	16.48 <sup>-2</sup>	1.43 <sup>-2</sup>	16.49 <sup>-2</sup>	29.00 <sup>-2</sup>	1.06 <sup>-2</sup>	1.62 <sup>-2</sup>	39.55 <sup>-2</sup>
Italy	368.53	59.0	373.78 <sup>-2</sup>	58.5	2.17 <sup>-2</sup>	204.26	157.54 <sup>-2</sup>	9.80 <sup>-2</sup>	87.00 <sup>-2</sup>	39.52 <sup>-2</sup>	8.69 <sup>-2</sup>	2.32 <sup>-2</sup>	50.36 <sup>-2</sup>
Latvia	17.02	65.4	14.59 <sup>-1</sup>	63.5	2.86 <sup>-1</sup>	7.42	4.16 <sup>-1</sup>	0.15 <sup>-1</sup>	3.04 <sup>-1</sup>	31.13 <sup>-1</sup>	0.24 <sup>-1</sup>	1.67 <sup>-1</sup>	46.50 <sup>-1</sup>
Lithuania	32.21	63.4	27.68 <sup>-1</sup>	61.7	a <sup>-1</sup>	19.73	7.63 <sup>-1</sup>	0.33 <sup>-1</sup>	7.11 <sup>-1</sup>	29.59 <sup>-1</sup>	0.68 <sup>-1</sup>	2.47 <sup>-1</sup>	53.43 <sup>-1</sup>
Luxembourg	2.05	56.5	1.68 <sup>-2</sup>	51.8	0.16 <sup>-2</sup>	0.75	0.66 <sup>-2</sup>	0.11 <sup>-2</sup>	0.30 <sup>-2</sup>	27.57 <sup>-2</sup>	0.04 <sup>-2</sup>	2.08 <sup>-2</sup>	22.86 <sup>-2</sup>
Malta	3.95	55.0	4.58 <sup>-1</sup>	54.9	0.72 <sup>-1</sup>	2.51	1.30 <sup>-1</sup>	0.05 <sup>-1</sup>	0.93 <sup>-1</sup>	27.85 <sup>-1</sup>	0.03 <sup>-1</sup>	0.66 <sup>-1</sup>	50.00 <sup>-1</sup>
Netherlands	-	-	155.50 <sup>-1</sup>	56.1	1.80 <sup>-1</sup>	103.03	45.93 <sup>-1</sup>	4.75 <sup>-1</sup>	25.84 <sup>-1</sup>	29.29 <sup>-1</sup>	2.02 <sup>-1</sup>	1.30 <sup>-1</sup>	55.37 <sup>-1</sup>
Poland	516.68	65.8	517.31 <sup>-1</sup>	65.2	0.05 <sup>-1</sup>	327.28	186.79 <sup>-1</sup>	3.20 <sup>-1</sup>	118.67 <sup>-1</sup>	43.36 <sup>-1</sup>	8.85 <sup>-1</sup>	1.71 <sup>-1</sup>	56.79 <sup>-1</sup>
Portugal	74.76	59.3	77.03 <sup>-1</sup>	57.9	3.21 <sup>-1</sup>	47.28	24.41 <sup>-1</sup>	2.14 <sup>-1</sup>	22.41 <sup>-1</sup>	37.76 <sup>-1</sup>	1.71 <sup>-1</sup>	2.22 <sup>-1</sup>	58.09 <sup>-1</sup>
Romania	133.48	58.3	121.79 <sup>-2</sup>	58.5	a <sup>-2</sup>	72.15	47.38 <sup>-2</sup>	2.26 <sup>-2</sup>	35.04 <sup>-2</sup>	41.22 <sup>-2</sup>	4.90 <sup>-2</sup>	4.02 <sup>-2</sup>	40.65 <sup>-2</sup>
Slovakia	61.05	62.6	50.62 <sup>-1</sup>	62.6	0.78 <sup>-1</sup>	22.29	25.89 <sup>-1</sup>	1.66 <sup>-1</sup>	10.72 <sup>-1</sup>	35.22 <sup>-1</sup>	1.11 <sup>-1</sup>	2.19 <sup>-1</sup>	59.28 <sup>-1</sup>
Slovenia	18.63	61.0	16.46 <sup>-1</sup>	61.3	1.89 <sup>-1</sup>	8.91	5.15 <sup>-1</sup>	0.51 <sup>-1</sup>	4.38 <sup>-1</sup>	33.32 <sup>-1</sup>	0.41 <sup>-1</sup>	2.47 <sup>-1</sup>	58.62 <sup>-1</sup>
Spain	438.62	55.4	445.56 <sup>-1</sup>	55.7	116.97 <sup>-1</sup>	177.42	131.12 <sup>-1</sup>	20.05 <sup>-1</sup>	104.50 <sup>-1</sup>	29.56 <sup>-1</sup>	5.65 <sup>-1</sup>	1.27 <sup>-1</sup>	43.51 <sup>-1</sup>
Sweden	78.24	61.8	73.51 <sup>-1</sup>	62.2	8.61 <sup>-1</sup>	34.37	26.94 <sup>-1</sup>	3.59 <sup>-1</sup>	20.22 <sup>-1</sup>	35.48 <sup>-1</sup>	0.67 <sup>-1</sup>	0.91 <sup>-1</sup>	65.97 <sup>-1</sup>
United Kingdom	740.28	57.1	754.30 <sup>-2</sup>	57.2	94.06 <sup>-2</sup>	399.72	233.16 <sup>-2</sup>	27.37 <sup>-2</sup>	198.53 <sup>-2</sup>	38.10 <sup>-2</sup>	7.37 <sup>-2</sup>	0.98 <sup>-2</sup>	65.01 <sup>-2</sup>
<b>Southeast Europe</b>													
Albania	33.70	64.2	34.33	63.3	0.39	20.11	13.63	0.20	7.08	46.65	1.38	4.01	45.96
Bosnia & Herzegovina	20.59	59.6	18.58	58.6	a	13.71	4.59	0.29	3.94	44.50	0.82	4.41	57.02
Montenegro	5.04 <sup>+1</sup>	59.8 <sup>+1</sup>	5.04 <sup>-1</sup>	58.4 <sup>-1</sup>	a <sup>-1</sup>	4.78 <sup>-1</sup>	0.24 <sup>-1</sup>	0.02 <sup>-1</sup>	-	-	-	-	-
North Macedonia	11.14	57.4	10.73 <sup>-1</sup>	57.6 <sup>-1</sup>	a <sup>-1</sup>	8.27 <sup>-1</sup>	2.25 <sup>-1</sup>	0.21 <sup>-1</sup>	2.35 <sup>-1</sup>	47.38 <sup>-1</sup>	0.20 <sup>-1</sup>	1.82 <sup>-1</sup>	39.49 <sup>-1</sup>
Serbia	50.50	58.6	45.41	58.9	a	32.66	11.80	0.95	12.77	42.56	1.11	2.45	48.92
<b>European Free Trade Assoc.</b>													
Iceland	-	-	-	-	-	-	-	-	-	-	-	-	-
Liechtenstein	0.28	30.7	-	-	-	-	-	-	-	-	-	-	-
Norway	48.21	58.8	53.09 <sup>-1</sup>	57.8 <sup>-1</sup>	2.75 <sup>-1</sup>	33.40 <sup>-1</sup>	15.45 <sup>-1</sup>	1.49 <sup>-1</sup>	11.73 <sup>-1</sup>	28.46 <sup>-1</sup>	0.43 <sup>-1</sup>	0.81 <sup>-1</sup>	55.61 <sup>-1</sup>
Switzerland	86.18	48.5	88.70 <sup>-1</sup>	48.5 <sup>-1</sup>	0.36 <sup>-1</sup>	58.55 <sup>-1</sup>	25.63 <sup>-1</sup>	4.15 <sup>-1</sup>	22.04 <sup>-1</sup>	22.32 <sup>-1</sup>	1.22 <sup>-1</sup>	1.38 <sup>-1</sup>	36.48 <sup>-1</sup>
<b>Eastern Europe &amp; West Asia</b>													
Armenia	35.13	60.5	29.93	59.4	7.16	17.79	4.61	0.36	4.54	39.81	0.32	1.07	24.45
Azerbaijan	48.02	54.9	54.10	56.7	16.23	31.64	5.70	0.53	12.72	35.10	0.64	1.18	51.96
Belarus	127.52	57.5	124.15	57.0	36.41	80.96	5.92	0.86	42.04	27.42	5.22	4.20	55.28
Georgia	22.21	61.5	24.76 <sup>+1</sup>	57.4 <sup>+1</sup>	1.31 <sup>+1</sup>	16.96 <sup>+1</sup>	6.00 <sup>+1</sup>	0.49 <sup>+1</sup>	6.08 <sup>+1</sup>	38.68 <sup>+1</sup>	0.53 <sup>+1</sup>	2.12 <sup>+1</sup>	43.43 <sup>+1</sup>
Iran Islamic Rep.	859.70 <sup>+1</sup>	41.2 <sup>+1</sup>	798.74 <sup>-1</sup>	41.6 <sup>-1</sup>	195.69 <sup>-1</sup>	456.42 <sup>-1</sup>	138.25 <sup>-1</sup>	8.39 <sup>-1</sup>	336.50 <sup>-1</sup>	31.16 <sup>-1</sup>	22.25 <sup>-1</sup>	2.79 <sup>-1</sup>	47.53 <sup>-1</sup>
Israel	-	-	-	-	-	-	-	-	-	-	-	-	-
Moldova, Rep.	31.46	59.5	27.48	58.3	6.37	13.63	7.01	0.47	6.45	30.52	0.53	1.95	22.80
Russian Federation	1 706.75	-	1 657.48 <sup>-1</sup>	-	469.06 <sup>-1</sup>	762.58 <sup>-1</sup>	398.50 <sup>-1</sup>	27.34 <sup>-1</sup>	496.61 <sup>-1</sup>	-	24.88 <sup>-1</sup>	1.50 <sup>-1</sup>	-
Turkey	-	-	-	-	-	-	-	-	-	-	-	-	-
Ukraine	499.99	53.8	438.77	53.1	114.55	137.81	179.62	6.80	110.94	28.79	17.21	3.92	32.89

Tertiary graduates by field of study, 2018

Engineering			Health and Welfare			Natural Sciences			ICTs			
MF (000s)	Share of tertiary graduates (%)	Females (%)	MF (000s)	Share of tertiary graduates (%)	Females (%)	MF (000s)	Share of tertiary graduates (%)	Females (%)	MF (000s)	Share of tertiary graduates (%)	Females (%)	
115.11 <sup>-2</sup>	14.90 <sup>-2</sup>	26.11 <sup>-2</sup>	119.24 <sup>-2</sup>	15.43 <sup>-2</sup>	73.99 <sup>-2</sup>	58.99 <sup>-2</sup>	7.63 <sup>-2</sup>	49.02 <sup>-2</sup>	23.43 <sup>-2</sup>	3.03 <sup>-2</sup>	16.46 <sup>-2</sup>	France
123.04 <sup>-1</sup>	21.62 <sup>-1</sup>	21.12 <sup>-1</sup>	41.18 <sup>-1</sup>	7.24 <sup>-1</sup>	70.58 <sup>-1</sup>	52.58 <sup>-1</sup>	9.24 <sup>-1</sup>	46.76 <sup>-1</sup>	26.73 <sup>-1</sup>	4.70 <sup>-1</sup>	19.41 <sup>-1</sup>	Germany
11.69 <sup>-1</sup>	16.91 <sup>-1</sup>	33.87 <sup>-1</sup>	8.11 <sup>-1</sup>	11.74 <sup>-1</sup>	70.59 <sup>-1</sup>	6.64 <sup>-1</sup>	9.60 <sup>-1</sup>	52.37 <sup>-1</sup>	2.00 <sup>-1</sup>	2.89 <sup>-1</sup>	35.69 <sup>-1</sup>	Greece
9.16 <sup>-1</sup>	14.52 <sup>-1</sup>	29.85 <sup>-1</sup>	4.95 <sup>-1</sup>	7.84 <sup>-1</sup>	73.65 <sup>-1</sup>	2.80 <sup>-1</sup>	4.44 <sup>-1</sup>	52.23 <sup>-1</sup>	2.72 <sup>-1</sup>	4.31 <sup>-1</sup>	16.70 <sup>-1</sup>	Hungary
6.72 <sup>-2</sup>	10.28 <sup>-2</sup>	17.56 <sup>-2</sup>	11.18 <sup>-2</sup>	17.10 <sup>-2</sup>	76.42 <sup>-2</sup>	5.21 <sup>-2</sup>	7.98 <sup>-2</sup>	50.87 <sup>-2</sup>	4.56 <sup>-2</sup>	6.98 <sup>-2</sup>	20.85 <sup>-2</sup>	Ireland
55.48 <sup>-2</sup>	14.84 <sup>-2</sup>	31.91 <sup>-2</sup>	51.30 <sup>-2</sup>	13.73 <sup>-2</sup>	62.28 <sup>-2</sup>	27.73 <sup>-2</sup>	7.42 <sup>-2</sup>	57.95 <sup>-2</sup>	3.78 <sup>-2</sup>	1.01 <sup>-2</sup>	16.12 <sup>-2</sup>	Italy
1.87 <sup>-1</sup>	12.79 <sup>-1</sup>	26.60 <sup>-1</sup>	2.49 <sup>-1</sup>	17.07 <sup>-1</sup>	83.94 <sup>-1</sup>	0.46 <sup>-1</sup>	3.13 <sup>-1</sup>	63.02 <sup>-1</sup>	0.72 <sup>-1</sup>	4.96 <sup>-1</sup>	22.68 <sup>-1</sup>	Latvia
5.24 <sup>-1</sup>	18.91 <sup>-1</sup>	25.48 <sup>-1</sup>	4.70 <sup>-1</sup>	16.97 <sup>-1</sup>	82.95 <sup>-1</sup>	1.11 <sup>-1</sup>	4.01 <sup>-1</sup>	57.75 <sup>-1</sup>	0.76 <sup>-1</sup>	2.75 <sup>-1</sup>	16.84 <sup>-1</sup>	Lithuania
0.11 <sup>-2</sup>	6.60 <sup>-2</sup>	19.82 <sup>-2</sup>	0.11 <sup>-2</sup>	6.42 <sup>-2</sup>	70.37 <sup>-2</sup>	0.09 <sup>-2</sup>	5.53 <sup>-2</sup>	45.16 <sup>-2</sup>	0.10 <sup>-2</sup>	5.77 <sup>-2</sup>	19.59 <sup>-2</sup>	Luxembourg
0.40 <sup>-1</sup>	8.76 <sup>-1</sup>	28.18 <sup>-1</sup>	0.78 <sup>-1</sup>	16.94 <sup>-1</sup>	71.91 <sup>-1</sup>	0.17 <sup>-1</sup>	3.62 <sup>-1</sup>	53.01 <sup>-1</sup>	0.36 <sup>-1</sup>	7.93 <sup>-1</sup>	15.98 <sup>-1</sup>	Malta
12.54 <sup>-1</sup>	8.06 <sup>-1</sup>	23.06 <sup>-1</sup>	26.62 <sup>-1</sup>	17.12 <sup>-1</sup>	75.93 <sup>-1</sup>	9.40 <sup>-1</sup>	6.05 <sup>-1</sup>	43.75 <sup>-1</sup>	3.90 <sup>-1</sup>	2.51 <sup>-1</sup>	14.47 <sup>-1</sup>	Netherlands
81.77 <sup>-1</sup>	15.81 <sup>-1</sup>	42.07 <sup>-1</sup>	68.68 <sup>-1</sup>	13.28 <sup>-1</sup>	72.17 <sup>-1</sup>	18.65 <sup>-1</sup>	3.60 <sup>-1</sup>	70.75 <sup>-1</sup>	18.26 <sup>-1</sup>	3.53 <sup>-1</sup>	21.18 <sup>-1</sup>	Poland
16.10 <sup>-1</sup>	20.91 <sup>-1</sup>	32.33 <sup>-1</sup>	13.41 <sup>-1</sup>	17.41 <sup>-1</sup>	77.86 <sup>-1</sup>	4.83 <sup>-1</sup>	6.27 <sup>-1</sup>	62.12 <sup>-1</sup>	1.48 <sup>-1</sup>	1.92 <sup>-1</sup>	17.44 <sup>-1</sup>	Portugal
22.10 <sup>-2</sup>	18.14 <sup>-2</sup>	35.32 <sup>-2</sup>	12.54 <sup>-2</sup>	10.30 <sup>-2</sup>	71.79 <sup>-2</sup>	6.95 <sup>-1</sup>	5.71 <sup>-2</sup>	66.86 <sup>-2</sup>	5.99 <sup>-2</sup>	4.92 <sup>-2</sup>	33.19 <sup>-2</sup>	Romania
6.14 <sup>-1</sup>	12.13 <sup>-1</sup>	28.16 <sup>-1</sup>	9.20 <sup>-1</sup>	18.18 <sup>-1</sup>	77.01 <sup>-1</sup>	2.89 <sup>-2</sup>	5.71 <sup>-1</sup>	63.71 <sup>-1</sup>	1.69 <sup>-1</sup>	3.34 <sup>-1</sup>	12.18 <sup>-1</sup>	Slovakia
2.73 <sup>-1</sup>	16.56 <sup>-1</sup>	26.73 <sup>-1</sup>	2.06 <sup>-1</sup>	12.50 <sup>-1</sup>	77.69 <sup>-1</sup>	1.05 <sup>-1</sup>	6.39 <sup>-1</sup>	61.44 <sup>-1</sup>	0.60 <sup>-1</sup>	3.67 <sup>-1</sup>	14.08 <sup>-1</sup>	Slovenia
63.26 <sup>-1</sup>	14.20 <sup>-1</sup>	26.61 <sup>-1</sup>	72.88 <sup>-1</sup>	16.36 <sup>-1</sup>	72.59 <sup>-1</sup>	23.54 <sup>-1</sup>	5.28 <sup>-1</sup>	49.94 <sup>-1</sup>	17.70 <sup>-1</sup>	3.97 <sup>-1</sup>	12.97 <sup>-1</sup>	Spain
13.82 <sup>-1</sup>	18.80 <sup>-1</sup>	32.77 <sup>-1</sup>	16.94 <sup>-1</sup>	23.05 <sup>-1</sup>	80.80 <sup>-1</sup>	3.25 <sup>-1</sup>	4.43 <sup>-1</sup>	52.03 <sup>-1</sup>	3.14 <sup>-1</sup>	4.28 <sup>-1</sup>	30.24 <sup>-1</sup>	Sweden
68.93 <sup>-2</sup>	9.14 <sup>-2</sup>	23.46 <sup>-2</sup>	101.33 <sup>-2</sup>	13.43 <sup>-2</sup>	75.37 <sup>-2</sup>	102.30 <sup>-2</sup>	13.56 <sup>-2</sup>	52.96 <sup>-2</sup>	27.30 <sup>-2</sup>	3.62 <sup>-2</sup>	19.38 <sup>-2</sup>	United Kingdom
												<b>Southeast Europe</b>
3.28	9.57	38.30	4.82	14.05	78.93	1.48	4.30	69.87	2.32	6.76	43.71	Albania
2.30	12.36	39.37	2.22	11.94	73.35	0.88	4.75	71.91	0.76	4.11	28.18	Bosnia & Herzegovina
-	-	-	-	-	-	-	-	-	-	-	-	Montenegro
1.27 <sup>-1</sup>	11.88 <sup>-1</sup>	47.76 <sup>-1</sup>	1.04 <sup>-1</sup>	9.65 <sup>-1</sup>	74.13 <sup>-1</sup>	0.37 <sup>-1</sup>	3.45 <sup>-1</sup>	69.46 <sup>-1</sup>	0.70 <sup>-1</sup>	6.56 <sup>-1</sup>	35.09 <sup>-1</sup>	North Macedonia
7.84	17.27	38.53	4.42	9.73	74.91	2.36	5.20	71.16	2.57	5.65	28.55	Serbia
												<b>European Free Trade Assoc.</b>
-	-	-	-	-	-	-	-	-	-	-	-	Iceland
-	-	-	-	-	-	-	-	-	-	-	-	Liechtenstein
7.21 <sup>-1</sup>	13.58 <sup>-1</sup>	23.89 <sup>-1</sup>	10.24 <sup>-1</sup>	19.29 <sup>-1</sup>	82.75 <sup>-1</sup>	2.56 <sup>-1</sup>	4.83 <sup>-1</sup>	51.48 <sup>-1</sup>	1.96 <sup>-1</sup>	3.69 <sup>-1</sup>	15.16 <sup>-1</sup>	Norway
13.96 <sup>-1</sup>	15.74 <sup>-1</sup>	15.99 <sup>-1</sup>	13.67 <sup>-1</sup>	15.41 <sup>-1</sup>	73.83 <sup>-1</sup>	5.89 <sup>-1</sup>	6.64 <sup>-1</sup>	41.92 <sup>-1</sup>	2.20 <sup>-1</sup>	2.47 <sup>-1</sup>	9.93 <sup>-1</sup>	Switzerland
												<b>Eastern Europe &amp; West Asia</b>
2.03	6.77	22.40	3.35	11.19	72.48	1.75	5.86	60.52	0.76	2.54	38.47	Armenia
9.18	16.97	26.56	3.28	6.06	78.28	2.06	3.80	65.34	1.49	2.75	45.97	Azerbaijan
30.02	24.18	23.21	10.09	8.12	85.23	4.59	3.70	62.04	7.44	5.99	23.04	Belarus
2.38 <sup>+1</sup>	9.60 <sup>+1</sup>	15.73 <sup>+1</sup>	2.50 <sup>+1</sup>	10.08 <sup>+1</sup>	70.99 <sup>+1</sup>	2.56 <sup>+1</sup>	10.33 <sup>+1</sup>	68.13 <sup>+1</sup>	1.15 <sup>+1</sup>	4.63 <sup>+1</sup>	20.58 <sup>+1</sup>	Georgia
233.03 <sup>-1</sup>	29.17 <sup>-1</sup>	22.66 <sup>-1</sup>	45.64 <sup>-1</sup>	5.71 <sup>-1</sup>	61.95 <sup>-1</sup>	40.06 <sup>-1</sup>	5.02 <sup>-1</sup>	68.02 <sup>-1</sup>	63.41 <sup>-1</sup>	7.94 <sup>-1</sup>	39.11 <sup>-1</sup>	Iran, Islamic Rep.
-	-	-	-	-	-	-	-	-	-	-	-	Israel
4.67	16.98	29.73	2.19	7.98	68.80	0.54	1.97	54.80	1.24	4.52	22.93	Moldova, Rep.
374.12 <sup>-1</sup>	22.57 <sup>-1</sup>	-	112.25 <sup>-1</sup>	6.77 <sup>-1</sup>	-	42.94 <sup>-1</sup>	2.59 <sup>-1</sup>	-	79.54 <sup>-1</sup>	4.8 <sup>-1</sup>	- <sup>-1</sup>	Russian Federation
-	-	-	-	-	-	-	-	-	-	-	-	Turkey
73.79	16.82	25.23	39.04	8.90	77.70	16.71	3.81	58.34	20.44	4.66	17.46	Ukraine

**Table C1:** Tertiary graduates in 2015 and 2018 and STEM graduates by field in 2018

	Tertiary graduates				Tertiary graduates by level of study, 2018				Tertiary graduates by field of study, 2018					
	MF (000s)	Females (%)	MF (000s)	Females (%)	Post-secondary diploma MF (000s)	Bachelor's degree MF (000s)	Master's degree MF (000s)	PhDs MF (000s)	Total graduates in science, technology, engineering and mathematics		Agriculture			
									MF (000s)	Females (%)	MF (000s)	Share of tertiary graduates (%)	Females (%)	
	2015		2018		2018									
<b>Sub-Saharan Africa</b>														
Angola	12.61	46.8	16.42 <sup>2</sup>	50.4 <sup>2</sup>	-	-	-	-	-	-	-	-	-	-
Benin	14.88	59.6	-	-	-	-	-	-	-	-	-	-	-	-
Botswana	15.59	-	10.63 <sup>-1</sup>	47.5 <sup>-1</sup>	5.16 <sup>-1</sup>	5.08 <sup>-1</sup>	0.38 <sup>-1</sup>	0.02 <sup>-1</sup>	-	-	-	-	-	-
Burkina Faso	15.66	34.3	10.39	40.2	3.09	5.63	1.57	0.10	2.05	20.59	0.14	1.37	33.80	
Burundi	17.83 <sup>+1</sup>	26.2 <sup>+1</sup>	17.64 <sup>-1</sup>	28.4 <sup>-1</sup>	0.96 <sup>-1</sup>	15.81 <sup>-1</sup>	0.55 <sup>-1</sup>	0.32 <sup>-1</sup>	2.86 <sup>-1</sup>	18.17 <sup>-1</sup>	0.23 <sup>-1</sup>	1.30 <sup>-1</sup>	65.07 <sup>-1</sup>	
Cameroon	73.73	-	69.20 <sup>-1</sup>	48.7 <sup>-1</sup>	13.84 <sup>-1</sup>	37.88 <sup>-1</sup>	15.74 <sup>-1</sup>	1.73 <sup>-1</sup>	16.78 <sup>-1</sup>	32.28 <sup>-1</sup>	0.92 <sup>-1</sup>	1.34 <sup>-1</sup>	29.08 <sup>-1</sup>	
Cabo Verde	1.38 <sup>+1</sup>	63.2 <sup>+1</sup>	1.42	64.4	0.04	1.36	0.03	0.00	0.23	42.36	0.00	0.07	100.00	
Central African Rep.	-	-	-	-	-	-	-	-	-	-	-	-	-	
Chad	-	-	-	-	-	-	-	-	-	-	-	-	-	
Comoros	-	-	-	-	-	-	-	-	-	-	-	-	-	
Congo	-	-	9.15 <sup>-1</sup>	41.7 <sup>-1</sup>	-	-	-	-	1.38 <sup>-1</sup>	20.81 <sup>-1</sup>	0.22 <sup>-1</sup>	2.39 <sup>-1</sup>	21.92 <sup>-1</sup>	
Côte d'Ivoire	-	-	-	-	-	-	-	-	-	-	-	-	-	
Congo, Dem. Rep.	-	-	105.09 <sup>2</sup>	35.1 <sup>2</sup>	a <sup>2</sup>	72.13 <sup>2</sup>	32.33 <sup>2</sup>	0.63 <sup>2</sup>	16.25 <sup>2</sup>	25.10 <sup>2</sup>	7.90 <sup>2</sup>	7.51 <sup>2</sup>	25.85 <sup>2</sup>	
Djibouti	-	-	-	-	-	-	-	-	-	-	-	-	-	
Equatorial Guinea	-	-	-	-	-	-	-	-	-	-	-	-	-	
Eritrea	-	-	2.58 <sup>2</sup>	37.0 <sup>2</sup>	1.29 <sup>2</sup>	1.26 <sup>2</sup>	0.02 <sup>2</sup>	0.00 <sup>2</sup>	0.75 <sup>2</sup>	27.81 <sup>2</sup>	0.34 <sup>2</sup>	13.32 <sup>2</sup>	51.60 <sup>2</sup>	
Eswatini	-	-	-	-	-	-	-	-	-	-	-	-	-	
Ethiopia	-	-	-	-	-	-	-	-	-	-	-	-	-	
Gabon	-	-	-	-	-	-	-	-	-	-	-	-	-	
Gambia	-	-	-	-	-	-	-	-	-	-	-	-	-	
Ghana	67.47	40.4	109.87	41.0	39.92	58.91	10.85	0.19	17.98	19.76	2.07	1.88	26.78	
Guinea	-	-	-	-	-	-	-	-	-	-	-	-	-	
Guinea-Bissau	-	-	-	-	-	-	-	-	-	-	-	-	-	
Kenya	-	-	217.33 <sup>2</sup>	45.2 <sup>2</sup>	-	-	-	-	35.81 <sup>2</sup>	30.73 <sup>2</sup>	5.98 <sup>2</sup>	2.75 <sup>2</sup>	37.28 <sup>2</sup>	
Lesotho	5.92	60.8	4.62	59.2	2.74	1.84	0.04	0.00	0.71	24.82	0.20	4.44	48.78	
Liberia	-	-	-	-	-	-	-	-	-	-	-	-	-	
Madagascar	26.26	48.1	29.76	49.5	1.39	23.46	4.78	0.14	7.10	31.02	0.70	2.37	41.19	
Malawi	-	-	-	-	-	-	-	-	-	-	-	-	-	
Mali	-	-	-	-	-	-	-	-	-	-	-	-	-	
Mauritius	-	-	8.28 <sup>-1</sup>	56.7 <sup>-1</sup>	1.19 <sup>-1</sup>	6.07 <sup>-1</sup>	0.98 <sup>-1</sup>	0.04 <sup>-1</sup>	1.93 <sup>-1</sup>	36.03 <sup>-1</sup>	0.12 <sup>-1</sup>	1.41 <sup>-1</sup>	29.06 <sup>-1</sup>	
Mozambique	14.51	43.9	24.21	49.8	a	22.56	1.63	0.02	2.31	29.26	0.42	1.74	35.39	
Namibia	5.40	65.2	9.79 <sup>-1</sup>	66.8 <sup>-1</sup>	2.77 <sup>-1</sup>	6.67 <sup>-1</sup>	0.32 <sup>-1</sup>	0.02 <sup>-1</sup>	1.19 <sup>-1</sup>	42.50 <sup>-1</sup>	0.18 <sup>-1</sup>	1.83 <sup>-1</sup>	53.07 <sup>-1</sup>	
Niger	6.40	32.2	41.94	32.3	5.68	20.72	13.97	1.58	4.37	18.03	1.48	3.53	18.72	
Nigeria	-	-	-	-	-	-	-	-	-	-	-	-	-	
Rwanda	17.52	45.2	20.41	47.5	2.25	16.12	2.03	0.01	3.32	35.36	0.81	3.99	37.47	
Sao Tome & Principe	-	-	-	-	-	-	-	-	-	-	-	-	-	
Senegal	-	-	28.06 <sup>-1</sup>	37.0 <sup>-1</sup>	0.65 <sup>-1</sup>	15.74 <sup>-1</sup>	10.51 <sup>-1</sup>	1.15 <sup>-1</sup>	-	-	-	-	-	
Seychelles	0.41	73.1	0.44	69.2	0.19	0.17	0.08	0.00	0.08	31.58	0.00	0.00	0.00	
Sierra Leone	-	-	-	-	-	-	-	-	-	-	-	-	-	
Somalia	-	-	-	-	-	-	-	-	-	-	-	-	-	
South Africa	208.97	60.4	232.60 <sup>-1</sup>	61.3 <sup>-1</sup>	66.09 <sup>-1</sup>	149.92 <sup>-1</sup>	13.52 <sup>-1</sup>	3.07 <sup>-1</sup>	43.20 <sup>-1</sup>	42.76 <sup>-1</sup>	4.66 <sup>-1</sup>	2.00 <sup>-1</sup>	52.22 <sup>-1</sup>	
South Sudan	-	-	-	-	-	-	-	-	-	-	-	-	-	
Togo	-	-	-	-	-	-	-	-	-	-	-	-	-	
Uganda	-	-	-	-	-	-	-	-	-	-	-	-	-	
Tanzania	-	-	-	-	-	-	-	-	-	-	-	-	-	
Zambia	-	-	-	-	-	-	-	-	-	-	-	-	-	
Zimbabwe	33.26	41.5	-	-	-	-	-	-	-	-	-	-	-	

Tertiary graduates by field of study, 2018

Engineering			Health and Welfare			Natural Sciences			ICTs			
MF (000s)	Share of tertiary graduates (%)	Females (%)	MF (000s)	Share of tertiary graduates (%)	Females (%)	MF (000s)	Share of tertiary graduates (%)	Females (%)	MF (000s)	Share of tertiary graduates (%)	Females (%)	
-	-	-	-	-	-	-	-	-	-	-	-	Sub-Saharan Africa
-	-	-	-	-	-	-	-	-	-	-	-	Angola
-	-	-	-	-	-	-	-	-	-	-	-	Benin
-	-	-	-	-	-	-	-	-	-	-	-	Botswana
1.33	12.80	21.58	0.56	5.44	42.65	0.71	6.88	18.74	0.00	0.00	0.00	Burkina Faso
1.06 <sup>-1</sup>	6.00 <sup>-1</sup>	8.03 <sup>-1</sup>	3.79 <sup>-1</sup>	21.50 <sup>-1</sup>	40.39 <sup>-1</sup>	0.81 <sup>-1</sup>	4.57 <sup>-1</sup>	21.09 <sup>-1</sup>	1.00 <sup>-1</sup>	5.66 <sup>-1</sup>	26.55 <sup>-1</sup>	Burundi
6.04 <sup>-1</sup>	8.73 <sup>-1</sup>	25.19 <sup>-1</sup>	1.66 <sup>-1</sup>	2.40 <sup>-1</sup>	60.71 <sup>-1</sup>	10.74 <sup>-1</sup>	15.52 <sup>-1</sup>	36.26 <sup>-1</sup>	0.00 <sup>-1</sup>	0.00 <sup>-1</sup>	0.00 <sup>-1</sup>	Cameroon
0.15	10.35	32.65	0.30	20.92	77.44	0.06	4.01	66.67	0.02	1.76	44.00	Cabo Verde
-	-	-	-	-	-	-	-	-	-	-	-	Central African Rep.
-	-	-	-	-	-	-	-	-	-	-	-	Chad
-	-	-	-	-	-	-	-	-	-	-	-	Comoros
0.50 <sup>-1</sup>	5.50 <sup>-1</sup>	15.71 <sup>-1</sup>	0.15 <sup>-1</sup>	1.68 <sup>-1</sup>	37.01 <sup>-1</sup>	0.69 <sup>-1</sup>	7.54 <sup>-1</sup>	22.90 <sup>-1</sup>	0.19 <sup>-1</sup>	2.09 <sup>-1</sup>	26.70 <sup>-1</sup>	Congo
-	-	-	-	-	-	-	-	-	-	-	-	Côte d'Ivoire
6.54 <sup>-2</sup>	6.22 <sup>-2</sup>	9.80 <sup>-2</sup>	19.17 <sup>-2</sup>	18.24 <sup>-2</sup>	45.79 <sup>-2</sup>	3.00 <sup>-2</sup>	2.85 <sup>-2</sup>	32.61 <sup>-2</sup>	6.71 <sup>-2</sup>	6.39 <sup>-2</sup>	36.65 <sup>-2</sup>	Congo, Dem. Rep.
-	-	-	-	-	-	-	-	-	-	-	-	Djibouti
-	-	-	-	-	-	-	-	-	-	-	-	Equatorial Guinea
0.61 <sup>-2</sup>	23.53 <sup>-2</sup>	28.05 <sup>-2</sup>	0.45 <sup>-2</sup>	17.36 <sup>-2</sup>	37.36 <sup>-2</sup>	0.13 <sup>-2</sup>	5.17 <sup>-2</sup>	28.57 <sup>-2</sup>	0.01 <sup>-2</sup>	0.35 <sup>-2</sup>	0.00 <sup>-2</sup>	Eritrea
-	-	-	-	-	-	-	-	-	-	-	-	Eswatini
-	-	-	-	-	-	-	-	-	-	-	-	Ethiopia
-	-	-	-	-	-	-	-	-	-	-	-	Gabon
-	-	-	-	-	-	-	-	-	-	-	-	Gambia
9.84	8.96	16.41	9.56	8.70	60.85	4.66	4.24	26.76	3.48	3.17	19.87	Ghana
-	-	-	-	-	-	-	-	-	-	-	-	Guinea
-	-	-	-	-	-	-	-	-	-	-	-	Guinea-Bissau
9.17 <sup>-2</sup>	4.22 <sup>-2</sup>	19.46 <sup>-2</sup>	12.99 <sup>-2</sup>	5.98 <sup>-2</sup>	49.06 <sup>-2</sup>	15.22 <sup>-2</sup>	7.00 <sup>-2</sup>	37.99 <sup>-2</sup>	11.42 <sup>-2</sup>	5.26 <sup>-2</sup>	30.10 <sup>-2</sup>	Kenya
0.42	9.16	18.44	0.47	10.27	72.78	0.06	1.34	45.16	0.22	4.85	31.25	Lesotho
-	-	-	-	-	-	-	-	-	-	-	-	Liberia
1.81	6.08	18.52	4.87	16.37	67.86	2.43	8.15	37.25	2.86	9.61	33.64	Madagascar
-	-	-	-	-	-	-	-	-	-	-	-	Malawi
-	-	-	-	-	-	-	-	-	-	-	-	Mali
0.69 <sup>-1</sup>	8.37 <sup>-1</sup>	25.25 <sup>-1</sup>	0.38 <sup>-1</sup>	4.54 <sup>-1</sup>	64.63 <sup>-1</sup>	0.37 <sup>-1</sup>	4.53 <sup>-1</sup>	66.13 <sup>-1</sup>	0.86 <sup>-1</sup>	10.4 <sup>-1</sup>	31.59 <sup>-1</sup>	Mauritius
1.76	7.25	28.64	2.64	10.90	75.17	0.23	0.97	45.30	0.32	1.34	20.99	Mozambique
0.40 <sup>-1</sup>	4.07 <sup>-1</sup>	33.92 <sup>-1</sup>	0.69 <sup>-1</sup>	7.03 <sup>-1</sup>	79.51 <sup>-1</sup>	0.31 <sup>-1</sup>	3.18 <sup>-1</sup>	60.13 <sup>-1</sup>	0.48 <sup>-1</sup>	4.87 <sup>-1</sup>	38.16 <sup>-1</sup>	Namibia
1.06	2.53	7.45	7.41	17.67	31.35	2.15	5.13	20.68	1.16	2.76	22.80	Niger
-	-	-	-	-	-	-	-	-	-	-	-	Nigeria
1.18	5.78	26.55	2.15	10.53	58.31	1.07	5.26	41.34	1.07	5.23	39.08	Rwanda
-	-	-	-	-	-	-	-	-	-	-	-	Sao Tome & Principe
-	-	-	-	-	-	-	-	-	-	-	-	Senegal
0.04	9.75	13.95	0.06	14.29	88.89	0.02	4.31	78.95	0.01	3.17	21.43	Seychelles
-	-	-	-	-	-	-	-	-	-	-	-	Sierra Leone
-	-	-	-	-	-	-	-	-	-	-	-	Somalia
18.82 <sup>-1</sup>	8.09 <sup>-1</sup>	32.24 <sup>-1</sup>	15.57 <sup>-1</sup>	6.69 <sup>-1</sup>	74.89 <sup>-1</sup>	16.94 <sup>-1</sup>	7.28 <sup>-1</sup>	56.35 <sup>-1</sup>	7.44 <sup>-1</sup>	3.20 <sup>-1</sup>	38.43 <sup>-1</sup>	South Africa
-	-	-	-	-	-	-	-	-	-	-	-	South Sudan
-	-	-	-	-	-	-	-	-	-	-	-	Togo
-	-	-	-	-	-	-	-	-	-	-	-	Uganda
-	-	-	-	-	-	-	-	-	-	-	-	Tanzania
-	-	-	-	-	-	-	-	-	-	-	-	Zambia
-	-	-	-	-	-	-	-	-	-	-	-	Zimbabwe

**Table C1: Tertiary graduates in 2015 and 2018 and STEM graduates by field in 2018**

	Tertiary graduates				Tertiary graduates by level of study, 2018				Tertiary graduates by field of study, 2018					
	MF (000s)	Females (%)	MF (000s)	Females (%)	Post-secondary diploma MF (000s)	Bachelor's degree MF (000s)	Master's degree MF (000s)	PhDs MF (000s)	Total graduates in science, technology, engineering and mathematics		Agriculture			
									MF (000s)	Females (%)	MF (000s)	Share of tertiary graduates (%)	Females (%)	
	2015		2018		2018									
<b>Arab States</b>														
Algeria	287.91	62.7	330.43	64.5	-	-	-	-	113.12	58.17	4.41	1.33	76.78	
Bahrain	5.69	60.8	5.92	63.6	0.51	4.61	0.77	0.03	0.96	41.21	0.00	0.00	0.00	
Egypt	-	-	428.63 <sup>-2</sup>	53.6 <sup>-2</sup>	0.01 <sup>-2</sup>	393.01 <sup>-2</sup>	27.91 <sup>-2</sup>	7.70 <sup>-2</sup>	48.18 <sup>-2</sup>	36.90 <sup>-2</sup>	11.76 <sup>-2</sup>	2.74 <sup>-2</sup>	49.37 <sup>-2</sup>	
Iraq	-	-	-	-	-	-	-	-	-	-	-	-	-	
Jordan	69.70	-	65.64	54.5	3.19	56.76	4.86	0.83	-	-	-	-	-	
Kuwait	-	-	-	-	-	-	-	-	-	-	-	-	-	
Lebanon	-	-	-	-	-	-	-	-	-	-	-	-	-	
Libya	-	-	-	-	-	-	-	-	-	-	-	-	-	
Mauritania	2.77	37.9	2.81 <sup>-1</sup>	29.6 <sup>-1</sup>	0.08 <sup>-1</sup>	2.68 <sup>-1</sup>	0.05 <sup>-1</sup>	0.00 <sup>-1</sup>	0.85 <sup>-1</sup>	28.86 <sup>-1</sup>	0.04 <sup>-1</sup>	1.32 <sup>-1</sup>	0.00 <sup>-1</sup>	
Morocco	155.80	48.5	171.74 <sup>-1</sup>	48.6 <sup>-1</sup>	59.07 <sup>-1</sup>	85.11 <sup>-1</sup>	25.60 <sup>-1</sup>	1.95 <sup>-1</sup>	32.72 <sup>-1</sup>	45.32 <sup>-1</sup>	0.57 <sup>-1</sup>	0.33 <sup>-1</sup>	44.21 <sup>-1</sup>	
Oman	18.61	55.7	24.90	62.7	7.36	15.71	1.79	0.04	11.49	55.73	0.06	0.26	81.54	
Palestine	39.72	60.3	47.28	60.2	6.94	37.20	3.14	0.00	7.29	44.27	0.19	0.40	35.60	
Qatar	3.23	58.2	6.04	67.4	1.40	3.66	0.96	0.02	1.36	47.58	0.00	0.00	0.00	
Saudi Arabia	185.12	49.6	256.36	53.1	39.82	207.14	8.95	0.45	54.19	36.82	0.25	0.10	0.00	
Sudan	115.50	48.5	-	-	-	-	-	-	-	-	-	-	-	
Syrian Arab Rep.	59.12	54.8	48.96 <sup>-2</sup>	59.1 <sup>-2</sup>	5.36 <sup>-2</sup>	41.43 <sup>-2</sup>	1.82 <sup>-2</sup>	0.35 <sup>-2</sup>	11.24 <sup>-2</sup>	49.51 <sup>-2</sup>	2.98 <sup>-2</sup>	6.08 <sup>-2</sup>	50.18 <sup>-2</sup>	
Tunisia	64.61	63.5	57.53	65.7	a	36.86	18.83	1.84	24.88	55.41	0.87	1.51	73.85	
United Arab Emirates	27.89	54.8	35.00 <sup>-1</sup>	51.8 <sup>-1</sup>	1.95 <sup>-1</sup>	24.48 <sup>-1</sup>	8.44 <sup>-1</sup>	0.13 <sup>-1</sup>	9.71 <sup>-1</sup>	41.49 <sup>-1</sup>	0.04 <sup>-1</sup>	0.12 <sup>-1</sup>	80.95 <sup>-1</sup>	
Yemen	-	-	-	-	-	-	-	-	-	-	-	-	-	
<b>Central Asia</b>														
Kazakhstan	241.47	54.5	234.80 <sup>+1</sup>	55.4 <sup>+1</sup>	84.57 <sup>+1</sup>	128.98 <sup>+1</sup>	20.53 <sup>+1</sup>	0.72 <sup>-1</sup>	58.06 <sup>+1</sup>	31.63 <sup>+1</sup>	9.24 <sup>+1</sup>	3.93 <sup>+1</sup>	37.52 <sup>+1</sup>	
Kyrgyzstan	53.99	53.1	66.62	57.6	17.25	25.61	23.29	0.47	13.85	31.28	1.19	1.78	25.89	
Mongolia	35.18	62.1	29.16	59.9	0.05	25.12	3.87	0.13	7.39	34.08	0.37	1.27	51.89	
Tajikistan	42.96	39.5	47.63 <sup>-1</sup>	42.5 <sup>-1</sup>	-	-	-	-	10.50 <sup>-1</sup>	-	0.99 <sup>-1</sup>	2.08 <sup>-1</sup>	-	
Turkmenistan	-	-	-	-	-	-	-	-	-	-	-	-	-	
Uzbekistan	68.19	35.9	67.90	40.4	-	-	-	-	23.87	24.61	5.00	7.37	26.66	
<b>South Asia</b>														
Afghanistan	-	-	68.43	23.5	a	66.95	1.48	0.01	-	-	-	-	-	
Bangladesh	493.38 <sup>+1</sup>	28.3 <sup>+1</sup>	488.25	28.0	-	-	-	-	54.81	20.55	5.47	1.12	21.19	
Bhutan	-	-	-	-	-	-	-	-	-	-	-	-	-	
India	8 428.84	50.5	8 441.26	50.4	a	6 789.93	1 622.55	28.78	2 678.78	42.73	61.89	0.73	27.50	
Maldives	-	-	2.78 <sup>-1</sup>	68.9 <sup>-1</sup>	1.30 <sup>-1</sup>	1.13 <sup>-1</sup>	0.35 <sup>-1</sup>	0.00 <sup>-1</sup>	0.14 <sup>-1</sup>	10.56 <sup>-1</sup>	0.00 <sup>-1</sup>	0.00 <sup>-1</sup>	0.00 <sup>-1</sup>	
Nepal	-	-	81.58	-	a	60.39	21.08	0.11	10.55	-	0.54	0.66	-	
Pakistan	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sri Lanka	46.34	62.5	55.70	61.3	5.45	39.11	11.00	0.14	-	-	-	-	-	

Tertiary graduates by field of study, 2018

Engineering			Health and Welfare			Natural Sciences			ICTs			
MF (000s)	Share of tertiary graduates (%)	Females (%)	MF (000s)	Share of tertiary graduates (%)	Females (%)	MF (000s)	Share of tertiary graduates (%)	Females (%)	MF (000s)	Share of tertiary graduates (%)	Females (%)	
												<b>Arab States</b>
72.83	22.04	48.46	12.01	3.63	70.52	31.62	9.57	83.06	8.68	2.63	48.93	Algeria
0.57	9.56	30.57	0.56	9.51	73.18	0.09	1.57	87.10	0.30	5.02	47.14	Bahrain
26.45 <sup>-2</sup>	6.17 <sup>-2</sup>	20.93 <sup>-2</sup>	47.61 <sup>-2</sup>	11.11 <sup>-2</sup>	55.95 <sup>-2</sup>	15.51 <sup>-2</sup>	3.62 <sup>-2</sup>	64.16 <sup>-2</sup>	6.22 <sup>-2</sup>	1.45 <sup>-2</sup>	36.81 <sup>-2</sup>	Egypt
-	-	-	-	-	-	-	-	-	-	-	-	Iraq
-	-	-	-	-	-	-	-	-	-	-	-	Jordan
-	-	-	-	-	-	-	-	-	-	-	-	Kuwait
-	-	-	-	-	-	-	-	-	-	-	-	Lebanon
-	-	-	-	-	-	-	-	-	-	-	-	Libya
0.15 <sup>-1</sup>	5.15 <sup>-1</sup>	11.72 <sup>-1</sup>	0.03 <sup>-1</sup>	0.92 <sup>-1</sup>	57.69 <sup>-1</sup>	0.54 <sup>-1</sup>	19.09 <sup>-1</sup>	29.61 <sup>-1</sup>	0.17 <sup>-1</sup>	5.94 <sup>-1</sup>	41.32 <sup>-1</sup>	Mauritania
10.05 <sup>-1</sup>	5.85 <sup>-1</sup>	42.20 <sup>-1</sup>	5.85 <sup>-1</sup>	3.41 <sup>-1</sup>	72.28 <sup>-1</sup>	16.62 <sup>-1</sup>	9.68 <sup>-1</sup>	48.66 <sup>-1</sup>	6.05 <sup>-1</sup>	3.52 <sup>-1</sup>	41.28 <sup>-1</sup>	Morocco
7.03	28.22	43.16	1.29	5.17	84.23	0.95	3.83	75.45	3.51	14.10	75.56	Oman
4.13	8.73	32.89	4.78	10.10	65.56	1.32	2.79	78.07	1.84	3.90	45.61	Palestine
0.83	13.79	37.21	0.48	7.91	88.08	0.25	4.11	75.81	0.28	4.65	53.38	Qatar
20.26	7.90	2.68	15.83	6.17	60.43	17.72	6.91	67.45	16.21	6.32	46.02	Saudi Arabia
-	-	-	-	-	-	-	-	-	-	-	-	Sudan
7.31 <sup>-2</sup>	14.93 <sup>-2</sup>	43.85 <sup>-2</sup>	6.06 <sup>-2</sup>	12.37 <sup>-2</sup>	54.86 <sup>-2</sup>	3.34	6.83 <sup>-2</sup>	60.51 <sup>-2</sup>	0.59 <sup>-2</sup>	1.20 <sup>-2</sup>	57.31 <sup>-2</sup>	Syrian Arab Rep.
11.21	19.49	44.19	5.02	8.73	75.26	5.70	9.91	77.15	7.97	13.85	55.64	Tunisia
6.90 <sup>-1</sup>	19.73 <sup>-1</sup>	33.29 <sup>-1</sup>	2.46 <sup>-1</sup>	7.03 <sup>-1</sup>	81.09 <sup>-1</sup>	0.58 <sup>-1</sup>	1.65 <sup>-1</sup>	85.94 <sup>-1</sup>	2.23 <sup>-1</sup>	6.36 <sup>-1</sup>	55.39 <sup>-1</sup>	United Arab Emirates
-	-	-	-	-	-	-	-	-	-	-	-	Yemen
												<b>Central Asia</b>
46.73 <sup>+1</sup>	19.90 <sup>+1</sup>	28.45 <sup>+1</sup>	29.03 <sup>+1</sup>	12.36 <sup>+1</sup>	77.33 <sup>+1</sup>	4.45 <sup>+1</sup>	1.89 <sup>+1</sup>	66.97 <sup>+1</sup>	6.89 <sup>+1</sup>	2.93 <sup>+1</sup>	30.4 <sup>+1</sup>	Kazakhstan
9.29	13.94	18.38	9.35	14.03	73.96	1.81	2.71	72.94	2.76	4.14	47.43	Kyrgyzstan
5.59	19.17	30.75	3.27	11.21	82.54	0.85	2.91	51.94	0.95	3.26	37.68	Mongolia
5.89 <sup>-1</sup>	12.36 <sup>-1</sup>	-	10.31 <sup>-1</sup>	21.64 <sup>-1</sup>	-	2.76 <sup>-1</sup>	5.79 <sup>-1</sup>	-	1.85 <sup>-1</sup>	3.89 <sup>-1</sup>	-	Tajikistan
-	-	-	-	-	-	-	-	-	-	-	-	Turkmenistan
16.07	23.66	17.70	3.49	5.14	41.63	4.75	6.99	52.33	3.06	4.50	17.83	Uzbekistan
												<b>South Asia</b>
-	-	-	-	-	-	-	-	-	-	-	-	Afghanistan
6.34	1.30	46.05	10.26	2.10	25.26	39.43	8.08	14.92	9.05	1.85	27.25	Bangladesh
-	-	-	-	-	-	-	-	-	-	-	-	Bhutan
990.81	11.74	30.83	273.44	3.24	61.55	1 137.82	13.48	51.37	550.15	6.52	46.33	India
0.05 <sup>-1</sup>	1.73 <sup>-1</sup>	10.42 <sup>-1</sup>	0.20 <sup>-1</sup>	7.20 <sup>-1</sup>	95.00 <sup>-1</sup>	0.00 <sup>-1</sup>	0.04 <sup>-1</sup>	100.00 <sup>-1</sup>	0.09 <sup>-1</sup>	3.35 <sup>-1</sup>	9.68 <sup>-1</sup>	Maldives
3.03	3.72	-	3.49	4.28	-	7.51	9.21	-	0.00	0.00	-	Nepal
-	-	-	-	-	-	-	-	-	-	-	-	Pakistan
-	-	-	-	-	-	-	-	-	-	-	-	Sri Lanka

**Table C1: Tertiary graduates in 2015 and 2018 and STEM graduates by field in 2018**

	Tertiary graduates				Tertiary graduates by level of study, 2018				Tertiary graduates by field of study, 2018				
	MF (000s)	Females (%)	MF (000s)	Females (%)	Post-secondary diploma MF (000s)	Bachelor's degree MF (000s)	Master's degree MF (000s)	PhDs MF (000s)	Total graduates in science, technology, engineering and mathematics		Agriculture		
									MF (000s)	Females (%)	MF (000s)	Share of tertiary graduates (%)	Females (%)
	2015		2018		2018								
<b>Southeast Asia</b>													
Brunei Darussalam	2.77	63.4	3.50	63.2	0.98	2.00	0.47	0.04	1.37	54.34	0.00	0.00	0.00
Cambodia	48.77	42.8	-	-	-	-	-	-	-	-	-	-	-
China	11 923.65	51.5	12 915.50	52.9	6 151.81	6 055.33	648.53	59.83	-	-	-	-	-
China, Hong Kong SAR	-	-	-	-	-	-	-	-	-	-	-	-	-
China, Macao SAR	6.67	58.8	7.87	59.1	0.08	5.25	2.20	0.35	0.60	25.37	0.00	0.00	0.00
China, Taiwan Prov.	-	-	-	-	-	-	-	-	-	-	-	-	-
Indonesia	1161.20	57.4	1 245.17	58.7	227.80	920.60	91.67	5.10	241.80	37.43	51.06	4.10	48.25
Japan	984.50	49.4	985.43 <sup>1</sup>	49.7 <sup>1</sup>	306.74 <sup>1</sup>	562.49 <sup>1</sup>	100.54 <sup>1</sup>	15.67 <sup>1</sup>	-	-	-	-	-
Korea DPR	129.62	36.4	-	-	-	-	-	-	-	-	-	-	-
Korea Rep.	629.79	51.0	628.74 <sup>1</sup>	51.3 <sup>1</sup>	172.09 <sup>1</sup>	359.86 <sup>1</sup>	82.48 <sup>1</sup>	14.32 <sup>1</sup>	184.50 <sup>1</sup>	25.22 <sup>1</sup>	8.33 <sup>1</sup>	1.33 <sup>1</sup>	44.83 <sup>1</sup>
Lao PDR	39.82	48.7	31.90	50.8	19.67	10.86	1.36	0.01	7.16	28.95	2.72	8.53	44.74
Malaysia	362.81	57.9	344.63	53.2	184.97	136.28	18.99	4.38	140.51	34.17	7.53	2.19	47.67
Myanmar	-	-	154.67	66.0	6.30	141.94	5.73	0.70	52.07	60.76	0.93	0.60	53.93
Philippines	-	-	645.97 <sup>1</sup>	58.6 <sup>1</sup>	70.96 <sup>1</sup>	537.06 <sup>1</sup>	34.70 <sup>1</sup>	3.25 <sup>1</sup>	185.65 <sup>1</sup>	36.25 <sup>1</sup>	21.21 <sup>1</sup>	3.28 <sup>1</sup>	53.37 <sup>1</sup>
Singapore	63.18 <sup>1</sup>	52.2 <sup>1</sup>	65.31 <sup>1</sup>	53.1 <sup>1</sup>	30.97 <sup>1</sup>	29.27 <sup>1</sup>	4.56 <sup>1</sup>	0.51 <sup>1</sup>	22.81 <sup>1</sup>	34.26 <sup>1</sup>	0.14 <sup>1</sup>	0.21 <sup>1</sup>	64.96 <sup>1</sup>
Thailand	371.41	56.4	455.15 <sup>2</sup>	56.0 <sup>2</sup>	130.56 <sup>2</sup>	280.16 <sup>2</sup>	41.16 <sup>2</sup>	3.27 <sup>2</sup>	126.78 <sup>2</sup>	30.14 <sup>2</sup>	13.68 <sup>2</sup>	3.00 <sup>2</sup>	52.03 <sup>2</sup>
Timor-Leste	-	-	-	-	-	-	-	-	-	-	-	-	-
Viet Nam	585.55	54.6	536.71 <sup>2</sup>	53.8 <sup>2</sup>	150.85 <sup>2</sup>	352.79 <sup>2</sup>	32.21 <sup>2</sup>	0.87 <sup>2</sup>	121.70 <sup>2</sup>	36.51 <sup>2</sup>	24.24 <sup>2</sup>	4.52 <sup>2</sup>	52.97 <sup>2</sup>
<b>Oceania</b>													
Australia	363.71	57.9	373.00 <sup>1</sup>	57.8 <sup>1</sup>	51.09 <sup>1</sup>	226.17 <sup>1</sup>	86.50 <sup>1</sup>	9.24 <sup>1</sup>	68.74 <sup>1</sup>	32.08 <sup>1</sup>	3.02 <sup>1</sup>	0.81 <sup>1</sup>	58.46 <sup>1</sup>
New Zealand	72.75	56.4	75.86 <sup>1</sup>	57.3 <sup>1</sup>	21.74 <sup>1</sup>	46.40 <sup>1</sup>	6.24 <sup>1</sup>	1.48 <sup>1</sup>	16.06 <sup>1</sup>	34.96 <sup>1</sup>	1.55 <sup>1</sup>	2.04 <sup>1</sup>	64.57 <sup>1</sup>
Cook Islands	-	-	-	-	-	-	-	-	-	-	-	-	-
Fiji	-	-	-	-	-	-	-	-	-	-	-	-	-
Kiribati	-	-	-	-	-	-	-	-	-	-	-	-	-
Marshall Islands	-	-	-	-	-	-	-	-	-	-	-	-	-
Micronesia	-	-	-	-	-	-	-	-	-	-	-	-	-
Nauru	-	-	-	-	-	-	-	-	-	-	-	-	-
Niue	a	a	a	a	a	a	a	a	a	a	a	a	a
Palau	-	-	-	-	-	-	-	-	-	-	-	-	-
Papua New Guinea	-	-	-	-	-	-	-	-	-	-	-	-	-
Samoa	-	-	-	-	-	-	-	-	-	-	-	-	-
Solomon Islands	-	-	-	-	-	-	-	-	-	-	-	-	-
Tonga	-	-	-	-	-	-	-	-	-	-	-	-	-
Tuvalu	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanuatu	-	-	-	-	-	-	-	-	-	-	-	-	-

**KEY** --: data unavailable | -n/+n: data refer to n years before or after reference year | 0: magnitude nil or negligible | a: not applicable

GDP: gross domestic product | MF: males and females | PPP\$: purchasing power parity dollars

Note: Within each field of study, the share of tertiary graduates refers to the share of all tertiary graduates in all fields accounted for by both sexes in that field of study. The share of females refers to the female share of total graduates within that field.

Source: UNESCO Institute for Statistics, August 2020



Tertiary graduates by field of study, 2018

Engineering			Health and Welfare			Natural Sciences			ICTs			
MF (000s)	Share of tertiary graduates (%)	Females (%)	MF (000s)	Share of tertiary graduates (%)	Females (%)	MF (000s)	Share of tertiary graduates (%)	Females (%)	MF (000s)	Share of tertiary graduates (%)	Females (%)	
												<b>Southeast Asia</b>
0.53	15.16	52.26	0.12	3.40	76.47	0.37	10.53	73.37	0.47	13.53	41.86	Brunei Darussalam
-	-	-	-	-	-	-	-	-	-	-	-	Cambodia
-	-	-	-	-	-	-	-	-	-	-	-	China
-	-	-	-	-	-	-	-	-	-	-	-	China, Hong Kong SAR
0.22	2.73	19.53	0.44	5.56	71.23	0.11	1.41	43.24	0.28	3.52	22.74	China, Macao SAR
-	-	-	-	-	-	-	-	-	-	-	-	China, Taiwan Prov.
97.98	7.87	24.92	200.25	16.08	78.00	40.97	3.29	74.30	102.84	8.26	34.67	Indonesia
-	-	-	-	-	-	-	-	-	-	-	-	Japan
-	-	-	-	-	-	-	-	-	-	-	-	Korea DPR
127.75 <sup>-1</sup>	20.32 <sup>-1</sup>	20.05 <sup>-1</sup>	97.41 <sup>-1</sup>	15.49 <sup>-1</sup>	71.48 <sup>-1</sup>	28.54 <sup>-1</sup>	4.54 <sup>-1</sup>	49.20 <sup>-1</sup>	28.21 <sup>-1</sup>	4.49 <sup>-1</sup>	24.32 <sup>-1</sup>	Korea Rep.
4.04	12.67	17.95	1.49	4.66	67.14	0.52	1.63	55.00	2.60	8.16	40.82	Lao PDR
103.70	30.09	27.05	22.77	6.61	72.41	12.22	3.55	70.73	24.59	7.13	46.00	Malaysia
12.29	7.95	42.34	3.52	2.27	57.17	36.46	23.57	66.38	3.33	2.15	67.35	Myanmar
98.84 <sup>-1</sup>	15.30 <sup>-1</sup>	24.48 <sup>-1</sup>	41.80 <sup>-1</sup>	6.47 <sup>-1</sup>	71.87 <sup>-1</sup>	9.56 <sup>-1</sup>	1.48 <sup>-1</sup>	61.97 <sup>-1</sup>	77.25 <sup>-1</sup>	11.96 <sup>-1</sup>	48.13 <sup>-1</sup>	Philippines
13.76 <sup>-1</sup>	21.07 <sup>-1</sup>	27.77 <sup>-1</sup>	5.76 <sup>-1</sup>	8.82 <sup>-1</sup>	70.95 <sup>-1</sup>	3.66 <sup>-1</sup>	5.60 <sup>-1</sup>	61.72 <sup>-1</sup>	5.4 <sup>-1</sup>	8.26 <sup>-1</sup>	32.22 <sup>-1</sup>	Singapore
86.66 <sup>-2</sup>	19.04 <sup>-2</sup>	16.75 <sup>-2</sup>	21.88 <sup>-2</sup>	4.81 <sup>-2</sup>	76.32 <sup>-2</sup>	19.64 <sup>-2</sup>	4.32 <sup>-2</sup>	70.72 <sup>-2</sup>	20.48 <sup>-2</sup>	4.50 <sup>-2</sup>	47.85 <sup>-2</sup>	Thailand
-	-	-	-	-	-	-	-	-	-	-	-	Timor-Leste
107.00 <sup>-2</sup>	19.94 <sup>-2</sup>	37.07 <sup>-2</sup>	32.37 <sup>-2</sup>	6.03 <sup>-2</sup>	58.72 <sup>-2</sup>	3.66 <sup>-2</sup>	0.68 <sup>-2</sup>	50.59 <sup>-2</sup>	11.04 <sup>-2</sup>	2.06 <sup>-2</sup>	26.43 <sup>-2</sup>	Viet Nam
												<b>Oceania</b>
30.87 <sup>-1</sup>	8.28 <sup>-1</sup>	23.23 <sup>-1</sup>	68.11 <sup>-1</sup>	18.26 <sup>-1</sup>	74.73 <sup>-1</sup>	22.48 <sup>-1</sup>	6.03 <sup>-1</sup>	51.28 <sup>-1</sup>	15.39 <sup>-1</sup>	4.13 <sup>-1</sup>	21.75 <sup>-1</sup>	Australia
6.18 <sup>-1</sup>	8.15 <sup>-1</sup>	28.63 <sup>-1</sup>	11.03 <sup>-1</sup>	14.53 <sup>-1</sup>	79.92 <sup>-1</sup>	4.80 <sup>-1</sup>	6.33 <sup>-1</sup>	55.67 <sup>-1</sup>	5.08 <sup>-1</sup>	6.70 <sup>-1</sup>	23.11 <sup>-1</sup>	New Zealand
-	-	-	-	-	-	-	-	-	-	-	-	Cook Islands
-	-	-	-	-	-	-	-	-	-	-	-	Fiji
-	-	-	-	-	-	-	-	-	-	-	-	Kiribati
-	-	-	-	-	-	-	-	-	-	-	-	Marshall Islands
-	-	-	-	-	-	-	-	-	-	-	-	Micronesia
-	-	-	-	-	-	-	-	-	-	-	-	Nauru
a	a	a	a	a	a	a	a	a	a	a	a	Niue
-	-	-	-	-	-	-	-	-	-	-	-	Palau
-	-	-	-	-	-	-	-	-	-	-	-	Papua New Guinea
-	-	-	-	-	-	-	-	-	-	-	-	Samoa
-	-	-	-	-	-	-	-	-	-	-	-	Solomon Islands
-	-	-	-	-	-	-	-	-	-	-	-	Tonga
-	-	-	-	-	-	-	-	-	-	-	-	Tuvalu
-	-	-	-	-	-	-	-	-	-	-	-	Vanuatu

**Table C2:** Total researchers and researchers per million inhabitants, 2015 and 2018

	Researchers in full-time equivalents					
	Total researchers	Female researchers (%)*	Researchers per million inhabitants	Total researchers	Female researchers (%)*	Researchers per million inhabitants
	2015			2018		
<b>North America</b>						
Canada	162 952	–	4 523	158 890 <sup>-1</sup>	–	4 326 <sup>-1</sup>
United States of America	1 369 457	–	4 268	1 434 415 <sup>-1</sup>	–	4 412 <sup>-1</sup>
<b>Latin America</b>						
Argentina	53 006	51.88	1 231	52 383 <sup>-1</sup>	53.28 <sup>-1</sup>	1 192 <sup>-1</sup>
Belize	–	–	–	–	–	–
Bolivia	–	–	–	–	–	–
Brazil	–	–	–	–	–	–
Chile	8 175	32.93	455	9 111 <sup>-1</sup>	34.75 <sup>-1</sup>	493 <sup>-1</sup>
Colombia	3 305	35.37	70	4 305 <sup>-1</sup>	37.65 <sup>-1</sup>	88 <sup>-1</sup>
Costa Rica	2 401	39.19	495	1 883 <sup>-1</sup>	42.86 <sup>-1</sup>	380 <sup>-1</sup>
Ecuador	–	–	–	–	–	–
El Salvador	400	38.75	63	407 <sup>-1</sup>	36.36 <sup>-1</sup>	64 <sup>-1</sup>
Guatemala	360	61.94	22	238 <sup>-1</sup>	52.94 <sup>-1</sup>	14 <sup>-1</sup>
Guyana	–	–	–	–	–	–
Honduras	204	–	22	327 <sup>-1</sup>	39.45 <sup>-1</sup>	35 <sup>-1</sup>
Mexico	34 282	–	281	38 882 <sup>-2</sup>	–	315 <sup>-2</sup>
Nicaragua	–	–	–	–	–	–
Panama	–	–	–	–	–	–
Paraguay	1 222	47.01	183	928 <sup>-1</sup>	48.46 <sup>-1</sup>	135 <sup>-1</sup>
Peru	–	–	–	–	–	–
Suriname	–	–	–	–	–	–
Uruguay	2 257	48.34	661	2 402	48.79	696
Venezuela	7 488	61.63	249	8 963 <sup>-2</sup>	–	300 <sup>-2</sup>
<b>Caribbean</b>						
Antigua & Barbuda	–	–	–	–	–	–
Bahamas	–	–	–	–	–	–
Barbados	–	–	–	–	–	–
Cuba	–	–	–	–	–	–
Dominica	–	–	–	–	–	–
Dominican Rep.	–	–	–	–	–	–
Grenada	–	–	–	–	–	–
Haiti	–	–	–	–	–	–
Jamaica	–	–	–	–	–	–
St Kitts & Nevis	–	–	–	–	–	–
St Lucia	–	–	–	–	–	–
St Vincent & Grenadines	–	–	–	–	–	–
Trinidad & Tobago	–	–	–	716 <sup>-1</sup>	54.61 <sup>-1</sup>	517 <sup>-1</sup>
<b>European Union</b>						
Austria	43 562	23.22	5 019	50 975	23.66 <sup>-1</sup>	5 733
Belgium	53 178	–	4 711	57 678	–	5 023
Bulgaria	14 236	47.89	1 977	16 521	46.40 <sup>-1</sup>	2 343
Croatia	6 367	49.62	1 504	7 985	47.72 <sup>-1</sup>	1 921
Cyprus	856	38.32	1 009	1 100	38.01 <sup>-1</sup>	1 256
Czech Rep.	38 081	23.43	3 592	41 198	23.16	3 863
Denmark	42 826	31.87	7 528	46 396	35.46 <sup>-1</sup>	8 066
Estonia	4 187	43.73	3 183	4 968	40.71 <sup>-1</sup>	3 755
Finland	37 516	–	6 845	37 891	–	6 861
France	277 631	26.93	4 307	306 451	28.60 <sup>-1</sup>	4 715
Germany	387 982	22.62	4 744	433 234	22.58 <sup>-1</sup>	5 212
Greece	34 708	35.64	3 256	36 646	38.72 <sup>-1</sup>	3 483
Hungary	25 316	26.86	2 589	31 430	26.85 <sup>-1</sup>	3 238
Ireland	24 521	35.29	5 271	25 265	35.34 <sup>-1</sup>	5 243
Italy	125 875	36.10	2 078	139 853	34.65 <sup>-1</sup>	2 307
Latvia	3 613	50.07	1 809	3 456	50.80 <sup>-1</sup>	1 792
Lithuania	8 167	46.87	2 786	8 938	46.14 <sup>-1</sup>	3 191

Researchers in head counts						
Total researchers	Female researchers (%)*	Researchers per million inhabitants	Total researchers	Female researchers (%)*	Researchers per million inhabitants	
2015			2018			
						<b>North America</b>
-	-	-	-	-	-	Canada
-	-	-	-	-	-	United States of America
						<b>Latin America</b>
82 396	52.50	1 913	83 190 <sup>-1</sup>	54.07 <sup>-1</sup>	1 893 <sup>-1</sup>	Argentina
-	-	-	-	-	-	Belize
-	-	-	-	-	-	Bolivia
-	-	-	-	-	-	Brazil
13 015	33.02	724	14 413 <sup>-1</sup>	34.43 <sup>-1</sup>	780 <sup>-1</sup>	Chile
10 050	35.45	211	13 001 <sup>-1</sup>	37.37 <sup>-1</sup>	266 <sup>-1</sup>	Colombia
4 228	42.15	872	3 834 <sup>-1</sup>	44.34 <sup>-1</sup>	775 <sup>-1</sup>	Costa Rica
-	-	-	-	-	-	Ecuador
1 001	40.36	158	981 <sup>-1</sup>	38.63 <sup>-1</sup>	154 <sup>-1</sup>	El Salvador
602	53.16	37	494 <sup>-1</sup>	43.93 <sup>-1</sup>	29 <sup>-1</sup>	Guatemala
-	-	-	-	-	-	Guyana
207	41.06	23	538 <sup>-1</sup>	36.43 <sup>-1</sup>	57 <sup>-1</sup>	Honduras
48 812	-	401	54 354 <sup>-2</sup>	-	441 <sup>-2</sup>	Mexico
-	-	-	-	-	-	Nicaragua
492	-	124	622 <sup>-1</sup>	-	151 <sup>-1</sup>	Panama
1 985	48.21	297	1 784 <sup>-1</sup>	49.27 <sup>-1</sup>	260 <sup>-1</sup>	Paraguay
3 374	31.89	111	2 496	28.57	78	Peru
-	-	-	-	-	-	Suriname
2 719	49.28	797	2 698	49.33	782	Uruguay
10 824	61.62	360	10 382 <sup>-2</sup>	61.43 <sup>-2</sup>	348 <sup>-2</sup>	Venezuela
						<b>Caribbean</b>
-	-	-	-	-	-	Antigua & Barbuda
-	-	-	-	-	-	Bahamas
-	-	-	-	-	-	Barbados
3 853	51.54	340	6 954	49.01	613	Cuba
-	-	-	-	-	-	Dominica
-	-	-	-	-	-	Dominican Rep.
-	-	-	-	-	-	Grenada
-	-	-	-	-	-	Haiti
-	-	-	-	-	-	Jamaica
-	-	-	-	-	-	St Kitts & Nevis
-	-	-	-	-	-	St Lucia
-	-	-	-	-	-	St Vincent & Grenadines
1 277	53.64	932	1 506 <sup>-1</sup>	55.91 <sup>-1</sup>	1 088 <sup>-1</sup>	Trinidad & Tobago
						<b>European Union</b>
78 051	29.49	8 993	83 648 <sup>-1</sup>	30.06 <sup>-1</sup>	9 484 <sup>-1</sup>	Austria
73 709	34.12	6 530	78 867 <sup>-1</sup>	34.82 <sup>-1</sup>	6 906 <sup>-1</sup>	Belgium
19 338	47.93	2 686	20 971 <sup>-1</sup>	47.37 <sup>-1</sup>	2 953 <sup>-1</sup>	Bulgaria
11 089	48.91	2 620	13 708 <sup>-1</sup>	48.42 <sup>-1</sup>	3 277 <sup>-1</sup>	Croatia
2 119	37.94	2 498	2 357 <sup>-1</sup>	38.06 <sup>-1</sup>	2 727 <sup>-1</sup>	Cyprus
56 605	26.95	5 339	61 966	26.56	5 810	Czech Rep.
60 492	33.84	10 634	61 961 <sup>-1</sup>	35.76 <sup>-1</sup>	10 809 <sup>-1</sup>	Denmark
7 181	43.88	5 459	7 344 <sup>-1</sup>	42.20 <sup>-1</sup>	5 566 <sup>-1</sup>	Estonia
55 728	32.29	10 167	54 139 <sup>-1</sup>	33.15 <sup>-1</sup>	9 823 <sup>-1</sup>	Finland
383 843	26.97	5 955	416 217 <sup>-1</sup>	28.29 <sup>-1</sup>	6 419 <sup>-1</sup>	France
586 030	28.00	7 165	623 125 <sup>-1</sup>	27.88 <sup>-1</sup>	7 539 <sup>-1</sup>	Germany
60 736	38.00	5 698	61 616 <sup>-1</sup>	37.82 <sup>-1</sup>	5 830 <sup>-1</sup>	Greece
38 418	30.84	3 929	42 729 <sup>-1</sup>	30.48 <sup>-1</sup>	4 392 <sup>-1</sup>	Hungary
33 117	36.11	7 118	34 791 <sup>-1</sup>	36.34 <sup>-1</sup>	7 319 <sup>-1</sup>	Ireland
174 327	36.04	2 878	195 560 <sup>-1</sup>	34.33 <sup>-1</sup>	3 223 <sup>-1</sup>	Italy
7 827	51.02	3 918	7 504 <sup>-1</sup>	52.23 <sup>-1</sup>	3 846 <sup>-1</sup>	Latvia
17 293	50.74	5 898	18 767 <sup>-1</sup>	49.51 <sup>-1</sup>	6 596 <sup>-1</sup>	Lithuania

**Table C2:** Total researchers and researchers per million inhabitants, 2015 and 2018

	Researchers in full-time equivalents					
	Total researchers	Female researchers (%)*	Researchers per million inhabitants	Total researchers	Female researchers (%)*	Researchers per million inhabitants
	2015			2018		
Luxembourg	2 539	28.36	4 480	2 986	27.32 <sup>-1</sup>	4 942
Malta	820	26.59	1 891	855	29.47 <sup>-1</sup>	1 947
Netherlands	79 155	26.68	4 673	95 611	27.08 <sup>-1</sup>	5 605
Poland	82 594	35.34	2 172	117 789	35.45 <sup>-1</sup>	3 106
Portugal	38 672	43.36	3 730	46 538	43.13 <sup>-1</sup>	4 538
Romania	17 459	45.24	876	17 213	46.33 <sup>-1</sup>	882
Slovakia	14 406	41.85	2 650	16 337	39.32	2 996
Slovenia	7 900	34.00	3 814	10 087	30.93 <sup>-1</sup>	4 855
Spain	122 437	38.98	2 623	140 120	38.78 <sup>-1</sup>	3 001
Sweden	66 734	27.26	6 834	75 151	28.65 <sup>-1</sup>	7 536
United Kingdom	284 483	–	4 320	309 074	–	4 603
<b>Southeast Europe</b>						
Albania	–	–	–	–	–	–
Bosnia & Herzegovina	1 253	43.66	365	1 566	47.47	471
Montenegro	523	45.76	835	461	47.17 <sup>-1</sup>	734
North Macedonia	1 785	50.67	858	1 665	56.19	799
Serbia	14 657	49.13	2 071	14 535	51.36	2 087
<b>European Free Trade Assoc.</b>						
Iceland	1 944	–	5 888	2 050 <sup>-1</sup>	–	6 131 <sup>-1</sup>
Liechtenstein	–	–	–	–	–	–
Norway	30 632	–	5 891	34 519	–	6 467
Switzerland	43 740	–	5 272	46 088 <sup>-1</sup>	–	5 450 <sup>-1</sup>
<b>Eastern Europe &amp; West Asia</b>						
Armenia	–	–	–	–	–	–
Azerbaijan	–	–	–	–	–	–
Belarus	–	–	–	–	–	–
Georgia	5 153	50.24	1 280	5 859	51.84	1 464
Iran Islamic Rep.	64 778	34.30	825	118 987 <sup>-1</sup>	31.22 <sup>-1</sup>	1 475 <sup>-1</sup>
Israel	–	–	–	–	–	–
Moldova, Rep.	2 694	49.78	758	2 466	49.27	696
Russian Federation	449 180	–	3 098	405 772	–	2 784
Turkey	95 161	32.98	1 212	111 893 <sup>-1</sup>	32.78 <sup>-1</sup>	1 379 <sup>-1</sup>
Ukraine	43 016	43.88 <sup>-1</sup>	1 006	41 713	43.6	988
<b>Sub-Saharan Africa</b>						
Angola	–	–	–	543 <sup>-2</sup>	28.91 <sup>-2</sup>	19 <sup>-2</sup>
Benin	–	–	–	–	–	–
Botswana	–	–	–	–	–	–
Burkina Faso	–	–	–	–	–	–
Burundi	–	–	–	262	14.32	23
Cameroon	–	–	–	–	–	–
Cabo Verde	–	–	–	–	–	–
Central African Rep.	–	–	–	–	–	–
Chad	–	–	–	843 <sup>-2</sup>	5.06 <sup>-2</sup>	58 <sup>-2</sup>
Comoros	–	–	–	–	–	–
Congo	–	–	–	–	–	–
Côte d'Ivoire	–	–	–	–	–	–
Congo, Dem. Rep.	806	10.06	11	–	–	–
Djibouti	–	–	–	–	–	–
Equatorial Guinea	–	–	–	–	–	–
Eritrea	–	–	–	–	–	–
Eswatini	157	44.90	142	–	–	–
Ethiopia	–	–	–	9 632 <sup>-1</sup>	12.29 <sup>-1</sup>	91 <sup>-1</sup>
Gabon	–	–	–	–	–	–
Gambia	–	–	–	121	28.11	53
Ghana	2 482	21.12	89	–	–	–
Guinea	–	–	–	–	–	–

Researchers in head counts						
Total researchers	Female researchers (%)*	Researchers per million inhabitants	Total researchers	Female researchers (%)*	Researchers per million inhabitants	
2015			2018			
3 134	28.88	5 530	3 540 <sup>-1</sup>	28.08 <sup>-1</sup>	5 981 <sup>-1</sup>	Luxembourg
1 412	28.54	3 257	1 546 <sup>-1</sup>	30.92 <sup>-1</sup>	3 530 <sup>-1</sup>	Malta
112 946	25.38	6 668	115 185 <sup>-1</sup>	26.44 <sup>-1</sup>	6 767 <sup>-1</sup>	Netherlands
118 494	37.02	3 115	187 905 <sup>-1</sup>	38.11 <sup>-1</sup>	4 951 <sup>-1</sup>	Poland
81 005	44.14	7 813	89 659 <sup>-1</sup>	43.66 <sup>-1</sup>	8 714 <sup>-1</sup>	Portugal
27 253	46.23	1 368	27 367 <sup>-1</sup>	46.74 <sup>-1</sup>	1 392 <sup>-1</sup>	Romania
24 396	42.19	4 488	28 755	41.19	5 273	Slovakia
11 308	36.49	5 460	14 079 <sup>-1</sup>	32.31 <sup>-1</sup>	6 781 <sup>-1</sup>	Slovenia
214 227	40.03	4 590	225 995 <sup>-1</sup>	40.49 <sup>-1</sup>	4 845 <sup>-1</sup>	Spain
108 761	33.72	11 138	107 042 <sup>-1</sup>	32.63 <sup>-1</sup>	10 807 <sup>-1</sup>	Sweden
496 953	38.59	7 546	510 980 <sup>-2</sup>	38.67 <sup>-2</sup>	7 707 <sup>-2</sup>	United Kingdom
						<b>Southeast Europe</b>
-	-	-	-	-	-	Albania
1 797	44.41	524	1 983	47.1	597	Bosnia & Herzegovina
1 766	47.57	2 817	1 528 <sup>-1</sup>	49.87 <sup>-1</sup>	2 435 <sup>-1</sup>	Montenegro
3 772	49.05	1 814	3 464	53.41	1 663	North Macedonia
16 338	49.23	2 309	16 213	51.37	2 328	Serbia
						<b>European Free Trade Assoc.</b>
3 722	45.65	11 270	3 783 <sup>-1</sup>	46.39 <sup>-1</sup>	11 313 <sup>-1</sup>	Iceland
-	-	-	-	-	-	Liechtenstein
52 181	37.38	10 035	57 934 <sup>-1</sup>	38.06 <sup>-1</sup>	10 939 <sup>-1</sup>	Norway
70 834	33.55	8 538	73 502 <sup>-1</sup>	34.92 <sup>-1</sup>	8 693 <sup>-1</sup>	Switzerland
						<b>Eastern Europe &amp; West Asia</b>
3 856	52.46	1 318	3 384	50.38	1 146	Armenia
16 137	54.84	1 677	14 412	58.57	1 449	Azerbaijan
16 953	40.48	1 796	17 804	39.26	1 883	Belarus
9 069	50.62	2 254	10 879	52.98	2 718	Georgia
126 533	33.00	1 612	225 658 <sup>-1</sup>	31.21 <sup>-1</sup>	2 797 <sup>-1</sup>	Iran, Islamic Rep.
-	-	-	-	-	-	Israel
3 368	49.14	948	3 054	48.56	862	Moldova, Rep.
379 411	40.31	2 617	347 854	39.22	2 387	Russian Federation
190 784	37.29	2 429	210 769 <sup>-1</sup>	37.03 <sup>-1</sup>	2 598 <sup>-1</sup>	Turkey
53 835	46.31	1 259	57 630	44.73	1 365	Ukraine
						<b>Sub-Saharan Africa</b>
-	-	-	1 400 <sup>-2</sup>	28.71 <sup>-2</sup>	49 <sup>-2</sup>	Angola
-	-	-	-	-	-	Benin
-	-	-	-	-	-	Botswana
-	-	-	2 050 <sup>-1</sup>	17.02 <sup>-1</sup>	107 <sup>-1</sup>	Burkina Faso
-	-	-	615	14.31	55	Burundi
-	-	-	-	-	-	Cameroon
-	-	-	-	-	-	Cabo Verde
-	-	-	-	-	-	Central African Rep.
2 031 <sup>+1</sup>	4.78 <sup>+1</sup>	139 <sup>+1</sup>	2 417	3.35	156	Chad
-	-	-	-	-	-	Comoros
-	-	-	-	-	-	Congo
-	-	-	4 286 <sup>-2</sup>	16.99 <sup>-2</sup>	180 <sup>-2</sup>	Côte d'Ivoire
1 310	8.70	17	-	-	-	Congo, Dem. Rep.
-	-	-	-	-	-	Djibouti
-	-	-	-	-	-	Equatorial Guinea
-	-	-	-	-	-	Eritrea
360	41.39	326	-	-	-	Eswatini
-	-	-	15 464 <sup>-1</sup>	11.51 <sup>-1</sup>	145 <sup>-1</sup>	Ethiopia
-	-	-	-	-	-	Gabon
-	-	-	125	27.2	55	Gambia
5 578	26.07	200	-	-	-	Ghana
-	-	-	-	-	-	Guinea

**Table C2:** Total researchers and researchers per million inhabitants, 2015 and 2018

	Researchers in full-time equivalents					
	Total researchers	Female researchers (%)*	Researchers per million inhabitants	Total researchers	Female researchers (%)*	Researchers per million inhabitants
	2015			2018		
Guinea-Bissau	–	–	–	–	–	–
Kenya	–	–	–	–	–	–
Lesotho	50	40.18	24	–	–	–
Liberia	–	–	–	–	–	–
Madagascar	615 <sup>+1</sup>	34.47 <sup>+1</sup>	25 <sup>+1</sup>	894	34.12	34
Malawi	–	–	–	–	–	–
Mali	538	10.24	31	608 <sup>-1</sup>	14.33 <sup>-1</sup>	33 <sup>-1</sup>
Mauritius	–	–	–	600	46.38	474
Mozambique	1 162	28.92	43	–	–	–
Namibia	–	–	–	–	–	–
Niger	–	–	–	–	–	–
Nigeria	–	–	–	–	–	–
Rwanda	–	–	–	162 <sup>-2</sup>	27.54 <sup>-2</sup>	14 <sup>-2</sup>
Sao Tome & Principe	–	–	–	–	–	–
Senegal	8 227	30.22	564	–	–	–
Seychelles	–	–	–	–	–	–
Sierra Leone	–	–	–	–	–	–
Somalia	–	–	–	–	–	–
South Africa	26 159	44.10	472	29 515 <sup>-1</sup>	44.42 <sup>-1</sup>	518 <sup>-1</sup>
South Sudan	–	–	–	–	–	–
Togo	265	8.77	36	379	11.06	48
Uganda	–	–	–	–	–	–
Tanzania	–	–	–	–	–	–
Zambia	–	–	–	–	–	–
Zimbabwe	–	–	–	–	–	–
<b>Arab States</b>						
Algeria	–	–	–	33 912 <sup>-1</sup>	46.71 <sup>-1</sup>	819 <sup>-1</sup>
Bahrain	–	–	–	–	–	–
Egypt	62 208	42.56	673	67 589	43.80	687
Iraq	2 341	40.78	66	4 271	42.02	111
Jordan	2 339	16.55	252	5 832 <sup>-1</sup>	21.09 <sup>-1</sup>	596 <sup>-1</sup>
Kuwait	1 518	48.29	396	2 126	50.42	514
Lebanon	–	–	–	–	–	–
Libya	–	–	–	–	–	–
Mauritania	–	–	–	–	–	–
Morocco	–	–	–	37 709 <sup>-2</sup>	36.64 <sup>-2</sup>	1 074 <sup>-2</sup>
Oman	907	27.14	213	1 358	29.87	281
Palestine	–	–	–	–	–	–
Qatar	1 498	30.09	584	1 606	32.02	577
Saudi Arabia	–	–	–	–	–	–
Sudan	–	–	–	–	–	–
Syrian Arab Rep.	1 637	35.13	91	–	–	–
Tunisia	20 113	58.89	1 799	20 489	59.15	1 772
United Arab Emirates	18 345	–	1 980	22 911	23.72	2 379
Yemen	–	–	–	–	–	–
<b>Central Asia</b>						
Kazakhstan	13 656	–	777	12 218	–	667
Kyrgyzstan	–	–	–	–	–	–
Mongolia	–	–	–	–	–	–
Tajikistan	–	–	–	–	–	–
Turkmenistan	–	–	–	–	–	–
Uzbekistan	15 385	39.12	497	15 465	38.27	476

Researchers in head counts						HC: head counts FTE: full-time equivalents
Total researchers	Female researchers (%)*	Researchers per million inhabitants	Total researchers	Female researchers (%)*	Researchers per million inhabitants	
2015			2018			
-	-	-	-	-	-	Guinea-Bissau
-	-	-	-	-	-	Kenya
118	36.44	57	-	-	-	Lesotho
-	-	-	-	-	-	Liberia
1 976 <sup>+1</sup>	33.20 <sup>+1</sup>	79 <sup>+1</sup>	2 246	33.04	86	Madagascar
-	-	-	-	-	-	Malawi
719	10.43	41	721 <sup>-1</sup>	15.12 <sup>-1</sup>	39 <sup>-1</sup>	Mali
-	-	-	1 265	43.72	998	Mauritius
2 434	28.92	90	-	-	-	Mozambique
-	-	-	-	-	-	Namibia
-	-	-	-	-	-	Niger
-	-	-	-	-	-	Nigeria
-	-	-	530 <sup>-2</sup>	22.64 <sup>-2</sup>	45 <sup>-2</sup>	Rwanda
-	-	-	-	-	-	Sao Tome & Principe
14 335	29.31	983	-	-	-	Senegal
-	-	-	149 <sup>-2</sup>	34.90 <sup>-2</sup>	1 557 <sup>-2</sup>	Seychelles
-	-	-	-	-	-	Sierra Leone
-	-	-	-	-	-	Somalia
51 877	44.98	937	61 840 <sup>-1</sup>	44.91 <sup>-1</sup>	1 085 <sup>-1</sup>	South Africa
-	-	-	-	-	-	South Sudan
712	9.27	97	985	11.17	125	Togo
-	-	-	-	-	-	Uganda
-	-	-	-	-	-	Tanzania
-	-	-	-	-	-	Zambia
-	-	-	-	-	-	Zimbabwe
<b>Arab States</b>						
-	-	-	96 403 <sup>-1</sup>	47.14 <sup>-1</sup>	2 329 <sup>-1</sup>	Algeria
-	-	-	-	-	-	Bahrain
127 770	43.41	1 382	138 491	45.58	1 407	Egypt
6 158	39.90	173	12 558	38.14	327	Iraq
9 092	19.69	981	8 587	19.52	862	Jordan
4 258	51.41	1 110	5 315	53.25	1 285	Kuwait
-	-	-	-	-	-	Lebanon
-	-	-	-	-	-	Libya
2 263 <sup>+1</sup>	23.11 <sup>+1</sup>	544 <sup>+1</sup>	3 206	24.49	728	Mauritania
-	-	-	50 142 <sup>-2</sup>	33.75 <sup>-2</sup>	1 427 <sup>-2</sup>	Morocco
2 313	27.80	542	4 131	36.43	855	Oman
-	-	-	-	-	-	Palestine
2 847	31.40	1 110	3 105	34.07	1 116	Qatar
-	-	-	-	-	-	Saudi Arabia
-	-	-	-	-	-	Sudan
6 119	34.89	340	-	-	-	Syrian Arab Rep.
34 589	54.55	3 094	35 273	56.05	3 050	Tunisia
-	-	-	47 346	33.35	4 916	United Arab Emirates
-	-	-	-	-	-	Yemen
<b>Central Asia</b>						
18 454	51.98	1 050	17 454	52.81	953	Kazakhstan
3 441	50.62	577	3 547	46.48 <sup>-1</sup>	563	Kyrgyzstan
1 867	49.01	623	1 917	48.88	605	Mongolia
2 467	35.91	292	2 654	37.45	292	Tajikistan
-	-	-	-	-	-	Turkmenistan
31 680	41.09	1 024	31 835	40.79	980	Uzbekistan

**Table C2:** Total researchers and researchers per million inhabitants, 2015 and 2018

	Researchers in full-time equivalents					
	Total researchers	Female researchers (%)*	Researchers per million inhabitants	Total researchers	Female researchers (%)*	Researchers per million inhabitants
	2015			2018		
<b>South Asia</b>						
Afghanistan	–	–	–	–	–	–
Bangladesh	–	–	–	–	–	–
Bhutan	–	–	–	–	–	–
India	282 994	13.92	216	341 818	16.60	253
Maldives	–	–	–	–	–	–
Nepal	–	–	–	–	–	–
Pakistan	55 611	34.34	279	69 769 <sup>-1</sup>	37.57 <sup>-1</sup>	336 <sup>-1</sup>
Sri Lanka	2 216	45.94	106	–	–	–
<b>Southeast Asia</b>						
Brunei Darussalam	–	–	–	–	–	–
Cambodia	471	26.82	30	–	–	–
China	1 619 028	–	1 151	1 866 109	–	1 307
China, Hong Kong SAR	25 619	–	3 565	29 682	–	4 026
China, Macao SAR	769	31.89	1 277	2 238	38.08	3 543
China, Taiwan Prov.	–	–	–	–	–	–
Indonesia	46 786 <sup>+1</sup>	44.54 <sup>+1</sup>	179 <sup>+1</sup>	57 815	44.87	216
Japan	662 071	–	5 173	678 134	–	5 331
Korea DPR	–	–	–	–	–	–
Korea Rep.	356 447	–	7 013	408 370	–	7 980
Lao PDR	–	–	–	–	–	–
Malaysia	69 864	48.57	2 308	73 537 <sup>-2</sup>	50.18 <sup>-2</sup>	2 397 <sup>-2</sup>
Myanmar	–	–	–	1 552 <sup>-1</sup>	74.94 <sup>-1</sup>	29 <sup>-1</sup>
Philippines	10 791	48.80	106	–	–	–
Singapore	39 182	–	7 007	38 829 <sup>-1</sup>	–	6 803 <sup>-1</sup>
Thailand	59 416	56.81	865	93 457 <sup>-1</sup>	48.55 <sup>-1</sup>	1 350 <sup>-1</sup>
Timor-Leste	–	–	–	–	–	–
Viet Nam	62 887	44.79	679	66 953 <sup>-1</sup>	–	708 <sup>-1</sup>
<b>Oceania</b>						
Australia	–	–	–	–	–	–
New Zealand	25 000	–	5 418	26 000 <sup>-1</sup>	–	5 530 <sup>-1</sup>
Cook Islands	–	–	–	–	–	–
Fiji	–	–	–	–	–	–
Kiribati	–	–	–	–	–	–
Marshall Islands	–	–	–	–	–	–
Micronesia	–	–	–	–	–	–
Nauru	–	–	–	–	–	–
Niue	–	–	–	–	–	–
Palau	–	–	–	–	–	–
Papua New Guinea	–	–	–	294 <sup>-2</sup>	28.80 <sup>-2</sup>	35 <sup>-2</sup>
Samoa	–	–	–	–	–	–
Solomon Islands	–	–	–	–	–	–
Tonga	–	–	–	–	–	–
Tuvalu	–	–	–	–	–	–
Vanuatu	–	–	–	–	–	–

**KEY** –: data unavailable | -n/+n: data refer to n years before or after reference year | 0: magnitude nil or negligible | a: not applicable

GDP: gross domestic product | MF: males and females | PPP\$: purchasing power parity dollars

Note: The year for the share of female researchers may not be the same as the year for total researchers for some countries.

Source: UNESCO Institute for Statistics, August 2020; for population, World Bank's World Development Indicators



Researchers in head counts						
Total researchers	Female researchers (%)*	Researchers per million inhabitants	Total researchers	Female researchers (%)*	Researchers per million inhabitants	HC: head counts FTE: full-time equivalents
2015			2018			
						<b>South Asia</b>
-	-	-	-	-	-	Afghanistan
-	-	-	-	-	-	Bangladesh
-	-	-	-	-	-	Bhutan
-	-	-	-	-	-	India
-	-	-	-	-	-	Maldives
-	-	-	-	-	-	Nepal
81 306	33.89	408	129 851 <sup>-1</sup>	38.79 <sup>-1</sup>	625 <sup>-1</sup>	Pakistan
6 117	46.62	293	-	-	-	Sri Lanka
						<b>Southeast Asia</b>
-	-	-	547	45.16	1 275	Brunei Darussalam
794	23.68	51	-	-	-	Cambodia
-	-	-	-	-	-	China
29 834	-	4 152	34 556	-	4 688	China, Hong Kong SAR
1 688	33.71	2 804	2 958	38.67	4 683	China, Macao SAR
-	-	-	-	-	-	China, Taiwan Prov.
141 281 <sup>+1</sup>	45.48 <sup>+1</sup>	540 <sup>+1</sup>	166 690	45.78	623	Indonesia
907 455	15.25	7 090	935 658	16.56	7 356	Japan
-	-	-	-	-	-	Korea DPR
453 262	18.90	8 918	514 170	20.37	10 048	Korea Rep.
-	-	-	-	-	-	Lao PDR
89 861	48.60	2 969	108 557 <sup>-2</sup>	48.20 <sup>-2</sup>	3 538 <sup>-2</sup>	Malaysia
-	-	-	1 616 <sup>-1</sup>	75.62 <sup>-1</sup>	30 <sup>-1</sup>	Myanmar
20 239	51.19	198	-	-	-	Philippines
43 159	-	7 718	42 769 <sup>-1</sup>	-	7 493 <sup>-1</sup>	Singapore
108 227	56.08	1 575	150 175 <sup>-1</sup>	49.71 <sup>-1</sup>	2 170 <sup>-1</sup>	Thailand
-	-	-	-	-	-	Timor-Leste
131 045	44.79	1 414	136 070 <sup>-1</sup>	-	1 438 <sup>-1</sup>	Viet Nam
						<b>Oceania</b>
-	-	-	-	-	-	Australia
39 000	-	8 452	44 000 <sup>-1</sup>	-	9 358 <sup>-1</sup>	New Zealand
-	-	-	-	-	-	Cook Islands
-	-	-	-	-	-	Fiji
-	-	-	-	-	-	Kiribati
-	-	-	-	-	-	Marshall Islands
-	-	-	-	-	-	Micronesia
-	-	-	-	-	-	Nauru
-	-	-	-	-	-	Niue
-	-	-	-	-	-	Palau
-	-	-	794 <sup>-2</sup>	33.25 <sup>-2</sup>	96 <sup>-2</sup>	Papua New Guinea
-	-	-	-	-	-	Samoa
-	-	-	-	-	-	Solomon Islands
-	-	-	-	-	-	Tonga
-	-	-	-	-	-	Tuvalu
-	-	-	-	-	-	Vanuatu

**Table C3:** Researchers by field of science, 2018 or closest year (%)

	Year	Researchers (in head counts) by field of science (%)								
		Natural sciences	Engineering & technology	Medical & health sciences	Agricultural sciences	Natural sciences & engineering (subtotal)	Social sciences	Humanities	Social sciences & humanities	Not elsewhere classified
<b>North America</b>										
Canada		-	-	-	-	-	-	-	-	-
United States of America		-	-	-	-	-	-	-	-	-
<b>Latin America</b>										
Argentina	2017	24.11	15.12	11.31	8.98	59.52	23.57	10.13	33.70	6.78
Belize		-	-	-	-	-	-	-	-	-
Bolivia	2014	17.31	22.81	15.88	17.80	73.79	22.25	3.96	26.21	0.00
Brazil		-	-	-	-	-	-	-	-	-
Chile		-	-	-	-	-	-	-	-	-
Colombia	2017	23.06	19.51	16.13	4.85	63.56	28.99	7.45	36.44	0.01
Costa Rica	2017	26.97	14.89	9.29	10.46	61.61	24.10	4.36	28.46	9.94
Ecuador	2014	17.87	21.45	11.51	8.10	58.93	33.43	7.64	41.07	0.00
El Salvador	2017	16.62	19.78	10.81	7.95	55.15	36.90	7.95	44.85	0.00
Guatemala	2017	13.77	9.92	25.30	29.35	78.34	15.38	6.28	21.66	0.00
Guyana		-	-	-	-	-	-	-	-	-
Honduras	2017	15.24	19.89	15.43	29.00	79.55	13.75	3.90	17.66	2.79
Mexico		-	-	-	-	-	-	-	-	-
Nicaragua	2012	13.62	12.81	18.19	16.48	61.10	25.29	7.67	32.95	5.95
Panama		-	-	-	-	-	-	-	-	-
Paraguay	2017	16.76	14.74	20.40	22.25	74.16	23.15	2.69	25.84	0.00
Peru	2018	27.96	11.66	29.85	17.31	86.78	8.97	1.84	10.82	2.40
Suriname		-	-	-	-	-	-	-	-	-
Uruguay	2018	31.91	10.45	11.71	13.86	67.94	22.98	8.78	31.76	0.30
Venezuela	2016	22.10	8.99	6.92	8.38	46.38	26.17	18.45	44.62	9.01
<b>Caribbean</b>										
Antigua & Barbuda		-	-	-	-	-	-	-	-	-
Bahamas		-	-	-	-	-	-	-	-	-
Barbados		-	-	-	-	-	-	-	-	-
Cuba		-	-	-	-	-	-	-	-	-
Dominica		-	-	-	-	-	-	-	-	-
Dominican Rep.		-	-	-	-	-	-	-	-	-
Grenada		-	-	-	-	-	-	-	-	-
Haiti		-	-	-	-	-	-	-	-	-
Jamaica		-	-	-	-	-	-	-	-	-
St Kitts & Nevis		-	-	-	-	-	-	-	-	-
St Lucia		-	-	-	-	-	-	-	-	-
St Vincent & Grenadines		-	-	-	-	-	-	-	-	-
Trinidad & Tobago	2017	21.25	14.54	26.16	10.42	72.38	10.96	16.67	27.62	0.00
<b>European Union</b>										
Austria		-	-	-	-	-	-	-	-	-
Belgium		-	-	-	-	-	-	-	-	-
Bulgaria	2014	21.49	30.65	16.65	6.91	75.71	15.25	9.04	24.29	0.00
Croatia	2014	15.91	29.55	20.53	8.16	74.16	16.95	8.89	25.84	0.00
Cyprus	2014	26.94	23.94	6.42	2.82	60.12	25.14	13.03	38.17	0.00
Czech Rep.	2014	29.57	37.92	12.00	4.35	83.83	10.23	5.95	16.17	0.00
Denmark		-	-	-	-	-	-	-	-	-
Estonia	2015	23.19	12.41	8.48	3.65	47.72	14.04	13.42	27.46	24.82
Finland		-	-	-	-	-	-	-	-	-
France		-	-	-	-	-	-	-	-	-
Germany		-	-	-	-	-	-	-	-	-
Greece	2011	14.98	34.49	21.23	5.22	75.91	12.12	11.97	24.09	0.00
Hungary	2014	28.45	33.87	11.44	3.93	77.69	11.76	10.55	22.31	0.00
Ireland		-	-	-	-	-	-	-	-	-
Italy		-	-	-	-	-	-	-	-	-

	Year	Researchers (in head counts) by field of science (%)								
		Natural sciences	Engineering & technology	Medical & health sciences	Agricultural sciences	Natural sciences & engineering (subtotal)	Social sciences	Humanities	Social sciences & humanities	Not elsewhere classified
Latvia	2017	19.80	23.61	10.75	9.14	63.31	13.23	8.20	21.43	15.26
Lithuania	2017	18.22	14.23	11.71	2.81	46.97	19.37	12.89	32.27	20.76
Luxembourg		-	-	-	-	-	-	-	-	-
Malta	2014	24.61	27.35	15.34	1.78	69.09	18.90	10.60	29.50	1.26
Netherlands	2014	19.55	45.83	14.75	7.05	87.19	9.86	2.95	12.81	0.00
Poland	2014	17.39	35.60	14.24	5.32	72.55	15.64	11.81	27.45	0.00
Portugal	2014	19.78	31.29	16.34	2.70	70.11	17.71	12.17	29.89	0.00
Romania	2014	14.64	46.86	9.94	9.17	80.61	15.27	4.12	19.39	0.00
Slovakia	2014	16.56	32.04	11.85	5.17	65.62	18.63	15.75	34.38	0.00
Slovenia	2013	25.00	41.35	14.69	3.42	84.48	9.99	5.54	15.53	0.00
Spain		-	-	-	-	-	-	-	-	-
Sweden		-	-	-	-	-	-	-	-	-
United Kingdom		-	-	-	-	-	-	-	-	-
<b>Southeast Europe</b>										
Albania		-	-	-	-	-	-	-	-	-
Bosnia & Herzegovina	2018	17.60	32.58	7.16	6.35	63.69	24.31	11.75	36.06	0.25
Montenegro	2015	13.87	21.29	27.35	3.28	65.80	19.76	14.44	34.20	0.00
North Macedonia	2018	21.88	25.26	12.70	7.94	67.78	18.39	13.83	32.22	0.00
Serbia	2018	22.67	28.08	15.31	7.04	73.11	17.68	9.20	26.89	0.00
<b>European Free Trade Assoc.</b>										
Iceland		-	-	-	-	-	-	-	-	-
Liechtenstein		-	-	-	-	-	-	-	-	-
Norway	2014	-	-	-	-	76.78	-	-	22.95	0.27
Switzerland		-	-	-	-	-	-	-	-	-
<b>Eastern Europe &amp; West Asia</b>										
Armenia	2018	46.69	17.85	5.94	1.89	72.37	9.96	17.67	27.63	0.00
Azerbaijan	2018	33.44	12.30	13.47	5.93	65.15	16.81	18.04	34.85	0.00
Belarus	2018	20.07	59.82	4.65	5.31	89.85	7.40	2.75	10.15	0.00
Georgia	2018	20.44	17.58	13.19	4.08	55.30	24.88	19.62	44.50	0.20
Iran Islamic Rep.	2017	13.45	30.14	14.67	8.89	67.16	30.15	2.69	32.84	0.00
Israel		-	-	-	-	-	-	-	-	-
Moldova, Rep.	2018	35.46	14.57	12.08	12.84	74.95	15.19	9.86	25.05	0.00
Russian Federation	2015	22.86	61.10	4.17	2.98	91.10	5.50	3.40	8.90	0.00
Turkey	2014	9.41	35.12	23.62	4.31	72.47	18.36	9.17	27.53	0.00
Ukraine	2018	28.29	41.88	6.88	8.31	85.36	10.31	4.33	14.64	0.00
<b>Sub-Saharan Africa</b>										
Angola	2016	25.79	7.00	11.93	12.00	56.71	38.29	5.00	43.29	0.00
Benin		-	-	-	-	-	-	-	-	-
Botswana	2013	40.00	19.34	13.16	22.11	94.61	4.87	0.53	5.39	0.00
Burkina Faso	2017	25.76	3.46	26.49	10.10	65.80	16.63	10.49	27.12	7.07
Burundi	2018	35.93	6.02	3.74	19.02	64.72	26.34	8.94	35.28	0.00
Cameroon		-	-	-	-	-	-	-	-	-
Cabo Verde	2014	12.42	22.22	4.58	15.69	54.90	29.41	15.69	45.10	0.00
Central African Rep.		-	-	-	-	-	-	-	-	-
Chad	2016	15.26	29.44	7.19	10.00	61.89	22.11	16.00	38.11	0.00
Comoros		-	-	-	-	-	-	-	-	-
Congo		-	-	-	-	-	-	-	-	-
Côte d'Ivoire	2016	14.58	12.13	20.44	2.08	49.23	27.60	7.82	35.42	15.35
Congo, Dem. Rep.	2015	31.68	6.26	8.63	20.15	66.72	24.27	5.50	29.77	3.51
Djibouti		-	-	-	-	-	-	-	-	-
Equatorial Guinea		-	-	-	-	-	-	-	-	-
Eritrea		-	-	-	-	-	-	-	-	-
Eswatini	2015	20.00	6.67	26.39	16.11	69.17	25.00	3.06	28.06	2.78
Ethiopia	2017	14.90	11.39	16.04	26.97	69.30	13.94	16.77	30.70	0.00

**Table C3: Researchers by field of science, 2018 or closest year (%)**

	Year	Researchers (in head counts) by field of science (%)								
		Natural sciences	Engineering & technology	Medical & health sciences	Agricultural sciences	Natural sciences & engineering (subtotal)	Social sciences	Humanities	Social sciences & humanities	Not elsewhere classified
Gabon	2014	49.13	16.71	13.72	15.96	95.51	4.49	–	4.49	0.00
Gambia	2018	12.80	0.80	58.40	26.40	98.40	1.60	–	1.60	0.00
Ghana	2015	14.49	16.91	8.30	20.96	60.65	22.84	10.52	33.36	5.99
Guinea		–	–	–	–	–	–	–	–	–
Guinea-Bissau		–	–	–	–	–	–	–	–	–
Kenya	2010	3.67	13.73	25.45	40.51	83.37	9.45	7.19	16.63	0.00
Lesotho	2015	49.15	24.58	2.54	19.49	95.76	4.24	–	4.24	0.00
Liberia		–	–	–	–	–	–	–	–	–
Madagascar	2018	33.13	23.24	8.50	5.34	70.21	14.96	11.04	26.00	3.78
Malawi	2010	15.63	20.18	18.61	16.93	71.35	18.45	10.20	28.65	0.00
Mali	2017	14.98	6.10	11.23	19.83	52.15	12.48	4.72	17.20	30.65
Mauritius	2018	18.26	15.89	4.74	14.62	53.52	16.13	3.08	19.21	27.27
Mozambique	2015	22.10	8.26	11.67	22.19	64.22	35.78	–	35.78	0.00
Namibia	2014	24.57	5.87	2.80	12.42	45.66	43.79	4.27	48.06	6.28
Niger	2013	38.81	11.19	10.95	11.92	72.87	16.79	9.73	26.52	0.61
Nigeria		–	–	–	–	–	–	–	–	–
Rwanda	2016	13.58	14.91	14.91	10.57	53.96	30.57	3.58	34.15	11.89
Sao Tome & Principe		–	–	–	–	–	–	–	–	–
Senegal	2015	21.10	7.07	14.85	1.30	44.32	39.18	16.51	55.68	0.00
Seychelles	2016	27.52	37.58	11.41	4.70	81.21	17.45	1.34	18.79	0.00
Sierra Leone		–	–	–	–	–	–	–	–	–
Somalia		–	–	–	–	–	–	–	–	–
South Africa		–	–	–	–	–	–	–	–	–
South Sudan		–	–	–	–	–	–	–	–	–
Togo	2018	16.04	5.99	15.13	20.41	57.56	24.67	17.56	42.23	0.20
Uganda	2014	10.92	12.05	18.43	17.10	58.50	28.73	12.77	41.50	0.00
Tanzania		–	–	–	–	–	–	–	–	–
Zambia		–	–	–	–	–	–	–	–	–
Zimbabwe	2012	30.05	13.33	0.18	13.91	57.47	22.16	15.48	37.64	4.89
<b>Arab States</b>										
Algeria	2017	4.45	26.80	14.53	2.22	48.00	33.48	–	33.48	18.52
Bahrain	2014	8.85	20.71	23.27	0.13	52.95	35.51	9.36	44.87	2.18
Egypt	2018	13.83	8.72	35.55	14.47	72.58	16.80	10.62	27.42	0.00
Iraq	2018	18.92	22.35	16.45	7.51	65.23	8.02	26.75	34.77	0.00
Jordan	2017	12.23	24.36	12.93	4.07	53.59	17.01	15.73	32.74	13.68
Kuwait	2018	20.09	22.65	11.23	0.49	54.47	26.27	16.59	42.86	2.67
Lebanon		–	–	–	–	–	–	–	–	–
Libya		–	–	–	–	–	–	–	–	–
Mauritania	2018	19.00	2.37	2.90	0.25	24.52	48.38	25.92	74.30	1.19
Morocco	2016	–	–	12.22	1.22	53.77	40.98	–	40.98	5.25
Oman	2018	9.15	7.65	38.39	11.47	66.67	19.83	13.51	33.33	0.00
Palestine	2013	16.55	10.90	5.85	4.83	38.12	27.69	34.19	61.88	0.00
Qatar	2018	8.70	23.29	18.55	0.68	51.21	21.00	14.17	35.17	13.62
Saudi Arabia		–	–	–	–	–	–	–	–	–
Sudan		–	–	–	–	–	–	–	–	–
Syrian Arab Rep.	2015	16.75	26.34	15.18	16.83	75.11	13.07	11.82	24.89	0.00
Tunisia		–	–	–	–	–	–	–	–	–
United Arab Emirates		–	–	–	–	–	–	–	–	–
Yemen		–	–	–	–	–	–	–	–	–
<b>Central Asia</b>										
Kazakhstan	2018	30.26	27.41	5.94	10.58	74.19	10.83	14.98	25.81	0.00
Kyrgyzstan	2017	33.07	16.55	10.55	7.56	67.72	16.18	16.09	32.28	0.00
Mongolia	2018	31.40	11.79	12.83	12.47	68.49	31.35	0.16	31.51	0.00
Tajikistan	2018	20.38	5.95	20.20	17.75	64.28	23.51	12.21	35.72	0.00

	Year	Researchers (in head counts) by field of science (%)								
		Natural sciences	Engineering & technology	Medical & health sciences	Agricultural sciences	Natural sciences & engineering (subtotal)	Social sciences	Humanities	Social sciences & humanities	Not elsewhere classified
Turkmenistan		-	-	-	-	-	-	-	-	-
Uzbekistan	2018	28.14	16.53	12.58	7.06	64.31	16.28	19.42	35.69	0.00
<b>South Asia</b>										
Afghanistan		-	-	-	-	-	-	-	-	-
Bangladesh		-	-	-	-	-	-	-	-	-
Bhutan		-	-	-	-	-	-	-	-	-
India		-	-	-	-	-	-	-	-	-
Maldives		-	-	-	-	-	-	-	-	-
Nepal		-	-	-	-	-	-	-	-	-
Pakistan	2017	28.76	14.72	8.67	9.08	61.23	22.78	9.79	32.56	6.21
Sri Lanka	2015	31.01	21.02	12.69	23.25	87.97	7.72	-	7.72	4.32
<b>Southeast Asia</b>										
Brunei Darussalam	2018	14.81	19.74	11.88	1.10	47.53	35.65	16.82	52.47	0.00
Cambodia	2015	15.52	18.75	11.96	17.53	63.76	31.21	5.03	36.24	0.00
China		-	-	-	-	-	-	-	-	-
China, Hong Kong SAR		-	-	-	-	-	-	-	-	-
China, Macao SAR	2018	12.75	15.21	25.35	-	53.31	33.20	13.49	46.69	0.00
China, Taiwan Prov.		-	-	-	-	-	-	-	-	-
Indonesia		-	-	-	-	-	-	-	-	-
Japan	2015	18.60	47.67	14.59	4.19	85.05	5.83	3.31	11.42	3.53
Korea DPR		-	-	-	-	-	-	-	-	-
Korea Rep.	2015	12.79	68.00	5.31	2.44	88.54	6.17	5.29	11.46	0.00
Lao PDR		-	-	-	-	-	-	-	-	-
Malaysia	2015	26.71	33.32	13.08	8.75	81.87	16.02	2.11	18.13	0.00
Myanmar	2017	12.93	36.82	6.19	40.04	95.98	3.84	0.19	4.02	0.00
Philippines	2015	14.38	35.22	5.50	15.34	70.43	23.21	3.67	26.88	2.69
Singapore	2014	15.04	60.43	17.40	2.27	95.14	-	-	-	4.86
Thailand	2017	7.61	13.27	9.71	5.60	36.20	20.41	2.92	23.33	40.47
Timor-Leste		-	-	-	-	-	-	-	-	-
Viet Nam	2017	10.39	33.73	12.30	10.18	66.59	27.02	6.39	33.41	0.00
<b>Oceania</b>										
Australia		-	-	-	-	-	-	-	-	-
New Zealand		-	-	-	-	-	-	-	-	-
Cook Islands		-	-	-	-	-	-	-	-	-
Fiji		-	-	-	-	-	-	-	-	-
Kiribati		-	-	-	-	-	-	-	-	-
Marshall Islands		-	-	-	-	-	-	-	-	-
Micronesia		-	-	-	-	-	-	-	-	-
Nauru		-	-	-	-	-	-	-	-	-
Niue		-	-	-	-	-	-	-	-	-
Palau		-	-	-	-	-	-	-	-	-
Papua New Guinea	2016	21.91	4.79	16.62	10.33	53.65	12.59	7.56	20.15	26.20
Samoa		-	-	-	-	-	-	-	-	-
Solomon Islands		-	-	-	-	-	-	-	-	-
Tonga		-	-	-	-	-	-	-	-	-
Tuvalu		-	-	-	-	-	-	-	-	-
Vanuatu		-	-	-	-	-	-	-	-	-

KEY --: data unavailable | -n/+n: data refer to n years before or after reference year | 0: magnitude nil or negligible | a: not applicable

GDP: gross domestic product | MF: males and females | PPP\$: purchasing power parity dollars

Source: UNESCO Institute for Statistics, August 2020

**Table D1: Scientific publications by region and country, 2011–2019**

	Number of publications								
	2011	2012	2013	2014	2015	2016	2017	2018	2019
<b>World</b>	<b>1 961 222</b>	<b>2 008 311</b>	<b>2 071 331</b>	<b>2 154 318</b>	<b>2 178 625</b>	<b>2 268 356</b>	<b>2 353 903</b>	<b>2 487 651</b>	<b>2 629 248</b>
High-income economies	1 407 136	1 442 175	1 468 995	1 507 683	1 509 655	1 540 602	1 566 644	1 599 751	1 654 704
Upper middle-income economies	565 314	582 051	625 501	674 336	702 587	759 928	818 426	905 160	1 000 301
Lower middle-income economies	127 429	137 066	148 737	163 674	174 394	198 794	223 045	268 831	299 319
Low-income economies	9 502	10 604	11 273	13 227	13 923	15 490	18 132	19 815	23 799
<b>Americas</b>	<b>612 476</b>	<b>629 942</b>	<b>641 311</b>	<b>657 048</b>	<b>658 936</b>	<b>671 271</b>	<b>687 451</b>	<b>701 639</b>	<b>724 263</b>
<b>North America</b>	<b>534 879</b>	<b>546 980</b>	<b>554 459</b>	<b>564 800</b>	<b>565 726</b>	<b>573 056</b>	<b>584 000</b>	<b>591 543</b>	<b>609 538</b>
Canada	74 539	78 265	79 679	82 438	82 595	84 546	85 740	89 312	94 578
United States of America	476 141	485 544	492 150	500 986	502 105	508 352	518 738	523 818	538 259
<b>Latin America</b>	<b>87 203</b>	<b>94 026</b>	<b>98 498</b>	<b>105 438</b>	<b>107 634</b>	<b>114 691</b>	<b>121 029</b>	<b>128 964</b>	<b>135 039</b>
Argentina	10 044	10 275	10 418	11 011	10 982	11 425	11 585	12 129	12 280
Belize	14	22	25	22	29	25	36	31	39
Bolivia	217	210	242	267	275	280	250	307	332
Brazil	49 273	53 770	56 620	59 723	61 006	64 069	67 611	71 513	74 270
Chile	6 463	7 214	7 460	8 782	9 095	10 295	10 418	11 544	12 005
Colombia	4 865	5 680	6 246	6 866	7 384	8 437	9 256	10 323	11 193
Costa Rica	545	579	574	722	724	807	911	1 020	1 053
Ecuador	422	572	634	889	1 378	2 081	2 844	3 588	3 737
El Salvador	44	52	44	57	76	88	67	92	69
Guatemala	117	167	168	168	220	228	248	242	269
Guyana	16	24	23	27	30	34	30	42	42
Honduras	66	73	76	68	92	83	118	156	181
Mexico	15 240	15 847	16 790	17 939	18 321	19 437	20 540	21 645	23 508
Nicaragua	84	99	77	88	95	110	128	124	118
Panama	351	423	438	449	478	489	541	565	727
Paraguay	104	118	125	135	197	214	259	226	338
Peru	1 078	1 161	1 215	1 417	1 692	1 948	2 290	2 684	3 124
Suriname	12	26	33	18	31	56	44	52	57
Uruguay	948	947	976	1 225	1 164	1 335	1 286	1 494	1 611
Venezuela	1 732	1 750	1 679	1 695	1 444	1 377	1 386	1 249	1 091
<b>Caribbean</b>	<b>2 906</b>	<b>2 973</b>	<b>3 065</b>	<b>3 125</b>	<b>2 833</b>	<b>2 796</b>	<b>2 895</b>	<b>3 046</b>	<b>3 110</b>
Antigua & Barbuda	4	6	9	6	7	16	16	19	19
Bahamas	29	27	42	38	39	32	62	64	79
Barbados	72	83	82	79	84	95	90	81	113
Cuba	2 014	2 065	2 112	2 013	1 851	1 696	1 658	1 758	1 626
Dominica	20	29	30	25	33	34	35	31	26
Dominican Rep.	67	73	104	101	117	123	135	161	232
Grenada	72	95	92	136	105	117	191	202	208
Haiti	61	52	76	105	99	104	109	90	101
Jamaica	265	267	278	281	243	243	261	313	335
St Kitts & Nevis	11	26	24	44	58	84	76	87	102
St Lucia	7	4	4	4	15	15	9	9	12
St Vincent & Grenadines	1	3	4	4	3	9	11	5	18
Trinidad & Tobago	319	287	261	354	248	299	298	315	338
<b>Europe</b>	<b>737 073</b>	<b>765 532</b>	<b>785 927</b>	<b>813 362</b>	<b>822 170</b>	<b>847 274</b>	<b>863 327</b>	<b>883 733</b>	<b>918 168</b>
<b>European Union</b>	<b>637 786</b>	<b>663 030</b>	<b>678 869</b>	<b>699 536</b>	<b>700 849</b>	<b>712 093</b>	<b>721 131</b>	<b>728 091</b>	<b>752 472</b>
Austria	17 656	18 468	19 267	20 014	20 681	21 244	21 603	21 761	23 065
Belgium	23 651	24 823	25 539	26 745	27 132	27 660	27 675	28 341	28 987
Bulgaria	3 496	3 727	3 763	3 790	3 665	3 898	4 256	4 946	5 180
Croatia	5 330	5 456	5 219	5 207	5 221	5 262	5 637	6 035	5 804
Cyprus	1 166	1 340	1 518	1 453	1 543	1 801	1 974	2 154	2 485
Czech Rep.	16 438	17 092	17 645	19 547	20 919	21 131	21 974	21 557	21 708
Denmark	16 942	18 445	19 484	21 595	22 268	22 931	23 484	24 352	25 462
Estonia	1 910	2 100	2 157	2 413	2 345	2 468	2 578	2 632	2 958
Finland	14 097	14 652	15 298	16 077	16 272	16 843	16 589	16 875	17 946
France	94 606	98 207	100 559	101 814	101 491	102 778	103 010	102 120	101 081
Germany	131 692	138 461	140 121	144 687	144 201	148 412	149 834	150 582	152 348
Greece	15 136	15 544	15 526	15 598	15 448	15 688	15 568	15 996	17 089

Publications per million inhabitants			Average of relative citations		
2011	2015	2019	2014–2016	2015–2017	
<b>278.6</b>	<b>295.2</b>	<b>340.9</b>	<b>1.00</b>	<b>1.0</b>	<b>World</b>
1 084.9	1 139.1	1 226.9	1.10	1.1	High-income economies
235.0	282.2	389.9	0.93	1.0	Upper middle-income economies
50.4	65.1	105.8	0.85	0.9	Lower middle-income economies
11.7	15.7	24.6	1.09	1.1	Low-income economies
<b>649.6</b>	<b>672.7</b>	<b>714.8</b>	<b>1.22</b>	<b>1.2</b>	<b>Americas</b>
<b>1 528.0</b>	<b>1 568.6</b>	<b>1 648.3</b>	<b>1.30</b>	<b>1.3</b>	<b>North America</b>
2 158.1	2 292.6	2 528.1	1.38	1.4	Canada
1 509.1	1 546.7	1 619.4	1.32	1.3	United States of America
<b>156.8</b>	<b>185.2</b>	<b>223.4</b>	<b>0.89</b>	<b>0.9</b>	<b>Latin America</b>
243.1	254.9	274.2	1.03	1.1	Argentina
42.4	80.3	99.9	10.45	10.2	Belize
21.2	25.3	28.8	1.27	1.4	Bolivia
249.5	298.4	351.9	0.91	0.9	Brazil
375.0	506.1	633.4	1.21	1.2	Chile
106.5	155.4	222.4	1.13	1.2	Colombia
117.6	149.3	208.6	1.48	1.6	Costa Rica
27.7	85.0	215.1	1.20	1.3	Ecuador
7.1	12.0	10.7	1.36	1.3	El Salvador
7.8	13.5	15.3	1.49	1.3	Guatemala
21.3	39.1	53.7	1.51	1.4	Guyana
7.8	10.1	18.6	1.17	1.2	Honduras
131.7	150.3	184.3	0.92	0.9	Mexico
14.2	15.3	18.0	1.33	1.5	Nicaragua
94.7	120.4	171.2	2.58	2.6	Panama
16.4	29.5	48.0	1.68	1.9	Paraguay
36.8	55.5	96.1	1.61	1.7	Peru
22.4	55.4	98.0	1.07	2.1	Suriname
281.4	341.1	465.4	1.45	1.5	Uruguay
60.0	48.0	38.3	0.95	1.0	Venezuela
<b>79.5</b>	<b>74.9</b>	<b>79.8</b>	<b>0.99</b>	<b>1.0</b>	<b>Caribbean</b>
44.8	74.8	195.6	–	–	Antigua & Barbuda
80.6	104.2	202.8	1.10	1.0	Bahamas
254.4	294.4	393.7	4.53	3.6	Barbados
179.2	163.4	143.5	0.74	0.9	Cuba
282.0	463.6	362.1	1.19	1.1	Dominica
6.8	11.4	21.6	1.23	1.2	Dominican Rep.
674.2	958.0	1 857.1	0.85	0.9	Grenada
6.0	9.3	9.0	1.05	1.0	Haiti
93.8	84.1	113.6	1.36	1.9	Jamaica
222.5	1 132.7	1 930.6	1.35	1.3	St Kitts & Nevis
39.9	83.7	65.6	–	13.8	St Lucia
9.2	27.5	162.8	–	–	St Vincent & Grenadines
238.7	181.0	242.3	0.81	0.8	Trinidad & Tobago
<b>903.8</b>	<b>995.4</b>	<b>1 099.4</b>	<b>1.09</b>	<b>1.1</b>	<b>Europe</b>
<b>1 256.0</b>	<b>1 368.2</b>	<b>1 457.4</b>	<b>1.14</b>	<b>1.1</b>	<b>European Union</b>
2 088.6	2 383.0	2 575.6	1.49	1.5	Austria
2 147.4	2 403.6	2 512.0	1.57	1.6	Belgium
473.8	509.0	740.0	1.24	1.3	Bulgaria
1 235.8	1 233.4	1 405.2	1.09	1.2	Croatia
1 036.6	1 329.0	2 073.3	1.92	1.9	Cyprus
1 555.7	1 973.2	2 030.8	1.09	1.1	Czech Rep.
2 978.9	3 843.9	4 332.3	1.66	1.6	Denmark
1 438.6	1 782.8	2 231.4	1.98	2.0	Estonia
2 615.4	2 968.7	3 243.9	1.52	1.5	Finland
1 435.6	1 510.2	1 487.0	1.31	1.3	France
1 628.7	1 763.1	1 824.2	1.34	1.3	Germany
1 397.7	1 449.2	1 631.6	1.36	1.4	Greece

**Table D1: Scientific publications by region and country, 2011–2019**

	Number of publications								
	2011	2012	2013	2014	2015	2016	2017	2018	2019
Hungary	8 659	8 973	8 837	9 384	9 148	9 429	9 626	9 943	10 072
Ireland	9 958	9 909	10 147	10 435	10 206	10 929	11 271	11 899	12 912
Italy	76 726	81 855	86 496	89 951	91 895	93 438	95 928	98 418	103 577
Latvia	1 514	1 428	1 496	1 455	1 842	1 824	2 164	2 029	2 016
Lithuania	2 649	2 501	2 566	2 812	2 855	2 765	3 019	3 054	3 291
Luxembourg	1 006	1 088	1 300	1 526	1 473	1 550	1 579	1 703	1 798
Malta	275	357	413	452	521	565	627	713	707
Netherlands	41 815	44 521	45 547	46 791	46 638	47 964	48 692	49 897	52 454
Poland	30 443	33 161	35 436	37 644	39 213	41 644	42 295	44 574	43 789
Portugal	15 703	17 162	18 526	19 478	20 100	20 046	20 536	21 368	23 633
Romania	11 569	11 866	12 217	12 224	12 999	12 846	13 869	13 364	13 755
Slovakia	4 962	5 429	5 520	6 284	6 291	6 833	7 199	6 887	6 831
Slovenia	4 554	4 650	4 666	4 635	4 863	4 787	4 857	4 952	5 151
Spain	65 277	68 746	69 745	72 474	71 830	73 624	74 480	75 963	81 343
Sweden	26 991	28 854	30 185	31 989	32 735	33 936	34 477	35 209	37 035
United Kingdom	124 602	128 999	133 552	138 144	141 834	145 915	149 219	152 956	160 174
<b>Southeast Europe</b>	<b>7 360</b>	<b>8 699</b>	<b>8 073</b>	<b>8 148</b>	<b>8 125</b>	<b>8 350</b>	<b>8 584</b>	<b>8 644</b>	<b>8 967</b>
Albania	215	249	246	273	298	320	274	353	366
Bosnia & Herzegovina	754	770	704	734	853	900	1 104	1 165	1 157
Montenegro	231	262	311	325	327	353	411	407	470
North Macedonia	600	640	643	744	761	735	766	783	758
Serbia	5 839	7 112	6 496	6 454	6 277	6 468	6 560	6 493	6 820
<b>European Free Trade Assoc.</b>	<b>46 236</b>	<b>49 621</b>	<b>51 184</b>	<b>53 551</b>	<b>54 041</b>	<b>56 616</b>	<b>58 619</b>	<b>59 778</b>	<b>61 685</b>
Iceland	1 025	1 144	1 147	1 217	1 263	1 436	1 381	1 476	1 558
Liechtenstein	81	82	79	102	89	96	88	99	85
Norway	13 508	14 690	14 962	15 877	15 972	17 441	18 249	19 111	19 980
Switzerland	32 277	34 531	35 790	37 304	37 805	38 895	40 146	40 500	41 433
<b>Eastern Europe &amp; West Asia</b>	<b>131 536</b>	<b>133 215</b>	<b>140 762</b>	<b>153 385</b>	<b>163 695</b>	<b>183 746</b>	<b>195 806</b>	<b>214 011</b>	<b>232 135</b>
Armenia	945	1 044	965	998	996	1 045	1 014	1 147	1 230
Azerbaijan	865	960	697	631	728	940	1 075	1 235	1 303
Belarus	1 678	1 699	1 721	1 721	1 679	1 812	1 965	2 223	2 275
Georgia	860	901	848	840	939	1 082	1 006	1 159	1 174
Iran Islamic Rep.	34 976	34 889	36 693	41 357	41 292	46 785	51 161	54 395	60 562
Israel	14 755	15 189	15 135	15 993	16 393	16 735	16 999	17 479	18 671
Moldova, Rep.	341	368	372	390	368	512	474	410	460
Russian Federation	42 682	42 804	45 578	52 240	60 156	70 920	78 761	91 621	96 394
Turkey	29 391	30 735	33 426	34 195	36 308	39 087	37 605	37 971	43 245
Ukraine	8 093	8 557	9 180	9 157	9 397	10 133	11 458	12 859	13 649
<b>Africa</b>	<b>44 034</b>	<b>47 469</b>	<b>51 650</b>	<b>57 213</b>	<b>61 236</b>	<b>68 806</b>	<b>74 831</b>	<b>82 763</b>	<b>92 133</b>
<b>Sub-Saharan Africa</b>	<b>23 068</b>	<b>24 032</b>	<b>26 074</b>	<b>29 131</b>	<b>30 805</b>	<b>34 122</b>	<b>37 736</b>	<b>41 770</b>	<b>47 374</b>
Angola	50	65	62	87	84	100	134	94	114
Benin	272	310	364	382	391	382	465	487	556
Botswana	263	250	287	349	300	473	458	592	627
Burkina Faso	351	428	384	429	513	492	509	552	558
Burundi	26	31	33	39	47	45	56	73	70
Cameroon	749	770	912	1 009	1 069	1 173	1 355	1 519	1 664
Cabo Verde	4	16	24	31	31	34	39	31	44
Central African Rep.	33	37	34	44	37	65	46	62	47
Chad	24	21	24	30	30	42	56	54	60
Comoros	11	5	18	5	8	18	12	19	19
Congo	119	142	137	202	191	230	198	231	256
Côte d'Ivoire	301	313	283	322	346	338	371	490	536
Congo, Dem. Rep.	148	195	217	256	300	292	357	390	409
Djibouti	16	19	18	23	16	18	20	21	20
Equatorial Guinea	7	7	8	12	16	16	12	14	14
Eritrea	24	10	23	25	26	21	34	47	46
Eswatini	47	43	48	42	55	64	81	99	116
Ethiopia	859	1 012	1 228	1 563	1 641	1 868	2 564	3 118	3 887



Publications per million inhabitants			Average of relative citations		
2011	2015	2019	2014–2016	2015–2017	
875.0	935.6	1 040.0	1.24	1.3	Hungary
2 169.0	2 193.7	2 644.5	1.56	1.6	Ireland
1 287.6	1 517.0	1 710.6	1.32	1.3	Italy
723.2	922.1	1 057.3	1.38	1.6	Latvia
859.1	973.8	1 192.6	1.24	1.3	Lithuania
1 937.2	2 599.1	2 920.1	1.94	2.3	Luxembourg
658.3	1 201.7	1 605.4	2.02	2.2	Malta
2 452.6	2 701.0	3 008.5	1.60	1.6	Netherlands
795.1	1 031.0	1 155.8	0.95	1.0	Poland
1 485.7	1 938.6	2 311.0	1.27	1.3	Portugal
568.9	652.4	710.3	1.01	1.1	Romania
917.4	1 157.4	1 251.8	1.08	1.1	Slovakia
2 220.1	2 347.9	2 478.0	1.31	1.4	Slovenia
1 386.4	1 539.0	1 740.4	1.26	1.3	Spain
2 851.2	3 352.3	3 690.1	1.53	1.5	Sweden
1 931.4	2 137.3	2 353.9	1.45	1.4	United Kingdom
<b>403.3</b>	<b>453.8</b>	<b>507.6</b>	<b>1.04</b>	<b>1.1</b>	<b>Southeast Europe</b>
73.4	103.1	127.0	1.18	1.4	Albania
205.9	248.7	350.5	1.16	1.4	Bosnia & Herzegovina
369.4	521.6	748.4	0.83	1.0	Montenegro
289.5	366.0	363.8	1.50	1.5	North Macedonia
651.4	707.1	777.5	1.09	1.2	Serbia
<b>3 498.7</b>	<b>3 897.9</b>	<b>4 299.4</b>	<b>1.57</b>	<b>1.6</b>	<b>European Free Trade Assoc.</b>
3 168.8	3 824.5	4 595.4	2.32	2.4	Iceland
2 231.5	2 375.6	2 235.7	1.17	1.2	Liechtenstein
2 729.8	3 071.6	3 714.5	1.54	1.5	Norway
4 082.1	4 556.6	4 822.6	1.67	1.7	Switzerland
<b>351.2</b>	<b>425.2</b>	<b>587.3</b>	<b>0.84</b>	<b>0.9</b>	<b>Eastern Europe &amp; West Asia</b>
328.5	340.4	415.9	1.67	1.8	Armenia
94.6	75.7	129.7	1.92	1.9	Azerbaijan
178.2	177.9	240.7	1.28	1.4	Belarus
210.7	233.3	293.7	2.64	2.4	Georgia
468.6	526.1	730.4	0.94	1.0	Iran, Islamic Rep.
1 970.7	2 054.6	2 191.6	1.36	1.4	Israel
83.6	90.4	113.8	1.57	1.9	Moldova, Rep.
297.0	414.9	660.8	0.71	0.7	Russian Federation
400.2	462.3	518.3	0.86	0.9	Turkey
177.4	209.2	310.2	0.81	0.9	Ukraine
<b>41.4</b>	<b>51.9</b>	<b>70.5</b>	<b>0.96</b>	<b>1.0</b>	<b>Africa</b>
<b>27.0</b>	<b>32.3</b>	<b>44.7</b>	<b>1.06</b>	<b>1.1</b>	<b>Sub-Saharan Africa</b>
2.1	3.0	3.6	1.98	1.9	Angola
28.8	37.0	47.1	2.25	2.7	Benin
130.5	141.5	272.2	1.69	1.3	Botswana
21.8	28.3	27.5	1.04	1.0	Burkina Faso
2.9	4.6	6.1	1.08	3.7	Burundi
35.8	45.9	64.3	1.29	1.5	Cameroon
8.0	59.1	80.0	0.91	1.0	Cabo Verde
7.5	8.2	9.9	1.17	1.1	Central African Rep.
1.9	2.1	3.8	0.90	0.8	Chad
15.6	10.3	22.3	–	0.7	Comoros
27.1	39.3	47.6	1.02	1.0	Congo
14.3	14.9	20.8	2.49	2.6	Côte d'Ivoire
2.2	3.9	4.7	2.11	2.4	Congo, Dem. Rep.
18.7	17.5	20.5	0.73	0.8	Djibouti
7.1	13.7	10.3	0.78	0.9	Equatorial Guinea
7.5	7.8	13.2	1.06	1.2	Eritrea
43.8	49.8	101.0	0.89	0.9	Eswatini
9.5	16.3	34.7	1.32	1.4	Ethiopia

**Table D1: Scientific publications by region and country, 2011–2019**

	Number of publications								
	2011	2012	2013	2014	2015	2016	2017	2018	2019
Gabon	152	124	156	182	177	170	176	185	186
Gambia	92	122	141	152	160	163	177	136	180
Ghana	691	827	925	1 063	1 287	1 607	1 737	2 161	2 619
Guinea	35	38	38	62	98	119	129	91	118
Guinea-Bissau	29	34	37	57	35	50	54	49	61
Kenya	1 574	1 582	1 742	2 002	2 030	2 255	2 541	2 691	3 045
Lesotho	27	31	28	26	34	29	35	43	60
Liberia	15	17	15	22	45	63	66	80	88
Madagascar	231	238	265	262	292	276	326	323	341
Malawi	320	346	348	413	447	534	606	657	713
Mali	196	223	193	191	240	244	286	262	302
Mauritius	94	148	175	169	178	218	261	249	435
Mozambique	190	185	190	226	294	330	392	417	460
Namibia	129	152	193	226	259	279	292	346	381
Niger	103	97	92	123	161	154	145	171	177
Nigeria	4 457	3 888	3 974	4 609	4 665	5 336	6 083	7 677	9 177
Rwanda	128	145	199	227	273	298	335	411	446
Sao Tome & Principe	0	2	3	3	3	3	8	6	11
Senegal	513	528	548	599	665	678	733	752	749
Seychelles	35	34	46	41	59	43	54	48	52
Sierra Leone	30	39	36	62	98	133	139	134	141
Somalia	5	6	7	12	15	10	44	24	59
South Africa	10 669	11 666	12 663	13 818	14 706	16 581	17 885	18 958	21 062
South Sudan	5	11	17	16	12	10	27	29	27
Togo	96	85	106	141	144	141	133	181	197
Uganda	872	919	966	1 099	1 225	1 284	1 467	1 510	1 731
Tanzania	811	808	897	1 123	1 173	1 237	1 341	1 406	1 736
Zambia	263	285	315	371	404	475	547	522	573
Zimbabwe	290	340	364	464	459	579	676	740	760
<b>Arab States</b>	<b>37 229</b>	<b>42 614</b>	<b>47 420</b>	<b>53 304</b>	<b>58 447</b>	<b>65 546</b>	<b>71 276</b>	<b>82 821</b>	<b>95 817</b>
Algeria	3 263	3 962	4 452	4 696	5 326	5 895	6 816	7 057	7 592
Bahrain	280	259	360	354	312	377	421	542	683
Egypt	10 039	11 435	12 313	13 646	14 728	16 619	17 121	20 023	23 224
Iraq	860	1 137	1 418	1 635	1 813	2 378	3 837	7 992	11 429
Jordan	1 903	1 895	1 901	1 937	2 057	2 337	2 738	3 638	4 361
Kuwait	1 091	1 111	1 220	1 190	1 272	1 298	1 404	1 614	1 963
Lebanon	1 329	1 589	1 759	1 939	2 057	2 390	2 541	2 938	3 310
Libya	241	293	381	395	405	355	405	434	477
Mauritania	31	31	37	38	37	52	45	60	74
Morocco	2 665	3 065	3 185	3 778	3 922	5 011	5 675	6 562	7 203
Oman	908	952	1 049	1 143	1 272	1 344	1 381	1 622	1 905
Palestine	340	341	396	447	418	429	640	689	812
Qatar	803	1 154	1 608	2 383	2 718	3 222	3 120	3 341	3 739
Saudi Arabia	8 451	10 703	13 005	15 760	17 681	18 758	19 488	21 092	25 205
Sudan	503	469	586	531	568	756	719	898	894
Syrian Arab Rep.	444	503	433	404	395	398	397	421	510
Tunisia	4 753	4 901	5 358	5 852	6 515	7 187	7 634	7 567	7 132
United Arab Emirates	2 164	2 500	2 687	3 013	3 839	4 374	4 967	5 690	7 198
Yemen	234	254	291	311	281	322	408	478	614
<b>Asia</b>	<b>755 322</b>	<b>771 492</b>	<b>818 391</b>	<b>873 299</b>	<b>900 254</b>	<b>967 127</b>	<b>1 036 556</b>	<b>1 155 950</b>	<b>1 262 260</b>
<b>Central Asia</b>	<b>1 470</b>	<b>1 554</b>	<b>1 936</b>	<b>2 330</b>	<b>2 528</b>	<b>3 209</b>	<b>3 841</b>	<b>4 489</b>	<b>5 780</b>
Kazakhstan	508	616	893	1 337	1 618	2 072	2 617	3 161	3 748
Kyrgyzstan	89	90	128	117	119	183	219	254	313
Mongolia	236	288	354	296	295	337	397	433	544
Tajikistan	72	84	97	88	104	101	125	137	192
Turkmenistan	30	45	16	44	20	11	16	9	9
Uzbekistan	556	452	495	502	431	553	530	590	1 106

Publications per million inhabitants			Average of relative citations		
2011	2015	2019	2014–2016	2015–2017	
90.2	90.9	85.6	1.48	1.4	Gabon
49.8	76.7	76.7	3.24	3.2	Gambia
27.2	46.2	86.1	1.35	1.4	Ghana
3.4	8.6	9.2	2.02	1.7	Guinea
18.6	20.1	31.8	1.03	1.0	Guinea-Bissau
36.5	42.4	57.9	1.60	1.6	Kenya
13.5	16.5	28.2	1.73	1.7	Lesotho
3.7	10.1	17.8	1.79	1.3	Liberia
10.6	12.0	12.6	1.06	1.0	Madagascar
21.4	26.7	38.3	1.71	1.7	Malawi
12.6	13.8	15.4	1.53	1.6	Mali
75.1	141.3	342.6	1.29	1.7	Mauritius
7.9	10.9	15.1	1.63	2.3	Mozambique
59.8	111.9	152.7	1.22	1.3	Namibia
6.0	8.0	7.6	1.34	1.4	Niger
27.4	25.8	45.7	0.90	1.0	Nigeria
12.4	24.0	35.3	2.71	3.1	Rwanda
0.0	15.0	51.2	–	–	Sao Tome & Principe
39.4	45.6	46.0	1.04	1.0	Senegal
380.9	621.2	532.0	3.40	4.1	Seychelles
4.6	13.7	18.0	2.34	1.7	Sierra Leone
0.4	1.1	3.8	2.54	1.9	Somalia
205.2	265.5	359.7	1.25	1.3	South Africa
0.5	1.1	2.4	1.54	1.2	South Sudan
14.6	19.7	24.4	1.98	2.2	Togo
26.0	32.0	39.1	1.53	1.6	Uganda
17.8	22.8	29.9	1.53	1.6	Tanzania
18.8	25.4	32.1	2.17	2.4	Zambia
22.5	33.2	51.9	1.32	1.2	Zimbabwe
<b>106.5</b>	<b>153.5</b>	<b>233.2</b>	<b>1.06</b>	<b>1.1</b>	<b>Arab States</b>
89.0	134.1	176.3	0.91	1.0	Algeria
219.1	227.4	416.2	2.85	3.5	Bahrain
118.8	159.3	231.3	0.96	1.0	Egypt
28.0	51.0	290.7	1.11	1.2	Iraq
248.3	222.0	431.7	1.27	1.4	Jordan
344.4	331.6	466.6	1.06	1.1	Kuwait
255.5	314.9	482.8	1.54	1.6	Lebanon
38.6	63.1	70.4	1.73	1.7	Libya
8.6	9.1	16.4	0.66	0.7	Mauritania
81.3	113.1	197.5	1.09	1.1	Morocco
279.3	298.1	382.9	1.25	1.4	Oman
81.9	92.3	163.0	2.31	2.4	Palestine
394.4	1 059.4	1 320.2	1.74	1.7	Qatar
299.0	557.4	735.5	1.35	1.4	Saudi Arabia
14.2	14.6	20.9	1.12	1.2	Sudan
21.1	21.9	29.9	1.29	1.3	Syrian Arab Rep.
442.5	582.7	609.8	0.92	1.0	Tunisia
241.9	414.4	736.7	1.34	1.4	United Arab Emirates
9.8	10.6	21.1	1.11	1.7	Yemen
<b>180.7</b>	<b>206.8</b>	<b>279.5</b>	<b>0.94</b>	<b>1.0</b>	<b>Asia</b>
<b>22.1</b>	<b>35.4</b>	<b>75.6</b>	<b>0.93</b>	<b>1.1</b>	<b>Central Asia</b>
30.8	92.1	202.0	0.93	1.1	Kazakhstan
16.1	20.0	48.8	3.37	5.4	Kyrgyzstan
85.2	98.4	168.7	1.12	1.3	Mongolia
9.4	12.3	20.6	0.77	0.7	Tajikistan
5.8	3.6	1.5	0.99	–	Turkmenistan
19.2	13.9	33.5	0.65	0.7	Uzbekistan

**Table D1: Scientific publications by region and country, 2011–2019**

	Number of publications								
	2011	2012	2013	2014	2015	2016	2017	2018	2019
<b>South Asia</b>	<b>92 082</b>	<b>99 633</b>	<b>107 614</b>	<b>119 648</b>	<b>126 301</b>	<b>141 783</b>	<b>154 527</b>	<b>178 244</b>	<b>191 638</b>
Afghanistan	71	67	52	80	67	132	173	196	285
Bangladesh	2 216	2 859	2 773	3 457	3 284	3 890	4 650	4 811	6 362
Bhutan	46	37	62	64	73	85	100	94	119
India	80 458	86 960	93 704	104 542	110 282	122 733	131 885	152 739	161 066
Maldives	16	21	12	18	23	18	26	27	36
Nepal	703	705	809	898	950	1 110	1 265	1 424	1 665
Pakistan	8 145	8 587	9 787	10 278	11 273	13 242	15 946	18 292	21 729
Sri Lanka	831	904	1 055	1 094	1 187	1 669	1 783	2 082	2 140
<b>Southeast Asia</b>	<b>602 295</b>	<b>609 284</b>	<b>644 387</b>	<b>680 494</b>	<b>699 375</b>	<b>743 669</b>	<b>795 200</b>	<b>882 814</b>	<b>964 627</b>
Brunei Darussalam	118	170	199	286	329	386	364	459	451
Cambodia	177	205	219	248	301	359	371	405	439
China	341 561	346 433	378 413	411 113	431 654	468 452	507 797	574 222	644 655
China, Hong Kong SAR	13 545	13 723	14 557	15 357	15 780	16 448	17 423	18 962	20 460
China, Macao SAR	616	779	976	1 221	1 384	1 865	2 110	2 232	2 480
China, Taiwan Prov.	38 026	36 960	36 892	36 147	33 922	33 042	32 253	32 057	33 371
Indonesia	2 875	3 225	4 108	4 800	6 080	9 008	16 770	30 088	37 513
Japan	125 604	124 228	123 657	121 215	117 020	119 147	119 831	121 400	119 347
Korea DPR	28	78	34	45	81	96	113	138	219
Korea Rep.	61 820	64 876	66 556	69 567	71 719	72 348	73 674	78 242	81 327
Lao PDR	139	183	182	175	209	237	202	259	300
Malaysia	16 489	17 347	18 555	20 766	22 405	24 210	26 486	28 476	30 172
Myanmar	155	100	86	118	190	274	347	515	639
Philippines	1 280	1 247	1 419	1 551	2 013	2 358	2 844	3 029	4 104
Singapore	13 880	14 898	15 827	16 564	17 099	18 084	18 676	18 920	19 437
Thailand	9 342	9 867	9 962	10 899	11 298	12 804	14 467	16 612	17 172
Timor-Leste	6	17	15	29	21	30	38	42	42
Viet Nam	2 149	2 819	3 320	3 589	4 051	5 195	5 863	7 612	10 924
<b>Oceania</b>	<b>65 658</b>	<b>68 790</b>	<b>74 309</b>	<b>79 227</b>	<b>80 984</b>	<b>85 096</b>	<b>86 358</b>	<b>91 207</b>	<b>98 304</b>
Australia	56 907	59 837	65 071	69 684	71 691	75 240	76 438	80 890	87 187
New Zealand	9 992	10 322	10 737	11 182	11 015	11 550	11 820	12 311	13 351
Cook Islands	8	7	5	10	7	6	8	5	9
Fiji	124	131	153	208	193	270	251	282	303
Kiribati	0	1	5	7	6	6	7	3	15
Marshall Islands	5	4	2	6	5	4	3	8	8
Micronesia	8	12	12	14	15	19	29	24	12
Nauru	3	1	2	3	2	2	0	0	0
Niue	0	0	0	3	0	1	2	1	3
Palau	7	7	14	11	17	12	21	18	27
Papua New Guinea	109	133	127	152	156	164	161	183	253
Samoa	19	11	12	22	22	19	30	29	32
Solomon Islands	22	14	19	26	44	50	42	52	47
Tonga	10	6	5	7	11	10	18	16	15
Tuvalu	0	1	1	6	1	3	3	2	2
Vanuatu	23	21	26	28	34	39	32	23	32

**KEY** –: data unavailable | -n/+n: data refer to n years before or after reference year | 0: magnitude nil or negligible | a: not applicable

GDP: gross domestic product | MF: males and females | PPP\$: purchasing power parity dollars

Note: The sum of the numbers for the various regions exceeds the total number because papers with multiple authors from different regions are counted for each of these regions.

Source: Scopus (Elsevier), data treatment by Science-Metrix, excluding Social sciences, Arts and Humanities; for population: United Nations Department of Economic and Social Affairs (2019) *World Population Prospects 2019*. Online Edition. Rev. 1.

Publications per million inhabitants			Average of relative citations		
2011	2015	2019	2014–2016	2015–2017	
55.4	72.2	104.4	0.86	0.9	<b>South Asia</b>
2.4	1.9	7.5	5.80	5.1	Afghanistan
14.8	21.0	39.0	1.24	1.3	Bangladesh
66.3	100.3	155.9	1.22	3.4	Bhutan
64.4	84.2	117.9	0.86	0.9	India
42.1	50.6	67.8	1.12	1.0	Maldives
26.0	35.2	58.2	1.01	1.3	Nepal
44.4	56.5	100.3	1.05	1.1	Pakistan
40.7	56.8	100.4	1.70	1.8	Sri Lanka
<b>272.0</b>	<b>307.2</b>	<b>413.8</b>	<b>0.96</b>	<b>1.0</b>	<b>Southeast Asia</b>
299.7	792.9	1 040.9	1.35	1.5	Brunei Darussalam
12.2	19.4	26.6	1.43	1.4	Cambodia
248.1	306.8	449.6	0.98	1.0	China
1 933.2	2 195.9	2 751.4	1.56	1.6	China, Hong Kong SAR
1 118.3	2 298.6	3 872.3	1.45	1.4	China, Macao SAR
1 634.2	1 440.0	1 403.7	0.99	1.0	China, Taiwan Prov.
11.7	23.5	138.6	0.96	0.9	Indonesia
977.5	914.3	940.8	0.94	1.0	Japan
1.1	3.2	8.5	0.79	0.8	Korea DPR
1 241.7	1 411.2	1 587.6	0.99	1.0	Korea Rep.
21.9	31.0	41.8	1.42	1.3	Lao PDR
575.5	740.1	944.4	0.96	1.0	Malaysia
3.0	3.6	11.8	2.79	2.8	Myanmar
13.4	19.7	38.0	1.52	1.6	Philippines
2 637.0	3 057.7	3 348.7	1.59	1.6	Singapore
138.4	164.4	246.6	0.98	1.0	Thailand
5.4	17.6	32.5	0.82	1.0	Timor-Leste
24.2	43.7	113.2	1.25	1.3	Viet Nam
<b>1 789.5</b>	<b>2 075.0</b>	<b>2 381.7</b>	<b>1.41</b>	<b>1.4</b>	<b>Oceania</b>
2 524.9	2 995.6	3 459.4	1.44	1.4	Australia
2 260.7	2 386.4	2 790.5	1.37	1.4	New Zealand
439.6	398.2	512.9	–	–	Cook Islands
143.6	222.2	340.5	3.52	2.9	Fiji
0.0	54.1	127.5	–	–	Kiribati
88.5	87.0	136.1	–	–	Marshall Islands
77.3	137.8	105.4	13.60	19.5	Micronesia
297.9	192.8	92.9	–	–	Nauru
0.0	0.0	1 858.7	–	–	Niue
394.4	962.4	1 499.9	1.48	1.2	Palau
14.6	19.2	28.8	3.32	3.6	Papua New Guinea
101.4	113.7	162.4	0.79	0.8	Samoa
40.6	73.0	70.2	1.16	2.0	Solomon Islands
96.6	109.1	143.5	–	8.4	Tonga
0.0	90.1	171.6	–	–	Tuvalu
94.8	125.4	106.7	0.89	0.9	Vanuatu

**Table D2: Publications by broad field of science, 2014–2016 and 2017–2019**

Regional/national level	Agriculture, fisheries & forestry		Animal & plant biology		Built environment & design		Chemistry		Cross-cutting strategic technologies		Engineering	
	2014–2016	2017–2019	2014–2016	2017–2019	2014–2016	2017–2019	2014–2016	2017–2019	2014–2016	2017–2019	2014–2016	2017–2019
<b>World</b>	<b>213 710</b>	<b>249 705</b>	<b>200 233</b>	<b>214 809</b>	<b>65 085</b>	<b>80 536</b>	<b>465 762</b>	<b>520 874</b>	<b>1 065 672</b>	<b>1 315 538</b>	<b>685 631</b>	<b>775 175</b>
High-income economies	128 707	139 903	127 872	131 752	50 275	55 102	270 230	281 289	643 478	715 579	412 973	424 952
Upper middle-income economies	85 230	114 038	77 061	89 593	17 536	26 335	195 956	243 770	427 613	572 786	286 542	356 609
Lower middle-income economies	21 828	27 598	24 343	29 100	2 995	8 480	53 288	66 621	101 390	187 270	48 878	81 454
Low-income economies	3 494	4 797	2 883	3 906	242	463	1 304	1 874	3 181	6 212	1 756	2 920
<b>Americas</b>	<b>72 217</b>	<b>79 422</b>	<b>68 140</b>	<b>71 754</b>	<b>18 280</b>	<b>20 930</b>	<b>93 212</b>	<b>97 630</b>	<b>235 822</b>	<b>260 576</b>	<b>154 927</b>	<b>158 279</b>
<b>North America</b>	<b>43 599</b>	<b>48 088</b>	<b>46 315</b>	<b>47 874</b>	<b>16 092</b>	<b>17 976</b>	<b>76 877</b>	<b>78 099</b>	<b>200 080</b>	<b>215 375</b>	<b>134 510</b>	<b>134 353</b>
Canada	8 882	9 533	7 342	7 675	2 505	2 975	10 316	11 051	29 065	31 241	22 512	23 011
United States of America	36 386	40 495	41 000	42 454	13 904	15 345	67 988	68 617	175 148	188 694	114 753	114 115
<b>Latin America</b>	<b>30 780</b>	<b>34 819</b>	<b>25 715</b>	<b>28 863</b>	<b>2 369</b>	<b>3 231</b>	<b>17 625</b>	<b>21 164</b>	<b>39 010</b>	<b>48 949</b>	<b>22 543</b>	<b>26 345</b>
Argentina	2 256	2 628	3 742	3 823	187	205	1 974	2 235	3 052	3 164	1 688	1 635
Belize	8	12	15	25	0	0	4	2	1	3	1	1
Bolivia	52	47	126	123	3	5	34	30	63	63	22	39
Brazil	22 184	24 040	12 875	14 939	1 151	1 512	10 470	12 454	20 420	24 635	11 847	13 980
Chile	1 484	1 731	1 888	1 996	407	519	1 139	1 479	2 769	3 434	1 802	2 116
Colombia	1 017	1 530	1 756	1 864	238	415	1 068	1 181	3 524	5 312	1 987	2 531
Costa Rica	165	222	470	564	13	20	75	75	163	282	138	152
Ecuador	287	595	505	794	40	125	174	325	803	2 698	379	807
El Salvador	4	6	13	23	1	1	6	3	13	9	11	36
Guatemala	29	26	44	74	3	4	8	11	27	38	16	13
Guyana	2	7	10	14	1	2	0	2	4	2	4	5
Honduras	15	39	37	41	1	6	1	2	9	55	15	16
Mexico	2 998	4 044	4 672	5 518	313	414	2 877	3 787	8 227	9 353	4 718	5 302
Nicaragua	16	19	27	29	0	0	1	2	13	21	8	20
Panama	87	92	363	405	5	7	34	52	43	141	58	40
Paraguay	22	46	63	79	2	7	18	22	86	111	27	59
Peru	428	655	490	727	44	62	84	184	453	1 122	209	386
Suriname	0	6	12	20	1	0	4	3	7	5	1	2
Uruguay	416	536	398	388	25	36	191	247	363	438	160	162
Venezuela	412	242	390	340	15	20	249	224	518	458	257	170
<b>Caribbean</b>	<b>734</b>	<b>620</b>	<b>452</b>	<b>508</b>	<b>59</b>	<b>88</b>	<b>391</b>	<b>400</b>	<b>816</b>	<b>854</b>	<b>338</b>	<b>336</b>
Antigua & Barbuda	0	2	0	2	0	0	1	0	1	1	0	0
Bahamas	12	21	22	50	0	0	0	1	2	4	2	2
Barbados	15	16	12	10	0	1	8	10	18	17	4	8
Cuba	455	316	250	294	36	50	304	305	591	607	251	257
Dominica	2	5	7	5	2	1	1	1	4	2	3	0
Dominican Rep.	20	14	41	41	3	7	8	13	18	47	6	6
Grenada	27	38	2	6	0	0	3	0	2	4	3	4
Haiti	9	7	8	3	1	1	0	2	6	2	4	2
Jamaica	31	26	39	31	5	7	26	36	44	63	23	16
St Kitts & Nevis	68	86	3	7	0	0	1	0	3	2	0	0
St Lucia	0	2	2	0	0	0	0	0	1	1	0	1
St Vincent & Grenadines	0	0	0	2	0	1	0	0	2	1	0	1
Trinidad & Tobago	109	102	83	74	12	22	42	36	131	113	44	40
<b>Europe</b>	<b>74 049</b>	<b>81 018</b>	<b>73 771</b>	<b>76 436</b>	<b>27 844</b>	<b>30 277</b>	<b>155 492</b>	<b>165 241</b>	<b>354 026</b>	<b>407 670</b>	<b>224 020</b>	<b>239 675</b>
<b>European Union</b>	<b>65 416</b>	<b>70 437</b>	<b>62 631</b>	<b>63 557</b>	<b>25 031</b>	<b>26 590</b>	<b>128 409</b>	<b>134 845</b>	<b>298 681</b>	<b>321 778</b>	<b>189 637</b>	<b>193 612</b>
Austria	1 657	1 926	1 940	1 952	539	617	3 382	3 665	8 981	9 240	4 872	4 896
Belgium	2 979	3 030	3 018	3 027	855	1 027	4 840	4 827	9 274	9 560	5 466	5 735
Bulgaria	652	801	869	773	32	71	885	1 133	1 599	2 231	821	1 589
Croatia	910	1 079	887	886	111	121	762	971	1 916	2 158	1 519	1 589
Cyprus	85	177	134	187	115	103	233	297	733	1 147	476	513
Czech Rep.	3 271	3 116	2 881	3 036	443	553	4 536	4 905	11 616	12 324	6 064	6 343
Denmark	2 631	2 881	2 246	2 332	915	888	2 669	2 694	7 596	8 352	3 970	4 542
Estonia	304	357	392	423	89	84	350	346	1 253	1 473	692	612
Finland	1 713	1 848	1 651	1 652	706	688	2 258	2 485	6 325	7 006	3 853	3 877
France	6 936	7 022	9 258	9 212	2 235	2 163	18 733	18 805	41 354	40 014	24 667	24 016

Environmental sciences (excl. geosciences)		Geosciences		Health sciences		ICTs, maths & statistics		Physics & astronomy		Regional/national level
2014–2016	2017–2019	2014–2016	2017–2019	2014–2016	2017–2019	2014–2016	2017–2019	2014–2016	2017–2019	
241 849	306 088	96 903	109 678	2 356 730	2 522 831	541 490	626 794	668 234	748 774	World
174 787	205 199	71 060	76 789	1 840 648	1 925 939	363 619	385 760	474 291	478 835	High-income economies
81 488	123 502	34 021	43 429	542 832	647 330	176 795	233 418	211 777	273 077	Upper middle-income economies
18 392	28 950	6 385	8 134	137 082	166 338	59 142	88 069	63 139	99 181	Lower middle-income economies
3 354	5 199	603	891	21 575	27 877	2 926	5 177	1 322	2 430	Low-income economies
88 789	102 148	31 043	33 607	908 746	962 677	140 183	153 167	175 896	173 163	Americas
76 571	84 894	26 223	27 331	806 575	850 023	124 719	133 936	152 021	147 132	North America
13 546	15 532	5 337	5 506	110 358	122 945	20 705	21 260	19 011	18 901	Canada
66 863	73 862	22 343	23 262	726 938	763 750	107 164	116 150	138 956	134 071	United States of America
15 540	21 612	5 931	7 574	120 401	137 572	17 216	21 482	30 633	33 421	Latin America
2 161	2 574	1 577	1 800	11 677	12 683	1 227	1 610	3 877	3 637	Argentina
16	24	0	0	31	37	0	2	0	0	Belize
175	179	46	41	266	323	11	15	24	24	Bolivia
6 870	10 362	2 414	3 336	72 344	81 029	9 709	12 076	14 514	15 031	Brazil
1 530	2 060	527	739	9 376	11 686	1 809	2 217	5 441	5 990	Chile
917	1 581	270	451	8 005	10 691	1 450	1 556	2 455	3 660	Colombia
260	378	58	83	748	955	51	128	112	125	Costa Rica
428	743	108	174	1 103	2 279	297	818	224	811	Ecuador
17	9	8	13	143	121	3	7	2	0	El Salvador
30	33	7	19	427	513	19	16	6	12	Guatemala
24	24	1	3	42	53	1	1	2	1	Guyana
8	22	5	4	149	224	3	11	0	35	Honduras
3 388	4 230	1 012	1 207	17 324	20 238	2 692	3 177	7 476	8 423	Mexico
36	32	18	15	169	226	5	4	0	2	Nicaragua
284	385	56	67	451	595	15	18	20	31	Panama
25	45	2	7	265	390	23	38	13	19	Paraguay
404	594	96	142	2 437	3 354	161	443	251	429	Peru
14	15	8	5	52	95	1	2	5	0	Suriname
170	273	69	82	1 384	1 637	298	310	250	282	Uruguay
189	198	119	102	1 711	1 420	241	196	415	356	Venezuela
302	396	105	115	4 787	4 925	259	266	511	543	Caribbean
6	5	0	0	21	43	0	0	0	1	Antigua & Barbuda
18	39	3	11	41	53	9	5	0	19	Bahamas
32	45	0	1	140	152	10	14	19	10	Barbados
139	168	42	33	2 937	2 446	106	122	449	444	Cuba
6	5	1	0	61	71	3	2	2	0	Dominica
20	22	10	16	197	319	17	21	1	22	Dominican Rep.
11	8	0	1	301	534	5	4	4	2	Grenada
12	9	8	10	251	262	9	2	0	0	Haiti
43	49	15	11	470	605	53	44	18	21	Jamaica
4	4	0	0	106	160	1	5	0	1	St Kitts & Nevis
7	2	1	1	21	22	2	1	0	0	St Lucia
1	0	0	0	11	27	2	1	0	1	St Vincent & Grenadines
52	72	33	35	328	387	47	48	20	22	Trinidad & Tobago
94 934	116 345	46 715	51 155	934 556	977 326	202 200	213 940	295 199	306 145	Europe
82 600	97 520	37 095	39 162	819 335	850 801	167 270	173 657	236 373	229 735	European Union
2 833	3 467	1 157	1 275	23 576	25 497	5 668	6 221	7 334	7 673	Austria
3 343	4 026	1 025	1 054	35 807	38 300	4 897	4 997	10 033	9 420	Belgium
299	389	174	171	2 890	3 332	776	1 009	2 356	2 883	Bulgaria
466	642	153	231	6 203	6 666	1 165	1 365	1 598	1 768	Croatia
311	406	27	35	1 386	2 217	687	696	610	835	Cyprus
2 225	3 092	1 263	1 409	16 387	16 437	4 490	4 556	8 421	9 468	Czech Rep.
3 380	3 963	1 045	1 295	32 718	36 116	3 151	3 696	6 473	6 539	Denmark
537	603	207	219	1 963	2 372	433	517	1 006	1 162	Estonia
3 460	3 861	490	535	17 500	18 670	5 342	5 226	5 894	5 562	Finland
12 505	14 466	7 072	7 590	106 838	110 675	29 467	28 715	47 018	43 533	France

**Table D2: Publications by broad field of science, 2014–2016 and 2017–2019**

Regional/national level	Agriculture, fisheries & forestry		Animal & plant biology		Built environment & design		Chemistry		Cross-cutting strategic technologies		Engineering	
	2014–2016	2017–2019	2014–2016	2017–2019	2014–2016	2017–2019	2014–2016	2017–2019	2014–2016	2017–2019	2014–2016	2017–2019
Germany	8 967	10 088	12 037	12 636	3 443	3 272	29 166	30 346	59 318	62 167	36 399	36 245
Greece	1 320	1 580	1 188	1 399	503	488	2 198	2 388	7 460	7 536	4 334	3 817
Hungary	851	987	1 401	1 370	202	298	2 125	2 252	3 362	3 810	1 873	2 115
Ireland	1 671	2 036	660	722	348	411	1 656	1 781	4 520	4 715	2 267	2 222
Italy	8 410	9 973	7 554	8 146	3 265	3 757	14 837	15 915	35 893	39 925	26 352	27 521
Latvia	600	653	146	170	47	52	346	290	1 482	1 957	589	655
Lithuania	582	516	306	294	85	120	634	600	1 363	1 655	1 235	1 041
Luxembourg	68	58	140	130	69	62	160	192	957	942	362	438
Malta	43	57	71	91	11	30	35	45	210	284	91	154
Netherlands	3 476	3 605	3 618	3 645	1 850	2 016	5 210	5 530	14 066	15 214	9 553	9 895
Poland	5 716	6 129	4 264	4 351	729	888	9 538	10 911	18 868	23 129	13 929	14 933
Portugal	2 286	2 815	2 411	2 482	1 097	1 177	3 895	4 162	10 176	11 464	6 458	6 415
Romania	611	797	591	570	259	259	4 604	5 559	7 186	8 440	6 105	7 197
Slovakia	1 310	1 280	639	706	146	137	1 187	1 324	3 587	4 375	2 914	3 064
Slovenia	728	677	500	549	168	180	1 144	1 147	2 420	2 449	1 347	1 251
Spain	9 631	10 465	8 352	8 725	2 800	3 073	15 985	16 749	30 318	31 643	14 282	13 639
Sweden	2 613	3 033	2 924	2 922	1 224	1 352	4 300	4 575	11 756	13 001	6 889	6 962
United Kingdom	8 270	9 708	11 954	12 679	5 807	6 634	19 613	20 534	51 086	57 509	29 642	32 540
<b>Southeast Europe</b>	<b>1 181</b>	<b>1 359</b>	<b>1 266</b>	<b>1 164</b>	<b>214</b>	<b>202</b>	<b>1 727</b>	<b>1 764</b>	<b>3 531</b>	<b>3 537</b>	<b>2 444</b>	<b>2 764</b>
Albania	28	67	50	52	13	12	32	32	136	147	55	64
Bosnia & Herzegovina	132	185	93	134	14	26	64	109	362	521	295	449
Montenegro	32	69	139	158	3	5	26	45	81	112	152	172
North Macedonia	127	133	103	71	4	18	109	109	353	400	186	201
Serbia	954	1 026	987	855	184	151	1 549	1 536	2 711	2 547	1 882	2 040
<b>European Free Trade Assoc.</b>	<b>4 768</b>	<b>5 349</b>	<b>4 975</b>	<b>5 236</b>	<b>1 510</b>	<b>1 748</b>	<b>7 949</b>	<b>8 000</b>	<b>18 416</b>	<b>20 468</b>	<b>11 171</b>	<b>11 539</b>
Iceland	190	217	159	175	18	31	88	111	345	349	292	261
Liechtenstein	1	1	1	2	5	2	32	31	45	42	17	13
Norway	2 029	2 243	1 869	2 002	634	767	1 224	1 421	6 540	7 513	4 497	5 237
Switzerland	2 656	3 029	3 044	3 189	875	979	6 643	6 497	11 638	12 717	6 476	6 125
<b>Eastern Europe &amp; West Asia</b>	<b>12 477</b>	<b>16 313</b>	<b>16 874</b>	<b>18 053</b>	<b>3 058</b>	<b>4 829</b>	<b>41 587</b>	<b>49 468</b>	<b>75 153</b>	<b>112 332</b>	<b>49 885</b>	<b>67 809</b>
Armenia	17	17	63	60	3	2	202	209	218	302	79	76
Azerbaijan	27	36	65	74	6	4	225	372	360	562	144	263
Belarus	19	49	121	145	7	20	394	430	710	1 161	432	415
Georgia	12	38	116	115	5	15	79	108	124	157	106	147
Iran Islamic Rep.	5 635	7 306	5 227	4 165	920	1 790	13 908	17 265	20 678	25 243	18 163	23 961
Israel	795	868	1 515	1 590	311	384	1 961	2 096	5 513	5 790	2 840	2 760
Moldova, Rep.	28	30	43	29	1	7	233	214	175	195	160	121
Russian Federation	1 274	2 495	5 852	7 946	277	827	16 211	19 702	30 975	55 448	16 608	26 202
Turkey	4 543	5 176	3 552	3 603	1 508	1 748	6 955	8 180	12 095	15 466	8 710	10 869
Ukraine	257	505	819	996	47	81	2 247	2 147	5 510	9 969	3 232	3 903
<b>Africa</b>	<b>9 708</b>	<b>13 906</b>	<b>9 520</b>	<b>12 080</b>	<b>1 693</b>	<b>2 896</b>	<b>12 969</b>	<b>17 864</b>	<b>27 435</b>	<b>39 735</b>	<b>16 020</b>	<b>22 379</b>
<b>Sub-Saharan Africa</b>	<b>6 360</b>	<b>8 710</b>	<b>6 397</b>	<b>7 855</b>	<b>1 070</b>	<b>1 736</b>	<b>4 465</b>	<b>5 790</b>	<b>9 365</b>	<b>15 084</b>	<b>5 200</b>	<b>7 733</b>
Angola	13	29	20	37	2	1	3	14	27	36	8	12
Benin	145	204	145	212	4	6	24	41	41	83	21	41
Botswana	67	75	45	78	6	14	59	59	99	172	78	162
Burkina Faso	87	155	87	96	14	12	33	32	64	86	32	30
Burundi	12	25	18	15	0	1	5	3	8	17	4	8
Cameroon	246	267	226	264	26	45	278	330	252	441	108	188
Cabo Verde	10	3	15	18	0	1	1	1	6	9	7	10
Central African Rep.	3	3	11	4	0	0	1	3	3	6	2	3
Chad	15	10	2	7	0	1	1	3	4	13	5	5
Comoros	4	4	3	6	0	0	1	4	0	3	0	3
Congo	25	38	31	37	0	1	6	8	27	21	10	9
Côte d'Ivoire	71	119	89	144	4	4	53	79	35	81	14	25
Congo, Dem. Rep.	48	76	49	85	3	1	27	45	24	35	12	22
Djibouti	1	3	2	3	2	0	2	4	6	12	3	3



Environmental sciences (excl. geosciences)		Geosciences		Health sciences		ICTs, maths & statistics		Physics & astronomy		Regional/national level
2014–2016	2017–2019	2014–2016	2017–2019	2014–2016	2017–2019	2014–2016	2017–2019	2014–2016	2017–2019	
16 795	19 564	7 867	8 880	163 742	170 684	31 958	34 359	67 608	64 523	Germany
2 176	2 527	603	668	16 509	18 018	5 505	5 353	4 938	4 879	Greece
1 091	1 230	634	585	9 750	10 058	2 290	2 395	4 382	4 541	Hungary
1 055	1 256	420	543	13 427	16 249	2 477	2 911	3 069	3 236	Ireland
9 205	11 115	5 486	5 823	108 043	118 913	20 740	21 920	35 499	34 915	Italy
135	197	48	62	847	1 075	243	238	638	860	Latvia
298	456	129	104	1 877	2 441	467	495	1 456	1 642	Lithuania
196	232	68	83	1 449	1 652	698	836	382	455	Luxembourg
46	66	23	39	788	973	120	164	100	144	Malta
7 000	8 076	2 086	2 234	74 547	80 526	6 851	7 389	13 136	12 913	Netherlands
4 174	7 096	2 258	2 423	33 569	34 899	7 412	7 742	18 044	18 157	Poland
3 101	3 880	1 061	831	18 023	21 226	5 216	5 013	5 900	6 072	Portugal
916	1 189	484	545	8 190	7 637	3 891	3 555	5 232	5 240	Romania
755	894	362	442	4 434	4 455	1 265	1 112	2 809	3 128	Slovakia
564	665	261	267	3 952	4 417	1 124	1 300	2 077	2 058	Slovenia
9 691	11 882	3 829	3 918	82 844	91 350	15 965	16 378	24 231	23 964	Spain
5 554	6 573	1 542	1 636	43 837	48 793	7 068	7 203	10 953	10 671	Sweden
19 635	22 193	8 797	9 703	196 687	212 415	27 909	31 787	46 493	46 647	United Kingdom
<b>733</b>	<b>901</b>	<b>205</b>	<b>284</b>	<b>7 908</b>	<b>8 406</b>	<b>2 938</b>	<b>3 147</b>	<b>2 476</b>	<b>2 667</b>	<b>Southeast Europe</b>
44	40	28	18	360	409	108	96	37	56	Albania
42	63	18	25	1 071	1 422	280	349	116	143	Bosnia & Herzegovina
22	47	3	6	246	339	259	264	42	71	Montenegro
69	75	20	32	845	786	301	321	123	161	North Macedonia
610	756	148	220	5 902	6 163	2 086	2 246	2 186	2 333	Serbia
<b>10 003</b>	<b>11 382</b>	<b>4 833</b>	<b>5 630</b>	<b>69 713</b>	<b>79 992</b>	<b>10 113</b>	<b>10 551</b>	<b>20 757</b>	<b>20 187</b>	<b>European Free Trade Assoc.</b>
256	298	267	314	1 638	1 890	311	353	352	416	Iceland
3	5	4	1	87	89	40	41	52	45	Liechtenstein
4 113	4 877	2 180	2 548	19 800	23 616	3 012	3 431	3 392	3 685	Norway
5 998	6 651	2 526	2 937	49 633	56 446	6 801	6 797	17 714	16 712	Switzerland
<b>14 640</b>	<b>24 060</b>	<b>11 266</b>	<b>14 293</b>	<b>142 570</b>	<b>168 562</b>	<b>47 268</b>	<b>56 940</b>	<b>86 048</b>	<b>109 293</b>	<b>Eastern Europe &amp; West Asia</b>
29	73	31	50	412	578	241	314	1 744	1 710	Armenia
31	62	49	64	278	600	345	481	769	1 095	Azerbaijan
95	150	54	50	733	1 084	462	454	2 185	2 505	Belarus
61	149	39	49	702	792	645	686	972	1 083	Georgia
3 809	6 150	1 898	2 433	36 272	47 869	10 419	13 405	12 505	16 531	Iran, Islamic Rep.
1 329	1 606	475	560	21 998	24 111	5 359	5 962	7 025	7 422	Israel
19	29	31	32	208	299	96	91	276	297	Moldova, Rep.
6 362	11 602	7 168	9 101	30 641	44 365	16 791	20 950	51 157	68 138	Russian Federation
2 812	3 954	1 221	1 526	50 196	46 816	9 285	10 672	8 713	10 811	Turkey
384	861	538	705	3 159	5 268	4 380	4 883	8 114	8 648	Ukraine
<b>9 542</b>	<b>14 353</b>	<b>3 828</b>	<b>4 614</b>	<b>66 121</b>	<b>80 057</b>	<b>15 721</b>	<b>22 159</b>	<b>14 698</b>	<b>19 684</b>	<b>Africa</b>
<b>6 770</b>	<b>10 355</b>	<b>2 021</b>	<b>2 501</b>	<b>41 929</b>	<b>51 863</b>	<b>4 733</b>	<b>7 199</b>	<b>5 748</b>	<b>8 054</b>	<b>Sub-Saharan Africa</b>
15	23	30	29	151	146	1	13	1	2	Angola
112	183	16	15	522	552	36	85	89	86	Benin
126	218	37	42	454	612	116	128	35	117	Botswana
95	137	18	29	934	952	52	66	18	24	Burkina Faso
6	17	5	7	67	82	1	15	5	9	Burundi
186	308	97	165	1 387	1 810	150	240	295	480	Cameroon
26	12	7	7	18	34	3	15	3	4	Cabo Verde
8	12	2	3	111	112	3	6	2	3	Central African Rep.
6	17	7	10	55	87	3	12	4	5	Chad
3	7	1	0	14	19	3	1	2	3	Comoros
36	56	18	29	460	456	5	19	5	11	Congo
81	146	11	23	603	696	30	55	15	25	Côte d'Ivoire
76	94	26	31	570	743	5	10	8	14	Congo, Dem. Rep.
5	8	7	6	28	16	0	3	1	3	Djibouti

**Table D2:** Publications by broad field of science, 2014–2016 and 2017–2019

Regional/national level	Agriculture, fisheries & forestry		Animal & plant biology		Built environment & design		Chemistry		Cross-cutting strategic technologies		Engineering	
	2014–2016	2017–2019	2014–2016	2017–2019	2014–2016	2017–2019	2014–2016	2017–2019	2014–2016	2017–2019	2014–2016	2017–2019
Equatorial Guinea	0	2	8	3	0	0	0	0	1	3	0	0
Eritrea	14	14	8	6	0	2	4	2	4	12	3	2
Eswatini	6	10	13	24	1	2	2	2	8	12	6	19
Ethiopia	665	947	271	470	27	71	188	341	421	1 215	147	305
Gabon	28	30	32	47	0	1	19	20	11	12	12	26
Gambia	5	19	9	8	0	0	3	3	11	11	3	2
Ghana	336	613	173	347	92	228	131	165	289	613	140	232
Guinea	7	10	13	25	1	1	8	3	7	13	2	2
Guinea-Bissau	2	4	6	14	0	0	0	1	0	2	0	1
Kenya	713	1 022	708	864	44	73	105	149	279	401	132	170
Lesotho	4	5	0	8	2	0	5	11	9	14	2	2
Liberia	4	6	4	11	0	1	0	1	3	7	2	3
Madagascar	53	70	158	185	2	7	35	27	25	34	26	18
Malawi	98	118	34	71	5	11	3	7	50	60	11	25
Mali	84	97	54	65	3	2	21	6	17	34	8	24
Mauritius	20	45	46	76	4	6	59	112	109	246	57	102
Mozambique	81	135	56	83	9	3	17	18	29	48	8	31
Namibia	48	70	63	94	3	5	13	19	71	105	40	64
Niger	59	64	67	60	2	2	8	6	21	21	13	13
Nigeria	1 349	2 117	595	845	223	531	750	1 352	2 464	4 255	820	1 640
Rwanda	59	109	40	66	4	8	6	22	31	74	15	36
Sao Tome & Principe	0	3	0	6	0	0	0	1	0	2	1	0
Senegal	99	131	124	156	8	10	77	71	123	190	51	72
Seychelles	22	18	46	33	0	0	1	2	6	1	1	0
Sierra Leone	9	22	13	19	1	1	1	3	8	12	4	20
Somalia	4	7	0	6	0	2	0	0	2	10	1	3
South Africa	1 964	2 547	3 484	3 936	562	722	2 639	3 161	4 887	7 178	3 417	4 697
South Sudan	1	4	4	1	0	0	0	1	2	7	0	3
Togo	24	27	18	50	0	0	15	12	19	31	5	7
Uganda	230	323	175	267	24	21	40	50	168	204	49	60
Tanzania	326	399	292	335	27	45	55	57	165	223	85	123
Zambia	85	140	40	77	11	20	3	9	57	77	31	57
Zimbabwe	157	240	133	155	6	12	37	44	113	163	53	180
<b>Arab States</b>	<b>5 088</b>	<b>7 555</b>	<b>5 428</b>	<b>8 313</b>	<b>1 740</b>	<b>3 180</b>	<b>15 121</b>	<b>20 863</b>	<b>36 072</b>	<b>52 846</b>	<b>19 254</b>	<b>26 184</b>
Algeria	396	657	452	568	128	232	1 139	1 760	3 893	5 102	2 883	4 053
Bahrain	5	7	9	5	18	33	23	62	161	361	48	131
Egypt	1 923	3 275	1 584	2 359	358	557	5 366	7 718	7 204	9 909	4 114	4 973
Iraq	201	548	286	1 689	137	635	541	1 044	1 461	6 169	725	1 909
Jordan	258	335	166	164	129	230	403	657	1 193	2 254	540	967
Kuwait	52	75	60	83	54	57	158	275	982	1 270	362	520
Lebanon	103	155	112	128	130	174	293	357	833	1 023	666	869
Libya	52	61	41	55	21	25	70	101	224	269	139	171
Mauritania	8	10	17	10	0	2	6	21	13	13	7	3
Morocco	260	389	361	537	34	160	705	1 047	2 743	4 739	1 151	2 426
Oman	115	155	164	239	36	62	241	348	759	1 092	428	495
Palestine	27	47	24	34	25	52	133	167	193	384	108	98
Qatar	64	60	105	68	108	140	383	557	1 714	2 015	1 142	1 185
Saudi Arabia	1 083	1 283	1 683	2 055	338	471	6 082	7 303	10 538	13 099	4 121	5 354
Sudan	184	259	69	101	15	13	115	157	245	480	95	152
Syrian Arab Rep.	115	73	134	141	12	9	87	96	138	170	59	85
Tunisia	667	770	772	832	71	192	1 335	1 704	4 113	4 723	2 609	3 170
United Arab Emirates	133	243	160	254	222	324	414	835	3 199	4 497	1 790	2 287
Yemen	13	49	32	46	4	12	63	166	157	284	28	69

Environmental sciences (excl. geosciences)		Geosciences		Health sciences		ICTs, maths & statistics		Physics & astronomy		Regional/national level
2014– 2016	2017– 2019	2014– 2016	2017– 2019	2014– 2016	2017– 2019	2014– 2016	2017– 2019	2014– 2016	2017– 2019	
6	3	0	0	29	27	0	2	0	0	Equatorial Guinea
4	9	11	12	23	56	1	9	0	3	Eritrea
17	30	0	2	96	153	8	28	4	14	Eswatini
400	875	110	156	2 572	4 562	167	345	104	282	Ethiopia
36	58	17	20	354	305	10	12	10	16	Gabon
12	7	0	0	431	440	1	3	0	0	Gambia
338	645	60	103	2 234	3 182	112	268	52	121	Ghana
10	16	1	3	225	262	5	3	0	0	Guinea
4	7	0	0	130	135	0	0	0	0	Guinea-Bissau
696	867	63	83	3 345	4 241	133	261	69	146	Kenya
5	10	1	0	51	75	5	8	5	5	Lesotho
9	8	1	2	104	190	3	4	0	1	Liberia
99	138	30	40	366	433	18	22	18	16	Madagascar
61	94	10	30	1 082	1 522	37	36	3	2	Malawi
30	73	5	5	436	519	13	22	4	3	Mali
36	56	9	3	144	188	52	91	29	20	Mauritius
61	105	25	33	546	772	14	30	4	11	Mozambique
110	160	48	48	253	255	78	112	37	87	Namibia
52	49	10	30	183	223	11	15	12	10	Niger
739	1 616	293	325	6 363	7 663	530	1 055	484	1 538	Nigeria
32	87	5	11	572	693	28	65	6	21	Rwanda
1	6	0	0	7	7	0	0	0	0	Sao Tome & Principe
119	177	44	39	1 076	1 016	155	293	66	79	Senegal
28	35	1	1	37	64	1	0	0	0	Seychelles
12	11	1	3	238	312	6	9	0	2	Sierra Leone
2	2	1	1	25	89	2	5	0	2	Somalia
3 192	4 573	1 030	1 212	16 422	20 379	2 984	3 967	4 524	5 533	South Africa
3	6	0	0	27	58	1	2	0	1	South Sudan
17	49	4	2	307	297	5	15	12	21	Togo
207	286	31	20	2 606	3 292	64	156	14	29	Uganda
287	457	65	97	2 109	2 571	77	135	45	41	Tanzania
78	115	16	11	888	1 078	26	39	15	19	Zambia
219	290	8	9	723	997	39	56	14	30	Zimbabwe
<b>5 478</b>	<b>8 346</b>	<b>3 427</b>	<b>3 809</b>	<b>48 078</b>	<b>65 737</b>	<b>21 586</b>	<b>29 835</b>	<b>16 025</b>	<b>23 246</b>	<b>Arab States</b>
567	780	238	352	1 225	1 364	2 668	3 563	2 328	3 034	Algeria
21	37	3	14	603	717	57	127	95	152	Bahrain
1 198	1 906	962	1 053	14 990	19 385	3 267	3 975	4 027	5 258	Egypt
200	558	194	190	881	6 198	545	1 584	655	2 734	Iraq
237	370	115	109	2 017	3 371	874	1 644	399	636	Jordan
98	190	99	91	1 284	1 553	441	535	170	332	Kuwait
181	344	70	70	2 822	4 232	825	1 027	351	410	Lebanon
38	45	47	38	304	313	153	132	66	106	Libya
11	18	3	4	54	79	3	13	5	6	Mauritania
315	607	325	407	3 482	3 181	1 944	3 899	1 391	2 048	Morocco
166	244	130	130	1 194	1 334	280	449	246	360	Oman
59	104	19	12	446	659	84	235	176	349	Palestine
208	342	49	45	2 562	3 513	1 143	1 161	845	1 114	Qatar
1 486	2 166	1 045	1 098	13 843	17 685	6 594	7 899	5 386	7 372	Saudi Arabia
53	83	23	35	798	897	176	151	82	183	Sudan
49	47	30	24	440	521	29	59	104	103	Syrian Arab Rep.
722	786	289	352	4 363	4 435	2 948	3 480	1 665	1 889	Tunisia
378	638	164	199	2 474	4 353	1 529	2 754	763	1 471	United Arab Emirates
33	40	78	31	334	414	81	174	91	215	Yemen

**Table D2: Publications by broad field of science, 2014–2016 and 2017–2019**

Regional/national level	Agriculture, fisheries & forestry		Animal & plant biology		Built environment & design		Chemistry		Cross-cutting strategic technologies		Engineering	
	2014–2016	2017–2019	2014–2016	2017–2019	2014–2016	2017–2019	2014–2016	2017–2019	2014–2016	2017–2019	2014–2016	2017–2019
<b>Asia</b>	<b>77 078</b>	<b>103 837</b>	<b>78 114</b>	<b>90 774</b>	<b>22 197</b>	<b>33 984</b>	<b>258 332</b>	<b>308 319</b>	<b>559 540</b>	<b>760 274</b>	<b>353 440</b>	<b>436 791</b>
<b>Central Asia</b>	<b>190</b>	<b>297</b>	<b>299</b>	<b>472</b>	<b>25</b>	<b>99</b>	<b>564</b>	<b>796</b>	<b>1 608</b>	<b>3 149</b>	<b>824</b>	<b>1 332</b>
Kazakhstan	80	150	139	265	16	84	320	510	1 254	2 405	641	1 041
Kyrgyzstan	41	42	28	33	2	4	12	3	30	55	27	61
Mongolia	37	55	72	83	4	7	32	47	96	151	67	102
Tajikistan	13	12	21	17	1	3	32	62	27	51	19	29
Turkmenistan	0	1	2	5	0	0	1	0	7	7	8	2
Uzbekistan	27	41	45	87	2	1	172	188	202	499	68	99
<b>South Asia</b>	<b>15 190</b>	<b>16 455</b>	<b>17 568</b>	<b>19 575</b>	<b>1 894</b>	<b>5 559</b>	<b>41 701</b>	<b>49 411</b>	<b>73 960</b>	<b>128 549</b>	<b>35 684</b>	<b>51 552</b>
Afghanistan	14	50	13	14	0	11	1	7	15	68	7	42
Bangladesh	705	941	591	726	60	132	540	762	1 343	2 701	895	1 417
Bhutan	28	27	28	39	0	3	7	5	7	33	6	20
India	12 694	12 653	13 237	14 716	1 643	4 940	37 920	44 098	67 164	115 510	32 124	45 517
Maldives	4	6	18	22	0	0	1	1	0	10	1	2
Nepal	121	186	116	188	10	27	79	89	197	332	124	163
Pakistan	1 455	2 468	3 469	3 781	137	353	3 144	4 479	4 759	9 073	2 212	3 899
Sri Lanka	265	306	242	313	49	111	145	170	592	1 161	401	697
<b>Southeast Asia</b>	<b>54 975</b>	<b>78 774</b>	<b>53 078</b>	<b>63 558</b>	<b>18 171</b>	<b>24 757</b>	<b>198 173</b>	<b>237 109</b>	<b>448 479</b>	<b>585 031</b>	<b>291 378</b>	<b>352 206</b>
Brunei Darussalam	21	31	55	68	6	11	61	63	266	381	123	174
Cambodia	72	105	53	88	4	16	7	9	24	53	24	49
China	34 902	54 783	31 396	40 032	10 315	15 518	136 051	171 930	299 848	407 748	206 583	256 288
China, Hong Kong SAR	349	515	561	724	1 402	1 806	3 205	3 377	8 852	11 957	5 843	6 819
China, Macao SAR	42	115	33	50	47	61	493	716	852	1 474	572	800
China, Taiwan Prov.	1 584	1 458	1 703	1 700	1 166	818	6 945	7 180	18 392	17 381	12 759	10 429
Indonesia	1 308	2 741	1 070	1 718	154	958	809	2 494	5 848	23 135	1 818	13 831
Japan	7 156	7 633	9 328	9 432	2 294	2 234	27 945	28 518	55 226	55 534	31 791	30 971
Korea DPR	5	9	3	7	0	1	13	31	48	114	36	73
Korea Rep.	6 072	6 831	5 143	5 993	1 961	2 107	18 800	20 144	38 315	44 387	23 609	24 025
Lao PDR	82	106	54	79	4	4	9	14	20	36	22	42
Malaysia	2 118	2 777	2 556	2 231	846	1 504	5 240	5 631	21 804	27 101	7 943	9 413
Myanmar	25	63	82	233	1	9	20	59	90	203	34	59
Philippines	452	574	903	1 150	30	43	138	232	755	1 740	527	627
Singapore	347	484	715	829	683	944	4 232	3 842	11 237	12 924	6 604	7 126
Thailand	2 326	3 078	2 249	2 652	240	314	2 569	3 463	6 439	9 688	3 312	4 662
Timor-Leste	9	6	7	15	0	1	0	1	5	16	0	10
Viet Nam	552	984	783	1 128	116	329	909	1 832	2 397	5 202	1 463	2 817
<b>Oceania</b>	<b>10 333</b>	<b>11 590</b>	<b>12 641</b>	<b>12 440</b>	<b>3 515</b>	<b>4 424</b>	<b>9 946</b>	<b>10 965</b>	<b>28 872</b>	<b>33 901</b>	<b>18 091</b>	<b>20 821</b>
Australia	8 125	9 130	10 444	10 454	3 115	3 998	8 785	9 737	25 825	30 467	16 284	18 760
New Zealand	2 560	2 783	2 531	2 403	439	473	1 258	1 376	3 199	3 650	1 918	2 191
Cook Islands	3	0	7	9	0	0	0	0	1	0	0	0
Fiji	47	80	78	59	5	6	24	46	171	166	60	78
Kiribati	2	0	4	0	0	1	0	0	0	9	1	0
Marshall Islands	1	4	1	0	0	0	0	0	2	5	0	0
Micronesia	3	5	9	9	0	0	1	0	1	1	0	0
Nauru	0	0	0	0	0	0	0	0	0	0	0	0
Niue	0	0	0	1	0	0	0	0	0	0	0	0
Palau	2	4	16	19	0	0	3	2	0	2	1	1
Papua New Guinea	32	53	73	63	0	3	15	6	22	35	15	25
Samoa	7	15	14	12	0	0	0	0	3	3	0	0
Solomon Islands	19	23	14	15	0	2	1	1	1	3	0	0
Tonga	6	11	2	7	0	0	0	5	0	1	0	0
Tuvalu	1	1	3	1	0	0	0	0	0	0	0	0
Vanuatu	15	7	21	24	0	0	0	0	1	6	0	1

**KEY** –: data unavailable | -n/+n: data refer to n years before or after reference year | 0: magnitude nil or negligible | a: not applicable

GDP: gross domestic product | MF: males and females | PPP\$: purchasing power parity dollars

Environmental sciences (excl. geosciences)		Geosciences		Health sciences		ICTs, maths & statistics		Physics & astronomy		Regional/national level
2014–2016	2017–2019	2014–2016	2017–2019	2014–2016	2017–2019	2014–2016	2017–2019	2014–2016	2017–2019	
89 065	132 192	34 285	43 707	712 150	831 652	253 176	327 303	303 303	385 933	Asia
496	1 350	320	462	1 183	2 360	889	1 476	1 669	2 317	Central Asia
275	922	109	163	655	1 536	528	970	1 010	1 480	Kazakhstan
42	86	76	86	111	268	17	76	33	72	Kyrgyzstan
123	169	106	131	251	341	41	60	99	228	Mongolia
20	48	23	35	37	81	32	32	68	84	Tajikistan
5	1	5	1	4	5	21	5	22	7	Turkmenistan
46	162	19	58	171	246	262	344	472	501	Uzbekistan
13 099	17 269	3 203	4 062	97 422	108 424	44 604	65 294	43 407	58 259	South Asia
11	57	2	3	164	242	46	144	6	16	Afghanistan
535	918	57	94	3 163	3 406	2 061	3 388	681	1 338	Bangladesh
36	41	6	4	85	128	10	10	9	3	Bhutan
10 741	12 911	2 747	3 442	81 460	87 095	38 320	54 055	39 507	50 753	India
17	15	1	1	14	29	2	2	1	1	Maldives
387	524	46	62	1 775	2 624	29	68	74	91	Nepal
1 261	2 690	326	437	10 548	14 747	3 923	7 343	3 559	6 697	Pakistan
295	415	36	51	1 367	1 874	291	494	267	413	Sri Lanka
69 836	105 916	27 293	35 419	539 403	624 675	184 602	233 684	238 150	301 512	Southeast Asia
62	76	34	93	244	226	75	63	54	88	Brunei Darussalam
81	128	11	12	614	706	9	32	9	17	Cambodia
49 691	78 415	21 593	28 514	269 280	334 630	113 574	156 081	137 986	182 735	China
1 624	2 808	436	508	13 706	15 574	6 723	7 258	4 884	5 499	China, Hong Kong SAR
76	142	16	34	1 196	1 757	850	1 194	293	479	China, Macao SAR
2 800	3 209	707	1 029	30 224	30 060	12 818	11 643	14 013	12 774	China, Taiwan Prov.
985	3 942	281	505	3 123	10 404	1 585	4 770	2 907	19 873	Indonesia
8 541	9 804	3 677	4 000	135 444	136 210	23 458	24 463	52 522	51 779	Japan
3	11	9	18	26	29	30	64	49	113	Korea DPR
4 731	6 235	901	1 257	68 851	74 886	19 373	20 938	25 878	26 440	Korea Rep.
97	73	10	19	304	374	14	9	5	5	Lao PDR
2 535	3 798	523	558	11 012	14 002	5 994	7 233	6 810	10 886	Malaysia
38	83	34	62	234	567	12	132	12	31	Myanmar
428	651	55	92	1 846	2 586	491	1 528	297	754	Philippines
1 133	1 622	220	326	14 238	16 708	6 452	6 508	5 886	5 720	Singapore
1 081	1 648	223	271	12 205	15 421	2 222	3 259	2 135	3 795	Thailand
7	11	2	2	43	50	5	5	2	5	Timor-Leste
605	1 347	114	254	1 943	3 809	2 455	3 676	1 498	3 021	Viet Nam
16 612	18 663	6 078	6 932	105 587	120 516	16 012	17 854	17 620	17 763	Oceania
14 337	16 122	5 113	5 943	94 540	108 282	13 931	15 516	16 116	16 106	Australia
2 743	3 054	1 143	1 201	13 903	15 777	2 249	2 535	1 804	2 039	New Zealand
6	6	2	0	3	6	1	0	0	1	Cook Islands
72	126	9	10	163	231	36	21	6	13	Fiji
3	0	0	0	9	15	0	0	0	0	Kiribati
2	2	0	0	8	8	1	0	0	0	Marshall Islands
6	10	1	0	27	40	0	0	0	0	Micronesia
1	0	0	0	6	1	0	0	0	0	Nauru
3	3	0	0	1	2	0	0	0	0	Niue
10	24	2	1	6	13	0	0	0	0	Palau
51	65	9	12	243	294	11	26	1	15	Papua New Guinea
10	12	1	0	27	47	1	2	0	0	Samoa
24	26	1	0	60	71	0	0	0	0	Solomon Islands
6	5	0	0	12	17	2	3	0	0	Tonga
2	1	0	0	4	4	0	0	0	0	Tuvalu
17	15	12	6	35	28	0	0	0	0	Vanuatu

Note: The sum of the numbers for the various regions exceeds the total number because papers with multiple authors from different regions are counted for each of these regions.

Source: Scopus (Elsevier), data treatment by Science-Metrix, excluding Social sciences, Arts and Humanities

**Table D3:** Scientific publications resulting from international collaboration, 2014–2016 and 2017–2019

	Total number of publications		Number of publications with international co-authors		Share of publications with international co-authors (%)	
	2014–2016	2017–2019	2014–2016	2017–2019	2014–2016	2017–2019
<b>World</b>	<b>6 601 299</b>	<b>7 470 802</b>	<b>1 427 498</b>	<b>1 719 047</b>	<b>21.6</b>	<b>23.0</b>
High-income economies	4 557 940	4 821 099	1 384 917	1 645 560	30.4	34.1
Upper middle-income economies	2 136 851	2 723 887	530 159	730 323	24.8	26.8
Lower middle-income economies	536 862	791 195	155 266	226 886	28.9	28.7
Low-income economies	42 640	61 746	30 411	43 852	71.3	71.0
<b>Americas</b>	<b>1 987 255</b>	<b>2 113 353</b>	<b>696 302</b>	<b>810 930</b>	<b>35.0</b>	<b>38.4</b>
<b>North America</b>	<b>1 703 582</b>	<b>1 785 081</b>	<b>623 024</b>	<b>717 572</b>	<b>36.6</b>	<b>40.2</b>
Canada	249 579	269 630	129 906	151 911	52.1	56.3
United States of America	1 511 443	1 580 815	550 558	631 025	36.4	39.9
<b>Latin America</b>	<b>327 763</b>	<b>385 032</b>	<b>121 012</b>	<b>153 091</b>	<b>36.9</b>	<b>39.8</b>
Argentina	33 418	35 994	15 558	17 599	46.6	48.9
Belize	76	106	73	99	96.1	93.4
Bolivia	822	889	759	820	92.3	92.2
Brazil	184 798	213 394	56 994	72 708	30.8	34.1
Chile	28 172	33 967	18 079	22 900	64.2	67.4
Colombia	22 687	30 772	11 025	15 707	48.6	51.0
Costa Rica	2 253	2 984	1 720	2 257	76.3	75.6
Ecuador	4 348	10 169	3 398	7 010	78.2	68.9
El Salvador	221	228	199	178	90.0	78.1
Guatemala	616	759	557	676	90.4	89.1
Guyana	91	114	79	102	86.8	89.5
Honduras	243	455	208	398	85.6	87.5
Mexico	55 697	65 693	22 955	28 969	41.2	44.1
Nicaragua	293	370	270	333	92.2	90.0
Panama	1 416	1 833	1 295	1 654	91.5	90.2
Paraguay	546	823	405	644	74.2	78.3
Peru	5 057	8 098	3 627	5 076	71.7	62.7
Suriname	105	153	92	138	87.6	90.2
Uruguay	3 724	4 391	2 538	3 030	68.2	69.0
Venezuela	4 516	3 726	2 517	2 679	55.7	71.9
<b>Caribbean</b>	<b>8 754</b>	<b>9 051</b>	<b>5 110</b>	<b>6 078</b>	<b>58.4</b>	<b>67.2</b>
Antigua & Barbuda	29	54	26	48	89.7	88.9
Bahamas	109	205	102	191	93.6	93.2
Barbados	258	284	192	229	74.4	80.6
Cuba	5 560	5 042	2 759	2 952	49.6	58.5
Dominica	92	92	80	78	87.0	84.8
Dominican Rep.	341	528	310	495	90.9	93.8
Grenada	358	601	336	573	93.9	95.3
Haiti	308	300	295	286	95.8	95.3
Jamaica	767	909	487	621	63.5	68.3
St Kitts & Nevis	186	265	170	239	91.4	90.2
St Lucia	34	30	32	26	94.1	86.7
St Vincent & Grenadines	16	34	15	29	93.8	85.3
Trinidad & Tobago	901	951	511	555	56.7	58.4
<b>Europe</b>	<b>2 482 806</b>	<b>2 665 228</b>	<b>926 308</b>	<b>1 071 360</b>	<b>37.3</b>	<b>40.2</b>
<b>European Union</b>	<b>2 112 478</b>	<b>2 201 694</b>	<b>866 676</b>	<b>995 707</b>	<b>41.0</b>	<b>45.2</b>
Austria	61 939	66 429	39 600	45 141	63.9	68.0
Belgium	81 537	85 003	54 057	60 139	66.3	70.7
Bulgaria	11 353	14 382	5 549	6 671	48.9	46.4
Croatia	15 690	17 476	6 698	8 362	42.7	47.8
Cyprus	4 797	6 613	3 351	4 865	69.9	73.6
Czech Rep.	61 597	65 239	26 186	31 340	42.5	48.0
Denmark	66 794	73 298	40 984	48 862	61.4	66.7
Estonia	7 226	8 168	4 461	5 760	61.7	70.5
Finland	49 192	51 410	29 590	33 763	60.2	65.7
France	306 083	306 211	166 820	180 387	54.5	58.9

**Main foreign collaborators (2017–2019)**  
*The number of articles is given within brackets*

First collaborator(s)	Second collaborator(s)	Third collaborator(s)	Fourth collaborator(s)	Fifth collaborator(s)	
					<b>World</b>
					High-income economies
					Upper middle-income economies
					Lower middle-income economies
					Low-income economies
					<b>Americas</b>
					<b>North America</b>
USA (65 364)	China (26 604)	UK (22 433)	Germany (15 721)	France (15 318)	Canada
China (158 219)	UK (83 678)	Germany (69 443)	Canada (65 364)	France (45 675)	United States of America
					<b>Latin America</b>
USA (5 955)	Spain (3 939)	Brazil (3 428)	Germany (2 701)	France (2 541)	Argentina
USA (65)	UK (23)	Mexico (18)	Canada (15)	Australia (11)	Belize
USA (262)	Brazil (194)	France (139)	Peru (134)	Spain (132)	Bolivia
USA (25 770)	UK (10 880)	Germany (8 757)	Spain (8 695)	France (8 670)	Brazil
USA (7 753)	Spain (5 866)	UK (4 127)	Germany (3 758)	France (3 259)	Chile
USA (5 418)	Spain (4 039)	Brazil (3 347)	UK (2 326)	Mexico (2 236)	Colombia
USA (975)	Spain (379)	Brazil (366)	Mexico (342)	Germany (335)	Costa Rica
Spain (2 506)	USA (1 832)	Colombia (1 030)	Brazil (996)	Mexico (941)	Ecuador
USA (92)	Mexico (54)	Spain (35)	Guatemala; Panama (27)		El Salvador
USA (409)	Mexico (159)	Brazil (102)	UK (86)	Spain (79)	Guatemala
USA (55)	UK (26)	Australia; France (18)		Brazil (17)	Guyana
USA (225)	Brazil (99)	Colombia (95)	Spain (92)	Mexico (78)	Honduras
USA (11 478)	Spain (6 051)	UK (3 467)	France (3 371)	Germany (3 063)	Mexico
USA (184)	Mexico (71)	Spain (56)	Colombia; Costa Rica (52)		Nicaragua
USA (1 025)	UK (289)	Germany (244)	Brazil (242)	Spain (215)	Panama
Spain (193)	Brazil; USA (187)		Chile (154)	Argentina (133)	Paraguay
USA (2 188)	Brazil (1 266)	UK (882)	Spain (863)	France (670)	Peru
Netherlands (64)	USA (51)	France (34)	Belgium; Brazil (31)		Suriname
Brazil (831)	USA (783)	Argentina (730)	Spain (599)	Mexico (339)	Uruguay
USA (781)	Colombia (667)	Ecuador (571)	Spain (506)	Brazil (417)	Venezuela
					<b>Caribbean</b>
USA (33)	Canada (6)	Egypt; Spain (5)		Australia; Dominica (4)	Antigua & Barbuda
USA (137)	UK (51)	Canada (45)	Australia (29)	Germany (25)	Bahamas
USA (112)	UK (67)	Canada (46)	Jamaica (33)	Trinidad & Tobago (31)	Barbados
Mexico (751)	Brazil (657)	Spain (607)	USA (493)	Ecuador (381)	Cuba
USA (46)	Germany; UK (11)		Brazil; Nigeria (8)		Dominica
USA (257)	Spain (135)	Brazil (74)	Mexico (71)	Argentina (62)	Dominican Rep.
USA (469)	Japan (95)	UK (58)	Canada (44)	Germany (34)	Grenada
USA (234)	UK (33)	France (29)	Canada (27)	Brazil (23)	Haiti
USA (379)	UK (118)	Canada (95)	France (52)	Mexico (51)	Jamaica
USA (114)	UK (46)	South Africa (27)	Canada; Denmark (23)		St Kitts & Nevis
USA (14)	Dominica; Nepal (5)		Barbados; Jamaica; Trinidad & Tobago (4)		St Lucia
USA (20)	Canada (6)	Nigeria; UK (4)		Barbados; Trinidad & Tobago (3)	St Vincent & Grenadines
USA (207)	UK (168)	India (92)	Canada (63)	Jamaica (45)	Trinidad & Tobago
					<b>Europe</b>
					<b>European Union</b>
Germany (17 902)	USA (11 685)	UK (8 723)	Italy (7 628)	France (6 506)	Austria
USA (15 177)	UK (14 054)	France (13 763)	Germany (12 810)	Netherlands (12 019)	Belgium
Germany (1 994)	Italy (1 717)	USA (1 666)	UK (1 486)	Russian Fed. (1 381)	Bulgaria
Italy (2 322)	Germany (2 302)	UK; USA (2 014)		France (1 758)	Croatia
Greece (1 863)	UK (1 518)	USA (1 232)	Italy (1 143)	Germany (1 109)	Cyprus
Germany (7 412)	USA (6 889)	UK (5 567)	France (5 001)	Italy (4 904)	Czech Rep.
USA (14 544)	UK (12 059)	Germany (10 548)	Sweden (7 809)	Netherlands (6 484)	Denmark
Germany (1 672)	Finland (1 649)	UK (1 622)	USA (1 524)	Italy (1 262)	Estonia
USA (8 609)	UK (7 642)	Germany (7 049)	Sweden (6 440)	France (4 592)	Finland
USA (45 675)	UK (32 518)	Germany (31 902)	Italy (26 818)	Spain (20 449)	France

**Table D3:** Scientific publications resulting from international collaboration, 2014–2016 and 2017–2019

	Total number of publications		Number of publications with international co-authors		Share of publications with international co-authors (%)	
	2014–2016	2017–2019	2014–2016	2017–2019	2014–2016	2017–2019
Germany	437 300	452 764	219 668	242 604	50.2	53.6
Greece	46 734	48 653	23 672	26 857	50.7	55.2
Hungary	27 961	29 641	14 609	16 250	52.2	54.8
Ireland	31 570	36 082	19 216	23 444	60.9	65.0
Italy	275 284	297 923	127 821	148 837	46.4	50.0
Latvia	5 121	6 209	2 025	2 802	39.5	45.1
Lithuania	8 432	9 364	3 801	5 080	45.1	54.3
Luxembourg	4 549	5 080	3 556	4 104	78.2	80.8
Malta	1 538	2 047	934	1 287	60.7	62.9
Netherlands	141 393	151 043	85 801	98 506	60.7	65.2
Poland	118 501	130 658	36 115	44 784	30.5	34.3
Portugal	59 624	65 537	31 368	37 237	52.6	56.8
Romania	38 069	40 988	13 514	15 096	35.5	36.8
Slovakia	19 408	20 917	8 702	10 333	44.8	49.4
Slovenia	14 285	14 960	7 745	8 847	54.2	59.1
Spain	217 928	231 786	109 166	124 587	50.1	53.8
Sweden	98 660	106 721	62 323	72 980	63.2	68.4
United Kingdom	425 893	462 349	245 324	292 039	57.6	63.2
<b>Southeast Europe</b>	<b>24 623</b>	<b>26 195</b>	<b>10 577</b>	<b>13 080</b>	<b>43.0</b>	<b>49.9</b>
Albania	891	993	532	673	59.7	67.8
Bosnia & Herzegovina	2 487	3 426	1 432	2 050	57.6	59.8
Montenegro	1 005	1 288	631	840	62.8	65.2
North Macedonia	2 240	2 307	1 132	1 303	50.5	56.5
Serbia	19 199	19 873	8 049	9 906	41.9	49.8
<b>European Free Trade Assoc.</b>	<b>164 208</b>	<b>180 082</b>	<b>108 339</b>	<b>124 309</b>	<b>66.0</b>	<b>69.0</b>
Iceland	3 916	4 415	3 075	3 642	78.5	82.5
Liechtenstein	287	272	242	253	84.3	93.0
Norway	49 290	57 340	30 297	36 823	61.5	64.2
Switzerland	114 004	122 079	78 014	87 615	68.4	71.8
<b>Eastern Europe &amp; West Asia</b>	<b>500 826</b>	<b>641 952</b>	<b>129 604</b>	<b>169 934</b>	<b>25.9</b>	<b>26.5</b>
Armenia	3 039	3 391	1 908	2 287	62.8	67.4
Azerbaijan	2 299	3 613	1 237	1 797	53.8	49.7
Belarus	5 212	6 463	3 240	4 381	62.2	67.8
Georgia	2 861	3 339	1 713	2 227	59.9	66.7
Iran Islamic Rep.	129 434	166 118	26 317	41 656	20.3	25.1
Israel	49 121	53 149	25 138	28 618	51.2	53.8
Moldova, Rep.	1 270	1 344	874	920	68.8	68.5
Russian Federation	183 316	266 776	48 570	64 015	26.5	24.0
Turkey	109 590	118 821	23 312	29 177	21.3	24.6
Ukraine	28 687	37 966	11 298	13 884	39.4	36.6
<b>Africa</b>	<b>187 255</b>	<b>249 727</b>	<b>100 341</b>	<b>136 020</b>	<b>53.6</b>	<b>54.5</b>
<b>Sub-Saharan Africa</b>	<b>94 058</b>	<b>126 880</b>	<b>55 075</b>	<b>76 142</b>	<b>58.6</b>	<b>60.0</b>
Angola	271	342	243	316	89.7	92.4
Benin	1 155	1 508	965	1 204	83.5	79.8
Botswana	1 122	1 677	860	1 359	76.6	81.0
Burkina Faso	1 434	1 619	1 201	1 400	83.8	86.5
Burundi	131	199	118	194	90.1	97.5
Cameroon	3 251	4 538	2 374	3 324	73.0	73.2
Cabo Verde	96	114	95	113	99.0	99.1
Central African Rep.	146	155	119	137	81.5	88.4
Chad	102	170	98	161	96.1	94.7
Comoros	31	50	31	50	100.0	100.0
Congo	623	685	533	605	85.6	88.3
Côte d'Ivoire	1 006	1 397	716	1 097	71.2	78.5
Congo, Dem. Rep.	848	1 156	736	1 070	86.8	92.6
Djibouti	57	61	54	59	94.7	96.7
Equatorial Guinea	44	40	44	39	100.0	97.5



**Main foreign collaborators (2017–2019)**  
*The number of articles is given within brackets*

First collaborator(s)	Second collaborator(s)	Third collaborator(s)	Fourth collaborator(s)	Fifth collaborator(s)	
USA (69 443)	UK (45 561)	France (31 902)	Italy (28 675)	Switzerland (26 969)	Germany
UK (8 272)	USA (7 471)	Italy (6 181)	Germany (6 094)	France (4 852)	Greece
Germany (4 896)	USA (4 849)	UK (4 062)	France (3 132)	Italy (3 127)	Hungary
UK (8 966)	USA (6 364)	Germany (4 239)	Italy (3 490)	France (3 487)	Ireland
USA (41 375)	UK (32 974)	Germany (28 675)	France (26 818)	Spain (22 367)	Italy
Germany (898)	Russian Fed. (840)	UK (755)	Poland (749)	Lithuania (728)	Latvia
Germany (1 319)	USA (1 197)	UK (1 196)	Poland (1 195)	Italy (1 145)	Lithuania
Germany (1 238)	France (941)	UK (798)	USA (714)	Italy (631)	Luxembourg
UK (547)	Italy (527)	Germany (287)	Spain (270)	France (252)	Malta
USA (29 970)	UK (26 538)	Germany (24 994)	Italy (14 639)	France (14 380)	Netherlands
USA (10 851)	Germany (10 587)	UK (8 391)	Italy (7 443)	France (7 191)	Poland
Spain (9 826)	UK (7 784)	USA (7 123)	Brazil (6 886)	Germany (5 907)	Portugal
France (3 465)	Germany (3 352)	Italy (3 284)	USA (3 161)	UK (2 649)	Romania
Czech Rep. (3 987)	Poland (1 982)	Germany (1 790)	USA (1 520)	Russian Fed. (1 386)	Slovakia
Italy (2 301)	Germany (2 122)	USA (1 912)	UK (1 814)	France (1 591)	Slovenia
USA (30 910)	UK (25 679)	Italy (22 367)	Germany (21 935)	France (20 449)	Spain
USA (20 923)	UK (16 701)	Germany (15 303)	France (9 214)	Italy (9 168)	Sweden
USA (83 678)	Germany (45 561)	China (41 732)	Italy (32 974)	France (32 518)	United Kingdom
					<b>Southeast Europe</b>
Italy (271)	USA (112)	Germany (105)	Spain (100)	UK (99)	Albania
Serbia (776)	Croatia (591)	Germany (250)	Slovenia (243)	USA (212)	Bosnia & Herzegovina
Serbia (380)	Croatia (186)	Italy (162)	Slovenia (120)	France (119)	Montenegro
Serbia (310)	Germany (264)	USA (223)	Italy (215)	Croatia (207)	North Macedonia
USA (2 211)	Italy (2 142)	Germany (2 132)	UK (1 903)	Spain (1 669)	Serbia
					<b>European Free Trade Assoc.</b>
USA (1 268)	Sweden (1 017)	UK (988)	Germany (814)	Denmark (773)	Iceland
Austria (129)	Germany (123)	Switzerland (83)	USA (63)	Italy (26)	Liechtenstein
USA (9 871)	UK (8 884)	Germany (7 000)	Sweden (6 740)	Denmark (4 945)	Norway
USA (28 241)	Germany (26 969)	UK (19 863)	France (16 560)	Italy (14 951)	Switzerland
					<b>Eastern Europe &amp; West Asia</b>
Russian Fed. (1 338)	USA (1 188)	Germany (1 076)	France (1 037)	Italy (1 008)	Armenia
Turkey (895)	Russian Fed. (831)	USA (518)	Germany (505)	China (455)	Azerbaijan
Russian Fed. (2 687)	Germany (1 121)	Poland (1 105)	USA (998)	France (961)	Belarus
USA (1 175)	Germany (1 026)	UK (928)	Russian Fed. (913)	Italy (891)	Georgia
USA (9 833)	Canada (4 578)	UK (3 859)	Australia (3 673)	Italy (3 586)	Iran, Islamic Rep.
USA (14 376)	Germany (5 832)	UK (4 704)	Italy (4 102)	France (3 619)	Israel
Germany (266)	Romania (264)	Russian Fed. (223)	USA (146)	France (115)	Moldova, Rep.
USA (14 476)	Germany (14 026)	France (8 621)	UK (7 874)	China (7 297)	Russian Federation
USA (9 132)	UK (4 453)	Germany (4 279)	Italy (3 785)	France (3 121)	Turkey
Poland (3 961)	Russian Fed. (3 583)	Germany (2 794)	USA (2 532)	France (1 881)	Ukraine
					<b>Africa</b>
					<b>Sub-Saharan Africa</b>
Portugal (123)	USA (64)	Brazil (57)	Spain (40)	Germany (35)	Angola
France (403)	USA (233)	Belgium (172)	UK (155)	Germany (151)	Benin
South Africa (510)	USA (488)	UK (254)	India (129)	Zimbabwe (111)	Botswana
France (484)	USA (318)	UK (265)	Germany (190)	Ghana (163)	Burkina Faso
Belgium (45)	USA (37)	China (34)	Uganda (29)	UK (28)	Burundi
France (879)	USA (728)	UK (513)	South Africa (506)	Germany (436)	Cameroon
Portugal (63)	Spain (28)	Brazil (23)	UK (18)	USA (16)	Cabo Verde
France (67)	UK (30)	Cameroon (28)	USA (23)	Belgium; Gabon (18)	Central African Rep.
France (61)	USA (42)	Switzerland (38)	UK (34)	Cameroon (33)	Chad
France (21)	Madagascar (10)	China (9)	Italy; Morocco (6)		Comoros
USA (236)	UK (137)	France (134)	Democratic Rep. of Congo (123)	Switzerland (105)	Congo
France (502)	USA (217)	Switzerland (163)	UK (152)	Germany (146)	Côte d'Ivoire
USA (390)	Belgium (375)	France (193)	UK (173)	South Africa (135)	Congo, Dem. Rep.
France (37)	Italy; USA (9)		Germany (7)	China (6)	Djibouti
Spain; USA (16)		UK (10)	China; Tanzania (5)		Equatorial Guinea

**Table D3:** Scientific publications resulting from international collaboration, 2014–2016 and 2017–2019

	Total number of publications		Number of publications with international co-authors		Share of publications with international co-authors (%)	
	2014–2016	2017–2019	2014–2016	2017–2019	2014–2016	2017–2019
Eritrea	72	127	64	91	88.9	71.7
Eswatini	161	296	154	270	95.7	91.2
Ethiopia	5 072	9 569	3 068	5 527	60.5	57.8
Gabon	529	547	471	486	89.0	88.8
Gambia	475	493	465	480	97.9	97.4
Ghana	3 957	6 517	2 733	4 644	69.1	71.3
Guinea	279	338	258	319	92.5	94.4
Guinea-Bissau	142	164	142	163	100.0	99.4
Kenya	6 287	8 277	5 236	6 910	83.3	83.5
Lesotho	89	138	78	117	87.6	84.8
Liberia	130	234	128	219	98.5	93.6
Madagascar	830	990	711	890	85.7	89.9
Malawi	1 394	1 976	1 273	1 857	91.3	94.0
Mali	675	850	617	776	91.4	91.3
Mauritius	565	945	305	599	54.0	63.4
Mozambique	850	1 269	798	1 211	93.9	95.4
Namibia	764	1 019	657	862	86.0	84.6
Niger	438	493	397	426	90.6	86.4
Nigeria	14 610	22 937	5 973	11 096	40.9	48.4
Rwanda	798	1 192	729	1 098	91.4	92.1
Sao Tome & Principe	9	25	8	25	88.9	100.0
Senegal	1 942	2 234	1 424	1 721	73.3	77.0
Seychelles	143	154	138	149	96.5	96.8
Sierra Leone	293	414	278	401	94.9	96.9
Somalia	37	127	35	125	94.6	98.4
South Africa	45 105	57 905	24 401	32 677	54.1	56.4
South Sudan	38	83	35	81	92.1	97.6
Togo	426	511	296	382	69.5	74.8
Uganda	3 608	4 708	3 058	4 079	84.8	86.6
Tanzania	3 533	4 483	2 956	3 794	83.7	84.6
Zambia	1 250	1 642	1 145	1 490	91.6	90.7
Zimbabwe	1 502	2 176	1 119	1 713	74.5	78.7
<b>Arab States</b>	<b>177 297</b>	<b>249 914</b>	<b>100 428</b>	<b>135 748</b>	<b>56.6</b>	<b>54.3</b>
Algeria	15 917	21 465	7 516	10 430	47.2	48.6
Bahrain	1 043	1 646	631	1 001	60.5	60.8
Egypt	44 993	60 368	23 269	31 567	51.7	52.3
Iraq	5 826	23 258	3 903	8 302	67.0	35.7
Jordan	6 331	10 737	3 537	5 745	55.9	53.5
Kuwait	3 760	4 981	2 115	3 044	56.3	61.1
Lebanon	6 386	8 789	4 221	5 825	66.1	66.3
Libya	1 155	1 316	906	1 092	78.4	83.0
Mauritania	127	179	116	159	91.3	88.8
Morocco	12 711	19 440	5 279	7 208	41.5	37.1
Oman	3 759	4 908	2 538	3 571	67.5	72.8
Palestine	1 294	2 141	909	1 451	70.2	67.8
Qatar	8 323	10 200	7 050	8 494	84.7	83.3
Saudi Arabia	52 199	65 785	39 530	49 817	75.7	75.7
Sudan	1 855	2 511	1 433	2 067	77.3	82.3
Syrian Arab Rep.	1 197	1 328	597	625	49.9	47.1
Tunisia	19 554	22 333	9 862	12 120	50.4	54.3
United Arab Emirates	11 226	17 855	7 526	12 664	67.0	70.9
Yemen	914	1 500	763	1 392	83.5	92.8
<b>Asia</b>	<b>2 740 680</b>	<b>3 454 766</b>	<b>615 593</b>	<b>823 669</b>	<b>22.5</b>	<b>23.8</b>
<b>Central Asia</b>	<b>8 067</b>	<b>14 110</b>	<b>4 808</b>	<b>8 590</b>	<b>59.6</b>	<b>60.9</b>
Kazakhstan	5 027	9 526	2 777	5 604	55.2	58.8
Kyrgyzstan	419	786	318	595	75.9	75.7
Mongolia	928	1 374	836	1 261	90.1	91.8

**Main foreign collaborators (2017–2019)**  
*The number of articles is given within brackets*

First collaborator(s)	Second collaborator(s)	Third collaborator(s)	Fourth collaborator(s)	Fifth collaborator(s)	
China (24)	India (18)	USA (17)	South Africa (11)	Switzerland (10)	Eritrea
South Africa (155)	USA (107)	UK (36)	Switzerland (35)	Germany (25)	Eswatini
USA (1 419)	India (897)	UK (854)	Germany (525)	South Africa (522)	Ethiopia
France (228)	Germany (135)	USA (129)	UK (87)	Cameroon (73)	Gabon
UK (339)	USA (180)	South Africa (82)	Netherlands (75)	Australia (74)	Gambia
USA (1 422)	UK (1 016)	South Africa (699)	China (631)	Nigeria (459)	Ghana
France (117)	USA (102)	UK (79)	Belgium (66)	Switzerland (52)	Guinea
Denmark (98)	UK (51)	Portugal (38)	USA (24)	Sweden (23)	Guinea-Bissau
USA (2 900)	UK (1 871)	South Africa (1 024)	Germany (750)	Uganda (591)	Kenya
South Africa (55)	USA (47)	Switzerland (13)	Malawi (10)	Botswana; Uganda (8)	Lesotho
USA (150)	UK (55)	Nigeria (44)	Ghana (39)	Germany (36)	Liberia
USA (337)	France (326)	UK (192)	Germany (159)	Italy (76)	Madagascar
USA (892)	UK (743)	South Africa (369)	Kenya (193)	Uganda (167)	Malawi
USA (314)	France (232)	UK (162)	Burkina Faso (126)	Kenya (103)	Mali
Turkey (135)	South Africa (129)	UK (113)	India (109)	Italy (101)	Mauritius
USA (372)	Spain (235)	South Africa (233)	UK (226)	Brazil (221)	Mozambique
South Africa (451)	USA (229)	UK (190)	Germany (182)	Australia (118)	Namibia
USA (129)	France (122)	Burkina Faso (75)	UK (73)	Senegal (66)	Niger
South Africa (2 765)	USA (2 122)	Malaysia (1 939)	UK (1 890)	India (819)	Nigeria
USA (481)	UK (171)	South Africa (161)	Kenya (153)	Uganda (123)	Rwanda
Portugal (19)	Brazil; UK (6)		Angola; Australia; France; South Africa; Spain; USA (4)		Sao Tome & Principe
France (862)	USA (442)	UK (227)	South Africa (146)	Germany (139)	Senegal
UK (68)	USA (64)	France (40)	Australia; South Africa (35)		Seychelles
USA (161)	UK (144)	China (57)	South Africa (44)	Ghana; Switzerland (40)	Sierra Leone
USA (40)	Italy (28)	Sweden (15)	UK (13)	Kenya; Malaysia (12)	Somalia
USA (10 110)	UK (7 474)	Australia (4 173)	Germany (4 155)	France (3 262)	South Africa
USA (32)	Uganda (24)	Kenya (15)	UK (13)	Sudan; Switzerland (11)	South Sudan
France (144)	Burkina Faso (91)	USA (80)	Benin (72)	Côte d'Ivoire (62)	Togo
USA (2 039)	UK (1 184)	South Africa (625)	Kenya (591)	Canada (381)	Uganda
USA (1 439)	UK (913)	South Africa (508)	Kenya (487)	Germany (437)	Tanzania
USA (752)	UK (424)	South Africa (390)	Kenya (183)	Uganda (147)	Zambia
South Africa (865)	USA (513)	UK (438)	Uganda (156)	Kenya (141)	Zimbabwe
					<b>Arab States</b>
France (5 153)	Saudi Arabia (980)	Spain (870)	Italy (678)	USA (578)	Algeria
Saudi Arabia (241)	Egypt (171)	USA (169)	UK (123)	India (119)	Bahrain
Saudi Arabia (11 523)	USA (6 151)	Germany (3 193)	China (3 074)	UK (2 865)	Egypt
Malaysia (2 116)	UK (1 812)	USA (1 174)	Australia (785)	Iran, Islamic Rep. (717)	Iraq
USA (1 549)	Saudi Arabia (1 025)	UK (664)	United Arab Emirates (617)	Germany (539)	Jordan
USA (890)	Egypt (465)	Saudi Arabia (435)	UK (407)	Iran, Islamic Rep. (273)	Kuwait
France (2 476)	USA (1 773)	UK (574)	Canada (519)	Italy (496)	Lebanon
UK (236)	Malaysia (216)	Egypt (185)	USA (123)	Saudi Arabia (100)	Libya
France (68)	Senegal (51)	Morocco (37)	Tunisia (25)	UK (24)	Mauritania
France (3 388)	Spain (1 133)	USA (1 059)	Italy (756)	Canada (746)	Morocco
India (733)	UK (473)	Pakistan (444)	USA (438)	Saudi Arabia (410)	Oman
USA (329)	Turkey (285)	Malaysia (270)	UK (265)	Germany (256)	Palestine
USA (2 895)	UK (1 627)	China (1 195)	Australia (828)	Italy (822)	Qatar
Egypt (11 523)	USA (9 023)	China (6 118)	India (5 856)	Pakistan (5 691)	Saudi Arabia
Saudi Arabia (609)	China (454)	UK (236)	Malaysia (216)	USA (215)	Sudan
USA (105)	France (85)	Germany (77)	UK (72)	China (63)	Syrian Arab Rep.
France (5 701)	Saudi Arabia (2 358)	Spain (1 074)	Italy (912)	USA (658)	Tunisia
USA (3 451)	UK (1 782)	Canada (1 421)	Saudi Arabia (1 253)	China (1 161)	United Arab Emirates
Saudi Arabia (505)	Egypt (410)	Malaysia (353)	India (132)	USA (113)	Yemen
					<b>Asia</b>
					<b>Central Asia</b>
Russian Fed. (2 151)	USA (758)	Ukraine (602)	Poland (583)	China (404)	Kazakhstan
Russian Fed. (213)	Germany (139)	Turkey (131)	Kazakhstan (123)	China (106)	Kyrgyzstan
Russian Fed. (355)	USA (346)	Japan (292)	China (285)	Rep. Korea (253)	Mongolia

**Table D3:** Scientific publications resulting from international collaboration, 2014–2016 and 2017–2019

	Total number of publications		Number of publications with international co-authors		Share of publications with international co-authors (%)	
	2014–2016	2017–2019	2014–2016	2017–2019	2014–2016	2017–2019
Tajikistan	293	454	210	365	71.7	80.4
Turkmenistan	75	34	69	27	92.0	79.4
Uzbekistan	1 486	2 226	759	1 028	51.1	46.2
<b>South Asia</b>	<b>387 732</b>	<b>524 409</b>	<b>83 050</b>	<b>121 235</b>	<b>21.4</b>	<b>23.1</b>
Afghanistan	279	654	242	528	86.7	80.7
Bangladesh	10 631	15 823	5 533	8 649	52.0	54.7
Bhutan	222	313	187	262	84.2	83.7
India	337 557	445 690	59 458	80 425	17.6	18.0
Maldives	59	89	57	87	96.6	97.8
Nepal	2 958	4 354	1 938	2 956	65.5	67.9
Pakistan	34 793	55 967	16 238	29 686	46.7	53.0
Sri Lanka	3 950	6 005	2 114	3 128	53.5	52.1
<b>Southeast Asia</b>	<b>2 123 538</b>	<b>2 642 641</b>	<b>465 771</b>	<b>624 460</b>	<b>21.9</b>	<b>23.6</b>
Brunei Darussalam	1 001	1 274	700	921	69.9	72.3
Cambodia	908	1 215	864	1 187	95.2	97.7
China	1 311 219	1 726 674	263 500	386 326	20.1	22.4
China, Hong Kong SAR	47 585	56 845	33 447	43 001	70.3	75.6
China, Macao SAR	4 470	6 822	3 600	5 870	80.5	86.0
China, Taiwan Prov.	103 111	97 681	27 973	34 682	27.1	35.5
Indonesia	19 888	84 371	7 597	15 236	38.2	18.1
Japan	357 382	360 578	93 983	107 423	26.3	29.8
Korea DPR	222	470	169	273	76.1	58.1
Korea Rep.	213 634	233 243	57 818	66 450	27.1	28.5
Lao PDR	621	761	610	737	98.2	96.8
Malaysia	67 381	85 134	26 484	35 117	39.3	41.2
Myanmar	582	1 501	493	1 204	84.7	80.2
Philippines	5 922	9 977	3 219	4 660	54.4	46.7
Singapore	51 747	57 033	32 129	38 842	62.1	68.1
Thailand	35 001	48 251	14 478	19 271	41.4	39.9
Timor-Leste	80	122	77	116	96.3	95.1
Viet Nam	12 835	24 399	8 681	16 854	67.6	69.1
<b>Oceania</b>	<b>245 307</b>	<b>275 869</b>	<b>131 218</b>	<b>165 658</b>	<b>53.5</b>	<b>60.0</b>
Australia	216 615	244 515	116 783	148 223	53.9	60.6
New Zealand	33 747	37 482	19 764	23 799	58.6	63.5
Cook Islands	23	22	22	22	95.7	100.0
Fiji	671	836	482	679	71.8	81.2
Kiribati	19	25	19	23	100.0	92.0
Marshall Islands	15	19	13	17	86.7	89.5
Micronesia	48	65	44	64	91.7	98.5
Nauru	7	1	7	1	100.0	100.0
Niue	4	6	4	6	100.0	100.0
Palau	40	66	36	63	90.0	95.5
Papua New Guinea	472	597	428	541	90.7	90.6
Samoa	63	91	44	83	69.8	91.2
Solomon Islands	120	141	115	141	95.8	100.0
Tonga	28	49	28	49	100.0	100.0
Tuvalu	10	7	10	7	100.0	100.0
Vanuatu	101	87	95	80	94.1	92.0

**KEY** --: data unavailable | -n/+n: data refer to n years before or after reference year | 0: magnitude nil or negligible | a: not applicable

GDP: gross domestic product | MF: males and females | PPP\$: purchasing power parity dollars

**Main foreign collaborators (2017–2019)**  
*The number of articles is given within brackets*

First collaborator(s)	Second collaborator(s)	Third collaborator(s)	Fourth collaborator(s)	Fifth collaborator(s)	
Russian Fed. (141)	USA (58)	Germany; Pakistan (52)		China (42)	Tajikistan
Turkey (12)	USA (8)	Germany; Kazakhstan; Russian Fed. (4)			Turkmenistan
Russian Fed. (326)	China (203)	Germany (154)	USA (137)	Italy; Spain (89)	Uzbekistan
					<b>South Asia</b>
USA (151)	Japan (94)	Pakistan (82)	India; UK (68)		Afghanistan
USA (2 132)	Japan (1 513)	Australia (1 505)	Malaysia (1 070)	UK (1 059)	Bangladesh
Australia (83)	USA (80)	India (67)	Thailand (46)	Nepal; UK (41)	Bhutan
USA (23 628)	UK (9 421)	China (7 244)	Germany (6 825)	Rep. Korea (6 676)	India
India (30)	UK (22)	Italy (21)	Australia (16)	Nepal (12)	Maldives
USA (932)	India (650)	UK (531)	China (415)	Australia (357)	Nepal
China (9 216)	Saudi Arabia (5 691)	USA (4 674)	UK (3 444)	Malaysia (3 179)	Pakistan
USA (946)	UK (880)	Australia (831)	India (599)	China (577)	Sri Lanka
					<b>Southeast Asia</b>
Malaysia (220)	China (160)	UK (152)	Australia (142)	Indonesia (111)	Brunei Darussalam
USA (345)	France; Thailand (248)		UK (246)	Australia (222)	Cambodia
USA (158 219)	UK (41 732)	Australia (36 750)	Canada (26 604)	Germany (23 968)	China
USA (9 530)	UK (4 166)	Australia (3 915)	Canada (2 446)	Germany (2 002)	China, Hong Kong SAR
USA (958)	Australia (368)	UK (274)	Portugal (222)	Singapore (181)	China, Macao SAR
USA (12 604)	Japan (4 898)	UK (3 440)	Germany (3 061)	India (2 919)	China, Taiwan Prov.
Malaysia (3 633)	Japan (3 548)	Australia (1 805)	USA (1 743)	UK (1 395)	Indonesia
USA (34 260)	China (23 322)	Germany (12 817)	UK (12 268)	France (9 541)	Japan
China (234)	Germany (17)	Rep. Korea (12)	USA (9)	Italy (8)	Korea DPR
USA (28 427)	China (12 467)	Japan (7 559)	India (6 676)	UK (5 605)	Korea Rep.
Thailand (240)	UK (163)	USA (160)	Australia (145)	Viet Nam (124)	Lao PDR
UK (4 807)	India (3 851)	Australia (3 741)	USA (3 716)	Indonesia (3 633)	Malaysia
Japan (321)	China (291)	Thailand; USA (236)		UK (169)	Myanmar
USA (1 503)	Japan (961)	China (723)	UK (693)	Australia (658)	Philippines
China (15 327)	USA (10 129)	UK (5 486)	Australia (4 257)	Germany (2 578)	Singapore
USA (5 742)	Japan (3 704)	UK (3 149)	China (2 577)	Australia (1 980)	Thailand
Australia (59)	Indonesia (19)	Portugal (17)	UK (16)	USA (13)	Timor-Leste
USA (2 462)	Japan (2 327)	Rep. Korea (2 302)	Australia (1 881)	China (1 841)	Viet Nam
					<b>Oceania</b>
USA (40 958)	China (36 750)	UK (30 121)	Germany (15 730)	Canada (13 185)	Australia
USA (7 149)	Australia (7 087)	UK (5 605)	China (3 643)	Germany (3 017)	New Zealand
New Zealand (16)	USA (13)	France (11)	Australia (9)	UK (6)	Cook Islands
Australia (329)	USA (150)	UK (111)	India (82)	New Zealand (74)	Fiji
Fiji (10)	USA (8)	Australia (7)	UK (6)	Switzerland (4)	Kiribati
USA (6)	Micronesia (5)	Australia; Japan; Palau (3)			Marshall Islands
USA (54)	Australia (32)	UK (26)	Canada; France; Germany; India; Japan; Rep. Korea; Saudi Arabia; Spain; Sweden (22)		Micronesia
Taiwan Prov. of China (1)					Nauru
Australia (6)	Samoa; Vanuatu (4)		Solomon Islands; UK (3)		Niue
USA (40)	Australia (13)	Japan; UK (12)		New Zealand (7)	Palau
Australia (313)	USA (157)	UK (96)	France (70)	India (54)	Papua New Guinea
Australia (45)	USA (32)	New Zealand (24)	Fiji (17)	UK (11)	Samoa
Australia (108)	UK (41)	USA (39)	Fiji (19)	France (17)	Solomon Islands
Australia (27)	New Zealand (21)	Fiji (12)	USA (11)	France (8)	Tonga
France; USA (4)		Brazil; Fiji; Tonga; UK (3)			Tuvalu
USA (34)	Australia (33)	France (21)	Canada (16)	Japan; UK (11)	Vanuatu

Note: Publication counts are based on the full-counting method. A publication is counted as internationally co-authored if at least two defined countries are present in the address field (i.e., excluding unassigned addresses). The share of publications with foreign co-authors is the ratio of the count of international co-authored publications and the total number of publications. Publication co-authorship could not be detected among regions or income groups. The numbers of co-authored publications are displayed in brackets. Because of ties, some positions are not occupied and cells are thus left empty. Publications from the following are presented separately but cannot be listed as collaborators of one another: China; China, Hong Kong SAR; China, Macao SAR; and China, Taiwan Province.

Source: Scopus (Elsevier), data treatment by Science-Metrix, excluding Social sciences, Arts and Humanities

**Table D4: Scientific publications on cross-cutting strategic technologies, 2012–2019**

*The growth rate is calculated as the number of publications from 2016–2019 divided by the number of publications from 2012–2015.*

	Total			Artificial intelligence & robotics			Bioinformatics			Biotechnology			Blockchain	
	2012–2015	2016–2019	Growth rate	2012–2015	2016–2019	Growth rate	2012–2015	2016–2019	Growth rate	2012–2015	2016–2019	Growth rate	2018	2019
<b>World</b>	<b>1 327 010</b>	<b>1 688 915</b>	<b>1.27</b>	<b>405 473</b>	<b>494 983</b>	<b>1.22</b>	<b>37 720</b>	<b>37 503</b>	<b>0.99</b>	<b>64 776</b>	<b>68 636</b>	<b>1.06</b>	<b>54</b>	<b>236</b>
High-income economies	818 231	935 301	1.14	257 380	279 659	1.09	30 994	28 329	0.91	39 011	37 237	0.95	50	219
Upper middle-income economies	517 687	727 301	1.40	140 617	174 851	1.24	8 712	11 163	1.28	24 432	30 614	1.25	4	26
Lower middle-income economies	108 483	226 524	2.09	39 189	89 781	2.29	2 049	2 689	1.31	8 619	10 737	1.25	3	15
Low-income economies	3 545	7 340	2.07	950	2 237	2.35	501	1 047	2.09	299	444	1.48	0	3
<b>Americas</b>	<b>304 449</b>	<b>340 551</b>	<b>1.12</b>	<b>78 795</b>	<b>92 894</b>	<b>1.18</b>	<b>16 890</b>	<b>15 412</b>	<b>0.91</b>	<b>15 550</b>	<b>15 942</b>	<b>1.03</b>	<b>10</b>	<b>90</b>
<b>North America</b>	<b>260 001</b>	<b>283 232</b>	<b>1.09</b>	<b>63 703</b>	<b>71 971</b>	<b>1.13</b>	<b>15 957</b>	<b>14 416</b>	<b>0.90</b>	<b>11 421</b>	<b>10 898</b>	<b>0.95</b>	<b>10</b>	<b>89</b>
Canada	37 609	41 110	1.09	11 399	12 037	1.06	1 918	1 778	0.93	1 647	1 633	0.99	0	17
United States of America	227 543	248 080	1.09	53 479	61 391	1.15	14 582	13 135	0.90	10 029	9 497	0.95	10	76
<b>Latin America</b>	<b>47 962</b>	<b>62 302</b>	<b>1.30</b>	<b>15 761</b>	<b>21 972</b>	<b>1.39</b>	<b>1 236</b>	<b>1 375</b>	<b>1.11</b>	<b>4 270</b>	<b>5 387</b>	<b>1.26</b>	<b>0</b>	<b>2</b>
Argentina	3 808	4 204	1.10	888	928	1.05	131	175	1.34	491	447	0.91	0	0
Belize	3	3	1.00	1	0	0.00	0	0	–	0	0	–	0	0
Bolivia	64	84	1.31	5	16	3.20	1	1	1.00	15	12	0.80	0	0
Brazil	25 281	31 504	1.25	8080	10 042	1.24	634	694	1.09	2 559	3 277	1.28	0	1
Chile	3 058	4 495	1.47	1 115	1 621	1.45	100	124	1.24	312	353	1.13	0	1
Colombia	4 324	6 477	1.50	1 254	2 436	1.94	108	113	1.05	169	269	1.59	0	0
Costa Rica	204	339	1.66	118	174	1.47	5	8	1.60	12	26	2.17	0	0
Ecuador	445	3 128	7.03	246	2 206	8.97	12	30	2.50	22	79	3.59	0	0
El Salvador	11	14	1.27	2	2	1.00	0	0	–	1	0	0.00	0	0
Guatemala	31	48	1.55	14	23	1.64	1	2	2.00	2	5	2.50	0	0
Guyana	5	4	0.80	1	0	0.00	0	1	–	1	1	1.00	0	0
Honduras	10	59	5.90	4	36	9.00	1	1	1.00	1	9	9.00	0	0
Mexico	10 558	12 113	1.15	3 760	4 141	1.10	233	251	1.08	743	1 025	1.38	0	0
Nicaragua	16	24	1.50	3	3	1.00	2	2	1.00	1	7	7.00	0	0
Panama	64	157	2.45	31	46	1.48	8	4	0.50	8	5	0.63	0	0
Paraguay	83	140	1.69	49	67	1.37	0	2	–	5	9	1.80	0	0
Peru	395	1 326	3.36	165	866	5.25	12	38	3.17	15	29	1.93	0	0
Suriname	13	6	0.46	0	0	–	1	1	1.00	1	0	0.00	0	0
Uruguay	421	569	1.35	187	212	1.13	28	24	0.86	51	65	1.27	0	0
Venezuela	782	595	0.76	273	239	0.88	13	7	0.54	12	11	0.92	0	0
<b>Caribbean</b>	<b>1 126</b>	<b>1 121</b>	<b>1.00</b>	<b>440</b>	<b>462</b>	<b>1.05</b>	<b>22</b>	<b>19</b>	<b>0.86</b>	<b>211</b>	<b>93</b>	<b>0.44</b>	<b>0</b>	<b>0</b>
Antigua & Barbuda	0	2	–	0	1	–	0	0	–	0	0	–	0	0
Bahamas	5	4	0.80	0	0	–	0	0	–	0	0	–	0	0
Barbados	20	23	1.15	4	8	2.00	1	0	0.00	2	5	2.50	0	0
Cuba	874	779	0.89	387	386	1.00	14	13	0.93	190	71	0.37	0	0
Dominica	3	4	1.33	0	1	–	1	0	0.00	0	0	–	0	0
Dominican Rep.	25	54	2.16	1	16	16.00	0	2	–	1	0	0.00	0	0
Grenada	5	4	0.80	1	1	1.00	1	0	0.00	0	0	–	0	0
Haiti	7	3	0.43	2	0	0.00	0	0	–	2	0	0.00	0	0
Jamaica	47	86	1.83	16	24	1.50	2	0	0.00	7	4	0.57	0	0
St Kitts & Nevis	3	2	0.67	0	0	–	2	2	1.00	1	0	0.00	0	0
St Lucia	1	1	1.00	0	0	–	0	0	–	0	0	–	0	0
St Vincent & Grenadines	1	3	3.00	0	0	–	0	0	–	1	3	3.00	0	0
Trinidad & Tobago	141	169	1.20	29	25	0.86	1	2	2.00	9	10	1.11	0	0
<b>Europe</b>	<b>437 545</b>	<b>529 733</b>	<b>1.21</b>	<b>156 616</b>	<b>174 173</b>	<b>1.11</b>	<b>14 555</b>	<b>13 332</b>	<b>0.92</b>	<b>18 536</b>	<b>18 890</b>	<b>1.02</b>	<b>42</b>	<b>88</b>
<b>European Union</b>	<b>377 257</b>	<b>421 700</b>	<b>1.12</b>	<b>142 481</b>	<b>143 137</b>	<b>1.00</b>	<b>13 275</b>	<b>11 997</b>	<b>0.90</b>	<b>16 266</b>	<b>16 389</b>	<b>1.01</b>	<b>35</b>	<b>77</b>
Austria	11 110	12 371	1.11	4 903	4 987	1.02	405	390	0.96	579	625	1.08	2	9
Belgium	11 982	12 695	1.06	3 690	3 703	1.00	499	468	0.94	851	749	0.88	0	4
Bulgaria	2 136	2 760	1.29	758	1 036	1.37	23	25	1.09	112	141	1.26	0	0
Croatia	2 311	2 809	1.22	999	1 051	1.05	37	43	1.16	146	125	0.86	0	1
Cyprus	960	1 418	1.48	404	586	1.45	75	31	0.41	28	42	1.50	1	1
Czech Rep.	13 092	16 322	1.25	4 959	5 040	1.02	190	213	1.12	328	438	1.34	1	1
Denmark	9 314	10 837	1.16	2 452	2 493	1.02	576	554	0.96	656	847	1.29	1	1
Estonia	1 500	1 944	1.30	514	724	1.41	37	46	1.24	51	54	1.06	0	0
Finland	8 037	9 101	1.13	3 100	3 273	1.06	334	339	1.01	498	495	0.99	1	2
France	54 323	53 373	0.98	20 243	18 739	0.93	1 831	1 828	1.00	2 077	1 892	0.91	3	7
Germany	75 262	82 089	1.09	26 080	25 595	0.98	3 065	2 864	0.93	3 221	3 245	1.01	5	20
Greece	9 812	9 966	1.02	4 211	3 900	0.93	368	252	0.68	413	418	1.01	0	3

Energy			Internet of Things			Materials			Nanoscience & nanotechnology			Optoelectronics & photonics			Strategic defence & security		
2012–2015	2016–2019	Growth rate	2012–2015	2016–2019	Growth rate	2012–2015	2016–2019	Growth rate	2012–2015	2016–2019	Growth rate	2012–2015	2016–2019	Growth rate	2012–2015	2016–2019	Growth rate
318 613	413 772	1.30	2 169	11 180	5.15	234 785	344 505	1.47	102 746	156 754	1.53	121 026	113 865	0.94	39 702	47 427	1.19
188 552	225 686	1.20	1 534	6 428	4.19	119 527	154 492	1.29	72 093	99 869	1.39	80 172	71 516	0.89	28 968	31 816	1.10
130 927	191 040	1.46	749	4 145	5.53	117 473	175 206	1.49	38 974	76 994	1.98	43 829	45 507	1.04	11 974	17 751	1.48
24 714	46 187	1.87	88	2 051	23.31	19 931	52 709	2.64	6 472	11 826	1.83	5 015	6 591	1.31	2 406	3 935	1.64
985	1 808	1.84	6	54	9.00	330	901	2.73	97	275	2.84	144	179	1.24	233	392	1.68
80 219	89 944	1.12	356	2 601	7.31	36 191	40 561	1.12	29 393	40 000	1.36	33 665	28 003	0.83	13 390	15 094	1.13
68 539	74 524	1.09	318	2 298	7.23	28 969	31 877	1.10	27 980	38 136	1.36	31 056	25 585	0.82	12 058	13 428	1.11
10 673	12 402	1.16	93	391	4.20	4 346	4 681	1.08	2 594	3 774	1.45	3 507	2 878	0.82	1 432	1 519	1.06
59 167	63 623	1.08	236	1 941	8.22	25 138	27 788	1.11	25 817	35 125	1.36	28 236	23 347	0.83	10 859	12 147	1.12
12 677	16 711	1.32	45	326	7.24	7 715	9 317	1.21	1 714	2 396	1.40	3 023	2 911	0.96	1 521	1 905	1.25
1 115	1 246	1.12	1	23	23.00	609	777	1.28	204	236	1.16	104	114	1.10	265	258	0.97
1	2	2.00	0	0	–	0	0	–	0	0	–	0	0	–	1	1	1.00
33	44	1.33	0	0	–	4	6	1.50	0	0	–	3	0	0.00	3	5	1.67
6372	8367	1.31	14	200	14.29	4842	5829	1.20	905	1120	1.24	1312	1178	0.90	563	796	1.41
681	1135	1.67	1	8	8.00	200	413	2.07	104	192	1.85	385	365	0.95	160	283	1.77
1895	2502	1.32	0	33	–	404	584	1.45	58	121	2.09	276	256	0.93	160	163	1.02
27	75	2.78	0	6	–	8	16	2.00	9	11	1.22	7	4	0.57	18	19	1.06
97	520	5.36	3	23	7.67	24	99	4.13	7	59	8.43	21	58	2.76	13	54	4.15
1	6	6.00	0	0	–	2	1	0.50	0	2	–	0	0	–	5	3	0.60
9	10	1.11	0	1	–	1	1	1.00	0	3	–	0	0	–	4	3	0.75
1	2	2.00	0	0	–	0	0	–	0	0	–	0	0	–	2	0	0.00
0	8	–	0	0	–	1	0	0.00	0	0	–	0	0	–	3	5	1.67
2454	2810	1.15	25	35	1.40	1669	1793	1.07	464	739	1.59	934	968	1.04	276	351	1.27
6	11	1.83	0	0	–	0	0	–	0	0	–	0	0	–	4	1	0.25
8	90	11.25	0	0	–	3	0	0.00	1	4	4.00	4	6	1.50	1	2	2.00
26	55	2.12	0	3	–	1	1	1.00	0	0	–	1	2	2.00	1	1	1.00
83	228	2.75	1	5	5.00	36	85	2.36	8	17	2.13	14	24	1.71	61	34	0.56
11	5	0.45	0	0	–	0	0	–	0	0	–	0	0	–	0	0	–
92	179	1.95	1	3	3.00	24	42	1.75	16	12	0.75	14	20	1.43	8	12	1.50
243	216	0.89	0	4	–	157	74	0.47	18	8	0.44	31	19	0.61	35	17	0.49
271	307	1.13	2	4	2.00	104	149	1.43	25	27	1.08	17	16	0.94	34	44	1.29
0	0	–	0	0	–	0	0	–	0	0	–	0	0	–	0	1	–
1	1	1.00	0	0	–	0	0	–	0	1	–	3	2	0.67	1	0	0.00
8	5	0.63	0	0	–	2	3	1.50	0	0	–	0	0	–	3	2	0.67
161	169	1.05	1	0	0.00	78	99	1.27	22	18	0.82	13	12	0.92	8	11	1.38
0	0	–	0	0	–	0	1	–	1	1	1.00	0	0	–	1	1	1.00
3	12	4.00	0	0	–	13	18	1.38	1	3	3.00	0	1	–	6	2	0.33
0	0	–	0	0	–	0	0	–	0	0	–	0	0	–	3	3	1.00
0	0	–	0	1	–	0	1	–	0	0	–	0	0	–	3	1	0.33
13	27	2.08	0	0	–	3	17	5.67	0	2	–	1	1	1.00	5	11	2.20
0	0	–	0	0	–	0	0	–	0	0	–	0	0	–	0	0	–
0	1	–	0	0	–	0	0	–	0	0	–	0	0	–	1	0	0.00
0	0	–	0	0	–	0	0	–	0	0	–	0	0	–	0	0	–
86	99	1.15	1	3	3.00	8	12	1.50	1	3	3.00	0	0	–	6	15	2.50
95 428	121 764	1.28	948	3 203	3.38	69 898	104 537	1.50	27 697	39 150	1.41	39 803	39 447	0.99	14 064	15 107	1.07
77 383	97 746	1.26	893	2 975	3.33	55 193	70 010	1.27	24 787	34 640	1.40	34 732	31 435	0.91	12 247	13 259	1.08
1923	2412	1.25	29	75	2.59	1677	2186	1.30	643	879	1.37	687	546	0.79	264	260	0.98
2588	2864	1.11	21	88	4.19	1599	1718	1.07	1061	1384	1.30	1348	1278	0.95	325	439	1.35
460	361	0.78	1	3	3.00	436	832	1.91	62	67	1.08	248	264	1.06	36	31	0.86
517	800	1.55	1	95	95.00	440	486	1.10	50	85	1.70	61	53	0.87	60	70	1.17
200	377	1.89	3	14	4.67	35	52	1.49	37	66	1.78	139	199	1.43	39	49	1.26
1732	2466	1.42	5	25	5.00	4100	6034	1.47	492	866	1.76	977	939	0.96	309	299	0.97
2802	3956	1.41	8	69	8.63	765	795	1.04	723	984	1.36	1126	854	0.76	206	283	1.37
488	662	1.36	3	11	3.67	262	266	1.02	46	102	2.22	61	47	0.77	38	32	0.84
1863	2378	1.28	43	80	1.86	804	1010	1.26	558	824	1.48	570	438	0.77	267	261	0.98
10092	10655	1.06	156	322	2.06	8227	7904	0.96	3923	4976	1.27	6005	5564	0.93	1769	1483	0.84
13982	17439	1.25	196	412	2.10	11 547	13 351	1.16	6 521	9 546	1.46	9 063	8 026	0.89	1 587	1 586	1.00
1931	2454	1.27	26	106	4.08	919	1 097	1.19	403	470	1.17	935	684	0.73	606	582	0.96

**Table D4:** Scientific publications on cross-cutting strategic technologies, 2012–2019

*The growth rate is calculated as the number of publications from 2016–2019 divided by the number of publications from 2012–2015.*

	Total			Artificial intelligence & robotics			Bioinformatics			Biotechnology			Blockchain	
	2012–2015	2016–2019	Growth rate	2012–2015	2016–2019	Growth rate	2012–2015	2016–2019	Growth rate	2012–2015	2016–2019	Growth rate	2018	2019
Hungary	4574	4956	1.08	2157	2193	1.02	142	139	0.98	159	172	1.08	0	0
Ireland	5875	6290	1.07	2285	2296	1.00	241	199	0.83	265	291	1.10	1	2
Italy	43849	51815	1.18	16284	17409	1.07	1456	1271	0.87	1685	1762	1.05	8	4
Latvia	1712	2462	1.44	614	709	1.15	8	19	2.38	187	234	1.25	0	0
Lithuania	1661	2070	1.25	560	564	1.01	22	41	1.86	80	96	1.20	0	0
Luxembourg	1215	1245	1.02	818	696	0.85	67	76	1.13	38	26	0.68	1	5
Malta	227	360	1.59	160	216	1.35	1	1	1.00	1	3	3.00	0	0
Netherlands	18113	19992	1.10	6893	6827	0.99	1024	909	0.89	1011	1016	1.00	2	3
Poland	21823	29801	1.37	9120	9870	1.08	322	390	1.21	702	945	1.35	0	2
Portugal	12908	14764	1.14	5768	6189	1.07	376	311	0.83	945	890	0.94	0	1
Romania	9121	10943	1.20	3552	3159	0.89	72	62	0.86	133	140	1.05	0	0
Slovakia	4045	5636	1.39	1611	1711	1.06	25	27	1.08	106	218	2.06	1	0
Slovenia	3277	3213	0.98	1161	1075	0.93	89	81	0.91	158	99	0.63	0	0
Spain	39109	41705	1.07	15520	14076	0.91	1307	1165	0.89	2129	2074	0.97	3	1
Sweden	14333	17019	1.19	3678	3887	1.06	720	730	1.01	850	869	1.02	1	2
United Kingdom	62923	75041	1.19	21978	24044	1.09	3713	3439	0.93	1916	2143	1.12	8	20
<b>Southeast Europe</b>	<b>4527</b>	<b>4773</b>	<b>1.05</b>	<b>1621</b>	<b>1466</b>	<b>0.90</b>	<b>95</b>	<b>62</b>	<b>0.65</b>	<b>307</b>	<b>299</b>	<b>0.97</b>	<b>0</b>	<b>0</b>
Albania	193	190	0.98	92	105	1.14	2	1	0.50	0	0	–	0	0
Bosnia & Herzegovina	406	663	1.63	215	221	1.03	2	6	3.00	15	10	0.67	0	0
Montenegro	88	149	1.69	24	41	1.71	2	0	0.00	1	5	5.00	0	0
North Macedonia	462	511	1.11	308	274	0.89	2	4	2.00	12	7	0.58	0	0
Serbia	3511	3491	0.99	1023	880	0.86	89	52	0.58	286	281	0.98	0	0
<b>European Free Trade Assoc.</b>	<b>23316</b>	<b>26620</b>	<b>1.14</b>	<b>7312</b>	<b>7657</b>	<b>1.05</b>	<b>1200</b>	<b>1230</b>	<b>1.03</b>	<b>744</b>	<b>860</b>	<b>1.16</b>	<b>4</b>	<b>16</b>
Iceland	463	462	1.00	221	163	0.74	31	27	0.87	17	18	1.06	0	0
Liechtenstein	41	58	1.41	7	16	2.29	0	0	–	0	1	–	0	0
Norway	8283	9677	1.17	2354	2709	1.15	312	352	1.13	206	293	1.42	1	2
Switzerland	14692	16639	1.13	4766	4823	1.01	871	874	1.00	525	552	1.05	3	14
<b>Eastern Europe &amp; West Asia</b>	<b>82120</b>	<b>142038</b>	<b>1.73</b>	<b>18664</b>	<b>37093</b>	<b>1.99</b>	<b>1647</b>	<b>2020</b>	<b>1.23</b>	<b>3627</b>	<b>4505</b>	<b>1.24</b>	<b>5</b>	<b>9</b>
Armenia	314	383	1.22	67	108	1.61	4	6	1.50	9	27	3.00	0	0
Azerbaijan	543	721	1.33	275	281	1.02	1	0	0.00	2	5	2.50	0	0
Belarus	876	1440	1.64	155	278	1.79	21	10	0.48	16	32	2.00	0	1
Georgia	182	197	1.08	77	64	0.83	4	5	1.25	12	9	0.75	0	0
Iran Islamic Rep.	24129	32802	1.36	5357	5967	1.11	269	518	1.93	1512	2084	1.38	0	2
Israel	7169	7655	1.07	2978	2741	0.92	555	466	0.84	222	225	1.01	0	4
Moldova Rep.	219	250	1.14	61	35	0.57	0	0	–	4	4	1.00	0	0
Russian Federation	28998	69092	2.38	4700	16872	3.59	503	673	1.34	793	1025	1.29	3	1
Turkey	14654	19827	1.35	4144	6007	1.45	294	342	1.16	1024	1075	1.05	1	0
Ukraine	6284	12126	1.93	1038	5176	4.99	22	33	1.50	81	94	1.16	1	1
<b>Africa</b>	<b>30704</b>	<b>49946</b>	<b>1.63</b>	<b>10324</b>	<b>16363</b>	<b>1.58</b>	<b>1005</b>	<b>1766</b>	<b>1.76</b>	<b>2078</b>	<b>2710</b>	<b>1.30</b>	<b>0</b>	<b>2</b>
<b>Sub-Saharan Africa</b>	<b>10242</b>	<b>18506</b>	<b>1.81</b>	<b>2465</b>	<b>4546</b>	<b>1.84</b>	<b>752</b>	<b>1453</b>	<b>1.93</b>	<b>841</b>	<b>1223</b>	<b>1.45</b>	<b>0</b>	<b>2</b>
Angola	35	46	1.31	5	13	2.60	0	0	–	1	7	7.00	0	0
Benin	47	97	2.06	8	19	2.38	3	6	2.00	19	14	0.74	0	0
Botswana	74	226	3.05	31	66	2.13	7	19	2.71	0	7	–	0	0
Burkina Faso	87	109	1.25	7	9	1.29	11	12	1.09	16	18	1.13	0	0
Burundi	7	20	2.86	0	6	–	1	2	2.00	1	2	2.00	0	0
Cameroon	271	534	1.97	54	107	1.98	59	129	2.19	30	48	1.60	0	0
Cabo Verde	8	10	1.25	4	3	0.75	0	0	–	0	0	–	0	0
Central African Rep.	2	7	3.50	0	0	–	1	2	2.00	0	0	–	0	0
Chad	7	14	2.00	5	1	0.20	1	2	2.00	0	0	–	0	0
Comoros	10	3	0.30	0	0	–	0	0	–	0	0	–	0	0
Congo	39	27	0.69	2	3	1.50	7	5	0.71	5	4	0.80	0	0
Côte d'Ivoire	44	97	2.20	0	5	–	1	6	6.00	13	20	1.54	0	0
Congo Dem. Rep.	21	46	2.19	0	5	–	5	5	1.00	10	5	0.50	0	0
Djibouti	10	13	1.30	3	1	0.33	0	1	–	0	2	–	0	0
Equatorial Guinea	1	3	3.00	1	0	0.00	0	1	–	0	0	–	0	0
Eritrea	3	14	4.67	0	0	–	0	3	–	1	0	0.00	0	0
Eswatini	4	17	4.25	1	5	5.00	0	1	–	0	0	–	0	0
Ethiopia	416	1349	3.24	97	208	2.14	149	530	3.56	20	93	4.65	0	0



Energy			Internet of Things			Materials			Nanoscience & nanotechnology			Optoelectronics & photonics			Strategic defence & security		
2012–2015	2016–2019	Growth rate	2012–2015	2016–2019	Growth rate	2012–2015	2016–2019	Growth rate	2012–2015	2016–2019	Growth rate	2012–2015	2016–2019	Growth rate	2012–2015	2016–2019	Growth rate
769	896	1.17	1	42	42.00	882	960	1.09	202	264	1.31	204	207	1.01	58	83	1.43
1026	1350	1.32	24	94	3.92	455	485	1.07	656	735	1.12	791	664	0.84	132	173	1.31
10460	14245	1.36	141	599	4.25	4425	6004	1.36	3033	4193	1.38	4177	3753	0.90	2188	2567	1.17
354	730	2.06	2	3	1.50	431	618	1.43	35	57	1.63	65	83	1.28	16	9	0.56
407	623	1.53	0	1	–	223	346	1.55	102	169	1.66	229	207	0.90	38	23	0.61
88	137	1.56	6	17	2.83	102	103	1.01	47	116	2.47	21	25	1.19	28	43	1.54
34	73	2.15	1	4	4.00	15	30	2.00	5	18	3.60	5	6	1.20	5	9	1.80
3707	4632	1.25	33	77	2.33	1406	1640	1.17	1429	2107	1.47	1813	1972	1.09	797	807	1.01
2835	4294	1.51	8	40	5.00	4957	8980	1.81	819	1415	1.73	2451	3142	1.28	609	723	1.19
2211	3172	1.43	23	142	6.17	1635	1931	1.18	636	863	1.36	928	727	0.78	386	538	1.39
2007	2151	1.07	5	25	5.00	1735	4281	2.47	631	458	0.73	871	532	0.61	115	135	1.17
395	734	1.86	2	48	24.00	1672	2616	1.56	64	87	1.36	109	122	1.12	61	72	1.18
688	744	1.08	7	23	3.29	785	785	1.00	170	221	1.30	95	67	0.71	124	118	0.95
8441	11023	1.31	120	265	2.21	4535	5094	1.12	2938	4186	1.42	3036	2660	0.88	1083	1158	1.07
4105	5244	1.28	28	107	3.82	2075	2434	1.17	1283	2127	1.66	1040	1049	1.01	554	569	1.03
13884	18704	1.35	134	649	4.84	7892	9501	1.20	4814	7754	1.61	5944	5396	0.91	2648	3383	1.28
<b>1202</b>	<b>1380</b>	<b>1.15</b>	<b>10</b>	<b>43</b>	<b>4.30</b>	<b>889</b>	<b>1092</b>	<b>1.23</b>	<b>158</b>	<b>127</b>	<b>0.80</b>	<b>151</b>	<b>191</b>	<b>1.26</b>	<b>94</b>	<b>113</b>	<b>1.20</b>
77	47	0.61	0	2	–	14	25	1.79	3	2	0.67	0	3	–	5	5	1.00
111	179	1.61	1	15	15.00	51	201	3.94	3	7	2.33	7	15	2.14	1	9	9.00
25	58	2.32	0	0	–	24	36	1.50	2	0	0.00	6	0	0.00	4	9	2.25
87	128	1.47	1	4	4.00	24	57	2.38	8	4	0.50	4	6	1.50	16	27	1.69
941	1056	1.12	9	23	2.56	808	822	1.02	145	118	0.81	135	172	1.27	75	87	1.16
<b>6313</b>	<b>7623</b>	<b>1.21</b>	<b>48</b>	<b>141</b>	<b>2.94</b>	<b>2453</b>	<b>2901</b>	<b>1.18</b>	<b>2046</b>	<b>3068</b>	<b>1.50</b>	<b>1687</b>	<b>1662</b>	<b>0.99</b>	<b>1513</b>	<b>1458</b>	<b>0.96</b>
96	131	1.36	0	2	–	29	43	1.48	11	32	2.91	32	12	0.38	26	34	1.31
5	9	1.80	0	0	–	20	20	1.00	5	5	1.00	4	6	1.50	0	1	–
3315	3920	1.18	3	70	23.33	802	1046	1.30	207	315	1.52	232	187	0.81	852	782	0.92
2938	3627	1.23	45	70	1.56	1632	1822	1.12	1831	2733	1.49	1423	1462	1.03	661	659	1.00
<b>23340</b>	<b>33781</b>	<b>1.45</b>	<b>44</b>	<b>240</b>	<b>5.45</b>	<b>20790</b>	<b>43246</b>	<b>2.08</b>	<b>4598</b>	<b>7527</b>	<b>1.64</b>	<b>7463</b>	<b>10936</b>	<b>1.47</b>	<b>1947</b>	<b>2676</b>	<b>1.37</b>
39	55	1.41	0	0	–	42	77	1.83	19	17	0.89	116	77	0.66	18	16	0.89
161	258	1.60	0	0	–	62	119	1.92	9	25	2.78	21	26	1.24	12	7	0.58
119	259	2.18	0	2	–	301	475	1.58	74	168	2.27	180	202	1.12	10	13	1.30
22	31	1.41	0	0	–	36	27	0.75	5	20	4.00	8	26	3.25	18	15	0.83
8307	12645	1.52	8	56	7.00	5608	7114	1.27	1312	1836	1.40	1028	1294	1.26	728	1286	1.77
649	784	1.21	3	24	8.00	486	749	1.54	795	1281	1.61	1140	996	0.87	341	385	1.13
30	35	1.17	0	0	–	46	87	1.89	18	40	2.22	56	45	0.80	4	4	1.00
8913	12489	1.40	21	82	3.90	8770	27856	3.18	1475	2894	1.96	3610	6963	1.93	213	234	1.10
3433	5339	1.56	12	74	6.17	3668	4564	1.24	676	911	1.35	833	773	0.93	570	741	1.30
1902	2357	1.24	0	5	–	2220	3024	1.36	333	578	1.74	643	824	1.28	45	33	0.73
<b>9485</b>	<b>16101</b>	<b>1.70</b>	<b>53</b>	<b>273</b>	<b>5.15</b>	<b>4516</b>	<b>7794</b>	<b>1.73</b>	<b>1201</b>	<b>2016</b>	<b>1.68</b>	<b>1196</b>	<b>1680</b>	<b>1.40</b>	<b>846</b>	<b>1241</b>	<b>1.47</b>
<b>4106</b>	<b>6698</b>	<b>1.63</b>	<b>8</b>	<b>46</b>	<b>5.75</b>	<b>992</b>	<b>2752</b>	<b>2.77</b>	<b>298</b>	<b>606</b>	<b>2.03</b>	<b>266</b>	<b>470</b>	<b>1.77</b>	<b>514</b>	<b>710</b>	<b>1.38</b>
26	24	0.92	0	0	–	1	1	1.00	1	1	1.00	0	0	–	1	0	0.00
11	41	3.73	1	0	0.00	2	6	3.00	0	5	–	1	3	3.00	2	3	1.50
19	48	2.53	0	2	–	8	64	8.00	0	8	–	1	5	5.00	8	7	0.88
39	60	1.54	0	4	–	11	1	0.09	0	2	–	0	1	–	3	2	0.67
2	4	2.00	0	1	–	0	4	–	2	0	0.00	0	0	–	1	1	1.00
71	134	1.89	0	1	–	29	59	2.03	5	9	1.80	14	31	2.21	9	16	1.78
1	5	5.00	0	0	–	1	0	0.00	0	0	–	0	1	–	2	1	0.50
0	1	–	0	0	–	1	3	3.00	0	0	–	0	0	–	0	1	–
1	2	2.00	0	0	–	0	6	–	0	2	–	0	0	–	0	1	–
10	2	0.20	0	0	–	0	1	–	0	0	–	0	0	–	0	0	–
21	8	0.38	0	0	–	2	2	1.00	0	0	–	0	0	–	2	5	2.50
14	37	2.64	0	3	–	8	19	2.38	3	3	1.00	0	1	–	5	3	0.60
1	10	10.00	0	0	–	0	3	–	1	5	5.00	0	1	–	4	12	3.00
7	6	0.86	0	0	–	0	1	–	0	2	–	0	0	–	0	0	–
0	0	–	0	0	–	0	1	–	0	0	–	0	0	–	0	1	–
1	6	6.00	0	0	–	0	4	–	0	1	–	0	0	–	1	0	0.00
3	4	1.33	0	1	–	0	3	–	0	0	–	0	0	–	0	3	–
90	276	3.07	0	4	–	27	140	5.19	15	67	4.47	2	10	5.00	16	21	1.31

**Table D4:** Scientific publications on cross-cutting strategic technologies, 2012–2019

*The growth rate is calculated as the number of publications from 2016–2019 divided by the number of publications from 2012–2015.*

	Total			Artificial intelligence & robotics			Bioinformatics			Biotechnology			Blockchain	
	2012–2015	2016–2019	Growth rate	2012–2015	2016–2019	Growth rate	2012–2015	2016–2019	Growth rate	2012–2015	2016–2019	Growth rate	2018	2019
Gabon	11	16	1.45	2	2	1.00	4	3	0.75	4	5	1.25	0	0
Gambia	13	13	1.00	3	1	0.33	8	8	1.00	1	2	2.00	0	0
Ghana	326	721	2.21	51	180	3.53	37	95	2.57	23	46	2.00	0	0
Guinea	8	14	1.75	1	1	1.00	1	3	3.00	1	2	2.00	0	0
Guinea-Bissau	0	2	–	0	0	–	0	1	–	0	0	–	0	0
Kenya	299	508	1.70	68	113	1.66	45	86	1.91	43	45	1.05	0	2
Lesotho	12	18	1.50	3	2	0.67	0	0	–	1	0	0.00	0	0
Liberia	4	9	2.25	2	0	0.00	0	0	–	0	0	–	0	0
Madagascar	34	39	1.15	11	14	1.27	1	2	2.00	8	4	0.50	0	0
Malawi	57	76	1.33	13	12	0.92	11	15	1.36	5	2	0.40	0	0
Mali	28	39	1.39	14	9	0.64	5	3	0.60	3	3	1.00	0	0
Mauritius	125	287	2.30	65	132	2.03	3	14	4.67	6	43	7.17	0	0
Mozambique	35	58	1.66	9	9	1.00	4	5	1.25	1	4	4.00	0	0
Namibia	64	138	2.16	32	53	1.66	3	2	0.67	6	15	2.50	0	0
Niger	19	33	1.74	2	4	2.00	3	2	0.67	6	3	0.50	0	0
Nigeria	2544	5199	2.04	454	1146	2.52	64	80	1.25	245	396	1.62	0	0
Rwanda	34	84	2.47	7	23	3.29	3	3	1.00	8	4	0.50	0	0
Sao Tome & Principe	1	2	2.00	1	1	1.00	0	0	–	0	0	–	0	0
Senegal	146	239	1.64	62	126	2.03	14	16	1.14	16	10	0.63	0	0
Seychelles	5	2	0.40	3	0	0.00	0	0	–	0	0	–	0	0
Sierra Leone	9	14	1.56	2	3	1.50	1	6	6.00	2	1	0.50	0	0
Somalia	2	10	5.00	0	6	–	1	0	0.00	0	0	–	0	0
South Africa	5414	8958	1.65	1442	2332	1.62	232	365	1.57	359	471	1.31	0	0
South Sudan	3	9	3.00	0	1	–	0	1	–	0	1	–	0	0
Togo	23	35	1.52	1	2	2.00	2	5	2.50	5	4	0.80	0	0
Uganda	195	259	1.33	49	54	1.10	63	68	1.08	10	17	1.70	0	0
Tanzania	175	277	1.58	26	36	1.38	50	66	1.32	13	18	1.38	0	0
Zambia	48	105	2.19	6	11	1.83	12	17	1.42	4	3	0.75	0	0
Zimbabwe	126	195	1.55	26	9	0.35	31	43	1.39	5	15	3.00	0	0
<b>Arab States</b>	<b>39 824</b>	<b>66 218</b>	<b>1.66</b>	<b>13 462</b>	<b>21 882</b>	<b>1.63</b>	<b>738</b>	<b>867</b>	<b>1.17</b>	<b>1 997</b>	<b>2 548</b>	<b>1.28</b>	<b>0</b>	<b>4</b>
Algeria	4853	6413	1.32	1902	2504	1.32	16	31	1.94	121	156	1.29	0	0
Bahrain	212	423	2.00	80	163	2.04	2	5	2.50	4	6	1.50	0	0
Egypt	8225	12507	1.52	2037	2902	1.42	125	154	1.23	667	899	1.35	0	0
Iraq	1375	6789	4.94	400	1913	4.78	10	26	2.60	42	305	7.26	0	0
Jordan	1315	2713	2.06	597	1358	2.27	19	27	1.42	70	90	1.29	0	0
Kuwait	1267	1576	1.24	227	308	1.36	8	12	1.50	8	14	1.75	0	0
Lebanon	926	1312	1.42	398	513	1.29	23	20	0.87	29	34	1.17	0	0
Libya	319	322	1.01	90	74	0.82	5	4	0.80	6	17	2.83	0	0
Mauritania	10	19	1.90	4	5	1.25	0	0	–	0	0	–	0	0
Morocco	2596	6048	2.33	1372	3026	2.21	62	59	0.95	69	99	1.43	0	0
Oman	904	1392	1.54	262	345	1.32	7	12	1.71	36	55	1.53	0	0
Palestine	238	453	1.90	64	183	2.86	17	13	0.76	12	12	1.00	0	0
Qatar	1594	2644	1.66	594	938	1.58	60	64	1.07	23	46	2.00	0	2
Saudi Arabia	11 376	16 736	1.47	2774	3970	1.43	324	345	1.06	808	684	0.85	0	2
Sudan	260	565	2.17	109	249	2.28	15	49	3.27	20	31	1.55	0	0
Syrian Arab Rep.	209	216	1.03	32	40	1.25	9	10	1.11	14	10	0.71	0	0
Tunisia	4593	6272	1.37	2411	3243	1.35	42	45	1.07	385	326	0.85	0	0
United Arab Emirates	3207	5808	1.81	847	1608	1.90	47	75	1.60	44	82	1.86	0	0
Yemen	185	340	1.84	47	128	2.72	2	6	3.00	10	19	1.90	0	0
<b>Asia</b>	<b>680 543</b>	<b>961 839</b>	<b>1.41</b>	<b>192 614</b>	<b>258 285</b>	<b>1.34</b>	<b>12 581</b>	<b>14 795</b>	<b>1.18</b>	<b>35 675</b>	<b>40 337</b>	<b>1.13</b>	<b>11</b>	<b>80</b>
<b>Central Asia</b>	<b>1 595</b>	<b>3 762</b>	<b>2.36</b>	<b>373</b>	<b>1 060</b>	<b>2.84</b>	<b>18</b>	<b>25</b>	<b>1.39</b>	<b>33</b>	<b>53</b>	<b>1.61</b>	<b>0</b>	<b>0</b>
Kazakhstan	1048	2891	2.76	325	725	2.23	16	21	1.31	23	37	1.61	0	0
Kyrgyzstan	39	69	1.77	3	20	6.67	2	0	0.00	1	0	0.00	0	0
Mongolia	225	180	0.80	33	44	1.33	2	1	0.50	5	8	1.60	0	0
Tajikistan	28	63	2.25	1	9	9.00	0	0	–	0	0	–	0	0
Turkmenistan	9	8	0.89	3	0	0.00	0	0	–	0	0	–	0	0
Uzbekistan	258	573	2.22	9	269	29.89	1	3	3.00	4	8	2.00	0	0

Energy			Internet of Things			Materials			Nanoscience & nanotechnology			Optoelectronics & photonics			Strategic defence & security		
2012–2015	2016–2019	Growth rate	2012–2015	2016–2019	Growth rate	2012–2015	2016–2019	Growth rate	2012–2015	2016–2019	Growth rate	2012–2015	2016–2019	Growth rate	2012–2015	2016–2019	Growth rate
0	1	–	0	0	–	0	2	–	1	1	1.00	0	2	–	0	0	–
1	1	1.00	0	0	–	0	0	–	0	0	–	0	0	–	0	1	–
152	285	1.88	0	2	–	23	51	2.22	3	14	4.67	5	6	1.20	32	42	1.31
4	4	1.00	0	0	–	1	1	1.00	0	0	–	0	0	–	0	3	–
0	1	–	0	0	–	0	0	–	0	0	–	0	0	–	0	0	–
94	163	1.73	0	0	–	16	38	2.38	8	14	1.75	6	12	2.00	19	35	1.84
8	11	1.38	0	0	–	0	4	–	0	0	–	0	0	–	0	1	–
2	3	1.50	0	0	–	0	0	–	0	0	–	0	0	–	0	6	–
12	13	1.08	0	0	–	0	2	–	1	2	2.00	0	0	–	1	2	2.00
18	33	1.83	0	0	–	4	1	0.25	1	2	2.00	0	0	–	5	11	2.20
3	15	5.00	0	0	–	2	1	0.50	0	3	–	0	0	–	1	5	5.00
38	67	1.76	0	1	–	8	20	2.50	4	4	1.00	0	0	–	1	6	6.00
18	28	1.56	0	0	–	0	6	–	0	0	–	0	2	–	3	4	1.33
9	41	4.56	0	4	–	9	12	1.33	1	3	3.00	0	2	–	4	6	1.50
6	14	2.33	0	0	–	0	6	–	0	0	–	0	0	–	2	4	2.00
1414	2111	1.49	0	5	–	255	1147	4.50	36	118	3.28	12	49	4.08	64	147	2.30
10	42	4.20	1	0	0.00	2	3	1.50	1	3	3.00	0	0	–	2	6	3.00
0	1	–	0	0	–	0	0	–	0	0	–	0	0	–	0	0	–
25	51	2.04	2	6	3.00	11	14	1.27	2	5	2.50	4	3	0.75	10	8	0.80
0	1	–	0	0	–	0	0	–	0	0	–	2	0	0.00	0	1	–
1	3	3.00	0	0	–	1	0	0.00	0	0	–	1	0	0.00	1	1	1.00
0	3	–	0	0	–	0	1	–	0	0	–	0	0	–	1	0	0.00
2011	3325	1.65	4	13	3.25	618	1399	2.26	227	356	1.57	219	357	1.63	302	340	1.13
0	3	–	0	0	–	0	1	–	0	0	–	0	0	–	3	2	0.67
5	14	2.80	0	0	–	9	3	0.33	1	5	5.00	0	1	–	0	1	–
56	76	1.36	0	2	–	6	18	3.00	0	3	–	1	0	0.00	10	21	2.10
56	102	1.82	0	0	–	16	24	1.50	3	10	3.33	4	4	1.00	7	17	2.43
18	54	3.00	0	0	–	3	14	4.67	0	0	–	2	0	0.00	3	6	2.00
33	88	2.67	0	0	–	2	5	2.50	3	1	0.33	0	3	–	26	31	1.19
<b>12902</b>	<b>21806</b>	<b>1.69</b>	<b>124</b>	<b>554</b>	<b>4.47</b>	<b>5717</b>	<b>10454</b>	<b>1.83</b>	<b>2456</b>	<b>4602</b>	<b>1.87</b>	<b>1724</b>	<b>2175</b>	<b>1.26</b>	<b>704</b>	<b>1326</b>	<b>1.88</b>
1546	2107	1.36	17	67	3.94	901	1143	1.27	107	121	1.13	169	180	1.07	74	104	1.41
65	131	2.02	0	12	–	44	60	1.36	5	17	3.40	5	10	2.00	7	19	2.71
2486	4322	1.74	13	39	3.00	1601	2222	1.39	631	1012	1.60	505	706	1.40	160	251	1.57
510	1985	3.89	5	19	3.80	210	1941	9.24	93	380	4.09	84	177	2.11	21	43	2.05
332	668	2.01	15	35	2.33	161	294	1.83	48	78	1.63	36	40	1.11	37	123	3.32
897	1005	1.12	0	8	–	58	110	1.90	22	55	2.50	24	31	1.29	23	33	1.43
279	414	1.48	7	22	3.14	93	153	1.65	37	58	1.57	33	35	1.06	27	63	2.33
154	148	0.96	0	2	–	37	53	1.43	9	8	0.89	14	10	0.71	4	6	1.50
5	9	1.80	0	0	–	1	1	1.00	0	1	–	0	2	–	0	1	–
540	1691	3.13	5	22	4.40	352	790	2.24	40	157	3.93	128	141	1.10	28	63	2.25
446	615	1.38	1	73	73.00	73	153	2.10	22	69	3.14	43	36	0.84	14	34	2.43
77	157	2.04	0	5	–	39	46	1.18	10	15	1.50	14	15	1.07	5	7	1.40
545	838	1.54	7	37	5.29	190	317	1.67	74	214	2.89	58	94	1.62	43	94	2.19
3563	5595	1.57	32	82	2.56	1657	2554	1.54	1490	2586	1.74	551	576	1.05	177	342	1.93
63	99	1.57	0	1	–	33	90	2.73	8	28	3.50	7	10	1.43	5	8	1.60
119	61	0.51	0	1	–	18	51	2.83	2	13	6.50	9	26	2.89	6	4	0.67
723	1228	1.70	10	100	10.00	674	885	1.31	127	111	0.87	149	219	1.47	72	115	1.60
1669	2651	1.59	18	62	3.44	293	757	2.58	122	294	2.41	94	128	1.36	73	151	2.07
75	98	1.31	0	0	–	24	56	2.33	5	15	3.00	17	12	0.71	5	6	1.20
<b>159553</b>	<b>231898</b>	<b>1.45</b>	<b>1056</b>	<b>6540</b>	<b>6.19</b>	<b>143593</b>	<b>222771</b>	<b>1.55</b>	<b>61691</b>	<b>107336</b>	<b>1.74</b>	<b>58781</b>	<b>57945</b>	<b>0.99</b>	<b>14999</b>	<b>21841</b>	<b>1.46</b>
<b>585</b>	<b>1086</b>	<b>1.86</b>	<b>0</b>	<b>10</b>	<b>–</b>	<b>401</b>	<b>960</b>	<b>2.39</b>	<b>44</b>	<b>149</b>	<b>3.39</b>	<b>111</b>	<b>367</b>	<b>3.31</b>	<b>30</b>	<b>52</b>	<b>1.73</b>
353	830	2.35	0	9	–	207	771	3.72	27	122	4.52	84	342	4.07	13	34	2.62
13	19	1.46	0	0	–	6	17	2.83	5	3	0.60	2	4	2.00	7	6	0.86
36	56	1.56	0	0	–	130	47	0.36	5	9	1.80	9	10	1.11	5	5	1.00
8	15	1.88	0	0	–	9	27	3.00	1	4	4.00	6	7	1.17	3	1	0.33
4	6	1.50	0	0	–	0	2	–	0	0	–	0	0	–	2	0	0.00
176	168	0.95	0	1	–	50	100	2.00	6	12	2.00	10	6	0.60	2	6	3.00

**Table D4:** Scientific publications on cross-cutting strategic technologies, 2012–2019

The growth rate is calculated as the number of publications from 2016–2019 divided by the number of publications from 2012–2015.

	Total			Artificial intelligence & robotics			Bioinformatics			Biotechnology			Blockchain	
	2012–2015	2016–2019	Growth rate	2012–2015	2016–2019	Growth rate	2012–2015	2016–2019	Growth rate	2012–2015	2016–2019	Growth rate	2018	2019
<b>South Asia</b>	<b>79 955</b>	<b>156 674</b>	<b>1.96</b>	<b>30 474</b>	<b>65 348</b>	<b>2.14</b>	<b>1 607</b>	<b>2 014</b>	<b>1.25</b>	<b>7 133</b>	<b>8 351</b>	<b>1.17</b>	<b>2</b>	<b>13</b>
Afghanistan	16	80	5.00	1	21	21.00	0	16	–	0	3	–	0	0
Bangladesh	1 560	3 157	2.02	527	1 365	2.59	82	111	1.35	107	163	1.52	0	0
Bhutan	8	37	4.63	1	17	17.00	2	3	1.50	0	0	–	0	0
India	72 505	141 107	1.95	27 831	59 634	2.14	1 251	1 508	1.21	6 617	7 548	1.14	2	12
Maldives	0	10	–	0	8	–	0	0	–	0	0	–	0	0
Nepal	193	431	2.23	17	90	5.29	33	66	2.00	19	25	1.32	0	1
Pakistan	5 116	10 845	2.12	1 828	3 509	1.92	160	211	1.32	374	605	1.62	0	0
Sri Lanka	678	1 407	2.08	291	793	2.73	85	138	1.62	31	40	1.29	0	0
<b>Southeast Asia</b>	<b>556 535</b>	<b>745 275</b>	<b>1.34</b>	<b>149 687</b>	<b>177 604</b>	<b>1.19</b>	<b>9 932</b>	<b>11 591</b>	<b>1.17</b>	<b>26 525</b>	<b>29 617</b>	<b>1.12</b>	<b>9</b>	<b>58</b>
Brunei Darussalam	195	516	2.65	62	106	1.71	4	4	1.00	5	14	2.80	0	0
Cambodia	40	61	1.53	6	20	3.33	6	4	0.67	6	11	1.83	0	0
China	365 773	516 574	1.41	91 520	108 636	1.19	6 077	8 022	1.32	14 317	18 273	1.28	3	21
China Hong Kong SAR	10 615	15 031	1.42	3 850	4 575	1.19	421	383	0.91	295	338	1.15	2	5
China Macao SAR	921	1 795	1.95	680	944	1.39	32	52	1.63	26	26	1.00	0	0
China Taiwan Prov.	26 660	23 105	0.87	9 333	7 332	0.79	684	527	0.77	969	752	0.78	0	6
Indonesia	56	136	2.43	22	21	0.95	1	1	1.00	1	4	4.00	0	0
Japan	4 850	25 733	5.31	2 254	8 784	3.90	45	86	1.91	212	550	2.59	0	0
Korea DPR	75 406	74 367	0.99	22 287	23 628	1.06	1 522	1 400	0.92	4 561	3 880	0.85	1	11
Korea Rep.	22	42	1.91	4	9	2.25	2	5	2.50	2	3	1.50	0	0
Lao PDR	23 523	35 235	1.50	7 229	10 234	1.42	191	178	0.93	1 292	1 511	1.17	0	0
Malaysia	64	250	3.91	29	174	6.00	1	3	3.00	1	9	9.00	0	0
Myanmar	640	2 070	3.23	214	862	4.03	24	42	1.75	42	93	2.21	0	0
Philippines	49 494	57 170	1.16	11 019	10 559	0.96	917	1 070	1.17	4 986	4 471	0.90	1	10
Singapore	13 441	17 001	1.26	4 443	5 141	1.16	499	368	0.74	499	449	0.90	3	10
Thailand	6 919	12 188	1.76	2 495	4 261	1.71	122	138	1.13	685	933	1.36	0	1
Timor-Leste	4	18	4.50	1	5	5.00	0	0	–	0	1	–	0	0
Viet Nam	2 426	6 224	2.57	1 231	2 849	2.31	48	65	1.35	155	313	2.02	0	2
<b>Oceania</b>	<b>34 772</b>	<b>44 082</b>	<b>1.27</b>	<b>11 562</b>	<b>13 094</b>	<b>1.13</b>	<b>1 676</b>	<b>1 649</b>	<b>0.98</b>	<b>1 436</b>	<b>1 604</b>	<b>1.12</b>	<b>1</b>	<b>16</b>
Australia	31 062	39 544	1.27	9 948	11 233	1.13	1 470	1 479	1.01	1 220	1 357	1.11	1	11
New Zealand	3 952	4 788	1.21	1 632	1 858	1.14	246	211	0.86	243	270	1.11	0	5
Cook Islands	0	1	–	0	0	–	0	0	–	0	0	–	0	0
Fiji	158	234	1.48	93	138	1.48	11	22	2.00	3	3	1.00	0	0
Kiribati	0	9	–	0	0	–	0	0	–	0	0	–	0	0
Marshall Islands	2	5	2.50	0	1	–	0	0	–	0	0	–	0	0
Micronesia	2	2	1.00	0	0	–	0	0	–	0	1	–	0	0
Nauru	0	0	–	0	0	–	0	0	–	0	0	–	0	0
Niue	0	0	–	0	0	–	0	0	–	0	0	–	0	0
Palau	0	2	–	0	1	–	0	0	–	0	0	–	0	0
Papua New Guinea	24	39	1.63	6	26	4.33	2	1	0.50	1	1	1.00	0	0
Samoa	6	3	0.50	3	0	0.00	0	0	–	0	0	–	0	0
Solomon Islands	1	4	4.00	0	0	–	0	0	–	1	1	1.00	0	0
Tonga	0	1	–	0	0	–	0	0	–	0	0	–	0	0
Tuvalu	0	0	–	0	0	–	0	0	–	0	0	–	0	0
Vanuatu	0	7	–	0	3	–	0	0	–	0	1	–	0	0

KEY –: data unavailable | -n/+n: data refer to n years before or after reference year | 0: magnitude nil or negligible | a: not applicable

GDP: gross domestic product | MF: males and females | PPP\$: purchasing power parity dollars

Note: The sum of the numbers for the various regions exceeds the total number because papers with multiple authors from different regions are counted for each of these regions. No Scopus-indexed journal specialized in blockchain technology published papers prior to 2018. As such, counts prior to 2018 are all 0. However, it is important to consider that these counts ignore blockchain technology publications that may have been published in more general ICT journals.

Source: Scopus (Elsevier), data treatment by Science-Metrix, excluding Social sciences, Arts and Humanities

Energy			Internet of Things			Materials			Nanoscience & nanotechnology			Optoelectronics & photonics			Strategic defence & security		
2012-2015	2016-2019	Growth rate	2012-2015	2016-2019	Growth rate	2012-2015	2016-2019	Growth rate	2012-2015	2016-2019	Growth rate	2012-2015	2016-2019	Growth rate	2012-2015	2016-2019	Growth rate
15783	29854	1.89	67	1692	25.25	14513	32735	2.26	5169	9374	1.81	3366	4191	1.25	1843	3100	1.68
4	26	6.50	0	0	-	1	3	3.00	0	0	-	0	0	-	10	11	1.10
434	643	1.48	2	33	16.50	172	493	2.87	52	112	2.15	111	124	1.12	73	113	1.55
4	13	3.25	0	0	-	1	1	1.00	0	0	-	0	0	-	0	3	-
14235	25923	1.82	44	1581	35.93	13249	30428	2.30	4799	8351	1.74	2955	3679	1.25	1524	2441	1.60
0	2	-	0	0	-	0	0	-	0	0	-	0	0	-	0	0	-
54	115	2.13	0	9	-	29	32	1.10	7	17	2.43	1	6	6.00	33	70	2.12
907	2985	3.29	18	66	3.67	1055	1754	1.66	299	888	2.97	282	378	1.34	193	449	2.33
170	248	1.46	3	11	3.67	28	84	3.00	23	40	1.74	20	8	0.40	27	45	1.67
<b>128599</b>	<b>180079</b>	<b>1.40</b>	<b>919</b>	<b>4570</b>	<b>4.97</b>	<b>122272</b>	<b>179745</b>	<b>1.47</b>	<b>54043</b>	<b>94436</b>	<b>1.75</b>	<b>52601</b>	<b>50667</b>	<b>0.96</b>	<b>11957</b>	<b>16899</b>	<b>1.41</b>
100	243	2.43	0	3	-	11	102	9.27	8	21	2.63	4	17	4.25	1	6	6.00
12	18	1.50	0	0	-	2	6	3.00	0	0	-	3	0	0.00	5	2	0.40
87617	131970	1.51	522	3228	6.18	88926	127320	1.43	32622	68961	2.11	36058	37643	1.04	8114	12497	1.54
1442	2701	1.87	21	114	5.43	1437	1915	1.33	1877	3586	1.91	911	901	0.99	361	511	1.42
57	242	4.25	1	30	30.00	35	111	3.17	61	306	5.02	13	45	3.46	16	39	2.44
4500	4262	0.95	116	275	2.37	3402	3482	1.02	4117	3957	0.96	2794	1825	0.65	745	687	0.92
6	43	7.17	0	0	-	16	48	3.00	1	13	13.00	8	5	0.63	1	1	1.00
1713	4008	2.34	1	258	258.00	366	11349	31.01	48	191	3.98	107	321	3.00	104	186	1.79
14627	14297	0.98	74	244	3.30	15594	13973	0.90	6429	8211	1.28	8731	7085	0.81	1581	1637	1.04
11	9	0.82	0	0	-	1	15	15.00	0	0	-	0	0	-	2	1	0.50
8459	9688	1.15	88	73	0.83	4231	11433	2.70	964	1095	1.14	824	678	0.82	245	345	1.41
16	18	1.13	2	0	0.00	6	19	3.17	0	7	-	2	1	0.50	7	19	2.71
161	409	2.54	0	38	-	95	395	4.16	16	57	3.56	17	78	4.59	71	96	1.35
10036	13574	1.35	86	357	4.15	9891	11054	1.12	8517	12237	1.44	3090	2508	0.81	952	1329	1.40
1778	2723	1.53	26	176	6.77	1260	1918	1.52	3246	4739	1.46	1386	1054	0.76	304	420	1.38
1703	2560	1.50	5	45	9.00	1194	3346	2.80	350	467	1.33	215	193	0.90	150	244	1.63
1	3	3.00	0	2	-	0	5	-	0	0	-	0	0	-	2	2	1.00
297	1127	3.79	1	7	7.00	342	1120	3.27	197	376	1.91	106	249	2.35	49	116	2.37
<b>7870</b>	<b>11417</b>	<b>1.45</b>	<b>63</b>	<b>235</b>	<b>3.73</b>	<b>5100</b>	<b>6210</b>	<b>1.22</b>	<b>3173</b>	<b>5875</b>	<b>1.85</b>	<b>2320</b>	<b>1919</b>	<b>0.83</b>	<b>1572</b>	<b>2062</b>	<b>1.31</b>
7342	10572	1.44	52	211	4.06	4626	5706	1.23	3038	5636	1.86	2152	1765	0.82	1214	1573	1.30
551	884	1.60	11	25	2.27	512	576	1.13	158	270	1.71	197	177	0.90	402	512	1.27
0	1	-	0	0	-	0	0	-	0	0	-	0	0	-	0	0	-
35	46	1.31	0	0	-	9	14	1.56	2	1	0.50	0	0	-	5	10	2.00
0	2	-	0	0	-	0	0	-	0	0	-	0	0	-	0	7	-
2	0	0.00	0	0	-	0	0	-	0	0	-	0	0	-	0	4	-
2	1	0.50	0	0	-	0	0	-	0	0	-	0	0	-	0	0	-
0	0	-	0	0	-	0	0	-	0	0	-	0	0	-	0	0	-
0	0	-	0	0	-	0	0	-	0	0	-	0	0	-	0	0	-
0	0	-	0	0	-	0	0	-	0	0	-	0	0	-	0	1	-
9	3	0.33	1	0	0.00	2	5	2.50	0	0	-	0	0	-	3	3	1.00
2	0	0.00	0	0	-	0	0	-	0	0	-	0	0	-	1	3	3.00
0	1	-	0	0	-	0	0	-	0	0	-	0	0	-	0	2	-
0	0	-	0	0	-	0	0	-	0	0	-	0	0	-	0	1	-
0	0	-	0	0	-	0	0	-	0	0	-	0	0	-	0	0	-
0	1	-	0	0	-	0	0	-	0	1	-	0	0	-	0	1	-

**Table E1:** Patents granted by the top five patent offices (IP5), 2015–2019

	Number of patents					Change (%)	World share of IP5 patents (%)			
	2015	2016	2017	2018	2019	2015–2019	2015	2019	2014–2016	2017–2019
<b>World</b>	<b>980 845</b>	<b>1 128 688</b>	<b>1 151 994</b>	<b>1 165 602</b>	<b>1 242 082</b>	<b>26.6</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>
High-income economies	718 046	800 894	799 362	788 790	842 954	17.4	73.21	67.87	75.04	68.30
Upper middle-income economies	266 871	332 434	356 132	380 997	401 644	50.5	27.21	32.34	25.37	31.99
Lower middle-income economies	12 794	14 250	14 082	13 692	14 561	13.8	1.30	1.17	1.28	1.19
Low-income economies	484	574	623	633	520	7.4	0.05	0.04	0.05	0.05
<b>Americas</b>	<b>230 779</b>	<b>249 777</b>	<b>256 354</b>	<b>254 115</b>	<b>281 706</b>	<b>22.1</b>	<b>23.53</b>	<b>22.68</b>	<b>23.16</b>	<b>22.25</b>
<b>North America</b>	<b>229 183</b>	<b>248 053</b>	<b>254 654</b>	<b>252 333</b>	<b>279 816</b>	<b>22.1</b>	<b>23.37</b>	<b>22.53</b>	<b>23.00</b>	<b>22.10</b>
Canada	15 367	16 155	16 029	15 823	17 172	11.7	1.57	1.38	1.54	1.38
United States of America	220 545	239 195	245 486	243 173	269 418	22.2	22.49	21.69	22.13	21.30
<b>Latin America</b>	<b>2 864</b>	<b>3 073</b>	<b>2 888</b>	<b>2 984</b>	<b>3 050</b>	<b>6.5</b>	<b>0.29</b>	<b>0.25</b>	<b>0.28</b>	<b>0.25</b>
Argentina	294	334	275	293	321	9.2	0.03	0.03	0.03	0.02
Belize	8	8	8	13	5	-37.5	0.00	0.00	0.00	0.00
Bolivia	13	13	9	6	4	-69.2	0.00	0.00	0.00	0.00
Brazil	1 096	1 211	1 110	1 150	1 276	16.4	0.11	0.10	0.11	0.10
Chile	183	171	161	174	161	-12.0	0.02	0.01	0.02	0.01
Colombia	143	165	163	152	177	23.8	0.01	0.01	0.01	0.01
Costa Rica	74	86	70	87	74	0.0	0.01	0.01	0.01	0.01
Ecuador	184	159	97	55	51	-72.3	0.02	0.00	0.02	0.01
El Salvador	8	10	4	7	7	-12.5	0.00	0.00	0.00	0.00
Guatemala	12	10	9	12	7	-41.7	0.00	0.00	0.00	0.00
Guyana	13	10	16	9	5	-61.5	0.00	0.00	0.00	0.00
Honduras	7	6	3	2	3	-57.1	0.00	0.00	0.00	0.00
Mexico	666	723	762	835	847	27.2	0.07	0.07	0.06	0.07
Nicaragua	7	3	3	7	1	-85.7	0.00	0.00	0.00	0.00
Panama	23	31	32	27	30	30.4	0.00	0.00	0.00	0.00
Paraguay	6	6	4	8	4	-33.3	0.00	0.00	0.00	0.00
Peru	67	71	79	62	41	-38.8	0.01	0.00	0.01	0.01
Suriname	1	0	2	1	0	-100.0	0.00	0.00	0.00	0.00
Uruguay	59	72	80	82	53	-10.2	0.01	0.00	0.01	0.01
Venezuela	75	52	49	47	44	-41.3	0.01	0.00	0.01	0.00
<b>Caribbean</b>	<b>415</b>	<b>486</b>	<b>392</b>	<b>329</b>	<b>402</b>	<b>-3.1</b>	<b>0.04</b>	<b>0.03</b>	<b>0.04</b>	<b>0.03</b>
Antigua & Barbuda	2	2	6	2	13	550.0	0.00	0.00	0.00	0.00
Bahamas	58	63	26	39	39	-32.8	0.01	0.00	0.01	0.00
Barbados	191	261	214	196	244	27.7	0.02	0.02	0.02	0.02
Cuba	51	59	49	44	31	-39.2	0.01	0.00	0.01	0.00
Dominica	4	3	3	3	7	75.0	0.00	0.00	0.00	0.00
Dominican Rep.	22	16	17	9	10	-54.5	0.00	0.00	0.00	0.00
Grenada	0	1	2	2	1	–	0.00	0.00	0.00	0.00
Haiti	2	4	7	5	5	150.0	0.00	0.00	0.00	0.00
Jamaica	39	28	27	13	21	-46.2	0.00	0.00	0.00	0.00
St Kitts & Nevis	8	6	8	4	5	-37.5	0.00	0.00	0.00	0.00
St Lucia	2	3	2	5	5	150.0	0.00	0.00	0.00	0.00
St Vincent & Grenadines	5	7	5	1	0	-100.0	0.00	0.00	0.00	0.00
Trinidad & Tobago	32	35	26	11	27	-15.6	0.00	0.00	0.00	0.00

	Number of patents					Change (%)	World share of IP5 patents (%)			
	2015	2016	2017	2018	2019	2015–2019	2015	2019	2014–2016	2017–2019
<b>Europe</b>	<b>152 383</b>	<b>176 013</b>	<b>173 473</b>	<b>172 499</b>	<b>184 458</b>	<b>21.0</b>	<b>15.54</b>	<b>14.85</b>	<b>15.50</b>	<b>14.90</b>
<b>European Union</b>	<b>142 378</b>	<b>164 506</b>	<b>161 924</b>	<b>161 090</b>	<b>172 266</b>	<b>21.0</b>	<b>14.52</b>	<b>13.87</b>	<b>14.50</b>	<b>13.91</b>
Austria	5 062	6 198	6 380	6 164	6 522	28.8	0.52	0.53	0.52	0.54
Belgium	5 213	5 993	5 920	5 914	6 003	15.2	0.53	0.48	0.54	0.50
Bulgaria	189	225	198	170	183	-3.2	0.02	0.01	0.02	0.02
Croatia	78	120	121	102	125	60.3	0.01	0.01	0.01	0.01
Cyprus	94	116	97	100	99	5.3	0.01	0.01	0.01	0.01
Czech Rep.	626	765	898	959	1 121	79.1	0.06	0.09	0.06	0.08
Denmark	3 663	4 286	4 124	3 916	4 237	15.7	0.37	0.34	0.37	0.34
Estonia	97	107	115	119	141	45.4	0.01	0.01	0.01	0.01
Finland	4 120	4 818	4 978	4 909	5 051	22.6	0.42	0.41	0.42	0.42
France	24 763	27 700	26 709	26 514	27 942	12.8	2.52	2.25	2.52	2.28
Germany	59 245	68 196	66 225	64 854	68 331	15.3	6.04	5.50	6.00	5.60
Greece	483	607	594	653	635	31.5	0.05	0.05	0.05	0.05
Hungary	618	699	702	650	730	18.1	0.06	0.06	0.06	0.06
Ireland	1 782	2 211	2 200	2 260	2 479	39.1	0.18	0.20	0.18	0.19
Italy	10 114	11 619	11 053	11 013	11 884	17.5	1.03	0.96	1.02	0.95
Latvia	38	55	51	33	33	-13.2	0.00	0.00	0.00	0.00
Lithuania	53	70	66	67	66	24.5	0.01	0.01	0.01	0.01
Luxembourg	716	802	703	694	649	-9.4	0.07	0.05	0.07	0.06
Malta	41	88	84	79	113	175.6	0.00	0.01	0.01	0.01
Netherlands	11 318	13 279	13 128	13 127	13 701	21.1	1.15	1.10	1.17	1.12
Poland	939	1 137	1 132	1 115	1 317	40.3	0.10	0.11	0.09	0.10
Portugal	354	369	409	426	509	43.8	0.04	0.04	0.03	0.04
Romania	378	454	426	440	473	25.1	0.04	0.04	0.04	0.04
Slovakia	180	209	214	230	259	43.9	0.02	0.02	0.02	0.02
Slovenia	226	251	288	261	283	25.2	0.02	0.02	0.02	0.02
Spain	3 130	3 790	3 774	3 998	4 136	32.1	0.32	0.33	0.32	0.33
Sweden	8 651	10 253	10 256	10 315	11 353	31.2	0.88	0.91	0.89	0.90
United Kingdom	21 536	24 367	23 227	23 334	25 019	16.2	2.20	2.01	2.21	2.01
<b>Southeast Europe</b>	<b>296</b>	<b>331</b>	<b>283</b>	<b>267</b>	<b>225</b>	<b>-24.0</b>	<b>0.03</b>	<b>0.02</b>	<b>0.03</b>	<b>0.02</b>
Albania	19	12	31	40	19	0.0	0.00	0.00	0.00	0.00
Bosnia & Herzegovina	53	77	58	35	36	-32.1	0.01	0.00	0.01	0.00
Montenegro	4	8	2	4	6	50.0	0.00	0.00	0.00	0.00
North Macedonia	14	17	14	10	8	-42.9	0.00	0.00	0.00	0.00
Serbia	206	217	178	178	156	-24.3	0.02	0.01	0.02	0.01
<b>European Free Trade Assoc.</b>	<b>14 558</b>	<b>16 706</b>	<b>16 054</b>	<b>15 245</b>	<b>16 005</b>	<b>9.9</b>	<b>1.48</b>	<b>1.29</b>	<b>1.48</b>	<b>1.33</b>
Iceland	164	213	246	324	274	67.1	0.02	0.02	0.02	0.02
Liechtenstein	260	303	303	261	303	16.5	0.03	0.02	0.03	0.02
Norway	1 629	1 740	1 761	1 724	1 755	7.7	0.17	0.14	0.16	0.15
Switzerland	12 704	14 687	13 969	13 114	13 886	9.3	1.30	1.12	1.30	1.15
<b>Eastern Europe &amp; West Asia</b>	<b>10 060</b>	<b>11 305</b>	<b>11 569</b>	<b>11 585</b>	<b>12 471</b>	<b>24.0</b>	<b>1.03</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>
Armenia	24	35	36	41	64	166.7	0.00	0.01	0.00	0.00
Azerbaijan	11	12	10	11	7	-36.4	0.00	0.00	0.00	0.00
Belarus	75	83	71	56	54	-28.0	0.01	0.00	0.01	0.01
Georgia	26	36	24	33	22	-15.4	0.00	0.00	0.00	0.00
Iran Islamic Rep.	362	393	396	443	457	26.2	0.04	0.04	0.03	0.04
Israel	6 439	7 209	7 593	7 928	8 623	33.9	0.66	0.69	0.64	0.68
Moldova, Rep.	18	11	14	17	10	-44.4	0.00	0.00	0.00	0.00
Russian Federation	1 957	2 368	2 323	2 341	2 236	14.3	0.20	0.18	0.21	0.19
Turkey	966	1 162	1 203	1 152	1 200	24.2	0.10	0.10	0.10	0.10
Ukraine	368	357	371	308	355	-3.5	0.04	0.03	0.03	0.03

**Table E1: Patents granted by the top five patent offices (IP5), 2015–2019**

	Number of patents					Change (%)	World share of IP5 patents (%)			
	2015	2016	2017	2018	2019	2015–2019	2015	2019	2014–2016	2017–2019
<b>Africa</b>	<b>1 351</b>	<b>1 491</b>	<b>1 414</b>	<b>1 397</b>	<b>1 276</b>	<b>-5.6</b>	<b>0.14</b>	<b>0.10</b>	<b>0.14</b>	<b>0.11</b>
<b>Sub-Saharan Africa</b>	<b>947</b>	<b>1 025</b>	<b>942</b>	<b>875</b>	<b>841</b>	<b>-11.2</b>	<b>0.10</b>	<b>0.07</b>	<b>0.09</b>	<b>0.07</b>
Angola	0	1	0	0	1	–	0.00	0.00	0.00	0.00
Benin	0	1	5	2	0	–	0.00	0.00	0.00	0.00
Botswana	0	0	0	0	0	–	0.00	0.00	0.00	0.00
Burkina Faso	3	0	0	0	0	-100.0	0.00	0.00	0.00	0.00
Burundi	0	0	0	0	0	–	0.00	0.00	0.00	0.00
Cameroon	23	25	28	21	32	39.1	0.00	0.00	0.00	0.00
Cabo Verde	0	0	0	0	0	–	0.00	0.00	0.00	0.00
Central African Rep.	0	0	0	0	0	–	0.00	0.00	0.00	0.00
Chad	0	3	2	2	0	–	0.00	0.00	0.00	0.00
Comoros	0	0	0	0	0	–	0.00	0.00	0.00	0.00
Congo	6	9	2	1	4	-33.3	0.00	0.00	0.00	0.00
Côte d'Ivoire	1	1	5	4	8	700.0	0.00	0.00	0.00	0.00
Congo, Dem. Rep.	2	2	1	1	1	-50.0	0.00	0.00	0.00	0.00
Djibouti	0	5	14	22	18	–	0.00	0.00	0.00	0.00
Equatorial Guinea	0	0	0	0	0	–	0.00	0.00	0.00	0.00
Eritrea	5	6	10	5	5	0.0	0.00	0.00	0.00	0.00
Eswatini	14	12	11	17	18	28.6	0.00	0.00	0.00	0.00
Ethiopia	28	28	43	31	32	14.3	0.00	0.00	0.00	0.00
Gabon	14	10	7	9	7	-50.0	0.00	0.00	0.00	0.00
Gambia	2	1	0	1	1	-50.0	0.00	0.00	0.00	0.00
Ghana	10	15	19	19	16	60.0	0.00	0.00	0.00	0.00
Guinea	2	4	1	3	2	0.0	0.00	0.00	0.00	0.00
Guinea-Bissau	0	0	0	0	0	–	0.00	0.00	0.00	0.00
Kenya	67	63	62	71	57	-14.9	0.01	0.00	0.01	0.01
Lesotho	0	0	0	0	0	–	0.00	0.00	0.00	0.00
Liberia	3	6	7	5	2	-33.3	0.00	0.00	0.00	0.00
Madagascar	2	5	6	3	3	50.0	0.00	0.00	0.00	0.00
Malawi	0	0	0	0	0	–	0.00	0.00	0.00	0.00
Mali	16	9	1	10	9	-43.8	0.00	0.00	0.00	0.00
Mauritius	25	30	20	14	24	-4.0	0.00	0.00	0.00	0.00
Mozambique	0	0	0	0	0	–	0.00	0.00	0.00	0.00
Namibia	32	32	28	16	3	-90.6	0.00	0.00	0.00	0.00
Niger	18	11	20	13	19	5.6	0.00	0.00	0.00	0.00
Nigeria	66	60	33	38	27	-59.1	0.01	0.00	0.01	0.00
Rwanda	3	3	2	2	1	-66.7	0.00	0.00	0.00	0.00
Sao Tome & Principe	0	0	0	0	0	–	0.00	0.00	0.00	0.00
Senegal	13	12	10	8	13	0.0	0.00	0.00	0.00	0.00
Seychelles	14	24	14	14	11	-21.4	0.00	0.00	0.00	0.00
Sierra Leone	4	6	9	3	5	25.0	0.00	0.00	0.00	0.00
Somalia	0	0	0	0	0	–	0.00	0.00	0.00	0.00
South Africa	557	614	554	516	505	-9.3	0.06	0.04	0.06	0.04
South Sudan	0	0	0	0	0	–	0.00	0.00	0.00	0.00
Togo	0	2	3	2	1	–	0.00	0.00	0.00	0.00
Uganda	7	7	8	10	7	0.0	0.00	0.00	0.00	0.00
Tanzania	16	22	14	7	7	-56.3	0.00	0.00	0.00	0.00
Zambia	0	0	0	3	1	–	0.00	0.00	0.00	0.00
Zimbabwe	5	6	8	13	8	60.0	0.00	0.00	0.00	0.00



	Number of patents					Change (%)	World share of IP5 patents (%)			
	2015	2016	2017	2018	2019	2015–2019	2015	2019	2014–2016	2017–2019
<b>Arab States</b>	<b>1 491</b>	<b>1 855</b>	<b>2 037</b>	<b>2 157</b>	<b>2 431</b>	<b>63.0</b>	<b>0.15</b>	<b>0.20</b>	<b>0.16</b>	<b>0.19</b>
Algeria	55	57	52	44	27	-50.9	0.01	0.00	0.01	0.00
Bahrain	7	8	19	19	18	157.1	0.00	0.00	0.00	0.00
Egypt	226	279	298	390	298	31.9	0.02	0.02	0.02	0.03
Iraq	6	7	5	4	2	-66.7	0.00	0.00	0.00	0.00
Jordan	112	149	131	97	90	-19.6	0.01	0.01	0.01	0.01
Kuwait	70	57	50	40	52	-25.7	0.01	0.00	0.01	0.00
Lebanon	96	102	98	69	89	-7.3	0.01	0.01	0.01	0.01
Libya	4	3	2	0	0	-100.0	0.00	0.00	0.00	0.00
Mauritania	0	0	0	0	0	–	0.00	0.00	0.00	0.00
Morocco	66	68	67	65	59	-10.6	0.01	0.00	0.01	0.01
Oman	13	5	12	4	9	-30.8	0.00	0.00	0.00	0.00
Palestine	0	0	0	0	0	–	0.00	0.00	0.00	0.00
Qatar	17	39	60	75	70	311.8	0.00	0.01	0.00	0.01
Saudi Arabia	611	874	1 012	1 123	1 453	137.8	0.06	0.12	0.06	0.10
Sudan	0	0	0	0	0	–	0.00	0.00	0.00	0.00
Syrian Arab Rep.	17	17	6	15	10	-41.2	0.00	0.00	0.00	0.00
Tunisia	59	67	55	25	54	-8.5	0.01	0.00	0.01	0.00
United Arab Emirates	156	170	222	224	260	66.7	0.02	0.02	0.01	0.02
Yemen	3	3	4	7	5	66.7	0.00	0.00	0.00	0.00
<b>Asia</b>	<b>643 347</b>	<b>754 934</b>	<b>770 634</b>	<b>786 253</b>	<b>823 335</b>	<b>28.0</b>	<b>65.59</b>	<b>66.29</b>	<b>65.98</b>	<b>66.87</b>
<b>Central Asia</b>	<b>52</b>	<b>52</b>	<b>69</b>	<b>50</b>	<b>46</b>	<b>-11.5</b>	<b>0.01</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
Kazakhstan	30	28	37	27	24	-20.0	0.00	0.00	0.00	0.00
Kyrgyzstan	2	5	5	4	3	50.0	0.00	0.00	0.00	0.00
Mongolia	0	0	0	0	0	–	0.00	0.00	0.00	0.00
Tajikistan	0	0	1	0	0	–	0.00	0.00	0.00	0.00
Turkmenistan	0	0	0	0	0	–	0.00	0.00	0.00	0.00
Uzbekistan	20	20	27	19	19	-5.0	0.00	0.00	0.00	0.00
<b>South Asia</b>	<b>11 512</b>	<b>12 826</b>	<b>12 585</b>	<b>12 276</b>	<b>13 206</b>	<b>14.7</b>	<b>1.17</b>	<b>1.06</b>	<b>1.15</b>	<b>1.07</b>
Afghanistan	8	2	4	3	2	-75.0	0.00	0.00	0.00	0.00
Bangladesh	74	111	92	99	75	1.4	0.01	0.01	0.01	0.01
Bhutan	0	0	0	0	0	–	0.00	0.00	0.00	0.00
India	11 190	12 456	12 184	11 916	12 905	15.3	1.14	1.04	1.11	1.04
Maldives	0	0	0	0	0	–	0.00	0.00	0.00	0.00
Nepal	62	145	204	265	199	221.0	0.01	0.02	0.01	0.02
Pakistan	159	197	191	196	153	-3.8	0.02	0.01	0.02	0.02
Sri Lanka	79	63	93	87	76	-3.8	0.01	0.01	0.01	0.01
<b>Southeast Asia</b>	<b>627 013</b>	<b>736 538</b>	<b>751 610</b>	<b>767 192</b>	<b>801 878</b>	<b>27.9</b>	<b>63.93</b>	<b>64.56</b>	<b>64.36</b>	<b>65.19</b>
Brunei Darussalam	8	10	6	4	13	62.5	0.00	0.00	0.00	0.00
Cambodia	21	15	19	16	11	-47.6	0.00	0.00	0.00	0.00
China	259 991	324 806	348 791	373 944	394 056	51.6	26.51	31.73	24.68	31.37
China, Hong Kong SAR	1 257	1 432	1 436	1 444	1 615	28.5	0.13	0.13	0.13	0.13
China, Macao SAR	14	18	25	41	31	121.4	0.00	0.00	0.00	0.00
China, Taiwan Prov.	18 597	20 046	20 029	19 264	20 587	10.7	1.90	1.66	1.81	1.68
Indonesia	235	338	364	423	383	63.0	0.02	0.03	0.03	0.03
Japan	244 627	274 007	254 526	246 450	248 094	1.4	24.94	19.97	26.65	21.04
Korea DPR	144	169	191	243	214	48.6	0.00	0.00	0.00	0.00
Korea Rep.	104 933	119 132	129 365	128 637	139 881	33.3	0.10	0.09	0.10	0.09
Lao PDR	12	17	11	11	4	-66.7	0.00	0.00	0.00	0.00
Malaysia	957	1 067	1 071	1 121	1 098	14.7	0.02	0.02	0.02	0.02
Myanmar	0	0	0	0	0	–	0.01	0.02	0.02	0.02
Philippines	238	259	284	269	226	-5.0	10.70	11.26	11.35	11.18
Singapore	2 722	3 243	3 279	3 364	3 468	27.4	0.28	0.28	0.28	0.28
Thailand	387	372	368	426	480	24.0	0.04	0.04	0.04	0.04
Timor-Leste	0	0	0	0	0	–	0.00	0.00	0.00	0.00
Viet Nam	227	254	330	299	265	16.7	0.02	0.02	0.02	0.03

**Table E1:** Patents granted by the top five patent offices (IP5), 2015–2019

	Number of patents					Change (%)	World share of IP5 patents (%)			
	2015	2016	2017	2018	2019	2015–2019	2015	2019	2014–2016	2017–2019
<b>Oceania</b>	<b>5 168</b>	<b>5 623</b>	<b>5 665</b>	<b>5 509</b>	<b>5 711</b>	<b>10.5</b>	<b>0.53</b>	<b>0.46</b>	<b>0.52</b>	<b>0.47</b>
Australia	4 454	4 803	4 742	4 553	4 731	6.2	0.45	0.38	0.45	0.39
New Zealand	780	911	992	1 006	1 016	30.3	0.08	0.08	0.08	0.08
Cook Islands	0	2	2	1	1	–	0.00	0.00	0.00	0.00
Fiji	3	1	2	1	0	-100.0	0.00	0.00	0.00	0.00
Kiribati	0	2	1	1	5	–	0.00	0.00	0.00	0.00
Marshall Islands	1	4	5	5	6	500.0	0.00	0.00	0.00	0.00
Micronesia	0	0	0	0	0	–	0.00	0.00	0.00	0.00
Nauru	0	0	0	0	0	–	0.00	0.00	0.00	0.00
Niue	0	0	0	0	0	–	0.00	0.00	0.00	0.00
Palau	0	0	1	0	0	–	0.00	0.00	0.00	0.00
Papua New Guinea	1	5	4	1	3	200.0	0.00	0.00	0.00	0.00
Samoa	7	6	9	16	23	228.6	0.00	0.00	0.00	0.00
Solomon Islands	1	0	0	0	0	-100.0	0.00	0.00	0.00	0.00
Tonga	0	0	0	0	0	–	0.00	0.00	0.00	0.00
Tuvalu	0	0	0	0	0	–	0.00	0.00	0.00	0.00
Vanuatu	0	0	3	0	1	–	0.00	0.00	0.00	0.00

**KEY** –: data unavailable | -n/+n: data refer to n years before or after reference year | 0: magnitude nil or negligible | a: not applicable

GDP: gross domestic product | MF: males and females | PPP\$: purchasing power parity dollars

Note: Patent counts are based on the full-counting method, according to the countries of inventors and years in which the patents were granted by the five patent offices, namely the US Patent and Trademark Office (USPTO), European Patent Office (EPO), Japanese Patent Office (JPO), Korean Intellectual Property Office (KIPO) and State Intellectual Property Office of the People's Republic of China (CNIPA). Therefore, the sum across countries/regions is higher than the world total because of co-inventorship. The IP5 total is the sum across all five offices; therefore, some inventions are counted more than once because patents to protect them may have been granted in more than one market. Data quality is high for the USPTO and EPO, but information related to the country affiliation of inventors is often missing in PATSTAT for CNIPA, JPO and KIPO. To avoid underestimating output levels for countries with intensive patenting activity at these offices, methods based on patent families were implemented to reduce the number of unknown affiliations to a minimum (i.e., only a few percentage points). Caution is nonetheless advised because these methods do not make it possible to correct the data perfectly.

Source: PATSTAT, data treatment by Science-Metrix

## Supporting data for UNESCO study of global publishing trends in sustainability science

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These data are analysed in the *UNESCO Science Report: the Race Against Time for Smarter Development* (2021); see chapter 2, entitled *Are we using science for smarter development?*

**Table F1:** Publications on selected research topics relating to SDG 2: Zero hunger  
Volume of output, 2012–2015 and 2016–2019, and specialization index, 2011–2019

	PEST-RESISTANT CROPS			HELP FOR SMALLHOLDER FOOD PRODUCERS			PRECISION AGRICULTURE		
	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019
<b>World</b>	<b>5 482</b>	<b>6 571</b>	<b>1.00</b>	<b>1 683</b>	<b>3 016</b>	<b>1.00</b>	<b>3 553</b>	<b>6 074</b>	<b>1.00</b>
<b>North America</b>	<b>1 559</b>	<b>1 768</b>	<b>1.02</b>	<b>299</b>	<b>594</b>	<b>0.55</b>	<b>834</b>	<b>1 304</b>	<b>0.85</b>
Canada	247	240	1.15	56	82	0.62	131	169	0.90
United States of America	1 366	1 600	1.00	250	531	0.54	737	1 169	0.85
<b>Latin America</b>	<b>483</b>	<b>683</b>	<b>1.86</b>	<b>300</b>	<b>456</b>	<b>2.86</b>	<b>351</b>	<b>580</b>	<b>2.03</b>
Argentina	31	62	1.64	8	26	0.91	32	50	1.92
Belize	0	0	na	0	0	na	0	0	na
Bolivia	1	1	na	7	6	30.28	0	0	na
Brazil	279	400	2.07	182	214	3.08	253	335	2.33
Chile	17	24	0.77	7	18	1.27	16	39	1.21
Colombia	39	40	1.74	31	59	3.98	13	62	2.44
Costa Rica	8	8	2.49	12	21	16.24	5	2	na
Ecuador	6	22	1.85	7	14	5.03	3	24	4.10
El Salvador	0	0	na	0	0	na	0	0	na
Guatemala	1	0	na	3	6	na	0	3	na
Guyana	0	2	na	0	0	na	0	0	na
Honduras	2	1	na	2	0	na	0	2	na
Mexico	98	137	1.73	42	86	2.18	29	62	1.13
Nicaragua	0	0	na	8	8	37.30	0	1	na
Panama	1	4	na	2	4	na	4	1	na
Paraguay	1	1	na	0	1	na	0	0	na
Peru	7	12	1.37	15	33	8.50	4	12	2.33
Suriname	0	0	na	0	1	na	0	0	na
Uruguay	6	15	3.04	3	2	na	2	3	na
Venezuela	3	1	na	3	4	na	1	2	na
<b>Caribbean</b>	<b>16</b>	<b>18</b>	<b>2.13</b>	<b>8</b>	<b>2</b>	<b>1.69</b>	<b>3</b>	<b>2</b>	<b>na</b>
Antigua & Barbuda	0	0	na	0	0	na	0	0	na
Bahamas	0	0	na	0	0	na	0	0	na
Barbados	0	0	na	0	0	na	1	0	na
Cuba	13	7	2.01	3	1	na	0	1	na
Dominica	0	0	na	0	0	na	0	0	na
Dominican Rep.	1	3	na	0	0	na	0	0	na
Grenada	0	0	na	0	0	na	0	0	na
Haiti	1	1	na	0	0	na	0	0	na
Jamaica	0	1	na	1	1	na	0	0	na
St Kitts & Nevis	0	0	na	0	0	na	0	0	na
Trinidad & Tobago	2	7	4.69	4	0	na	2	1	na
<b>European Union</b>	<b>1 212</b>	<b>1 231</b>	<b>0.59</b>	<b>643</b>	<b>1 047</b>	<b>0.85</b>	<b>1 125</b>	<b>1 849</b>	<b>0.99</b>
Austria	23	22	0.36	21	39	1.07	33	24	0.51
Belgium	64	55	0.77	35	75	1.53	52	74	1.26
Bulgaria	12	12	1.03	2	2	na	6	9	0.93
Croatia	3	6	na	4	10	1.45	5	8	0.61
Cyprus	3	0	na	0	3	na	8	17	5.74
Czech Rep.	36	33	0.57	4	13	0.37	29	58	1.24
Denmark	43	43	0.61	30	42	1.15	23	51	0.95
Estonia	7	7	0.68	0	2	na	0	3	na
Finland	19	20	0.42	6	19	0.62	33	42	1.12
France	188	217	0.63	103	121	0.72	121	171	0.67
Germany	262	289	0.59	120	236	0.93	275	339	1.02
Greece	7	21	0.27	4	14	0.39	72	127	3.09
Hungary	36	25	1.23	5	8	0.75	15	26	1.20
Ireland	19	7	0.59	10	14	0.62	10	24	0.89
Italy	138	121	0.48	40	94	0.52	174	385	1.47
Latvia	10	7	1.96	3	3	na	12	9	3.28
Lithuania	7	5	0.55	1	8	na	1	5	na
Luxembourg	2	1	na	0	0	na	5	6	1.40
Malta	0	1	na	1	0	na	0	0	na

AGRO-ECOLOGY			MAINTAIN GENETIC DIVERSITY OF FOOD CROPS			TRADITIONAL KNOWLEDGE			
2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	
9 666	14 322	1.00	3 553	4 988	1.00	6 601	7 670	1.00	World
2 274	3 384	0.88	799	1 022	0.64	837	986	0.41	North America
437	592	1.15	129	166	0.65	246	300	1.11	Canada
1 893	2 895	0.84	702	911	0.64	617	735	0.31	United States of America
1 959	2 507	3.95	446	593	2.25	1 026	1 181	3.34	Latin America
192	292	4.53	55	69	3.24	94	90	2.94	Argentina
1	0	na	0	0	na	5	5	35.54	Belize
14	20	11.61	11	11	24.12	17	27	29.34	Bolivia
1 281	1 472	4.48	153	198	1.43	628	658	3.52	Brazil
62	87	1.57	17	18	0.81	26	55	1.36	Chile
118	196	3.58	65	64	2.83	56	71	2.67	Colombia
73	68	14.76	6	16	5.68	5	14	2.84	Costa Rica
18	59	3.45	9	15	2.93	15	43	4.78	Ecuador
0	1	na	0	1	na	0	0	na	El Salvador
5	8	6.41	0	4	na	11	8	10.67	Guatemala
1	1	na	0	0	na	0	3	na	Guyana
3	4	na	2	2	na	0	0	na	Honduras
217	330	2.50	142	195	4.36	186	215	3.58	Mexico
16	7	18.10	3	1	na	1	0	na	Nicaragua
5	9	3.84	2	0	na	5	6	5.49	Panama
6	7	5.62	3	3	na	1	3	na	Paraguay
21	55	3.15	29	37	8.20	22	36	4.63	Peru
1	0	na	0	1	na	2	5	na	Suriname
17	25	3.32	7	11	2.96	3	6	1.23	Uruguay
24	23	3.22	3	5	na	12	11	3.28	Venezuela
38	48	2.42	4	10	0.92	20	29	2.89	Caribbean
0	0	na	0	0	na	0	0	na	Antigua & Barbuda
0	2	na	0	0	na	1	0	na	Bahamas
0	0	na	0	1	na	0	1	na	Barbados
31	37	3.03	2	7	na	11	16	2.30	Cuba
1	0	na	0	0	na	0	0	na	Dominica
3	2	na	0	0	na	0	1	na	Dominican Rep.
0	0	na	0	0	na	1	0	na	Grenada
1	2	na	0	0	na	0	2	na	Haiti
0	3	na	1	0	na	4	8	6.96	Jamaica
0	0	na	0	0	na	0	0	na	St Kitts & Nevis
2	3	na	1	2	na	4	3	na	Trinidad & Tobago
3 650	5 185	1.13	1 197	1 546	0.94	1 219	1 475	0.49	European Union
119	152	1.08	26	25	0.44	58	41	0.75	Austria
145	260	1.27	43	82	0.78	80	63	0.67	Belgium
21	26	1.04	11	9	1.16	16	22	1.13	Bulgaria
16	38	0.93	13	22	1.30	11	13	0.80	Croatia
5	8	0.75	4	7	1.25	4	2	na	Cyprus
95	160	1.22	51	50	1.23	26	37	0.31	Czech Rep.
155	219	1.30	35	45	0.68	62	71	0.85	Denmark
24	56	3.18	4	7	0.52	10	15	1.57	Estonia
89	113	1.19	26	28	0.68	21	36	0.49	Finland
665	936	1.46	174	179	0.72	126	161	0.37	France
615	918	0.84	210	290	0.70	168	203	0.29	Germany
78	130	1.16	21	46	1.08	13	24	0.33	Greece
61	88	1.33	13	26	0.98	32	31	1.07	Hungary
66	73	1.26	13	15	0.56	13	12	0.28	Ireland
493	816	1.33	263	354	1.66	194	261	0.67	Italy
18	39	3.10	10	12	2.72	0	0	na	Latvia
35	52	3.24	8	6	1.74	2	6	na	Lithuania
3	18	1.12	2	4	na	5	1	na	Luxembourg
2	0	na	0	0	na	0	2	na	Malta

**Table F1:** Publications on selected research topics relating to SDG 2: Zero hunger  
Volume of output, 2012–2015 and 2016–2019, and specialization index, 2011–2019

	PEST-RESISTANT CROPS			HELP FOR SMALLHOLDER FOOD PRODUCERS			PRECISION AGRICULTURE		
	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019
Netherlands	105	105	0.78	142	206	2.93	59	88	0.65
Poland	63	44	0.53	7	18	0.29	20	44	0.38
Portugal	13	21	0.34	8	9	0.37	28	77	1.39
Romania	16	15	0.44	7	12	0.64	11	27	0.88
Slovakia	4	11	0.32	1	5	na	7	10	0.66
Slovenia	8	4	0.37	3	4	na	3	14	0.95
Spain	190	179	0.88	30	58	0.45	224	339	1.90
Sweden	35	37	0.33	38	87	1.49	27	32	0.38
United Kingdom	211	233	0.53	127	225	0.84	100	206	0.44
<b>Southeast Europe</b>	<b>12</b>	<b>7</b>	<b>0.37</b>	<b>11</b>	<b>3</b>	<b>0.73</b>	<b>6</b>	<b>20</b>	<b>0.82</b>
Albania	3	2	na	2	1	na	0	0	na
Bosnia & Herzegovina	0	1	na	3	0	na	0	0	na
Montenegro	0	0	na	0	0	na	0	4	na
North Macedonia	2	0	na	1	0	na	1	5	na
Serbia	10	4	0.36	5	2	na	5	12	0.65
<b>European Free Trade Assoc.</b>	<b>160</b>	<b>146</b>	<b>0.95</b>	<b>64</b>	<b>84</b>	<b>1.08</b>	<b>45</b>	<b>87</b>	<b>0.48</b>
Iceland	1	2	na	0	0	na	3	2	na
Norway	27	28	0.49	22	27	0.99	12	23	0.42
Switzerland	136	118	1.20	42	58	1.15	30	63	0.51
<b>Other Europe &amp; West Asia</b>	<b>227</b>	<b>322</b>	<b>0.55</b>	<b>18</b>	<b>43</b>	<b>0.14</b>	<b>155</b>	<b>334</b>	<b>0.61</b>
Armenia	3	0	na	0	0	na	0	0	na
Azerbaijan	0	3	na	0	0	na	0	0	na
Belarus	0	4	na	0	0	na	1	1	na
Georgia	1	3	na	0	1	na	0	0	na
Iran Islamic Rep.	88	111	0.76	5	19	0.21	49	65	0.51
Israel	33	40	0.68	4	2	na	35	60	1.25
Moldova, Rep.	0	0	na	0	0	na	0	0	na
Russian Federation	40	85	0.35	0	11	0.06	19	116	0.48
Turkey	55	83	0.62	8	8	0.16	50	79	0.74
Ukraine	9	7	0.35	1	7	na	8	21	0.73
<b>Sub-Saharan Africa</b>	<b>151</b>	<b>249</b>	<b>2.30</b>	<b>592</b>	<b>1 194</b>	<b>27.35</b>	<b>57</b>	<b>126</b>	<b>1.17</b>
Angola	0	1	na	1	1	na	0	1	na
Benin	6	9	6.67	24	31	56.32	1	3	na
Botswana	2	0	na	2	8	13.89	1	0	na
Burkina Faso	2	9	4.74	11	35	31.22	0	1	na
Burundi	0	1	na	8	6	93.28	0	0	na
Cameroon	2	6	1.21	16	23	16.10	0	0	na
Cabo Verde	0	0	na	2	0	na	0	1	na
Central African Rep.	0	1	na	1	0	na	0	0	na
Chad	0	0	na	1	1	na	0	0	na
Comoros	0	0	na	0	0	na	0	0	na
Congo	0	2	na	0	3	na	0	0	na
Côte d'Ivoire	1	6	na	2	16	11.37	1	1	na
Congo, Dem. Rep.	0	3	na	5	10	21.23	0	0	na
Djibouti	0	0	na	0	0	na	0	0	na
Eritrea	0	0	na	0	1	na	0	0	na
Eswatini	0	0	na	1	1	na	0	0	na
Ethiopia	13	26	2.48	86	202	63.81	4	11	1.60
Gabon	0	1	na	0	1	na	0	0	na
Gambia	0	0	na	1	4	na	0	0	na
Ghana	6	12	2.48	30	112	42.07	0	3	na
Guinea	0	0	na	1	3	na	0	0	na
Guinea-Bissau	0	0	na	1	1	na	0	0	na
Kenya	34	47	8.61	175	333	123.97	19	14	2.92
Lesotho	0	0	na	0	0	na	0	0	na
Liberia	0	0	na	0	1	na	0	0	na
Madagascar	3	1	na	9	15	42.38	1	1	na

AGRO-ECOLOGY			MAINTAIN GENETIC DIVERSITY OF FOOD CROPS			TRADITIONAL KNOWLEDGE			
2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	
286	390	0.98	118	130	1.17	85	97	0.48	Netherlands
147	218	0.85	28	54	0.49	56	70	0.39	Poland
118	203	1.43	44	57	1.12	46	69	0.84	Portugal
64	92	1.08	7	13	0.33	23	32	0.49	Romania
33	44	1.24	8	14	0.77	7	12	0.34	Slovakia
19	26	0.93	8	10	0.60	9	6	0.45	Slovenia
477	667	1.45	207	251	1.57	140	167	0.63	Spain
172	256	1.12	81	72	0.93	55	67	0.47	Sweden
554	835	0.80	186	282	0.66	223	298	0.44	United Kingdom
<b>23</b>	<b>44</b>	<b>0.64</b>	<b>44</b>	<b>34</b>	<b>2.12</b>	<b>35</b>	<b>48</b>	<b>1.44</b>	<b>Southeast Europe</b>
4	3	na	5	6	4.94	3	0	na	Albania
1	5	na	8	2	1.60	3	1	na	Bosnia & Herzegovina
1	3	na	1	3	na	0	0	na	Montenegro
0	2	na	8	6	3.02	5	0	na	North Macedonia
18	34	0.68	35	27	2.07	26	47	1.73	Serbia
<b>279</b>	<b>450</b>	<b>1.11</b>	<b>64</b>	<b>91</b>	<b>0.61</b>	<b>114</b>	<b>124</b>	<b>0.61</b>	<b>European Free Trade Assoc.</b>
1	6	na	1	2	na	2	5	na	Iceland
75	82	0.70	24	35	0.60	51	55	0.86	Norway
208	379	1.32	42	59	0.63	64	67	0.49	Switzerland
<b>301</b>	<b>606</b>	<b>0.47</b>	<b>235</b>	<b>429</b>	<b>0.94</b>	<b>251</b>	<b>403</b>	<b>0.54</b>	<b>Other Europe &amp; West Asia</b>
1	0	na	2	2	na	0	2	na	Armenia
1	2	na	7	6	3.27	2	3	na	Azerbaijan
2	1	na	1	7	na	1	2	na	Belarus
1	1	na	5	3	na	4	9	1.67	Georgia
151	244	0.84	80	135	1.26	111	190	0.98	Iran Islamic Rep.
31	47	0.37	38	38	0.90	17	20	0.38	Israel
2	3	na	1	0	na	0	0	na	Moldova, Rep.
31	142	0.23	38	121	0.55	17	50	0.12	Russian Federation
70	137	0.49	66	134	1.35	104	140	0.93	Turkey
13	38	0.35	6	8	0.24	3	3	na	Ukraine
<b>737</b>	<b>1 225</b>	<b>5.23</b>	<b>257</b>	<b>422</b>	<b>5.33</b>	<b>918</b>	<b>1 139</b>	<b>11.75</b>	<b>Sub-Saharan Africa</b>
2	1	na	1	0	na	0	9	na	Angola
34	67	28.00	20	30	38.97	25	47	45.72	Benin
1	7	2.12	1	2	na	12	11	14.24	Botswana
26	51	11.59	7	6	5.62	25	20	16.97	Burkina Faso
1	2	na	0	0	na	1	0	na	Burundi
47	65	8.01	5	17	4.51	85	66	22.24	Cameroon
1	0	na	0	0	na	0	0	na	Cabo Verde
0	0	na	0	0	na	0	2	na	Central African Rep.
0	1	na	0	0	na	1	2	na	Chad
2	2	na	0	0	na	0	0	na	Comoros
6	6	5.79	0	2	na	6	6	19.22	Congo
8	28	8.63	3	10	10.36	6	13	10.91	Côte d'Ivoire
9	15	6.56	2	1	na	19	10	16.82	Congo, Dem. Rep.
1	0	na	1	0	na	1	1	na	Djibouti
0	0	na	0	0	na	0	1	na	Eritrea
3	2	na	0	2	na	0	0	na	Eswatini
100	183	10.07	43	94	14.53	101	98	16.68	Ethiopia
2	1	na	1	1	na	7	7	18.50	Gabon
0	0	na	0	0	na	1	0	na	Gambia
41	107	8.15	19	24	6.86	36	62	12.82	Ghana
1	4	na	1	1	na	4	3	na	Guinea
2	1	na	0	0	na	1	1	na	Guinea-Bissau
204	248	17.70	54	80	16.24	80	65	13.87	Kenya
1	0	na	0	0	na	1	3	na	Lesotho
0	2	na	0	0	na	0	0	na	Liberia
23	26	15.95	8	1	na	14	14	19.13	Madagascar

**Table F1:** Publications on selected research topics relating to SDG 2: Zero hunger  
Volume of output, 2012–2015 and 2016–2019, and specialization index, 2011–2019

	PEST-RESISTANT CROPS			HELP FOR SMALLHOLDER FOOD PRODUCERS			PRECISION AGRICULTURE		
	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019
Malawi	0	3	na	27	54	97.21	1	1	na
Mali	1	5	na	15	35	73.77	2	5	na
Mauritius	1	4	na	0	1	na	1	2	na
Mozambique	0	0	na	6	21	36.42	0	4	na
Namibia	0	1	na	4	5	15.90	0	0	na
Niger	1	2	na	7	15	81.78	2	2	na
Nigeria	25	29	1.06	46	95	9.45	3	15	0.86
Rwanda	3	4	na	13	34	55.85	0	4	na
Sao Tome & Principe	0	0	na	0	0	na	0	0	na
Senegal	2	2	na	10	32	16.10	0	6	na
Seychelles	0	0	na	0	0	na	0	0	na
Sierra Leone	1	0	na	0	5	na	0	4	na
Somalia	0	0	na	0	0	na	0	0	na
South Africa	59	101	2.00	89	222	10.78	18	48	1.03
South Sudan	0	0	na	0	0	na	0	0	na
Togo	0	1	na	0	3	na	0	0	na
Uganda	10	27	6.60	38	105	55.62	2	4	na
Tanzania	5	27	4.07	47	123	73.14	3	1	na
Zambia	0	2	na	8	33	49.91	0	0	na
Zimbabwe	4	3	na	79	118	217.05	5	13	8.02
<b>Arab States</b>	<b>152</b>	<b>195</b>	<b>0.94</b>	<b>50</b>	<b>49</b>	<b>0.65</b>	<b>67</b>	<b>172</b>	<b>0.78</b>
Algeria	2	9	0.21	6	3	0.67	1	10	0.38
Bahrain	0	0	na	0	0	na	1	2	na
Egypt	83	74	1.79	10	10	0.52	18	50	0.87
Iraq	4	11	0.46	0	3	na	1	10	0.49
Jordan	5	3	na	6	4	1.20	4	7	0.62
Kuwait	0	2	na	0	1	na	0	1	na
Lebanon	1	6	na	0	0	na	1	8	na
Libya	0	2	na	0	1	na	0	0	na
Mauritania	0	0	na	2	0	na	1	0	na
Morocco	11	26	0.79	9	13	1.60	7	22	1.29
Oman	3	6	na	1	2	na	5	3	1.62
Palestine	0	0	na	0	0	na	0	5	na
Qatar	2	7	0.45	1	2	na	1	4	na
Saudi Arabia	20	42	0.41	3	8	0.19	11	42	0.86
Sudan	3	8	1.96	2	2	na	5	9	2.42
Syrian Arab Rep.	14	8	9.64	10	1	8.51	0	1	na
Tunisia	22	31	1.52	5	3	0.61	13	16	0.74
United Arab Emirates	0	3	na	3	0	na	1	3	na
Yemen	0	1	na	0	1	na	1	0	na
<b>Central Asia</b>	<b>5</b>	<b>14</b>	<b>0.77</b>	<b>2</b>	<b>6</b>	<b>1.50</b>	<b>4</b>	<b>14</b>	<b>1.36</b>
Kazakhstan	1	8	na	0	3	na	1	9	1.40
Kyrgyzstan	1	0	na	0	0	na	0	0	na
Mongolia	0	1	na	0	0	na	0	1	na
Tajikistan	0	0	na	1	0	na	0	0	na
Uzbekistan	3	5	na	1	3	na	3	4	na
<b>South Asia</b>	<b>819</b>	<b>961</b>	<b>2.39</b>	<b>169</b>	<b>315</b>	<b>1.33</b>	<b>279</b>	<b>600</b>	<b>1.51</b>
Afghanistan	1	2	na	0	0	na	0	0	na
Bangladesh	14	37	1.09	15	35	4.52	6	9	0.55
Bhutan	0	1	na	0	4	na	0	1	na
India	645	676	2.12	108	200	1.05	255	535	1.59
Maldives	0	0	na	0	0	na	0	0	na
Nepal	6	12	2.09	16	23	13.79	2	2	na
Pakistan	153	240	5.70	20	50	2.11	15	51	0.94
Sri Lanka	8	9	2.11	17	17	8.42	5	4	1.35



AGRO-ECOLOGY			MAINTAIN GENETIC DIVERSITY OF FOOD CROPS			TRADITIONAL KNOWLEDGE			
2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	
22	46	15.34	2	8	6.41	5	6	8.10	Malawi
32	36	23.86	13	13	24.29	13	9	12.09	Mali
4	1	na	1	3	na	13	26	34.20	Mauritius
5	10	4.06	6	6	10.64	3	4	na	Mozambique
0	3	na	3	2	na	20	23	41.12	Namibia
12	16	22.06	10	9	32.62	5	3	19.62	Niger
66	118	2.87	28	54	3.01	187	267	13.91	Nigeria
11	18	6.63	2	2	na	4	6	7.00	Rwanda
1	1	na	0	0	na	0	0	na	Sao Tome & Principe
18	40	6.26	8	13	3.73	9	6	3.87	Senegal
0	0	na	0	0	na	0	2	na	Seychelles
2	4	na	2	0	na	4	0	na	Sierra Leone
0	0	na	0	0	na	0	1	na	Somalia
119	238	2.21	55	118	3.08	267	387	8.18	South Africa
0	0	na	1	0	na	0	0	na	South Sudan
8	10	10.28	2	0	na	11	8	33.80	Togo
37	54	6.61	13	24	8.84	30	37	12.81	Uganda
31	42	5.85	10	27	5.71	17	35	7.37	Tanzania
10	34	7.08	3	5	na	2	6	4.11	Zambia
72	92	30.21	4	8	4.20	22	23	18.72	Zimbabwe
<b>159</b>	<b>303</b>	<b>0.57</b>	<b>135</b>	<b>229</b>	<b>1.18</b>	<b>204</b>	<b>335</b>	<b>1.23</b>	<b>Arab States</b>
12	21	0.52	12	23	1.10	26	42	1.86	Algeria
1	0	na	0	0	na	0	2	na	Bahrain
31	68	0.44	24	43	0.67	29	70	0.63	Egypt
3	24	0.57	2	9	0.22	5	14	0.56	Iraq
12	17	0.72	12	28	3.42	15	16	2.28	Jordan
1	6	na	0	0	na	0	5	na	Kuwait
7	11	0.74	3	11	0.77	7	12	1.04	Lebanon
2	0	na	0	0	na	0	0	na	Libya
0	1	na	0	1	na	0	0	na	Mauritania
19	53	0.96	22	43	2.00	24	58	2.68	Morocco
8	22	1.17	3	10	1.81	20	6	2.33	Oman
0	2	na	3	4	na	2	12	5.33	Palestine
4	3	na	0	1	na	1	4	na	Qatar
15	50	0.34	16	36	0.67	58	100	1.12	Saudi Arabia
12	14	3.18	5	8	2.49	10	15	4.94	Sudan
17	6	4.58	23	6	15.57	3	0	na	Syrian Arab Rep.
23	33	0.71	26	39	2.17	21	25	1.25	Tunisia
7	9	0.29	4	13	0.62	4	9	0.35	United Arab Emirates
1	2	na	0	1	na	4	5	5.13	Yemen
<b>16</b>	<b>31</b>	<b>1.27</b>	<b>8</b>	<b>18</b>	<b>1.47</b>	<b>8</b>	<b>15</b>	<b>0.44</b>	<b>Central Asia</b>
9	15	1.26	2	5	na	1	0	na	Kazakhstan
2	7	na	2	5	na	2	2	na	Kyrgyzstan
1	0	na	0	0	na	3	5	3.14	Mongolia
0	2	na	0	3	na	0	6	na	Tajikistan
6	12	1.25	4	7	1.93	2	3	na	Uzbekistan
<b>891</b>	<b>1 483</b>	<b>1.51</b>	<b>499</b>	<b>703</b>	<b>2.16</b>	<b>1 352</b>	<b>1 333</b>	<b>3.30</b>	<b>South Asia</b>
1	14	5.31	1	5	na	1	3	na	Afghanistan
62	116	2.96	28	35	3.04	122	62	9.65	Bangladesh
1	4	na	1	0	na	6	7	21.20	Bhutan
697	1 098	1.39	406	554	2.04	975	972	2.83	India
0	0	na	0	0	na	0	1	na	Maldives
28	43	3.26	14	18	6.63	41	41	10.80	Nepal
116	223	2.27	62	80	2.60	202	257	6.18	Pakistan
16	37	2.47	11	22	6.25	14	22	4.18	Sri Lanka

**Table F1:** Publications on selected research topics relating to SDG 2: Zero hunger  
Volume of output, 2012–2015 and 2016–2019, and specialization index, 2011–2019

	PEST-RESISTANT CROPS			HELP FOR SMALLHOLDER FOOD PRODUCERS			PRECISION AGRICULTURE		
	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019
<b>Southeast Asia</b>	<b>1 809</b>	<b>2 611</b>	<b>1.04</b>	<b>268</b>	<b>622</b>	<b>0.42</b>	<b>1 146</b>	<b>1 964</b>	<b>0.98</b>
Brunei Darussalam	0	0	na	0	2	na	0	0	na
Cambodia	0	1	na	9	18	41.35	0	0	na
China	1 309	2 035	1.28	64	178	0.18	910	1 598	1.28
China, Hong Kong SAR	9	12	0.27	0	9	na	4	21	0.30
China, Macao SAR	1	0	na	0	0	na	0	0	na
China, Taiwan Prov.	47	72	0.47	6	15	0.24	22	22	0.32
Indonesia	16	46	0.77	55	152	6.25	9	60	1.11
Japan	205	171	0.52	40	51	0.25	88	98	0.33
Lao PDR	0	0	na	18	28	118.59	1	0	na
Malaysia	42	49	0.73	24	52	1.33	53	71	1.28
Myanmar	0	4	na	2	5	na	0	1	na
Philippines	32	44	4.76	26	52	16.94	11	32	5.05
Korea, DPR	0	0	na	0	0	na	0	0	na
Korea, Rep.	162	203	0.90	1	12	0.08	55	79	0.38
Singapore	10	15	0.19	6	5	0.20	1	4	na
Thailand	38	47	1.20	28	67	3.10	23	33	1.16
Timor-Leste	0	0	na	3	2	na	0	0	na
Viet Nam	10	26	0.84	18	46	3.60	4	13	0.70
<b>Oceania</b>	<b>278</b>	<b>299</b>	<b>1.25</b>	<b>130</b>	<b>252</b>	<b>1.80</b>	<b>161</b>	<b>257</b>	<b>1.37</b>
Australia	240	271	1.28	119	236	1.84	146	233	1.40
New Zealand	41	33	1.10	9	14	0.80	18	28	1.26
Fiji	2	1	na	3	2	na	0	0	na
Kiribati	0	0	na	0	0	na	0	0	na
Marshall Islands	0	0	na	0	0	na	0	0	na
Micronesia	0	0	na	0	0	na	0	0	na
Niue	0	0	na	0	0	na	0	0	na
Palau	0	0	na	0	0	na	0	0	na
Papua New Guinea	1	0	na	5	10	59.41	1	0	na
Samoa	0	0	na	0	0	na	0	0	na
Solomon Islands	0	0	na	0	1	na	0	0	na
Tonga	0	0	na	0	0	na	0	0	na
Vanuatu	1	0	na	3	3	na	0	0	na

SI<sub>2011–19</sub>: The specialization index is measured as the proportion of output of a given country on a given topic, divided by the proportion observed at the global level. For example, a country with 2% of its output being on a research topic that represents 1% of all research worldwide would score 2.00, having twice as much output as expected, relative to the global average.

na = the total number of publications is too low to calculate the specialization index

**KEY** –: data unavailable | -n/+n: data refer to n years before or after reference year | 0: magnitude nil or negligible | na: not applicable

GDP: gross domestic product | MF: males and females | PPP\$: purchasing power parity dollars

Note: Publication counts of articles, reviews and conference papers are based on the full-counting method. Therefore, the sum across countries is higher than the global total because of co-authorship. The selected topics in the present table are examples of research topics furthering the SDG agenda. These topics are not necessarily mutually exclusive. The following are excluded from the present table because they did not publish on these topics over the period under study: Cook Islands, Equatorial Guinea, Liechtenstein, Nauru, St Lucia, St Vincent and the Grenadines, Turkmenistan and Tuvalu. The total for the People's Republic of China excludes its Special Administrative Regions of Hong Kong and Macao and the Taiwan Province of China.

Source: Prepared by Science-Metrix using Scopus data (Elsevier), including those for social sciences, arts and humanities

AGRO-ECOLOGY			MAINTAIN GENETIC DIVERSITY OF FOOD CROPS			TRADITIONAL KNOWLEDGE			
2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	
1 455	2 911	0.48	1 007	1 431	0.78	1 865	2 348	0.88	<b>Southeast Asia</b>
1	0	na	1	0	na	1	6	na	Brunei Darussalam
6	14	4.86	3	4	na	3	1	na	Cambodia
921	1 902	0.53	670	963	0.85	1 035	1 211	0.73	China
4	20	0.10	6	15	0.27	88	70	1.77	China, Hong Kong SAR
0	0	na	1	1	na	22	39	6.63	China, Macao SAR
18	37	0.12	32	31	0.30	111	108	1.07	China, Taiwan Prov.
125	372	3.02	27	53	1.18	44	296	3.86	Indonesia
156	215	0.22	147	190	0.59	92	118	0.18	Japan
13	10	9.69	2	2	na	7	7	11.80	Lao PDR
73	105	0.64	48	40	0.84	209	217	2.99	Malaysia
1	13	3.89	3	9	7.13	5	19	11.24	Myanmar
56	89	4.83	43	61	10.21	25	28	4.57	Philippines
2	1	na	0	0	na	0	0	na	Korea, DPR
69	127	0.19	80	109	0.58	280	294	1.36	Korea, Rep.
4	17	0.06	3	6	na	7	14	0.19	Singapore
54	82	0.87	41	50	1.50	91	93	2.38	Thailand
2	0	na	1	1	na	1	1	na	Timor-Leste
39	73	1.29	18	47	1.93	13	30	1.00	Viet Nam
441	713	1.16	190	286	1.20	264	310	1.10	<b>Oceania</b>
396	621	1.15	165	262	1.23	204	236	0.91	Australia
57	93	1.08	14	18	0.59	47	73	1.88	New Zealand
5	9	4.69	4	3	na	10	10	15.94	Fiji
0	0	na	0	0	na	0	2	na	Kiribati
0	0	na	0	0	na	2	2	na	Marshall Islands
0	1	na	0	0	na	2	2	na	Micronesia
0	0	na	0	0	na	0	2	na	Niue
0	0	na	0	0	na	2	3	na	Palau
3	7	7.36	2	3	na	5	3	na	Papua New Guinea
0	0	na	0	0	na	1	2	na	Samoa
1	2	na	1	0	na	4	4	na	Solomon Islands
0	0	na	0	1	na	0	1	na	Tonga
2	4	na	6	4	167.82	3	2	na	Vanuatu

**Table F2:** Publications on selected research topics relating to SDG 3: Good health and well-being  
Volume of output, 2012–2015 and 2016–2019, and specialization index, 2011–2019

	REPRODUCTIVE HEALTH AND NEONATOLOGY			TROPICAL COMMUNICABLE DISEASES*			HUMAN RESISTANCE TO ANTIBIOTICS			REGENERATIVE MEDICINE			IMPACT ON HEALTH OF SOIL, FRESHWATER AND AIR POLLUTION		
	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019
<b>World</b>	<b>140 722</b>	<b>163 151</b>	<b>1.00</b>	<b>47 019</b>	<b>53 534</b>	<b>1.00</b>	<b>16 203</b>	<b>23 780</b>	<b>1.00</b>	<b>95 314</b>	<b>111 568</b>	<b>1.00</b>	<b>17 924</b>	<b>30 364</b>	<b>1.00</b>
<b>North America</b>	<b>43 058</b>	<b>48 809</b>	<b>1.24</b>	<b>13 150</b>	<b>14 276</b>	<b>0.86</b>	<b>4 039</b>	<b>5 775</b>	<b>0.97</b>	<b>33 461</b>	<b>35 347</b>	<b>1.31</b>	<b>5 441</b>	<b>7 810</b>	<b>1.03</b>
Canada	6 171	7 564	1.22	1 320	1 434	0.57	561	775	0.96	3 222	3 595	0.85	958	1 290	1.20
United States of America	38 297	43 272	1.24	12 235	13 375	0.91	3 602	5 189	0.97	31 109	32 731	1.37	4 750	6 933	1.01
<b>Latin America</b>	<b>8 368</b>	<b>9 700</b>	<b>1.24</b>	<b>8 256</b>	<b>10 056</b>	<b>3.77</b>	<b>979</b>	<b>1 464</b>	<b>1.26</b>	<b>2 514</b>	<b>3 723</b>	<b>0.56</b>	<b>1 004</b>	<b>1 810</b>	<b>1.14</b>
Argentina	759	778	0.92	718	887	3.33	130	182	1.52	226	329	0.49	101	148	1.07
Belize	3	2	na	9	5	13.77	0	1	na	0	0	na	1	0	na
Bolivia	24	23	1.23	92	93	19.37	5	7	1.14	0	1	na	6	10	2.70
Brazil	4 639	5 391	1.23	5 136	6 398	4.16	498	770	1.18	1 594	2 173	0.60	484	881	0.99
Chile	738	861	1.49	173	235	1.02	70	122	1.15	201	365	0.67	87	148	1.21
Colombia	596	755	1.36	737	1 073	5.17	101	149	1.69	121	194	0.42	87	194	1.69
Costa Rica	31	34	0.46	74	82	4.02	13	18	2.45	9	20	0.27	9	13	1.30
Ecuador	64	192	0.94	155	189	3.20	16	51	2.21	12	33	0.13	17	62	2.03
El Salvador	11	13	2.51	15	15	7.00	2	1	na	1	1	na	1	4	na
Guatemala	63	66	3.06	51	79	13.73	2	5	na	1	0	na	5	10	2.40
Guyana	3	5	na	8	5	13.31	0	3	na	0	0	na	0	0	na
Honduras	11	14	1.53	27	39	16.56	3	4	na	1	1	na	4	8	1.81
Mexico	1 301	1 500	1.16	802	985	2.09	125	175	0.91	351	643	0.56	207	388	1.44
Nicaragua	19	12	1.60	34	73	22.97	1	2	na	0	4	na	3	4	na
Panama	34	41	1.70	81	89	10.54	4	5	1.05	7	8	0.33	2	5	na
Paraguay	16	28	1.25	46	60	13.63	0	6	na	2	1	na	0	5	na
Peru	155	247	1.76	354	374	7.68	34	62	3.00	17	43	0.37	27	54	1.50
Suriname	2	14	1.77	23	21	33.20	0	1	na	0	1	na	1	1	na
Uruguay	84	149	1.23	139	145	4.18	24	40	3.04	32	34	0.38	9	15	0.58
Venezuela	267	233	3.46	305	243	8.99	30	27	2.17	29	19	0.39	15	11	0.79
<b>Caribbean</b>	<b>488</b>	<b>484</b>	<b>2.92</b>	<b>353</b>	<b>390</b>	<b>5.40</b>	<b>38</b>	<b>82</b>	<b>1.78</b>	<b>87</b>	<b>87</b>	<b>0.69</b>	<b>26</b>	<b>36</b>	<b>0.84</b>
Antigua & Barbuda	2	1	na	0	0	na	0	0	na	1	5	na	0	0	na
Bahamas	5	5	1.80	0	0	na	0	0	na	1	1	na	0	1	na
Barbados	7	12	1.72	7	10	5.69	0	4	na	2	2	na	1	3	na
Cuba	321	246	3.08	218	190	5.32	23	21	1.41	66	47	0.83	13	14	0.66
Dominica	4	8	2.60	3	1	na	0	0	na	2	5	na	0	0	na
Dominican Rep.	21	28	2.83	12	26	6.72	3	3	na	2	7	na	0	0	na
Grenada	29	55	4.63	6	18	6.45	2	4	na	2	4	na	2	0	na
Haiti	25	24	3.57	58	67	29.71	0	1	na	0	0	na	3	6	na
Jamaica	53	72	3.52	19	24	3.83	7	9	2.87	6	7	0.18	4	7	1.75
St Kitts & Nevis	5	17	2.10	5	33	13.51	5	26	9.08	1	4	na	1	1	na
St Lucia	2	0	na	4	1	na	0	0	na	0	0	na	0	0	na
St Vincent & Grenadines	0	4	na	0	0	na	0	2	na	1	3	na	0	0	na
Trinidad & Tobago	24	22	1.26	33	28	2.87	3	17	2.82	5	4	0.20	3	5	na
<b>European Union</b>	<b>48 039</b>	<b>51 652</b>	<b>1.09</b>	<b>15 003</b>	<b>16 720</b>	<b>0.78</b>	<b>5 647</b>	<b>7 698</b>	<b>1.07</b>	<b>30 334</b>	<b>34 128</b>	<b>1.00</b>	<b>6 050</b>	<b>8 450</b>	<b>0.94</b>
Austria	1 260	1 481	0.98	280	295	0.47	96	162	0.66	899	1 109	0.91	170	217	0.65
Belgium	2 254	2 608	1.25	983	1 133	1.29	294	355	1.27	1 183	1 468	1.02	267	391	1.11
Bulgaria	295	208	1.12	36	53	0.42	35	43	1.14	81	75	0.42	49	83	1.63
Croatia	534	418	1.46	58	69	0.54	56	90	1.41	103	160	0.45	49	88	1.28
Cyprus	51	136	0.68	27	34	0.53	14	29	1.00	23	57	0.47	38	70	2.16
Czech Rep.	1 054	1 081	0.85	212	270	0.42	131	139	0.77	629	903	0.78	167	253	0.98
Denmark	1 966	2 394	1.57	506	568	0.74	255	392	1.48	687	953	0.71	265	327	1.04
Estonia	93	154	0.71	33	75	0.49	18	24	0.77	44	62	0.36	27	35	1.34
Finland	1 055	1 331	1.06	197	244	0.51	65	115	0.57	582	748	0.82	193	272	1.08
France	5 486	6 161	0.99	2 922	3 104	1.08	838	1 080	1.09	3 665	4 274	0.83	734	961	0.71
Germany	6 335	6 875	0.70	2 182	2 494	0.55	932	1 196	0.82	7 384	8 178	1.14	771	1 089	0.49
Greece	1 388	1 364	1.44	212	231	0.55	203	251	1.71	447	533	0.65	308	314	1.63
Hungary	512	483	0.88	58	89	0.31	60	96	0.99	318	363	0.65	74	85	0.72
Ireland	1 074	1 316	1.80	114	154	0.46	124	191	1.68	544	587	1.22	82	121	0.74
Italy	6 568	7 528	1.22	1 288	1 518	0.56	620	962	0.99	5 232	6 076	1.35	872	1 340	1.10

MEDICINES AND VACCINES FOR TUBERCULOSIS			HUMAN IMMUNODEFICIENCY VIRUS (HIV)			NEW OR RE-EMERGING VIRUSES THAT CAN INFECT HUMANS			TYPE 2 DIABETES			
2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	
<b>24 616</b>	<b>27 180</b>	<b>1.00</b>	<b>61 999</b>	<b>63 513</b>	<b>1.00</b>	<b>24 251</b>	<b>29 141</b>	<b>1.00</b>	<b>64 792</b>	<b>77 769</b>	<b>1.00</b>	<b>World</b>
5 928	6 377	0.76	30 034	30 639	1.85	9 139	11 249	1.41	20 545	22 660	1.19	North America
711	826	0.61	3 344	3 590	1.34	1 073	1 234	1.06	2 831	3 284	1.09	Canada
5 427	5 832	0.78	27 781	28 340	1.92	8 464	10 459	1.46	18 479	20 414	1.20	United States of America
<b>1 838</b>	<b>2 192</b>	<b>1.53</b>	<b>3 724</b>	<b>3 979</b>	<b>1.18</b>	<b>1 276</b>	<b>2 582</b>	<b>1.33</b>	<b>3 433</b>	<b>4 462</b>	<b>1.13</b>	<b>Latin America</b>
174	181	1.21	375	330	1.04	142	186	1.13	300	305	0.84	Argentina
1	0	na	8	5	4.17	0	4	na	4	2	na	Belize
11	6	2.23	9	6	0.80	7	17	1.98	6	4	0.47	Bolivia
966	1 178	1.46	2 223	2 354	1.30	643	1 605	1.37	1 846	2 257	1.05	Brazil
70	83	0.66	183	204	0.68	95	125	1.02	276	414	1.29	Chile
157	231	2.14	289	340	1.43	74	248	1.58	147	275	0.74	Colombia
5	8	0.14	18	8	0.24	10	29	1.43	10	19	0.47	Costa Rica
12	27	0.80	27	48	0.58	8	48	0.94	28	79	0.96	Ecuador
1	5	na	14	12	5.26	4	7	1.81	6	4	2.99	El Salvador
6	10	4.35	46	43	8.07	17	30	8.49	12	19	3.57	Guatemala
4	2	na	6	8	10.82	0	1	na	1	2	na	Guyana
5	5	3.77	20	32	6.09	5	18	5.34	2	8	2.13	Honduras
334	421	1.64	507	582	0.82	214	293	1.02	818	1 145	1.68	Mexico
0	0	na	8	10	2.86	9	48	21.16	4	5	na	Nicaragua
12	16	2.03	24	30	1.16	20	24	3.41	6	10	0.31	Panama
1	8	1.94	5	5	1.14	5	11	3.08	3	3	na	Paraguay
168	247	8.40	229	324	3.72	93	91	3.76	61	128	1.65	Peru
0	1	na	0	4	na	2	9	16.13	0	10	7.20	Suriname
25	16	1.14	27	21	0.46	18	46	1.84	21	20	0.23	Uruguay
44	28	1.87	47	33	1.10	17	42	1.40	72	83	1.65	Venezuela
<b>116</b>	<b>100</b>	<b>3.01</b>	<b>375</b>	<b>307</b>	<b>3.66</b>	<b>67</b>	<b>119</b>	<b>2.34</b>	<b>173</b>	<b>146</b>	<b>1.81</b>	<b>Caribbean</b>
0	0	na	0	0	na	0	0	na	0	2	na	Antigua & Barbuda
0	0	na	17	12	14.94	0	1	na	1	0	na	Bahamas
3	1	na	17	9	3.80	1	5	na	14	16	5.02	Barbados
73	42	3.23	157	64	2.72	29	29	1.54	82	51	1.29	Cuba
0	0	na	1	1	na	4	3	na	0	2	na	Dominica
5	6	4.03	32	48	13.13	10	16	8.38	3	11	1.42	Dominican Rep.
0	1	na	6	11	2.27	1	13	5.54	6	10	1.35	Grenada
26	32	23.16	78	90	26.89	4	16	7.61	2	2	na	Haiti
8	10	1.25	58	57	5.71	6	12	2.73	38	28	3.85	Jamaica
0	1	na	0	0	na	4	8	10.38	2	1	na	St Kitts & Nevis
1	1	na	4	1	na	0	0	na	3	0	na	St Lucia
0	0	na	0	1	na	0	0	na	0	0	na	St Vincent & Grenadines
6	7	1.24	18	27	2.74	12	22	3.34	26	31	3.53	Trinidad & Tobago
<b>7 100</b>	<b>7 497</b>	<b>0.76</b>	<b>19 149</b>	<b>18 503</b>	<b>0.83</b>	<b>7 741</b>	<b>9 064</b>	<b>0.92</b>	<b>21 861</b>	<b>24 241</b>	<b>1.04</b>	<b>European Union</b>
64	93	0.21	318	361	0.43	227	228	0.80	611	712	0.87	Austria
366	462	0.94	1 366	1 203	1.25	479	637	1.34	803	844	0.89	Belgium
54	37	0.83	66	72	0.38	49	65	0.98	111	185	1.18	Bulgaria
71	33	0.89	107	74	0.50	55	72	1.00	177	213	1.10	Croatia
9	10	0.33	32	65	0.55	2	18	0.42	32	60	0.60	Cyprus
130	128	0.56	205	237	0.36	169	187	0.64	439	513	0.82	Czech Rep.
321	285	0.85	701	694	0.87	160	223	0.57	1 520	2 097	2.66	Denmark
40	37	0.51	73	84	0.79	36	69	0.87	57	72	0.47	Estonia
50	77	0.30	189	173	0.29	272	281	1.43	783	870	1.40	Finland
1 206	1 213	0.82	3 214	3 020	1.05	1 531	1 906	1.30	2 283	2 395	0.71	France
975	1 056	0.46	2 491	2 464	0.51	1 534	1 909	0.88	3 458	3 808	0.74	Germany
93	123	0.60	264	304	0.52	178	191	1.00	703	748	1.49	Greece
68	52	0.52	95	83	0.29	99	123	0.75	307	322	1.04	Hungary
108	135	0.82	281	292	0.78	104	112	0.58	401	437	1.16	Ireland
789	850	0.66	2 410	2 276	0.89	907	976	0.78	3 358	3 637	1.20	Italy

**Table F2:** Publications on selected research topics relating to SDG 3: Good health and well-being  
Volume of output, 2012–2015 and 2016–2019, and specialization index, 2011–2019

	REPRODUCTIVE HEALTH AND NEONATOLOGY			TROPICAL COMMUNICABLE DISEASES*			HUMAN RESISTANCE TO ANTIBIOTICS			REGENERATIVE MEDICINE			IMPACT ON HEALTH OF SOIL, FRESHWATER AND AIR POLLUTION		
	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019
Latvia	39	54	0.26	11	19	0.23	11	35	0.85	35	64	0.49	14	38	1.50
Lithuania	109	132	0.52	28	50	0.39	28	36	1.18	59	110	0.63	48	69	1.80
Luxembourg	26	33	0.15	29	44	0.51	11	10	0.30	54	94	0.90	24	33	1.97
Malta	75	72	2.17	6	4	0.41	8	16	0.76	7	15	0.26	4	8	0.95
Netherlands	4 238	4 663	1.53	1 318	1 496	0.97	460	604	1.24	2 486	2 796	1.16	454	606	0.81
Poland	2 792	2 802	1.16	225	255	0.27	255	320	0.84	1 155	1 689	0.73	389	635	1.29
Portugal	868	1 121	0.78	555	553	0.97	269	334	1.78	940	1 081	1.14	297	361	1.73
Romania	736	844	1.02	64	89	0.23	77	109	0.80	437	474	0.80	241	319	2.31
Slovakia	220	258	0.59	61	78	0.39	32	44	0.71	122	187	0.52	81	107	1.48
Slovenia	252	358	1.05	33	50	0.36	50	61	1.12	153	208	0.81	75	75	1.46
Spain	4 386	5 235	1.03	1 599	1 807	0.85	778	1 024	1.42	2 912	3 577	0.92	763	1 069	1.12
Sweden	2 599	3 348	1.35	793	942	0.79	331	466	1.28	1 432	1 794	0.97	346	463	0.95
United Kingdom	11 244	12 657	1.32	5 280	6 233	1.26	998	1 761	1.07	6 474	7 619	1.05	1 142	1 747	0.81
<b>Southeast Europe</b>	<b>623</b>	<b>641</b>	<b>1.23</b>	<b>85</b>	<b>96</b>	<b>0.38</b>	<b>69</b>	<b>96</b>	<b>1.07</b>	<b>186</b>	<b>241</b>	<b>0.49</b>	<b>122</b>	<b>150</b>	<b>1.73</b>
Albania	34	35	1.95	12	11	1.70	0	7	na	1	7	na	11	12	5.31
Bosnia & Herzegovina	79	123	1.80	3	6	0.16	14	25	2.00	5	14	0.18	6	18	1.29
Montenegro	16	20	0.52	2	5	na	1	6	na	0	6	na	0	6	na
North Macedonia	52	62	1.35	4	7	0.30	6	6	0.58	19	23	0.57	17	24	2.38
Serbia	461	449	1.15	67	79	0.38	54	66	1.04	165	197	0.55	90	103	1.63
<b>European Free Trade Assoc.</b>	<b>3 643</b>	<b>4 675</b>	<b>1.05</b>	<b>2 098</b>	<b>2 444</b>	<b>1.24</b>	<b>494</b>	<b>785</b>	<b>1.27</b>	<b>2 273</b>	<b>2 771</b>	<b>0.91</b>	<b>547</b>	<b>735</b>	<b>0.86</b>
Iceland	116	169	1.15	15	14	0.33	7	14	0.73	28	34	0.48	13	17	0.89
Liechtenstein	1	3	na	0	0	na	0	0	na	0	0	na	0	0	na
Norway	1 488	1 927	1.41	262	315	0.53	107	212	0.96	395	518	0.51	217	299	0.97
Switzerland	2 117	2 733	0.88	1 850	2 162	1.60	385	584	1.44	1 864	2 271	1.12	349	464	0.81
<b>Other Europe &amp; West Asia</b>	<b>11 323</b>	<b>15 365</b>	<b>1.20</b>	<b>1 860</b>	<b>2 473</b>	<b>0.54</b>	<b>1 290</b>	<b>2 097</b>	<b>1.14</b>	<b>4 740</b>	<b>8 356</b>	<b>0.77</b>	<b>986</b>	<b>2 182</b>	<b>0.84</b>
Armenia	13	32	0.35	3	8	0.14	2	8	0.63	2	5	0.09	7	18	1.61
Azerbaijan	34	53	0.94	6	11	0.33	0	11	0.27	1	11	0.10	1	2	na
Belarus	41	47	0.22	3	3	na	3	5	0.28	41	53	0.64	2	13	0.36
Georgia	47	45	0.82	17	14	0.61	4	18	1.19	9	18	0.30	6	15	1.11
Iran Islamic Rep.	3 386	4 847	1.40	1 025	1 323	1.18	592	1 045	2.11	1 757	3 688	1.26	410	876	1.31
Israel	1 733	2 258	2.07	234	232	0.53	165	228	1.41	972	1 119	1.26	99	182	0.60
Moldova, Rep.	15	17	0.46	4	10	0.43	2	2	na	6	7	0.21	1	6	na
Russian Federation	792	2 854	0.41	216	378	0.17	82	281	0.30	1 036	1 988	0.48	157	609	0.54
Turkey	5 187	5 045	2.34	380	512	0.54	447	532	1.60	881	1 508	0.64	285	435	0.95
Ukraine	151	325	0.32	13	46	0.07	5	21	0.13	107	182	0.26	35	85	0.50
<b>Sub-Saharan Africa</b>	<b>5 158</b>	<b>7 297</b>	<b>2.91</b>	<b>6 847</b>	<b>8 161</b>	<b>9.04</b>	<b>434</b>	<b>953</b>	<b>2.38</b>	<b>221</b>	<b>387</b>	<b>0.16</b>	<b>523</b>	<b>1 085</b>	<b>2.27</b>
Angola	7	17	1.66	60	65	25.89	0	2	na	0	0	na	0	0	na
Benin	36	68	1.85	280	212	22.49	5	7	1.73	0	1	na	10	18	2.56
Botswana	45	70	2.01	25	61	3.65	3	8	0.82	0	1	na	5	12	1.54
Burkina Faso	92	151	4.00	384	397	29.94	4	18	1.79	0	3	na	3	8	1.18
Burundi	6	11	1.92	9	17	11.01	1	9	7.84	0	0	na	1	1	na
Cameroon	144	226	2.94	396	562	16.79	15	34	2.23	9	6	0.08	18	28	1.64
Cabo Verde	0	0	na	3	6	na	0	0	na	0	0	na	4	1	na
Central African Rep.	1	8	na	30	31	35.39	4	3	na	0	3	na	1	0	na
Chad	5	5	2.67	10	30	25.03	1	4	na	0	1	na	1	2	na
Comoros	1	1	na	6	14	25.73	0	0	na	0	0	na	1	0	na
Congo	25	44	2.57	83	127	18.29	4	5	na	0	0	na	2	3	na
Côte d'Ivoire	52	42	2.35	175	234	19.83	9	7	2.67	1	1	na	8	16	2.29
Congo, Dem. Rep.	61	139	5.44	144	223	26.46	10	12	3.97	0	3	na	9	24	4.89
Djibouti	4	1	na	5	6	14.64	0	1	na	0	0	na	1	0	na
Equatorial Guinea	0	1	na	20	30	109.88	1	0	na	0	0	na	0	0	na
Eritrea	2	5	na	2	12	13.63	0	2	na	0	0	na	0	2	na
Eswatini	13	10	2.32	8	14	6.76	0	1	na	0	0	na	0	2	na
Ethiopia	358	837	5.15	521	773	13.94	37	122	5.72	7	18	0.05	21	67	1.87
Gabon	17	23	2.81	176	154	41.13	11	6	4.07	0	1	na	1	1	na

MEDICINES AND VACCINES FOR TUBERCULOSIS			HUMAN IMMUNODEFICIENCY VIRUS (HIV)			NEW OR RE-EMERGING VIRUSES THAT CAN INFECT HUMANS			TYPE 2 DIABETES			
2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	
32	40	0.55	37	35	0.24	10	11	0.20	21	37	0.38	Latvia
18	29	0.40	35	49	0.20	21	26	0.39	36	44	0.34	Lithuania
44	46	1.01	90	83	1.05	25	31	1.00	39	37	0.47	Luxembourg
9	5	1.04	11	11	0.58	8	6	0.45	28	46	3.05	Malta
758	863	1.01	1 860	1 847	1.08	795	819	1.29	1 856	2 050	1.29	Netherlands
283	201	0.56	432	421	0.34	237	234	0.47	1 125	1 343	1.03	Poland
264	356	1.28	485	572	0.85	115	161	0.41	377	520	0.74	Portugal
117	154	0.77	188	199	0.42	54	61	0.24	351	396	1.01	Romania
67	86	0.57	53	85	0.23	63	51	0.55	130	186	0.73	Slovakia
26	23	0.32	71	78	0.36	74	82	1.30	112	152	0.87	Slovenia
745	891	0.94	2 405	2 364	1.19	649	797	0.81	2 425	2 727	1.14	Spain
410	471	0.76	950	987	0.73	473	589	1.06	1 710	2 069	1.68	Sweden
2 177	2 609	1.11	6 015	6 369	1.24	1 923	2 460	1.08	4 936	6 075	1.10	United Kingdom
<b>76</b>	<b>86</b>	<b>0.70</b>	<b>117</b>	<b>138</b>	<b>0.42</b>	<b>103</b>	<b>91</b>	<b>0.79</b>	<b>265</b>	<b>366</b>	<b>1.17</b>	<b>Southeast Europe</b>
11	6	0.50	2	6	0.51	6	15	2.33	6	10	0.79	Albania
10	11	0.91	17	14	0.24	10	6	0.79	43	62	2.01	Bosnia & Herzegovina
1	3	na	5	5	0.49	2	6	na	7	17	0.99	Montenegro
11	13	1.50	5	8	0.30	8	6	0.75	32	40	1.36	North Macedonia
50	61	0.61	98	116	0.45	87	66	0.75	192	264	1.08	Serbia
<b>976</b>	<b>1 078</b>	<b>1.10</b>	<b>2 048</b>	<b>2 090</b>	<b>0.98</b>	<b>546</b>	<b>927</b>	<b>0.89</b>	<b>1 478</b>	<b>1 820</b>	<b>0.82</b>	<b>European Free Trade Assoc.</b>
11	14	0.43	20	26	0.24	7	15	0.55	57	62	0.99	Iceland
0	0	na	0	5	na	2	1	na	14	19	3.03	Liechtenstein
177	197	0.65	396	381	0.56	133	200	0.67	460	634	0.87	Norway
804	902	1.34	1 676	1 748	1.21	426	736	1.01	991	1 157	0.78	Switzerland
<b>1 707</b>	<b>2 379</b>	<b>1.01</b>	<b>1 899</b>	<b>2 610</b>	<b>0.41</b>	<b>1 215</b>	<b>1 538</b>	<b>0.65</b>	<b>4 016</b>	<b>5 954</b>	<b>0.92</b>	<b>Other Europe &amp; West Asia</b>
6	27	1.19	8	23	0.42	5	4	na	8	12	0.46	Armenia
12	23	1.42	5	9	0.18	8	1	na	7	38	0.94	Azerbaijan
31	72	1.33	54	51	0.64	15	5	0.35	6	16	0.24	Belarus
44	45	3.03	46	47	1.46	9	21	0.83	10	15	0.51	Georgia
513	654	1.14	658	870	0.59	266	352	0.56	1 385	2 333	1.33	Iran Islamic Rep.
95	84	0.41	323	272	0.55	139	168	0.78	546	741	1.19	Israel
25	43	4.08	11	8	0.49	5	5	0.33	3	6	0.29	Moldova, Rep.
401	999	0.87	511	927	0.33	438	651	0.68	613	1 125	0.42	Russian Federation
572	448	1.36	284	376	0.31	363	332	0.83	1 401	1 491	1.33	Turkey
57	97	0.52	106	178	0.25	20	36	0.14	87	274	0.58	Ukraine
<b>3 150</b>	<b>3 920</b>	<b>8.74</b>	<b>10 585</b>	<b>12 318</b>	<b>11.46</b>	<b>955</b>	<b>1 826</b>	<b>2.60</b>	<b>909</b>	<b>1 570</b>	<b>1.29</b>	<b>Sub-Saharan Africa</b>
5	14	10.18	18	9	4.87	2	3	na	0	3	na	Angola
26	45	4.64	78	64	4.13	5	6	0.95	14	13	1.07	Benin
51	73	10.22	255	350	23.55	5	8	0.71	8	10	0.90	Botswana
31	34	5.40	163	145	11.33	15	33	2.75	7	11	0.77	Burkina Faso
6	7	9.82	13	25	12.53	0	0	na	1	1	na	Burundi
99	112	7.38	339	441	11.18	23	91	2.67	69	91	2.23	Cameroon
1	0	na	2	2	na	3	3	na	0	0	na	Cabo Verde
6	4	14.36	20	28	23.78	14	15	30.51	0	0	na	Central African Rep.
5	1	na	9	8	10.43	2	6	na	1	1	na	Chad
0	0	na	2	0	na	1	3	na	0	2	na	Comoros
31	31	12.02	54	53	9.76	19	61	14.38	12	13	2.87	Congo
61	41	15.25	154	163	12.53	26	44	3.69	11	15	1.08	Côte d'Ivoire
25	37	7.95	105	120	13.56	29	89	11.94	27	21	3.98	Congo, Dem. Rep.
8	8	26.82	2	1	na	2	1	na	0	0	na	Djibouti
0	3	na	3	4	na	1	2	na	0	0	na	Equatorial Guinea
0	1	na	2	5	na	0	0	na	1	1	na	Eritrea
7	37	24.52	50	110	39.04	1	2	na	0	2	na	Eswatini
289	482	17.46	555	812	13.86	12	60	0.66	38	166	1.96	Ethiopia
22	19	12.42	69	64	15.82	44	34	18.05	4	3	na	Gabon

**Table F2:** Publications on selected research topics relating to SDG 3: Good health and well-being  
Volume of output, 2012–2015 and 2016–2019, and specialization index, 2011–2019

	REPRODUCTIVE HEALTH AND NEONATOLOGY			TROPICAL COMMUNICABLE DISEASES*			HUMAN RESISTANCE TO ANTIBIOTICS			REGENERATIVE MEDICINE			IMPACT ON HEALTH OF SOIL, FRESHWATER AND AIR POLLUTION		
	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019
Gambia	26	42	3.00	177	161	41.45	0	12	5.47	1	0	na	3	4	na
Ghana	280	473	3.93	523	760	17.65	17	61	2.88	4	15	0.08	35	88	4.16
Guinea	27	36	6.70	40	80	31.94	0	2	na	1	0	na	0	1	na
Guinea-Bissau	5	5	1.55	22	25	16.39	2	1	na	0	1	na	0	0	na
Kenya	414	623	2.98	942	985	19.48	25	55	2.24	4	9	0.04	43	73	1.91
Lesotho	7	6	2.28	1	3	na	0	0	na	0	0	na	1	1	na
Liberia	8	20	4.83	10	31	17.32	0	1	na	0	1	na	0	1	na
Madagascar	39	35	2.36	121	107	13.84	10	10	4.44	1	2	na	2	3	na
Malawi	107	253	5.17	228	312	21.02	5	24	2.53	1	2	na	12	32	4.53
Mali	45	33	2.96	247	268	48.88	1	7	na	0	0	na	4	3	na
Mauritius	12	7	0.58	8	17	1.74	4	0	na	7	13	1.25	1	6	na
Mozambique	40	95	3.56	161	223	30.74	6	12	2.77	1	1	na	1	10	1.37
Namibia	14	27	0.99	27	48	5.75	3	5	na	1	5	na	5	7	2.38
Niger	17	25	2.32	52	43	11.85	2	4	na	0	1	na	2	1	na
Nigeria	839	971	2.66	872	1 047	7.99	98	164	2.44	25	53	0.13	111	338	3.70
Rwanda	70	128	5.30	75	101	11.93	3	7	2.33	1	0	na	4	16	2.21
Sao Tome & Principe	0	2	na	6	4	38.87	0	0	na	0	0	na	0	0	na
Senegal	89	104	2.45	293	276	17.81	12	24	2.36	2	0	na	13	15	1.28
Seychelles	1	1	na	3	1	na	0	0	na	0	0	na	1	0	na
Sierra Leone	17	46	5.03	33	52	26.84	2	4	na	0	0	na	0	3	na
Somalia	6	20	8.27	1	9	10.32	0	0	na	0	0	na	0	1	na
South Africa	2 027	2 615	2.42	843	1 235	2.41	122	358	1.76	151	246	0.24	213	377	1.81
South Sudan	3	15	5.78	16	19	53.10	0	0	na	0	0	na	0	2	na
Togo	24	33	3.12	46	60	15.12	2	3	na	0	2	na	0	0	na
Uganda	331	476	4.95	566	694	20.66	16	38	3.06	3	2	na	19	35	1.41
Tanzania	279	426	4.61	670	741	26.55	32	75	5.61	3	12	0.10	16	48	2.33
Zambia	135	206	4.53	175	200	21.13	7	12	2.82	1	1	na	9	14	2.88
Zimbabwe	80	171	2.92	91	112	7.16	4	15	1.65	1	2	na	6	25	2.53
<b>Arab States</b>	<b>3 326</b>	<b>4 868</b>	<b>1.03</b>	<b>1 635</b>	<b>2 095</b>	<b>1.23</b>	<b>669</b>	<b>1 334</b>	<b>1.87</b>	<b>1 265</b>	<b>2 404</b>	<b>0.45</b>	<b>582</b>	<b>1 163</b>	<b>1.27</b>
Algeria	55	90	0.17	47	82	0.40	57	96	1.23	13	49	0.05	35	80	1.00
Bahrain	59	96	2.98	14	23	0.64	8	12	2.14	1	6	na	4	8	1.55
Egypt	1 251	1 782	1.55	602	646	1.59	189	406	2.01	473	986	0.82	141	299	1.34
Iraq	83	497	1.37	25	178	1.31	18	153	2.88	20	113	0.23	24	114	1.69
Jordan	156	241	1.17	37	54	0.51	35	50	2.11	58	59	0.36	27	55	1.17
Kuwait	102	76	0.94	27	14	0.72	26	37	2.23	30	36	0.22	20	43	2.60
Lebanon	170	258	1.39	39	54	0.82	53	97	4.21	75	174	0.92	31	54	1.79
Libya	25	17	0.90	16	19	1.58	14	13	4.77	3	10	0.16	7	11	1.63
Mauritania	2	4	na	15	29	28.24	0	2	na	0	0	na	2	3	na
Morocco	245	213	0.80	120	141	1.19	41	56	1.15	29	41	0.11	24	57	0.79
Oman	111	122	1.53	39	53	1.08	11	14	1.15	16	34	0.23	31	43	2.24
Palestine	25	61	1.13	27	31	2.54	14	15	4.06	0	10	0.11	12	12	2.13
Qatar	128	258	1.26	27	77	0.80	9	26	0.58	73	126	0.62	26	65	1.80
Saudi Arabia	679	934	0.80	410	582	1.08	189	352	1.95	521	865	0.61	169	286	1.21
Sudan	80	118	2.90	222	209	15.88	9	24	2.39	1	5	na	4	12	0.41
Syrian Arab Rep.	22	24	0.61	22	22	1.68	6	4	1.68	12	9	0.40	6	9	1.26
Tunisia	303	312	0.81	159	154	1.03	88	123	1.81	39	51	0.11	51	75	0.81
United Arab Emirates	158	246	0.66	29	67	0.35	23	64	0.77	48	131	0.30	51	83	1.59
Yemen	11	23	0.97	68	68	9.24	2	6	na	1	7	na	4	5	na
<b>Central Asia</b>	<b>79</b>	<b>145</b>	<b>0.41</b>	<b>18</b>	<b>38</b>	<b>0.25</b>	<b>10</b>	<b>33</b>	<b>0.60</b>	<b>31</b>	<b>54</b>	<b>0.21</b>	<b>20</b>	<b>86</b>	<b>1.48</b>
Kazakhstan	40	99	0.41	7	19	0.16	6	22	0.67	19	43	0.27	8	50	1.38
Kyrgyzstan	6	13	0.96	1	7	0.41	0	2	na	3	0	na	1	6	na
Mongolia	20	22	0.63	5	9	0.80	4	9	2.17	5	7	0.11	10	27	6.71
Tajikistan	3	6	na	3	5	na	0	1	na	2	1	na	0	2	na
Turkmenistan	1	1	na	0	0	na	0	0	na	0	0	na	0	0	na
Uzbekistan	10	10	0.22	2	3	na	0	1	na	3	3	na	1	4	na



MEDICINES AND VACCINES FOR TUBERCULOSIS			HUMAN IMMUNODEFICIENCY VIRUS (HIV)			NEW OR RE-EMERGING VIRUSES THAT CAN INFECT HUMANS			TYPE 2 DIABETES			
2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	
69	73	39.29	74	45	12.91	7	20	6.43	4	4	na	Gambia
64	133	4.58	267	374	5.99	56	91	2.83	51	135	2.06	Ghana
14	12	17.81	21	25	14.42	32	160	87.30	5	8	2.51	Guinea
28	22	57.86	45	52	34.51	3	9	11.98	2	2	na	Guinea-Bissau
135	210	6.47	1 142	1 359	17.36	125	186	5.82	33	68	0.73	Kenya
11	10	23.08	45	58	43.62	0	0	na	2	0	na	Lesotho
1	8	na	10	13	12.65	33	122	143.79	0	4	na	Liberia
21	18	10.70	16	16	2.11	35	37	9.58	0	6	na	Madagascar
85	130	17.93	499	686	40.97	4	12	0.56	5	25	0.95	Malawi
21	24	13.29	69	67	10.23	15	28	5.07	1	9	0.41	Mali
4	5	na	6	6	0.88	6	6	1.03	12	26	1.88	Mauritius
47	89	19.45	207	243	31.49	13	41	7.89	2	13	0.57	Mozambique
30	42	8.14	78	92	11.36	6	5	1.42	3	5	na	Namibia
6	12	6.16	7	15	3.12	5	6	4.75	0	2	na	Niger
208	216	3.24	832	888	5.34	132	227	2.00	224	377	1.84	Nigeria
24	32	8.14	189	165	21.14	9	17	2.75	9	13	1.42	Rwanda
0	0	na	0	0	na	0	3	na	0	0	na	Sao Tome & Principe
35	50	6.34	180	143	7.54	67	114	8.29	17	25	1.31	Senegal
0	0	na	0	0	na	3	2	na	3	5	na	Seychelles
6	9	5.25	8	32	7.57	62	261	139.34	0	3	na	Sierra Leone
2	2	na	2	3	na	0	2	na	0	1	na	Somalia
1 614	2 015	9.13	4 406	5 359	10.23	251	372	1.25	398	654	0.97	South Africa
1	0	na	2	5	na	1	4	na	0	0	na	South Sudan
16	17	13.26	74	94	21.26	3	7	0.97	3	9	2.03	Togo
263	287	18.46	1 259	1 466	36.68	57	111	4.15	27	81	1.14	Uganda
189	217	13.97	705	722	22.04	44	66	3.44	36	55	1.32	Tanzania
84	124	19.30	445	537	36.98	42	35	5.86	6	12	0.77	Zambia
61	99	9.63	407	644	25.48	10	24	1.38	7	10	0.34	Zimbabwe
<b>745</b>	<b>930</b>	<b>1.19</b>	<b>768</b>	<b>1 067</b>	<b>0.43</b>	<b>670</b>	<b>1 150</b>	<b>1.00</b>	<b>1 867</b>	<b>3 244</b>	<b>1.32</b>	<b>Arab States</b>
12	22	0.20	13	34	0.09	7	17	0.10	90	104	0.46	Algeria
4	9	0.89	9	13	0.26	2	12	1.18	52	62	4.44	Bahrain
110	175	0.64	166	218	0.33	243	398	1.21	514	886	1.53	Egypt
20	73	1.00	28	75	0.38	5	45	0.50	38	296	1.66	Iraq
16	27	0.34	31	45	0.40	22	33	0.54	107	184	1.87	Jordan
25	21	2.08	20	23	0.58	12	13	0.77	95	169	2.78	Kuwait
17	27	0.69	66	71	0.68	34	95	1.31	98	129	1.28	Lebanon
6	5	1.04	10	15	1.17	5	9	1.46	14	16	1.09	Libya
0	4	na	2	8	6.17	10	10	15.93	2	0	na	Mauritania
136	141	3.07	77	126	0.72	26	48	0.45	69	88	0.49	Morocco
20	25	1.14	25	42	0.75	37	21	0.81	52	72	1.54	Oman
5	9	0.54	11	23	0.74	2	11	0.78	19	40	2.20	Palestine
30	39	1.15	63	105	0.74	26	54	1.18	130	305	2.54	Qatar
229	283	1.26	234	308	0.52	230	449	1.84	575	950	1.49	Saudi Arabia
38	50	5.70	38	33	1.77	15	39	2.96	30	46	1.88	Sudan
11	6	1.13	8	8	0.42	2	4	na	11	9	0.59	Syrian Arab Rep.
122	139	2.16	50	47	0.25	44	53	0.58	134	141	0.72	Tunisia
22	42	0.51	66	67	0.42	27	71	0.59	133	285	1.46	United Arab Emirates
7	18	2.84	8	11	0.82	4	8	1.41	14	16	1.48	Yemen
<b>46</b>	<b>119</b>	<b>1.77</b>	<b>56</b>	<b>111</b>	<b>0.61</b>	<b>51</b>	<b>49</b>	<b>1.03</b>	<b>32</b>	<b>72</b>	<b>0.51</b>	<b>Central Asia</b>
24	59	1.47	24	77	0.59	27	26	1.04	12	48	0.42	Kazakhstan
7	24	5.30	8	17	1.45	3	0	na	10	10	3.18	Kyrgyzstan
6	18	3.59	10	10	1.02	20	20	4.32	7	6	0.54	Mongolia
3	15	5.57	9	14	2.06	6	2	na	1	3	na	Tajikistan
0	1	na	0	0	na	2	0	na	1	0	na	Turkmenistan
9	14	0.91	9	6	0.17	2	1	na	2	8	0.32	Uzbekistan

**Table F2:** Publications on selected research topics relating to SDG 3: Good health and well-being  
Volume of output, 2012–2015 and 2016–2019, and specialization index, 2011–2019

	REPRODUCTIVE HEALTH AND NEONATOLOGY			TROPICAL COMMUNICABLE DISEASES*			HUMAN RESISTANCE TO ANTIBIOTICS			REGENERATIVE MEDICINE			IMPACT ON HEALTH OF SOIL, FRESHWATER AND AIR POLLUTION		
	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019
<b>South Asia</b>	<b>7 381</b>	<b>8 779</b>	<b>0.87</b>	<b>6 038</b>	<b>6 797</b>	<b>2.02</b>	<b>1 133</b>	<b>1 985</b>	<b>1.25</b>	<b>2 558</b>	<b>3 970</b>	<b>0.47</b>	<b>1 186</b>	<b>2 553</b>	<b>1.17</b>
Afghanistan	34	26	2.38	28	41	8.27	2	3	na	0	1	na	1	4	na
Bangladesh	413	386	1.39	385	393	3.49	49	102	2.18	21	60	0.13	69	163	2.32
Bhutan	3	8	0.93	16	22	6.76	1	5	na	0	0	na	2	5	na
India	5 613	6 691	0.77	4 812	5 211	1.86	893	1 431	1.09	2 370	3 554	0.49	893	1 895	1.05
Maldives	1	1	na	0	1	na	0	1	na	0	0	na	1	1	na
Nepal	206	337	4.12	147	199	6.31	37	93	8.68	16	28	0.18	32	66	2.73
Pakistan	1 112	1 344	1.56	514	755	2.32	156	358	2.34	148	322	0.31	177	411	1.97
Sri Lanka	122	157	1.41	270	367	10.11	15	36	1.61	6	24	0.20	25	64	2.21
<b>Southeast Asia</b>	<b>24 838</b>	<b>34 186</b>	<b>0.58</b>	<b>8 835</b>	<b>11 580</b>	<b>0.53</b>	<b>3 691</b>	<b>6 109</b>	<b>0.73</b>	<b>34 540</b>	<b>43 201</b>	<b>1.09</b>	<b>4 747</b>	<b>11 393</b>	<b>0.97</b>
Brunei Darussalam	21	10	1.02	13	13	2.06	2	6	na	1	3	na	0	6	na
Cambodia	28	44	2.19	190	256	30.37	8	29	6.44	0	0	na	4	8	1.53
China	12 505	19 745	0.50	3 377	4 335	0.34	1 586	3 342	0.58	19 406	26 982	1.03	3 105	8 254	1.08
China, Hong Kong SAR	636	860	0.78	116	162	0.32	109	190	1.10	756	950	1.06	202	422	1.56
China, Macao SAR	33	83	0.43	7	24	0.53	0	8	na	28	100	0.73	10	21	1.01
China, Taiwan Prov.	1 819	1 720	0.80	375	449	0.45	343	358	1.23	1 726	1 773	1.07	308	545	1.11
Indonesia	203	814	0.52	384	1 177	2.10	33	102	0.44	65	417	0.37	70	371	1.46
Japan	5 484	5 978	0.74	1 472	1 552	0.43	729	849	0.73	7 300	7 510	1.31	424	690	0.35
Lao PDR	22	31	2.25	93	134	21.74	4	8	2.49	0	0	na	4	3	na
Malaysia	599	747	0.38	709	1 100	1.60	193	266	1.06	511	773	0.54	312	599	1.91
Myanmar	13	47	1.37	64	183	15.39	1	20	2.92	0	7	na	0	9	na
Philippines	122	208	0.74	220	262	3.60	24	42	1.38	8	26	0.09	24	64	1.90
Korea, DPR	0	0	na	0	0	na	0	0	na	0	0	na	0	2	na
Korea, Rep.	2 807	3 346	0.67	757	913	0.48	569	724	1.08	4 649	5 086	1.47	401	812	0.71
Singapore	544	670	0.50	651	750	1.58	105	179	0.94	1 372	1 329	1.71	76	178	0.57
Thailand	853	1 073	1.16	1 358	1 624	3.96	155	353	1.92	298	550	0.63	119	227	1.24
Timor-Leste	3	9	3.71	6	7	8.21	0	3	na	0	1	na	0	1	na
Viet Nam	124	211	0.40	240	394	1.80	64	124	1.61	47	166	0.36	35	119	0.97
<b>Oceania</b>	<b>7 044</b>	<b>8 766</b>	<b>1.53</b>	<b>2 486</b>	<b>2 845</b>	<b>1.23</b>	<b>568</b>	<b>951</b>	<b>1.01</b>	<b>2 694</b>	<b>3 339</b>	<b>0.75</b>	<b>621</b>	<b>1 150</b>	<b>0.92</b>
Australia	6 334	7 900	1.56	2 266	2 623	1.26	526	865	1.04	2 537	3 081	0.80	546	1 044	0.93
New Zealand	952	1 195	1.32	204	207	0.60	65	107	0.82	188	306	0.47	94	130	0.80
Cook Islands	2	0	na	0	1	na	0	0	na	0	0	na	0	0	na
Fiji	14	7	0.52	16	39	3.12	0	1	na	0	2	na	1	5	na
Kiribati	0	1	na	0	4	na	0	0	na	0	0	na	1	0	na
Marshall Islands	0	1	na	2	3	na	0	0	na	0	0	na	0	0	na
Micronesia	0	7	na	7	9	13.01	0	0	na	0	0	na	0	1	na
Nauru	0	0	na	0	0	na	0	0	na	0	0	na	0	0	na
Niue	0	0	na	0	1	na	0	0	na	0	0	na	0	0	na
Palau	0	2	na	0	0	na	0	0	na	0	0	na	0	0	na
Papua New Guinea	40	48	4.14	159	137	37.80	0	6	na	1	1	na	1	2	na
Samoa	2	3	na	3	2	na	0	0	na	0	0	na	0	1	na
Solomon Islands	1	11	2.84	22	54	46.49	0	2	na	0	0	na	0	0	na
Tonga	0	2	na	1	2	na	0	0	na	0	0	na	0	0	na
Tuvalu	0	0	na	1	0	na	0	0	na	0	0	na	0	0	na
Vanuatu	2	0	na	18	18	22.54	0	0	na	0	0	na	0	0	na

\*All diseases in the list of the neglected tropical diseases from the World Health Organization were included: Buruli ulcer, Chagas disease, Dengue and Chikungunya, Dracunculiasis (guinea-worm disease), Echinococcosis, Foodborne trematodiases, Human African trypanosomiasis (sleeping sickness), Leishmaniasis, Leprosy (Hansen's disease), Lymphatic filariasis, Mycetoma, chromoblastomycosis and other deep mycoses, Onchocerciasis (river blindness), Rabies, Scabies and other ectoparasites, Schistosomiasis, Soil-transmitted helminthiases, Snakebite envenoming, Taeniasis/Cysticercosis, Trachoma and Yaws (Endemic treponematoses). Malaria and water-borne diseases, such as coliform, giardia, cholera and norovirus, were also included.

SI2011–2019: The specialization index is measured as the proportion of output of a given country on a given topic, divided by the proportion observed at the global level. For example, a country with 2% of its output being on a research topic that represents 1% of all research worldwide would score 2.00, having twice as much output as expected, relative to the global average.

MEDICINES AND VACCINES FOR TUBERCULOSIS			HUMAN IMMUNODEFICIENCY VIRUS (HIV)			NEW OR RE-EMERGING VIRUSES THAT CAN INFECT HUMANS			TYPE 2 DIABETES			
2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	
4 331	5 025	2.96	3 585	4 167	0.95	1 095	1 560	0.72	3 395	4 963	0.94	South Asia
6	12	4.89	12	14	1.77	5	9	3.55	5	5	0.73	Afghanistan
157	129	2.84	104	93	0.70	117	151	2.20	159	230	1.45	Bangladesh
3	6	na	1	5	na	7	10	7.29	4	3	na	Bhutan
3 781	4 325	2.95	3 225	3 686	0.97	859	1 159	0.66	2 742	3 847	0.86	India
1	0	na	0	1	na	0	0	na	0	7	na	Maldives
63	109	6.46	81	102	3.02	32	36	1.98	43	69	1.83	Nepal
346	512	3.02	195	316	0.68	73	196	0.77	426	795	1.58	Pakistan
34	47	2.63	26	29	0.42	25	38	1.12	77	124	2.06	Sri Lanka
5 763	6 605	0.70	8 611	9 478	0.37	7 100	8 121	0.80	16 050	22 479	0.79	Southeast Asia
4	3	na	6	8	0.98	4	5	1.53	6	8	0.60	Brunei Darussalam
57	35	17.07	115	158	16.37	59	71	21.02	5	12	0.74	Cambodia
2 507	3 295	0.53	4 193	4 693	0.30	3 199	3 928	0.59	7 108	11 993	0.61	China
168	150	0.79	314	337	0.65	496	418	2.50	395	556	0.93	China, Hong Kong SAR
4	11	0.33	18	40	0.43	12	25	0.30	29	82	0.97	China, Macao SAR
449	373	1.03	524	516	0.49	396	377	0.96	1 226	1 326	1.19	China, Taiwan Prov.
122	496	1.80	150	558	0.74	113	165	0.58	104	534	0.68	Indonesia
848	755	0.57	1 518	1 267	0.36	1 644	1 520	1.05	4 211	4 193	1.16	Japan
9	8	5.04	33	16	4.27	27	31	10.60	2	8	0.50	Lao PDR
236	316	0.91	388	505	0.52	136	221	0.57	515	686	0.73	Malaysia
12	64	12.02	25	78	6.85	7	13	1.43	2	26	1.25	Myanmar
104	121	3.28	85	132	0.99	47	72	1.14	66	121	1.15	Philippines
0	0	na	0	0	na	0	0	na	0	0	na	Korea, DPR
1 041	822	1.22	565	686	0.26	738	1 043	1.08	2 374	2 873	1.20	Korea, Rep.
197	272	1.05	302	371	0.54	396	492	1.83	423	711	0.86	Singapore
277	317	1.84	977	995	2.03	431	419	2.22	326	587	1.10	Thailand
2	1	na	4	1	na	0	0	na	0	1	na	Timor-Leste
115	172	1.68	274	356	1.53	200	177	2.17	48	114	0.43	Viet Nam
686	934	0.68	2 527	2 751	0.97	1 109	1 244	1.16	2 996	3 807	1.28	Oceania
550	782	0.60	2 321	2 564	1.02	1 022	1 156	1.22	2 666	3 440	1.29	Australia
147	181	1.07	222	224	0.58	110	112	0.68	403	475	1.24	New Zealand
1	0	na	0	0	na	0	0	na	1	0	na	Cook Islands
6	6	2.39	9	5	1.07	5	6	1.50	3	14	1.26	Fiji
5	1	na	1	0	na	0	0	na	1	0	na	Kiribati
0	1	na	0	0	na	0	2	na	1	0	na	Marshall Islands
1	7	na	0	8	na	3	3	na	0	1	na	Micronesia
0	0	na	0	0	na	0	0	na	2	1	na	Nauru
0	0	na	0	0	na	0	0	na	0	0	na	Niue
0	0	na	0	0	na	0	0	na	3	4	na	Palau
17	29	12.64	57	31	10.43	12	4	4.40	3	0	na	Papua New Guinea
1	0	na	1	0	na	0	0	na	1	4	na	Samoa
3	1	na	0	0	na	0	0	na	4	1	na	Solomon Islands
0	0	na	0	0	na	0	0	na	0	1	na	Tonga
0	0	na	0	0	na	0	0	na	0	0	na	Tuvalu
3	1	na	3	2	na	0	0	na	1	0	na	Vanuatu

na = the total number of publications is too low to calculate the specialization index

**KEY** –: data unavailable | -n/+n: data refer to n years before or after reference year | 0: magnitude nil or negligible | na: not applicable

GDP: gross domestic product | MF: males and females | PPP\$: purchasing power parity dollars

Note: Publication counts of articles, reviews and conference papers are based on the full-counting method. Therefore, the sum across countries is higher than the global total because of co-authorship. The selected topics in the present table are examples of research topics furthering the SDG agenda. These topics are not necessarily mutually exclusive. The total for the People's Republic of China excludes its Special Administrative Regions of Hong Kong and Macao and the Taiwan Province of China.

Source: Prepared by Science-Metrix using Scopus data (Elsevier), including those for social sciences, arts and humanities

**Table F3:** Publications on selected research topics relating to SDG 6: Clean water and sanitation  
Volume of output, 2012–2015 and 2016–2019, and specialization index, 2011–2019

	SUSTAINABLE WITHDRAWAL AND SUPPLY OF FRESHWATER			WATER HARVESTING			DESALINATION		
	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019
<b>World</b>	<b>4 959</b>	<b>7 777</b>	<b>1.00</b>	<b>1 615</b>	<b>2 500</b>	<b>1.00</b>	<b>15 973</b>	<b>20 153</b>	<b>1.00</b>
<b>North America</b>	<b>1 197</b>	<b>1 692</b>	<b>0.80</b>	<b>340</b>	<b>504</b>	<b>0.69</b>	<b>2 988</b>	<b>3 521</b>	<b>0.67</b>
Canada	184	272	0.82	41	59	0.46	496	604	0.84
United States of America	1 051	1 479	0.80	308	455	0.72	2 567	2 979	0.65
<b>Latin America</b>	<b>395</b>	<b>652</b>	<b>1.61</b>	<b>135</b>	<b>214</b>	<b>1.62</b>	<b>600</b>	<b>810</b>	<b>0.82</b>
Argentina	44	38	1.43	16	20	1.97	58	49	0.67
Bolivia	2	3	na	2	1	na	0	2	na
Brazil	202	405	1.71	50	95	1.20	319	442	0.80
Chile	31	61	1.82	12	11	1.55	72	114	1.55
Colombia	20	30	1.11	11	15	1.55	33	37	0.53
Costa Rica	6	8	1.65	1	2	na	2	4	na
Ecuador	5	14	1.45	0	3	na	3	20	0.37
El Salvador	0	0	na	0	0	na	0	1	na
Guatemala	0	0	na	1	0	na	0	1	na
Honduras	0	1	na	0	0	na	1	1	na
Mexico	72	78	1.36	39	63	2.98	117	150	0.93
Nicaragua	0	0	na	1	0	na	0	0	na
Panama	8	11	6.23	1	0	na	1	1	na
Paraguay	1	1	na	1	0	na	1	0	na
Peru	9	14	1.56	5	4	na	4	10	0.55
Uruguay	2	6	na	0	7	na	2	0	na
Venezuela	14	10	3.17	2	1	na	5	6	0.47
<b>Caribbean</b>	<b>3</b>	<b>6</b>	<b>0.53</b>	<b>3</b>	<b>4</b>	<b>na</b>	<b>12</b>	<b>11</b>	<b>0.39</b>
Bahamas	0	0	na	0	0	na	0	0	na
Barbados	0	1	na	0	2	na	2	1	na
Cuba	2	3	na	2	0	na	7	6	0.27
Dominican Rep.	1	0	na	0	0	na	0	0	na
Haiti	0	0	na	0	0	na	0	1	na
Jamaica	0	1	na	0	0	na	1	0	na
Trinidad & Tobago	0	1	na	1	2	na	2	3	na
<b>European Union</b>	<b>1 365</b>	<b>1 917</b>	<b>0.75</b>	<b>474</b>	<b>607</b>	<b>0.75</b>	<b>4 393</b>	<b>4 725</b>	<b>0.79</b>
Austria	41	52	0.65	12	18	0.50	85	88	0.57
Belgium	47	71	0.61	23	28	0.82	239	303	1.23
Bulgaria	8	11	0.97	0	0	na	25	25	0.88
Croatia	5	13	0.60	1	0	na	37	26	0.83
Cyprus	10	9	1.63	4	8	4.27	24	16	2.01
Czech Rep.	27	29	0.45	6	12	0.48	97	118	0.73
Denmark	44	60	0.71	9	15	0.39	149	195	1.03
Estonia	12	16	1.33	1	2	na	6	7	0.36
Finland	28	38	0.57	9	9	0.54	101	113	0.87
France	136	182	0.41	68	69	0.64	536	507	0.64
Germany	244	361	0.60	78	124	0.64	606	737	0.56
Greece	59	83	1.76	16	20	1.30	176	143	1.60
Hungary	25	23	0.98	0	3	na	52	49	0.83
Ireland	8	15	0.39	10	7	0.89	54	59	0.65
Italy	217	339	1.08	45	72	0.67	435	560	0.66
Latvia	0	0	na	0	0	na	6	6	0.68
Lithuania	4	13	1.31	1	0	na	8	10	0.27
Luxembourg	2	4	na	0	0	na	4	7	0.29
Malta	1	1	na	0	1	na	6	7	1.36
Netherlands	113	167	0.83	56	84	1.33	378	367	1.05
Poland	28	57	0.36	5	11	0.20	301	345	1.14
Portugal	43	77	1.07	18	24	1.23	139	142	0.98
Romania	16	22	0.51	2	4	na	68	83	0.77
Slovakia	5	10	0.44	5	2	na	18	15	0.38
Slovenia	7	4	0.36	0	2	na	24	34	0.73

WASTEWATER TREATMENT, RECYCLING AND RE-USE			NATIONAL INTEGRATED WATER RESOURCE MANAGEMENT			TRANSBOUNDARY WATER RESOURCE MANAGEMENT			
2012-2015	2016-2019	SI 2011-2019	2012-2015	2016-2019	SI 2011-2019	2012-2015	2016-2019	SI 2011-2019	
19 417	29 400	1.00	8 281	11 870	1.00	367	497	1.00	World
3 708	4 447	0.62	2 429	3 218	1.04	94	132	0.91	North America
784	1 054	1.05	448	648	1.41	20	45	1.71	Canada
3 049	3 522	0.56	2 021	2 663	0.99	79	94	0.80	United States of America
1 096	1 912	1.27	409	726	1.02	16	27	0.97	Latin America
53	77	0.59	18	27	0.43	2	1	na	Argentina
3	11	2.84	7	14	7.34	0	0	na	Bolivia
631	1 093	1.32	226	392	1.06	4	13	0.69	Brazil
62	157	1.08	34	68	1.18	2	2	na	Chile
79	161	1.44	33	58	1.12	1	1	na	Colombia
8	18	1.55	4	22	3.81	1	1	na	Costa Rica
6	51	1.33	6	41	2.05	1	0	na	Ecuador
1	1	na	0	0	na	0	0	na	El Salvador
1	0	na	1	0	na	1	0	na	Guatemala
0	2	na	0	0	na	0	0	na	Honduras
251	355	1.60	74	104	0.98	4	12	2.31	Mexico
0	5	na	1	0	na	0	0	na	Nicaragua
1	2	na	1	3	na	0	0	na	Panama
0	2	na	1	0	na	0	0	na	Paraguay
3	29	0.77	13	25	1.62	1	1	na	Peru
7	11	0.72	3	5	na	1	2	na	Uruguay
18	6	0.80	3	3	na	0	0	na	Venezuela
18	28	0.68	10	18	1.05	0	1	na	Caribbean
0	0	na	1	0	na	0	0	na	Bahamas
3	6	na	4	4	na	0	1	na	Barbados
11	20	0.65	3	6	0.55	0	0	na	Cuba
0	4	na	1	1	na	0	0	na	Dominican Rep.
1	0	na	0	3	na	0	0	na	Haiti
1	1	na	0	1	na	0	0	na	Jamaica
2	1	na	2	3	na	0	0	na	Trinidad & Tobago
6 055	8 173	0.95	2 785	3 506	0.95	162	197	1.20	European Union
114	141	0.56	84	120	1.02	7	10	1.72	Austria
282	298	0.98	76	92	0.68	0	3	na	Belgium
31	60	1.27	9	11	0.62	1	0	na	Bulgaria
54	89	1.32	10	17	0.46	2	1	na	Croatia
39	42	2.09	18	21	3.22	0	1	na	Cyprus
174	274	1.08	27	49	0.43	2	4	na	Czech Rep.
210	302	1.01	71	79	0.84	2	2	na	Denmark
31	33	1.78	7	5	0.62	1	1	na	Estonia
134	208	1.07	44	72	0.83	11	12	3.76	Finland
649	719	0.62	262	359	0.62	16	19	0.65	France
703	1 028	0.55	465	563	0.75	21	42	0.92	Germany
234	265	1.70	139	170	2.42	17	13	5.06	Greece
59	78	0.81	34	21	0.65	7	6	3.45	Hungary
102	156	1.33	43	36	0.85	1	3	na	Ireland
628	985	0.81	399	518	1.11	10	18	0.51	Italy
5	25	0.83	2	4	na	0	1	na	Latvia
25	40	1.28	3	7	0.40	1	3	na	Lithuania
18	34	2.01	5	5	0.68	1	2	na	Luxembourg
0	0	na	2	1	na	0	0	na	Malta
342	438	0.67	358	440	1.80	22	41	3.01	Netherlands
504	991	2.00	98	166	0.80	10	5	1.03	Poland
253	411	1.73	86	108	1.14	6	5	1.24	Portugal
258	309	2.38	79	70	1.39	3	2	na	Romania
70	90	1.31	15	26	0.78	3	2	na	Slovakia
62	73	1.49	15	24	0.86	4	3	na	Slovenia

**Table F3:** Publications on selected research topics relating to SDG 6: Clean water and sanitation  
Volume of output, 2012–2015 and 2016–2019, and specialization index, 2011–2019

	SUSTAINABLE WITHDRAWAL AND SUPPLY OF FRESHWATER			WATER HARVESTING			DESALINATION		
	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019
Spain	294	390	1.75	73	88	1.35	801	769	1.51
Sweden	48	63	0.33	18	36	0.76	108	168	0.54
United Kingdom	209	315	0.53	100	105	0.78	572	691	0.55
<b>Southeast Europe</b>	<b>19</b>	<b>27</b>	<b>1.12</b>	<b>2</b>	<b>1</b>	<b>na</b>	<b>48</b>	<b>42</b>	<b>0.69</b>
Albania	3	1	na	0	0	na	0	1	na
Bosnia & Herzegovina	2	1	na	0	0	na	5	3	na
Montenegro	1	3	na	0	0	na	0	1	na
North Macedonia	1	3	na	0	1	na	4	0	na
Serbia	13	22	1.10	2	0	na	42	38	0.81
<b>European Free Trade Assoc.</b>	<b>78</b>	<b>117</b>	<b>0.44</b>	<b>26</b>	<b>34</b>	<b>0.43</b>	<b>196</b>	<b>175</b>	<b>0.42</b>
Iceland	0	1	na	0	0	na	2	6	na
Liechtenstein	0	0	na	0	0	na	0	0	na
Norway	9	12	0.10	6	8	0.33	64	73	0.50
Switzerland	71	106	0.61	20	26	0.49	131	97	0.38
<b>Other Europe &amp; West Asia</b>	<b>268</b>	<b>428</b>	<b>0.70</b>	<b>65</b>	<b>129</b>	<b>0.57</b>	<b>1 359</b>	<b>2 031</b>	<b>1.22</b>
Armenia	1	1	na	0	0	na	1	3	na
Azerbaijan	1	2	na	0	0	na	4	8	0.71
Belarus	1	0	na	0	0	na	13	20	1.10
Georgia	0	1	na	0	0	na	2	3	na
Iran Islamic Rep.	109	202	1.20	34	66	1.15	576	950	2.07
Israel	54	50	1.21	17	37	1.93	215	255	2.12
Moldova, Rep.	0	0	na	0	0	na	0	0	na
Russian Federation	21	49	0.15	5	12	0.11	240	433	0.64
Turkey	85	118	1.05	8	18	0.29	297	343	1.05
Ukraine	2	7	na	2	0	na	29	61	0.55
<b>Sub-Saharan Africa</b>	<b>141</b>	<b>304</b>	<b>2.40</b>	<b>188</b>	<b>306</b>	<b>8.74</b>	<b>171</b>	<b>302</b>	<b>0.75</b>
Angola	0	0	na	0	0	na	0	0	na
Benin	4	9	6.23	4	3	na	1	0	na
Botswana	1	4	na	3	4	na	0	1	na
Burkina Faso	3	6	na	6	14	19.58	2	2	na
Burundi	1	0	na	2	0	na	1	8	na
Cameroon	1	5	na	4	4	na	6	3	na
Cabo Verde	0	0	na	0	0	na	0	1	na
Central African Rep.	1	0	na	0	0	na	0	0	na
Chad	0	1	na	0	0	na	0	0	na
Congo	3	0	na	1	0	na	0	0	na
Côte d'Ivoire	0	5	na	2	2	na	5	1	na
Congo, Dem. Rep.	1	1	na	0	0	na	0	0	na
Djibouti	0	0	na	0	0	na	1	0	na
Eritrea	1	1	na	3	1	na	0	2	na
Eswatini	0	0	na	2	0	na	2	3	na
Ethiopia	16	32	4.33	25	68	21.34	4	7	0.27
Gabon	0	1	na	1	0	na	0	0	na
Gambia	0	0	na	0	0	na	0	0	na
Ghana	10	21	3.67	10	19	10.75	2	4	na
Guinea	0	0	na	0	1	na	0	0	na
Kenya	13	33	3.14	25	49	22.48	2	6	na
Lesotho	0	0	na	0	0	na	0	0	na
Madagascar	0	0	na	2	3	na	0	0	na
Malawi	2	2	na	6	3	23.51	2	2	na
Mali	1	2	na	5	3	20.82	1	1	na
Mauritius	0	1	na	0	1	na	0	0	na
Mozambique	0	4	na	1	2	na	0	0	na
Namibia	1	1	na	2	10	20.12	1	1	na
Niger	4	2	na	6	4	45.95	1	0	na
Nigeria	15	36	1.36	15	30	4.27	23	23	0.36

WASTEWATER TREATMENT, RECYCLING AND RE-USE			NATIONAL INTEGRATED WATER RESOURCE MANAGEMENT			TRANSBOUNDARY WATER RESOURCE MANAGEMENT			
2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	
1 210	1 447	1.88	303	462	1.22	7	15	0.51	Spain
295	384	1.02	86	175	0.72	11	17	1.93	Sweden
587	873	0.45	596	712	0.97	41	48	1.49	United Kingdom
<b>57</b>	<b>79</b>	<b>0.83</b>	<b>30</b>	<b>38</b>	<b>0.91</b>	<b>5</b>	<b>3</b>	<b>2.74</b>	<b>Southeast Europe</b>
2	1	na	1	0	na	2	0	na	Albania
6	3	0.45	2	2	na	1	0 0	na	Bosnia & Herzegovina
2	2	na	1	2	na	1		na	Montenegro
2	3	na	4	5	na	1	0	na	North Macedonia
47	70	0.91	23	31	0.96	2	3	na	Serbia
<b>322</b>	<b>389</b>	<b>0.62</b>	<b>204</b>	<b>313</b>	<b>0.96</b>	<b>11</b>	<b>13</b>	<b>1.01</b>	<b>European Free Trade Assoc.</b>
2	4	na	2	0	na	0	0	na	Iceland
0	1	na	0	1	na	0	0	na	Liechtenstein
81	138	0.54	60	134	1.09	3	2	na	Norway
243	251	0.67	145	182	0.91	8	11	1.41	Switzerland
<b>1 083</b>	<b>2 251</b>	<b>0.89</b>	<b>524</b>	<b>949</b>	<b>0.87</b>	<b>48</b>	<b>49</b>	<b>1.32</b>	<b>Other Europe &amp; West Asia</b>
1	1	na	0	2	na	1	0	na	Armenia
2	3	na	1	1	na	0	1	na	Azerbaijan
3	13	0.40	1	1	na	2	0	na	Belarus
1	2	na	1	38	2.09	0	0	na	Georgia
501	930	1.44	327	684	2.18	6	8	0.62	Iran Islamic Rep.
123	175	0.96	72	33	0.82	5	7	1.75	Israel
2	5	na	0	0	na	0	0	na	Moldova, Rep.
108	531	0.46	40	57	0.15	16	23	1.36	Russian Federation
320	501	1.06	84	150	0.66	15	5	1.52	Turkey
30	109	0.56	10	21	0.29	5	6	2.10	Ukraine
<b>322</b>	<b>723</b>	<b>1.58</b>	<b>290</b>	<b>558</b>	<b>3.01</b>	<b>21</b>	<b>37</b>	<b>4.26</b>	<b>Sub-Saharan Africa</b>
0	1	na	0	0	na	0	0	na	Angola
0	8	na	7	7	3.69	1	2	na	Benin
1	19	1.50	7	24	14.87	3	4	na	Botswana
13	10	3.17	14	9	5.24	0	1	na	Burkina Faso
0	4	na	1	1	na	1	0	na	Burundi
5	9	0.60	3	5	1.11	0	0	na	Cameroon
0	0	na	0	1	na	0	0	na	Cabo Verde
0	0	na	0	1	na	0	0	na	Central African Rep.
0	1	na	1	1	na	1	0	na	Chad
2	0	na	0	2	na	0	0	na	Congo
1	8	1.24	3	2	na	0	0	na	Côte d'Ivoire
3	4	na	0	3	na	0	0	na	Congo, Dem. Rep.
3	0	na	1	0	na	0	0	na	Djibouti
0	1	na	0	3	na	0	0	na	Eritrea
1	1	na	1	2	na	0	0	na	Eswatini
7	50	1.30	22	51	2.93	1	2	na	Ethiopia
0	1	na	0	0	na	0	0	na	Gabon
0	1	na	0	0	na	0	0	na	Gambia
14	24	1.11	22	37	4.24	1	1	na	Ghana
0	0	na	0	0	na	0	0	na	Guinea
18	29	1.11	22	41	3.69	2	2	na	Kenya
2	2	na	0	3	na	0	0	na	Lesotho
1	0	na	1	2	na	1	0	na	Madagascar
0	3	na	3	10	4.22	0	1	na	Malawi
1	1	na	7	5	4.76	0	0	na	Mali
1	0	na	1	1	na	0	0	na	Mauritius
3	4	na	7	5	8.83	0	0	na	Mozambique
2	1	na	4	13	9.98	3	3	na	Namibia
1	0	na	4	2	na	0	0	na	Niger
50	118	1.11	16	46	1.13	0	0	na	Nigeria

**Table F3:** Publications on selected research topics relating to SDG 6: Clean water and sanitation  
Volume of output, 2012–2015 and 2016–2019, and specialization index, 2011–2019

	SUSTAINABLE WITHDRAWAL AND SUPPLY OF FRESHWATER			WATER HARVESTING			DESALINATION		
	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019
Rwanda	1	2	na	1	5	na	1	0	na
Senegal	4	10	2.87	8	10	12.41	3	3	0.47
Sierra Leone	0	0	na	0	1	na	0	0	na
South Africa	64	128	2.61	67	78	5.89	105	231	1.21
South Sudan	0	0	na	0	0	na	0	0	na
Togo	0	5	na	1	1	na	0	0	na
Uganda	2	7	1.29	2	13	6.29	0	2	na
Tanzania	2	11	1.40	9	28	18.30	12	14	1.15
Zambia	0	3	na	0	4	na	0	0	na
Zimbabwe	9	9	6.52	17	25	55.07	0	0	na
<b>Arab States</b>	<b>221</b>	<b>420</b>	<b>1.83</b>	<b>126</b>	<b>149</b>	<b>2.36</b>	<b>1 468</b>	<b>2 218</b>	<b>3.75</b>
Algeria	11	29	1.03	4	5	1.09	163	117	3.35
Bahrain	2	3	na	0	1	na	8	18	5.25
Egypt	69	120	2.17	19	25	1.04	270	462	2.86
Iraq	3	38	2.02	5	23	3.01	46	129	2.26
Jordan	15	27	2.97	19	21	11.40	37	83	2.79
Kuwait	6	9	2.26	0	3	na	40	99	6.90
Lebanon	3	16	1.54	0	3	na	22	21	1.31
Libya	0	0	na	1	0	na	17	24	6.00
Mauritania	2	1	na	0	0	na	0	0	na
Morocco	17	19	0.88	13	13	2.01	46	108	2.19
Oman	6	17	2.52	2	4	na	26	55	4.24
Palestine	4	5	na	3	10	20.30	13	20	4.25
Qatar	7	7	1.25	0	1	na	90	202	9.19
Saudi Arabia	60	91	1.84	40	30	2.92	516	726	5.11
Sudan	1	10	1.77	6	6	16.63	2	6	na
Syrian Arab Rep.	10	5	6.67	11	3	13.64	1	2	na
Tunisia	25	49	1.90	12	13	1.45	183	185	3.55
United Arab Emirates	5	27	1.49	3	9	1.72	135	253	6.83
Yemen	0	2	na	0	0	na	1	4	na
<b>Central Asia</b>	<b>11</b>	<b>31</b>	<b>2.02</b>	<b>2</b>	<b>2</b>	<b>na</b>	<b>14</b>	<b>42</b>	<b>1.31</b>
Kazakhstan	2	15	1.26	0	0	na	5	31	1.38
Kyrgyzstan	1	1	na	0	0	na	0	0	na
Mongolia	3	7	3.16	0	1	na	2	1	na
Tajikistan	2	0	na	1	0	na	0	0	na
Turkmenistan	1	0	na	0	0	na	0	0	na
Uzbekistan	6	8	3.40	1	1	na	7	10	1.90
<b>South Asia</b>	<b>511</b>	<b>850</b>	<b>1.66</b>	<b>299</b>	<b>425</b>	<b>2.81</b>	<b>1 030</b>	<b>1 436</b>	<b>1.10</b>
Afghanistan	1	6	na	0	0	na	0	0	na
Bangladesh	25	50	2.82	22	26	6.96	9	27	0.42
Bhutan	0	1	na	0	0	na	0	0	na
India	358	603	1.44	246	348	2.74	937	1 252	1.15
Nepal	10	15	2.25	8	10	8.09	0	1	na
Pakistan	115	171	3.62	13	34	1.88	80	152	0.92
Sri Lanka	10	20	2.91	12	12	6.46	5	8	0.42
<b>Southeast Asia</b>	<b>1 553</b>	<b>3 110</b>	<b>1.07</b>	<b>334</b>	<b>747</b>	<b>0.73</b>	<b>5 888</b>	<b>8 639</b>	<b>1.19</b>
Brunei Darussalam	2	2	na	1	1	na	1	3	na
Cambodia	1	5	na	2	3	na	0	1	na
China	1 291	2 642	1.49	183	502	0.75	3 473	5 631	1.21
China, Hong Kong SAR	22	38	0.49	5	16	0.81	74	173	0.77
China, Macao SAR	1	1	na	0	0	na	8	9	0.69
China, Taiwan Prov.	19	41	0.28	16	13	0.46	258	251	0.93
Indonesia	22	81	1.21	6	48	2.21	47	279	1.43
Japan	98	115	0.22	37	47	0.27	476	588	0.51
Lao PDR	0	5	na	5	2	na	0	1	na
Malaysia	33	83	0.83	28	61	2.15	423	501	2.32



WASTEWATER TREATMENT, RECYCLING AND RE-USE			NATIONAL INTEGRATED WATER RESOURCE MANAGEMENT			TRANSBOUNDARY WATER RESOURCE MANAGEMENT			
2012-2015	2016-2019	SI 2011-2019	2012-2015	2016-2019	SI 2011-2019	2012-2015	2016-2019	SI 2011-2019	
2	1	na	2	4	na	0	1	na	Rwanda
4	5	0.50	4	11	1.62	0	2	na	Senegal
1	0	na	0	0	na	0	0	na	Sierra Leone
176	447	2.16	144	276	3.37	9	23	4.84	South Africa
0	1	na	0	0	na	0	0	na	South Sudan
0	1	na	1	3	na	0	1	na	Togo
19	16	1.10	6	14	1.47	0	2	na	Uganda
8	13	0.96	12	27	4.78	0	1	na	Tanzania
2	0	na	3	4	na	0	0	na	Zambia
8	22	2.87	10	22	8.23	0	0	na	Zimbabwe
<b>916</b>	<b>1 778</b>	<b>2.00</b>	<b>305</b>	<b>571</b>	<b>1.49</b>	<b>14</b>	<b>31</b>	<b>1.31</b>	<b>Arab States</b>
96	169	2.25	19	48	1.34	1	2	na	Algeria
6	14	1.78	4	5	2.59	0	0	na	Bahrain
193	413	1.87	60	125	1.05	5	8	1.73	Egypt
49	154	2.28	5	61	1.38	1	2	na	Iraq
58	86	2.70	24	36	2.55	2	4	na	Jordan
11	32	2.00	9	12	2.05	0	0	na	Kuwait
10	32	0.85	4	29	1.27	0	5	na	Lebanon
4	3	na	6	2	na	0	0	na	Libya
1	1	na	3	2	na	0	0	na	Mauritania
41	149	1.86	19	42	1.36	0	0	na	Morocco
41	62	4.17	10	29	3.06	0	2	na	Oman
25	28	4.73	10	12	5.52	1	0	na	Palestine
29	126	3.18	7	18	1.46	0	1	na	Qatar
205	369	1.53	70	95	1.28	2	2	na	Saudi Arabia
3	9	0.64	11	10	2.42	1	4	na	Sudan
10	7	1.34	5	7	3.01	1	0	na	Syrian Arab Rep.
147	200	2.27	40	60	1.62	1	2	na	Tunisia
70	110	2.22	24	52	2.36	1	1	na	United Arab Emirates
5	5	1.16	2	3	na	0	0	na	Yemen
<b>9</b>	<b>50</b>	<b>0.82</b>	<b>35</b>	<b>49</b>	<b>2.90</b>	<b>18</b>	<b>24</b>	<b>38.04</b>	<b>Central Asia</b>
6	33	0.94	6	26	1.48	8	17	32.67	Kazakhstan
0	0	na	4	10	4.68	2	2	na	Kyrgyzstan
2	11	1.18	3	11	2.69	0	2	na	Mongolia
0	1	na	5	1	na	4	1	na	Tajikistan
0	0	na	0	1	na	0	0	na	Turkmenistan
1	6	na	20	7	6.22	7	6	51.25	Uzbekistan
<b>1 088</b>	<b>2 163</b>	<b>1.04</b>	<b>464</b>	<b>792</b>	<b>0.91</b>	<b>20</b>	<b>43</b>	<b>0.95</b>	<b>South Asia</b>
0	1	na	4	3	na	0	1	na	Afghanistan
31	46	0.72	22	60	1.92	3	8	6.09	Bangladesh
0	2	na	1	0	na	0	0	na	Bhutan
917	1 733	1.01	343	577	0.83	6	21	0.50	India
12	16	0.87	35	35	5.56	4	6	24.08	Nepal
119	348	1.47	43	95	0.86	2	9	2.28	Pakistan
11	32	1.04	38	35	4.73	6	2	7.90	Sri Lanka
<b>7 199</b>	<b>12 284</b>	<b>1.22</b>	<b>2 089</b>	<b>3 876</b>	<b>0.85</b>	<b>61</b>	<b>126</b>	<b>0.59</b>	<b>Southeast Asia</b>
4	12	1.79	0	2	na	0	0	na	Brunei Darussalam
2	5	na	2	9	3.10	3	1	na	Cambodia
5 149	8 904	1.43	1 434	2 731	0.97	33	94	0.69	China
204	335	1.46	33	86	0.73	0	5	na	China, Hong Kong SAR
7	13	0.94	4	7	1.15	1	0	na	China, Macao SAR
251	359	0.72	103	126	0.76	1	0	na	China, Taiwan Prov.
64	411	1.61	34	144	1.43	1	1	na	Indonesia
532	697	0.41	135	193	0.26	10	12	0.38	Japan
2	3	na	10	12	14.55	3	0	na	Lao PDR
411	797	2.46	129	218	1.57	1	1	na	Malaysia

**Table F3:** Publications on selected research topics relating to SDG 6: Clean water and sanitation  
Volume of output, 2012–2015 and 2016–2019, and specialization index, 2011–2019

	SUSTAINABLE WITHDRAWAL AND SUPPLY OF FRESHWATER			WATER HARVESTING			DESALINATION		
	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019
Myanmar	3	5	na	1	0	na	0	2	na
Philippines	20	22	2.49	3	8	2.83	18	29	1.12
Korea, DPR	0	0	na	0	0	na	0	0	na
Korea, Rep.	60	83	0.28	40	46	0.62	891	1 071	1.59
Singapore	13	27	0.29	4	26	0.98	435	540	4.03
Thailand	31	54	1.22	11	6	0.56	73	111	0.92
Timor-Leste	1	0	na	0	1	na	0	0	na
Viet Nam	6	28	0.72	5	9	0.84	23	78	0.74
<b>Oceania</b>	<b>437</b>	<b>517</b>	<b>2.02</b>	<b>135</b>	<b>183</b>	<b>2.16</b>	<b>831</b>	<b>1 006</b>	<b>1.47</b>
Australia	409	467	2.15	124	169	2.28	805	978	1.64
New Zealand	34	53	1.13	13	14	1.26	30	39	0.36
Fiji	0	1	na	0	0	na	0	0	na
Micronesia	0	0	na	0	0	na	0	0	na
Palau	0	0	na	0	0	na	0	0	na
Papua New Guinea	0	0	na	1	2	na	0	0	na
Solomon Islands	1	0	na	0	0	na	0	0	na
Vanuatu	0	4	na	1	0	na	0	0	na

SI<sub>2011–19</sub>: The specialization index is measured as the proportion of output of a given country on a given topic, divided by the proportion observed at the global level. For example, a country with 2% of its output being on a research topic that represents 1% of all research worldwide would score 2.00, having twice as much output as expected, relative to the global average.

na = the total number of publications is too low to calculate the specialization index

**KEY** –: data unavailable | -n/+n: data refer to n years before or after reference year | 0: magnitude nil or negligible | na: not applicable

GDP: gross domestic product | MF: males and females | PPP\$: purchasing power parity dollars

Note: Publication counts of articles, reviews and conference papers are based on the full-counting method. Therefore, the sum across countries is higher than the global total because of co-authorship. The selected topics in the present table are examples of research topics furthering the SDG agenda. These topics are not necessarily mutually exclusive. The following are excluded from the present table because they did not publish on these topics over the period under study: Antigua and Barbuda, Belize, Cook Islands, Comoros, Dominica, Equatorial Guinea, Grenada, Guinea-Bissau, Guyana, Kiribati, Liberia, Maldives, Marshall Islands, Nauru, Niue, Samoa, Sao Tome and Principe, Seychelles, Somalia, St Kitts and Nevis, St Lucia, St Vincent and the Grenadines, Suriname, Tonga and Tuvalu. The total for the People's Republic of China excludes its Special Administrative Regions of Hong Kong and Macao and the Taiwan Province of China.

Source: Prepared by Science-Metrix using Scopus data (Elsevier), including those for social sciences, arts and humanities

WASTEWATER TREATMENT, RECYCLING AND RE-USE			NATIONAL INTEGRATED WATER RESOURCE MANAGEMENT			TRANSBOUNDARY WATER RESOURCE MANAGEMENT			
2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	
0	5	na	1	2	na	0	0	na	Myanmar
21	50	1.48	7	29	1.76	0	1	na	Philippines
1	1	na	0	2	na	0	0	na	Korea, DPR
589	865	0.85	156	261	0.57	2	6	na	Korea, Rep.
182	285	1.21	62	101	1.00	1	9	1.57	Singapore
146	272	1.67	55	121	1.45	9	3	1.44	Thailand
0	0	na	0	1	na	0	0	na	Timor-Leste
51	206	1.89	22	74	1.35	3	3	na	Viet Nam
<b>752</b>	<b>1 155</b>	<b>1.03</b>	<b>744</b>	<b>760</b>	<b>2.32</b>	<b>19</b>	<b>21</b>	<b>1.03</b>	<b>Oceania</b>
677	1 063	1.05	699	698	2.48	17	16	1.02	Australia
81	108	0.93	50	71	1.22	1	5	na	New Zealand
1	0	na	2	3	na	0	0	na	Fiji
0	0	na	1	0	na	0	0	na	Micronesia
0	0	na	0	0	na	1	0	na	Palau
0	0	na	0	0	na	0	0	na	Papua New Guinea
0	0	na	0	0	na	0	0	na	Solomon Islands
0	0	na	0	0	na	0	0	na	Vanuatu

**Table F4:** Publications on selected research topics relating to SDG 7: Affordable and clean energy  
Volume of output, 2012–2015 and 2016–2019, and specialization index, 2011–2019

	CLEANER FOSSIL FUEL TECHNOLOGY			PHOTOVOLTAICS			HYDROPOWER			BIOFUELS AND BIOMASS			WIND TURBINE TECHNOLOGIES		
	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019
<b>World</b>	<b>7 051</b>	<b>8 197</b>	<b>1.00</b>	<b>48 011</b>	<b>57 452</b>	<b>1.00</b>	<b>15 413</b>	<b>20 677</b>	<b>1.00</b>	<b>38 221</b>	<b>51 236</b>	<b>1.00</b>	<b>26 638</b>	<b>35 302</b>	<b>1.00</b>
<b>North America</b>	<b>1 556</b>	<b>1 387</b>	<b>0.81</b>	<b>9 376</b>	<b>8 488</b>	<b>0.65</b>	<b>3 168</b>	<b>3 611</b>	<b>0.73</b>	<b>9 898</b>	<b>9 171</b>	<b>0.90</b>	<b>5 079</b>	<b>4 983</b>	<b>0.66</b>
Canada	243	295	1.05	857	950	0.48	710	825	1.19	1 425	1 563	1.00	892	981	0.90
United States of America	1 334	1 116	0.78	8 661	7 647	0.67	2 593	2 930	0.67	8 675	7 820	0.88	4 289	4 092	0.62
<b>Latin America</b>	<b>178</b>	<b>241</b>	<b>0.52</b>	<b>921</b>	<b>1 602</b>	<b>0.47</b>	<b>1 172</b>	<b>1 719</b>	<b>1.71</b>	<b>3 549</b>	<b>4 934</b>	<b>2.01</b>	<b>705</b>	<b>1 233</b>	<b>0.64</b>
Argentina	12	18	0.41	65	81	0.26	81	76	0.93	212	298	1.22	76	89	0.58
Belize	0	0	na	0	0	na	1	0	na	0	0	na	0	0	na
Bolivia	3	0	na	0	1	na	3	13	3.11	7	6	0.98	1	3	na
Brazil	93	126	0.49	382	599	0.32	827	1 191	2.11	2 433	3 222	2.36	324	621	0.57
Chile	9	12	0.29	60	160	0.54	56	89	0.97	149	202	0.99	77	118	0.84
Colombia	34	39	1.50	111	181	0.83	63	119	1.54	320	410	2.64	49	110	0.77
Costa Rica	0	2	na	1	11	0.39	13	5	2.29	6	29	1.59	3	9	0.38
Ecuador	0	0	na	3	36	0.56	11	75	2.82	13	72	0.96	12	57	1.43
El Salvador	0	0	na	0	1	na	0	0	na	0	1	na	0	0	na
Guatemala	0	0	na	0	3	na	2	1	na	3	5	1.26	0	0	na
Guyana	0	0	na	0	1	na	0	0	na	0	0	na	0	0	na
Honduras	0	0	na	0	0	na	1	3	na	1	6	na	0	2	na
Mexico	24	44	0.50	314	559	1.01	121	155	0.96	457	762	1.69	153	224	0.79
Nicaragua	0	0	na	1	0	na	1	1	na	0	2	na	5	0	na
Panama	0	4	na	1	4	na	3	8	2.05	9	8	0.84	1	5	na
Paraguay	1	0	na	2	1	na	6	15	12.24	8	10	1.26	3	5	na
Peru	0	4	na	0	14	0.17	12	36	1.31	22	28	0.57	3	10	0.17
Suriname	0	0	na	0	0	na	0	3	na	0	0	na	1	0	na
Uruguay	1	3	na	6	26	0.65	8	13	1.07	18	71	2.15	16	24	1.59
Venezuela	8	5	0.57	7	10	0.23	13	6	0.81	8	17	0.39	10	8	0.21
<b>Caribbean</b>	<b>9</b>	<b>6</b>	<b>0.63</b>	<b>31</b>	<b>24</b>	<b>0.26</b>	<b>7</b>	<b>15</b>	<b>0.48</b>	<b>56</b>	<b>54</b>	<b>0.72</b>	<b>13</b>	<b>23</b>	<b>0.44</b>
Bahamas	0	0	na	1	0	na	0	0	na	1	2	na	0	1	na
Barbados	0	0	na	1	0	na	0	0	na	0	9	na	2	1	na
Cuba	8	6	0.80	25	21	0.30	6	10	0.50	51	34	0.75	5	12	0.27
Dominica	0	0	na	0	0	na	1	0	na	0	0	na	0	0	na
Dominican Rep.	0	0	na	0	0	na	0	1	na	2	0	na	0	2	na
Haiti	0	0	na	0	0	na	0	1	na	0	1	na	0	0	na
Jamaica	0	0	na	2	2	na	0	1	na	0	2	na	1	5	na
St Lucia	0	0	na	0	0	na	0	1	na	0	0	na	0	0	na
St Vincent & Grenadines	0	0	na	0	0	na	0	0	na	0	1	na	0	0	na
Trinidad & Tobago	1	0	na	2	1	na	0	2	na	4	5	na	5	4	1.54
<b>European Union</b>	<b>2 351</b>	<b>2 476</b>	<b>1.05</b>	<b>12 213</b>	<b>12 622</b>	<b>0.73</b>	<b>3 737</b>	<b>4 966</b>	<b>0.74</b>	<b>11 609</b>	<b>14 986</b>	<b>0.96</b>	<b>9 546</b>	<b>11 109</b>	<b>1.11</b>
Austria	43	67	0.96	232	196	0.46	193	248	1.49	403	447	1.16	116	112	0.44
Belgium	56	56	0.59	541	406	0.85	83	153	0.54	395	446	0.82	306	344	1.10
Bulgaria	6	6	0.41	53	52	0.55	31	27	1.03	54	72	0.92	20	42	0.67
Croatia	8	17	0.47	23	46	0.27	51	38	1.27	30	81	0.44	106	106	1.57
Cyprus	0	0	na	49	62	1.46	17	8	1.00	8	33	0.80	14	31	0.93
Czech Rep.	27	47	0.58	225	212	0.42	123	142	0.96	256	373	0.82	83	74	0.37
Denmark	70	82	1.21	289	314	0.59	51	79	0.27	557	728	1.58	1 360	1 442	5.67
Estonia	3	8	0.81	62	63	1.33	4	21	0.47	54	69	1.39	39	37	1.56
Finland	58	59	1.32	236	295	0.68	64	81	0.55	591	643	2.26	126	204	0.85
France	199	150	0.59	1 568	1 667	0.64	437	607	0.64	1 183	1 403	0.65	714	910	0.54
Germany	401	387	0.90	3 559	3 224	1.06	512	725	0.51	1 662	2 170	0.64	1 658	2 182	1.08
Greece	50	37	0.90	289	318	0.83	99	95	0.87	305	423	1.28	343	327	1.82
Hungary	6	16	0.33	70	80	0.35	35	30	0.52	133	209	0.93	37	47	0.39
Ireland	8	11	0.26	117	114	0.45	31	44	0.42	235	290	1.29	235	238	1.86
Italy	334	386	1.23	1 610	1 486	0.72	411	562	0.66	1 502	2 199	1.06	753	972	0.70
Latvia	13	8	2.26	25	30	0.78	34	26	2.39	151	218	6.52	51	40	2.30
Lithuania	3	8	0.71	107	95	1.25	17	16	1.00	93	134	2.47	37	38	1.13
Luxembourg	0	0	na	66	80	2.76	2	4	na	25	30	1.16	5	8	0.30

NUCLEAR FUSION			GEOTHERMAL ENERGY			HYDROGEN ENERGY			SMART GRID TECHNOLOGY			
2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	
12 174	12 852	1.00	4 883	6 943	1.00	24 946	32 790	1.00	28 025	46 983	1.00	World
3 023	3 340	0.89	1 480	1 541	1.05	4 999	4 958	0.68	7 006	9 051	0.87	North America
140	147	0.19	264	258	1.16	976	1 023	1.02	1 328	1 869	1.27	Canada
2 941	3 266	0.99	1 265	1 323	1.03	4 115	4 034	0.63	5 801	7 369	0.82	United States of America
171	148	0.20	223	313	0.85	959	1 186	0.73	1 146	2 316	0.96	Latin America
24	19	0.28	24	35	0.68	185	155	1.18	77	75	0.44	Argentina
0	0	na	0	0	na	0	0	na	0	0	na	Belize
0	0	na	2	0	na	0	0	na	0	4	na	Bolivia
80	69	0.16	31	38	0.18	438	541	0.58	723	1 394	1.04	Brazil
20	16	0.24	18	59	1.65	38	65	0.40	68	176	0.80	Chile
2	9	0.09	10	27	0.80	59	81	0.64	171	366	2.31	Colombia
11	15	4.21	5	5	2.80	3	5	na	2	22	0.87	Costa Rica
4	1	na	3	11	1.58	6	24	0.44	35	143	3.27	Ecuador
0	0	na	0	1	na	0	0	na	0	0	na	El Salvador
0	0	na	0	0	na	0	0	na	1	1	na	Guatemala
0	0	na	0	1	na	0	0	na	0	1	na	Guyana
0	0	na	0	1	na	0	0	na	0	0	na	Honduras
40	24	0.26	127	143	3.06	250	358	1.32	86	170	0.43	Mexico
0	0	na	1	2	na	0	0	na	2	2	na	Nicaragua
0	0	na	0	0	na	0	1	na	1	3	na	Panama
0	0	na	0	0	na	5	2	na	5	12	3.69	Paraguay
0	4	na	2	3	na	1	0	na	5	18	0.35	Peru
0	0	na	1	0	na	0	0	na	0	0	na	Suriname
3	1	na	0	1	na	13	20	1.06	6	32	1.45	Uruguay
4	1	na	3	2	na	8	4	0.29	5	16	0.25	Venezuela
1	0	na	2	4	na	12	16	0.30	13	29	0.47	Caribbean
0	0	na	0	0	na	0	0	na	0	0	na	Bahamas
0	0	na	0	0	na	0	0	na	0	0	na	Barbados
1	0	na	0	0	na	10	14	0.33	4	8	0.12	Cuba
0	0	na	0	0	na	0	0	na	0	0	na	Dominica
0	0	na	0	0	na	0	0	na	0	2	na	Dominican Rep.
0	0	na	0	0	na	0	0	na	0	2	na	Haiti
0	0	na	0	0	na	1	1	na	0	1	na	Jamaica
0	0	na	1	0	na	0	0	na	0	0	na	St Lucia
0	0	na	0	0	na	0	0	na	0	0	na	St Vincent & Grenadines
0	0	na	2	4	na	1	1	na	9	16	3.37	Trinidad & Tobago
5 703	5 611	1.41	1 709	2 287	1.07	6 863	7 680	0.80	8 989	12 796	0.96	European Union
143	151	0.59	20	47	0.61	148	179	0.73	269	342	1.10	Austria
370	358	1.28	37	63	0.78	116	149	0.37	298	332	0.93	Belgium
22	41	0.66	8	6	0.69	65	52	1.18	17	66	0.65	Bulgaria
11	17	0.21	15	26	1.64	16	34	0.29	80	130	1.33	Croatia
4	2	na	6	13	2.88	6	18	0.52	25	87	2.32	Cyprus
228	279	1.37	39	40	0.69	125	174	0.59	154	208	0.64	Czech Rep.
81	115	0.38	43	81	0.98	346	325	1.29	693	1 191	2.60	Denmark
15	20	0.74	4	9	1.17	35	21	1.16	41	73	1.70	Estonia
236	256	1.43	22	29	0.56	119	161	0.71	276	448	1.51	Finland
1 810	1 640	2.09	188	279	0.85	1 004	982	0.76	667	1 036	0.52	France
2 215	2 377	2.27	550	612	1.59	1 401	1 708	0.84	1 401	1 778	0.74	Germany
52	68	0.39	47	42	1.06	214	218	1.09	313	510	1.72	Greece
97	118	0.84	44	47	2.41	63	83	0.53	46	84	0.54	Hungary
39	36	0.19	16	32	0.71	51	101	0.46	192	248	1.34	Ireland
1 201	1 302	1.92	351	433	1.71	1 116	1 197	1.05	1 606	2 119	1.34	Italy
18	17	1.14	3	2	na	30	17	1.18	54	74	2.45	Latvia
22	30	1.16	6	6	1.03	17	33	0.71	13	19	0.44	Lithuania
0	0	na	2	4	na	7	5	0.27	17	36	1.35	Luxembourg

**Table F4:** Publications on selected research topics relating to SDG 7: Affordable and clean energy  
Volume of output, 2012–2015 and 2016–2019, and specialization index, 2011–2019

	CLEANER FOSSIL FUEL TECHNOLOGY			PHOTOVOLTAICS			HYDROPOWER			BIOFUELS AND BIOMASS			WIND TURBINE TECHNOLOGIES		
	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019
Malta	0	0	na	1	4	na	3	3	na	1	3	na	24	49	7.04
Netherlands	185	157	1.14	751	705	0.71	191	297	0.49	768	914	0.90	490	745	1.05
Poland	257	248	2.15	320	520	0.42	211	294	0.89	442	870	0.86	306	484	0.80
Portugal	35	54	0.71	209	267	0.49	197	272	1.51	452	612	1.49	384	411	1.69
Romania	65	60	1.63	229	339	1.00	177	247	2.44	224	280	1.03	264	350	2.07
Slovakia	20	22	1.40	80	86	0.54	56	51	1.14	112	117	0.99	17	27	0.27
Slovenia	10	17	1.16	84	76	0.70	49	42	1.45	64	86	0.81	18	23	0.33
Spain	274	295	1.28	1 296	1 403	0.74	410	564	0.95	1 477	1 948	1.22	1 006	1 157	1.19
Sweden	171	156	1.85	635	859	0.86	162	293	0.90	923	1 168	1.90	342	377	0.95
United Kingdom	372	517	1.00	1 944	2 342	0.61	612	907	0.61	1 691	2 289	0.71	2 107	2 355	1.30
<b>Southeast Europe</b>	<b>12</b>	<b>22</b>	<b>0.53</b>	<b>47</b>	<b>76</b>	<b>0.33</b>	<b>90</b>	<b>92</b>	<b>1.59</b>	<b>136</b>	<b>158</b>	<b>0.97</b>	<b>100</b>	<b>114</b>	<b>0.95</b>
Albania	1	1	na	1	6	na	2	5	na	3	3	na	2	5	na
Bosnia & Herzegovina	0	2	na	4	11	0.25	6	6	1.27	7	5	0.26	15	22	1.87
Montenegro	0	0	na	3	2	na	5	9	2.48	0	2	na	12	7	1.28
North Macedonia	0	1	na	1	4	na	12	15	2.38	3	7	0.20	14	11	1.43
Serbia	11	19	0.63	40	61	0.35	70	63	1.48	126	147	1.17	60	74	0.78
<b>European Free Trade Assoc.</b>	<b>295</b>	<b>266</b>	<b>1.98</b>	<b>1 197</b>	<b>1 249</b>	<b>0.99</b>	<b>576</b>	<b>875</b>	<b>2.10</b>	<b>542</b>	<b>708</b>	<b>0.58</b>	<b>914</b>	<b>972</b>	<b>1.60</b>
Iceland	1	3	na	5	10	0.15	19	18	2.53	19	13	1.09	15	11	1.02
Liechtenstein	0	0	na	3	0	na	0	1	na	0	0	na	0	0	na
Norway	221	184	4.68	234	229	0.63	239	421	2.81	275	390	0.96	681	694	3.71
Switzerland	75	81	0.71	961	1 018	1.19	327	449	1.74	255	310	0.38	223	278	0.60
<b>Other Europe &amp; West Asia</b>	<b>246</b>	<b>423</b>	<b>0.56</b>	<b>2 085</b>	<b>3 600</b>	<b>0.64</b>	<b>1 142</b>	<b>1 919</b>	<b>1.14</b>	<b>1 373</b>	<b>2 769</b>	<b>0.56</b>	<b>1 284</b>	<b>2 439</b>	<b>0.77</b>
Armenia	0	0	na	12	11	0.45	3	7	0.88	13	17	1.20	1	1	na
Azerbaijan	0	0	na	15	14	0.65	1	4	na	2	12	0.25	2	5	na
Belarus	1	1	na	34	68	0.93	1	2	na	15	17	0.34	0	4	na
Georgia	0	1	na	4	4	na	8	22	2.06	3	0	na	2	4	na
Iran Islamic Rep.	117	192	0.99	664	1 331	0.89	539	769	1.79	420	1 034	0.71	778	1 357	1.66
Israel	2	6	na	242	292	0.70	27	25	0.16	112	133	0.36	40	44	0.20
Moldova, Rep.	0	0	na	18	20	1.84	0	3	na	6	4	0.55	1	10	1.42
Russian Federation	64	139	0.45	460	895	0.37	212	607	0.80	274	686	0.35	86	426	0.26
Turkey	47	59	0.38	501	839	0.73	346	459	1.48	482	763	0.85	351	554	0.89
Ukraine	20	28	0.73	183	216	0.79	18	47	0.41	64	145	0.43	27	58	0.28
<b>Sub-Saharan Africa</b>	<b>66</b>	<b>94</b>	<b>0.78</b>	<b>267</b>	<b>642</b>	<b>0.60</b>	<b>414</b>	<b>680</b>	<b>2.40</b>	<b>671</b>	<b>1 265</b>	<b>1.50</b>	<b>252</b>	<b>543</b>	<b>0.95</b>
Angola	0	0	na	0	0	na	0	1	na	1	5	na	1	0	na
Benin	0	1	na	3	0	na	7	15	2.36	6	7	0.78	0	8	na
Botswana	0	2	na	3	5	na	2	14	2.96	8	35	2.63	2	4	na
Burkina Faso	3	2	na	15	15	1.71	12	8	2.93	21	25	2.84	0	3	na
Burundi	0	0	na	0	0	na	1	0	na	2	1	na	0	0	na
Cameroon	1	0	na	14	24	0.71	10	24	2.18	13	29	0.70	7	20	1.10
Cabo Verde	0	0	na	0	0	na	2	1	na	0	1	na	1	0	na
Central African Rep.	0	0	na	0	1	na	1	0	na	0	0	na	0	0	na
Chad	0	0	na	0	1	na	0	1	na	0	0	na	0	2	na
Congo	0	0	na	0	1	na	3	2	na	1	1	na	0	0	na
Côte d'Ivoire	0	1	na	1	7	na	12	11	4.65	6	5	0.60	2	1	na
Congo, Dem. Rep.	0	0	na	0	0	na	1	5	na	1	3	na	0	0	na
Djibouti	0	0	na	0	5	na	0	1	na	0	0	na	0	2	na
Eritrea	0	0	na	0	1	na	0	0	na	0	1	na	0	0	na
Eswatini	0	0	na	0	0	na	0	0	na	0	0	na	0	0	na
Ethiopia	1	4	na	30	48	0.52	43	69	2.79	25	105	1.22	8	39	0.85
Gambia	0	0	na	0	0	na	0	0	na	0	0	na	0	0	na
Ghana	0	3	na	10	21	0.33	17	49	3.46	26	60	1.41	4	15	0.38
Guinea	0	0	na	1	0	na	1	1	na	1	2	na	0	0	na
Kenya	2	3	na	7	13	0.27	21	35	1.83	45	44	0.86	12	25	0.73
Lesotho	0	0	na	1	0	na	1	1	na	0	0	na	1	0	na
Liberia	0	0	na	0	0	na	0	0	na	0	1	na	0	0	na

NUCLEAR FUSION			GEOTHERMAL ENERGY			HYDROGEN ENERGY			SMART GRID TECHNOLOGY			
2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	
1	1	na	0	3	na	0	0	na	9	17	1.45	Malta
399	319	0.70	88	140	0.93	282	409	0.56	436	641	0.82	Netherlands
256	297	0.67	69	105	0.89	382	500	0.86	252	358	0.52	Poland
308	309	1.41	33	48	0.75	179	191	0.76	487	776	2.08	Portugal
80	143	0.78	45	89	2.15	121	117	0.71	217	410	1.59	Romania
17	34	0.30	38	22	2.14	16	32	0.27	33	70	0.58	Slovakia
45	87	1.47	6	19	1.17	38	57	0.86	61	52	0.84	Slovenia
811	879	1.28	104	170	0.74	851	896	0.96	1 001	1 280	1.02	Spain
320	323	0.92	38	72	0.52	317	365	0.77	336	482	0.83	Sweden
1 144	1 205	1.01	171	363	0.60	1 054	1 340	0.67	1 376	2 186	0.82	United Kingdom
<b>5</b>	<b>10</b>	<b>0.08</b>	<b>27</b>	<b>28</b>	<b>1.57</b>	<b>60</b>	<b>53</b>	<b>0.57</b>	<b>89</b>	<b>191</b>	<b>1.03</b>	<b>Southeast Europe</b>
0	0	na	2	0	na	0	0	na	0	1	na	Albania
0	0	na	1	5	na	1	4	na	16	51	2.22	Bosnia & Herzegovina
0	0	na	1	1	na	0	0	na	4	7	0.99	Montenegro
3	3	na	0	5	na	3	1	na	8	19	1.25	North Macedonia
3	7	0.07	23	19	1.49	57	52	0.67	63	116	0.90	Serbia
<b>394</b>	<b>483</b>	<b>0.93</b>	<b>302</b>	<b>420</b>	<b>2.72</b>	<b>516</b>	<b>592</b>	<b>0.87</b>	<b>552</b>	<b>819</b>	<b>0.86</b>	<b>European Free Trade Assoc.</b>
1	2	na	123	144	59.19	14	11	0.92	4	7	0.21	Iceland
0	0	na	0	0	na	0	1	na	0	0	na	Liechtenstein
19	31	0.10	53	85	1.44	180	221	0.88	218	315	0.96	Norway
377	452	1.36	135	204	1.78	327	369	0.86	334	501	0.84	Switzerland
<b>1 164</b>	<b>1 381</b>	<b>1.09</b>	<b>405</b>	<b>687</b>	<b>1.19</b>	<b>1 480</b>	<b>2 725</b>	<b>0.93</b>	<b>1 576</b>	<b>3 413</b>	<b>0.84</b>	<b>Other Europe &amp; West Asia</b>
4	1	na	2	1	na	26	21	2.74	1	1	na	Armenia
1	0	na	3	4	na	1	16	0.59	1	5	na	Azerbaijan
1	7	na	1	2	na	7	9	0.37	0	5	na	Belarus
4	4	0.66	0	0	na	5	0	na	0	0	na	Georgia
106	142	0.49	76	171	0.96	517	972	1.23	1 136	2 158	2.14	Iran Islamic Rep.
21	29	0.16	14	5	0.18	58	163	0.53	44	58	0.20	Israel
1	0	na	0	0	na	1	4	na	0	3	na	Moldova, Rep.
869	1 042	2.11	117	246	1.04	376	749	0.63	136	549	0.30	Russian Federation
66	62	0.31	184	246	2.36	435	750	1.29	235	567	0.54	Turkey
135	154	1.71	13	20	0.52	81	99	0.66	29	99	0.39	Ukraine
<b>18</b>	<b>23</b>	<b>0.06</b>	<b>81</b>	<b>134</b>	<b>1.45</b>	<b>180</b>	<b>320</b>	<b>0.61</b>	<b>222</b>	<b>580</b>	<b>0.81</b>	<b>Sub-Saharan Africa</b>
1	0	na	0	1	na	0	0	na	1	0	na	Angola
0	0	na	1	1	na	0	0	na	0	3	na	Benin
0	0	na	0	1	na	0	7	na	0	7	na	Botswana
0	0	na	1	0	na	1	4	na	1	1	na	Burkina Faso
0	3	na	0	0	na	0	0	na	0	0	na	Burundi
1	0	na	2	4	na	2	1	na	0	1	na	Cameroon
0	0	na	0	0	na	0	0	na	1	0	na	Cabo Verde
0	0	na	0	0	na	0	0	na	0	0	na	Central African Rep.
0	0	na	0	0	na	0	0	na	0	0	na	Chad
0	0	na	0	0	na	0	0	na	0	0	na	Congo
0	0	na	0	0	na	0	3	na	0	0	na	Côte d'Ivoire
0	0	na	0	1	na	0	0	na	0	1	na	Congo, Dem. Rep.
0	0	na	3	4	na	1	0	na	0	0	na	Djibouti
0	0	na	0	0	na	0	0	na	0	0	na	Eritrea
0	0	na	0	0	na	0	1	na	0	1	na	Eswatini
6	2	na	6	15	1.54	2	12	0.13	0	18	0.22	Ethiopia
0	0	na	0	0	na	0	0	na	0	0	na	Gambia
0	0	na	0	2	na	4	4	na	4	24	0.63	Ghana
0	0	na	0	0	na	0	1	na	0	0	na	Guinea
0	0	na	38	40	15.12	2	5	na	3	13	0.33	Kenya
0	0	na	0	0	na	0	0	na	0	2	na	Lesotho
0	0	na	0	0	na	0	0	na	0	0	na	Liberia

**Table F4:** Publications on selected research topics relating to SDG 7: Affordable and clean energy  
Volume of output, 2012–2015 and 2016–2019, and specialization index, 2011–2019

	CLEANER FOSSIL FUEL TECHNOLOGY			PHOTOVOLTAICS			HYDROPOWER			BIOFUELS AND BIOMASS			WIND TURBINE TECHNOLOGIES		
	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019
Madagascar	0	0	na	0	2	na	0	4	na	2	5	na	3	2	na
Malawi	0	1	na	0	1	na	4	4	na	5	11	0.96	2	1	na
Mali	0	0	na	0	2	na	5	4	2.02	4	2	na	0	2	na
Mauritius	0	0	na	1	9	1.37	1	4	na	12	31	4.92	3	8	2.50
Mozambique	1	0	na	0	0	na	3	8	1.32	8	18	1.43	2	4	na
Namibia	0	0	na	1	7	na	6	6	2.61	0	2	na	1	3	na
Niger	1	0	na	1	1	na	0	4	na	4	1	na	0	1	na
Nigeria	6	19	0.53	52	169	0.77	36	94	1.73	155	397	2.16	60	119	1.04
Rwanda	1	0	na	0	2	na	1	10	2.49	2	4	na	0	3	na
Senegal	0	0	na	12	19	1.28	12	9	1.78	6	8	0.55	6	8	0.85
Seychelles	0	0	na	0	0	na	1	0	na	0	1	na	0	0	na
Sierra Leone	0	0	na	0	0	na	0	3	na	2	1	na	0	1	na
Somalia	0	0	na	0	0	na	0	1	na	0	0	na	0	0	na
South Africa	48	62	1.28	124	339	0.67	203	315	2.62	295	524	1.51	142	297	1.16
South Sudan	0	0	na	0	1	na	0	1	na	0	3	na	0	0	na
Togo	0	0	na	6	3	0.78	0	1	na	1	2	na	0	2	na
Uganda	4	1	na	1	2	na	11	7	0.99	20	26	0.87	2	2	na
Tanzania	1	1	na	10	8	0.30	15	19	2.43	29	25	1.29	4	3	na
Zambia	0	1	na	1	3	na	6	15	3.60	8	5	0.74	2	5	na
Zimbabwe	0	0	na	0	4	na	13	34	7.89	5	23	2.06	1	1	na
<b>Arab States</b>	<b>142</b>	<b>271</b>	<b>0.81</b>	<b>2 208</b>	<b>4 537</b>	<b>2.22</b>	<b>406</b>	<b>691</b>	<b>1.11</b>	<b>790</b>	<b>1 743</b>	<b>0.78</b>	<b>1 379</b>	<b>2 600</b>	<b>2.63</b>
Algeria	8	8	0.35	442	806	5.03	79	129	2.45	37	73	0.42	343	561	6.48
Bahrain	0	1	na	12	19	1.53	1	4	na	0	3	na	4	7	1.55
Egypt	13	32	0.34	381	792	1.43	114	128	0.91	218	510	0.92	297	605	2.23
Iraq	5	12	0.45	82	384	2.32	27	113	1.88	42	145	1.07	18	94	0.91
Jordan	5	4	na	62	130	1.68	21	28	1.49	26	49	0.64	30	74	1.50
Kuwait	7	4	1.23	28	52	0.86	4	6	0.62	8	16	0.26	17	40	1.20
Lebanon	1	3	na	49	43	0.97	13	18	0.93	25	43	0.58	45	44	1.70
Libya	0	3	na	12	14	1.55	8	5	2.61	3	4	na	19	22	6.19
Mauritania	0	0	na	0	5	na	1	0	na	0	0	na	3	5	na
Morocco	1	0	na	145	569	3.31	24	83	1.35	22	92	0.48	148	477	5.58
Oman	2	7	na	24	40	0.94	14	22	1.99	37	68	1.45	28	53	2.81
Palestine	0	0	na	35	55	4.30	0	1	na	1	6	na	9	12	1.69
Qatar	22	31	3.77	85	229	2.90	2	7	0.24	28	76	0.74	41	48	1.39
Saudi Arabia	45	107	1.33	711	1 314	1.98	64	91	0.60	257	469	0.79	168	301	1.12
Sudan	2	2	na	11	30	1.08	10	19	2.52	8	20	0.59	3	12	0.85
Syrian Arab Rep.	0	0	na	9	1	0.76	4	5	1.62	6	4	0.47	2	6	0.56
Tunisia	2	4	na	260	356	2.03	40	52	0.92	63	143	0.59	179	284	2.87
United Arab Emirates	39	64	4.36	128	229	2.11	11	38	0.71	77	172	1.65	128	171	3.09
Yemen	0	4	na	7	22	1.23	1	1	na	6	10	0.68	1	3	na
<b>Central Asia</b>	<b>6</b>	<b>26</b>	<b>1.47</b>	<b>62</b>	<b>136</b>	<b>1.39</b>	<b>39</b>	<b>82</b>	<b>2.80</b>	<b>11</b>	<b>46</b>	<b>0.39</b>	<b>30</b>	<b>59</b>	<b>1.09</b>
Kazakhstan	4	19	1.65	27	78	0.92	8	41	1.59	8	30	0.43	21	49	1.26
Kyrgyzstan	0	2	na	0	1	na	10	12	8.56	2	2	na	1	1	na
Mongolia	1	2	na	6	4	1.02	2	2	na	1	2	na	2	2	na
Tajikistan	0	2	na	3	8	0.90	12	10	17.15	0	4	na	1	0	na
Turkmenistan	0	0	na	0	1	na	0	0	na	0	0	na	0	0	na
Uzbekistan	1	2	na	26	47	3.34	10	22	4.25	0	8	na	5	7	0.95
<b>South Asia</b>	<b>248</b>	<b>458</b>	<b>0.68</b>	<b>3 614</b>	<b>8 242</b>	<b>1.74</b>	<b>732</b>	<b>1 276</b>	<b>0.88</b>	<b>3 038</b>	<b>6 341</b>	<b>1.65</b>	<b>1 645</b>	<b>3 703</b>	<b>1.46</b>
Afghanistan	0	0	na	0	1	na	0	2	na	1	0	na	0	9	na
Bangladesh	7	12	0.62	192	411	4.03	32	32	1.08	99	158	1.34	117	163	3.18
Bhutan	0	0	na	0	0	na	6	11	23.70	0	0	na	0	0	na
India	207	357	0.67	3 144	7 042	1.75	560	986	0.81	2 679	5 514	1.70	1 421	3 195	1.47
Maldives	0	0	na	0	0	na	0	0	na	1	0	na	0	2	na
Nepal	2	1	na	7	12	0.30	45	88	7.86	19	34	0.60	5	12	0.54
Pakistan	32	86	0.84	207	711	1.07	75	151	0.98	239	617	1.26	89	294	0.99



NUCLEAR FUSION			GEOTHERMAL ENERGY			HYDROGEN ENERGY			SMART GRID TECHNOLOGY			
2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	
0	0	na	0	1	na	0	1	na	0	0	na	Madagascar
0	0	na	1	0	na	0	0	na	0	0	na	Malawi
0	0	na	0	1	na	0	1	na	0	2	na	Mali
0	0	na	0	2	na	2	15	2.50	1	9	2.14	Mauritius
0	0	na	0	1	na	0	0	na	0	2	na	Mozambique
0	0	na	1	0	na	0	0	na	1	7	na	Namibia
0	0	na	0	0	na	1	0	na	0	4	na	Niger
1	0	na	14	25	1.36	18	50	0.35	28	93	0.56	Nigeria
0	0	na	0	1	na	1	0	na	0	7	na	Rwanda
0	0	na	1	0	na	0	2	na	0	5	na	Senegal
0	0	na	0	0	na	0	0	na	0	0	na	Seychelles
0	0	na	0	0	na	0	0	na	0	0	na	Sierra Leone
0	1	na	0	0	na	0	0	na	0	0	na	Somalia
9	16	0.08	14	31	0.56	149	224	1.06	177	373	1.26	South Africa
0	0	na	0	0	na	0	0	na	0	0	na	South Sudan
0	0	na	0	0	na	0	0	na	0	0	na	Togo
0	1	na	0	5	na	1	4	na	4	1	na	Uganda
0	1	na	1	1	na	3	4	na	5	21	0.63	Tanzania
0	0	na	0	0	na	0	2	na	0	8	na	Zambia
0	0	na	0	1	na	0	2	na	1	1	na	Zimbabwe
<b>62</b>	<b>82</b>	<b>0.17</b>	<b>173</b>	<b>245</b>	<b>1.27</b>	<b>793</b>	<b>1 443</b>	<b>1.19</b>	<b>884</b>	<b>2 415</b>	<b>1.53</b>	<b>Arab States</b>
5	4	0.14	18	38	1.97	107	161	2.07	51	172	1.17	Algeria
0	0	na	0	0	na	7	7	1.09	1	11	0.68	Bahrain
27	21	0.24	35	46	0.91	176	275	0.94	223	587	1.50	Egypt
2	21	0.65	3	21	1.03	20	46	0.51	9	79	0.45	Iraq
1	3	na	4	9	1.35	15	18	0.48	23	91	1.22	Jordan
0	0	na	4	4	na	22	27	1.43	11	33	0.85	Kuwait
6	3	na	4	6	1.17	19	37	0.75	30	72	1.27	Lebanon
0	0	na	1	2	na	4	6	1.24	11	32	5.40	Libya
0	0	na	1	0	na	0	0	na	0	1	na	Mauritania
3	3	na	7	15	0.73	26	57	0.62	42	252	2.03	Morocco
0	0	na	4	5	1.38	11	17	0.53	19	44	1.42	Oman
0	0	na	3	1	na	1	7	na	11	23	1.83	Palestine
1	3	na	9	8	1.24	37	88	2.50	100	192	4.10	Qatar
15	18	0.12	52	77	1.37	295	596	1.65	185	458	1.17	Saudi Arabia
3	0	na	1	3	na	1	6	na	1	4	na	Sudan
0	2	na	2	0	na	1	1	na	2	13	0.43	Syrian Arab Rep.
1	1	na	27	9	1.27	65	145	1.10	65	187	1.22	Tunisia
3	6	na	22	33	2.56	62	123	1.58	193	402	4.48	United Arab Emirates
0	0	na	3	4	na	6	4	0.24	0	2	na	Yemen
<b>19</b>	<b>31</b>	<b>1.28</b>	<b>10</b>	<b>14</b>	<b>1.68</b>	<b>20</b>	<b>35</b>	<b>0.53</b>	<b>8</b>	<b>65</b>	<b>0.62</b>	<b>Central Asia</b>
14	25	1.76	6	11	1.54	15	26	0.63	5	53	0.73	Kazakhstan
0	0	na	2	1	na	0	0	na	0	0	na	Kyrgyzstan
0	0	na	2	0	na	2	1	na	3	5	na	Mongolia
0	0	na	0	1	na	0	2	na	0	1	na	Tajikistan
0	0	na	0	1	na	0	0	na	0	0	na	Turkmenistan
5	6	0.47	0	0	na	3	6	na	0	6	na	Uzbekistan
<b>534</b>	<b>594</b>	<b>0.67</b>	<b>123</b>	<b>295</b>	<b>0.54</b>	<b>1 318</b>	<b>2 395</b>	<b>0.98</b>	<b>1 852</b>	<b>6 192</b>	<b>1.78</b>	<b>South Asia</b>
0	0	na	0	1	na	0	0	na	0	4	na	Afghanistan
5	5	0.25	12	11	0.99	17	57	0.60	51	194	2.09	Bangladesh
0	0	na	0	0	na	0	0	na	2	0	na	Bhutan
517	564	0.73	99	245	0.52	1 229	2 069	1.03	1 624	5 177	1.76	India
0	0	na	0	0	na	0	0	na	0	1	na	Maldives
2	1	na	0	1	na	3	7	0.18	6	10	0.47	Nepal
10	24	0.22	10	31	0.56	67	266	0.65	147	756	1.90	Pakistan

**Table F4:** Publications on selected research topics relating to SDG 7: Affordable and clean energy  
Volume of output, 2012–2015 and 2016–2019, and specialization index, 2011–2019

	CLEANER FOSSIL FUEL TECHNOLOGY			PHOTOVOLTAICS			HYDROPOWER			BIOFUELS AND BIOMASS			WIND TURBINE TECHNOLOGIES		
	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019
Sri Lanka	0	4	na	66	99	2.63	22	25	1.85	12	44	0.92	13	29	1.27
<b>Southeast Asia</b>	<b>2 671</b>	<b>3 825</b>	<b>1.28</b>	<b>23 157</b>	<b>27 739</b>	<b>1.46</b>	<b>5 767</b>	<b>8 127</b>	<b>1.20</b>	<b>12 031</b>	<b>18 816</b>	<b>1.00</b>	<b>8 409</b>	<b>12 692</b>	<b>1.04</b>
Brunei Darussalam	0	3	na	23	34	4.62	2	3	na	13	49	3.88	12	14	2.84
Cambodia	0	0	na	1	2	na	12	28	5.79	4	2	na	0	0	na
China	1 959	2 870	1.52	11 060	16 367	1.21	4 617	6 200	1.53	6 383	10 822	0.88	5 764	9 487	1.22
China, Hong Kong SAR	13	35	0.30	562	919	1.80	73	111	0.56	139	266	0.51	135	238	0.76
China, Macao SAR	0	0	na	3	36	0.36	3	4	na	6	15	0.38	10	17	0.53
China, Taiwan Prov.	73	83	0.64	2 675	1 798	3.05	153	133	0.49	656	759	0.94	392	424	0.92
Indonesia	22	88	0.99	139	770	1.48	61	365	2.05	361	1 409	3.09	75	391	1.30
Japan	279	250	0.61	3 574	3 472	1.21	450	539	0.50	1 406	1 561	0.55	763	829	0.48
Lao PDR	0	2	na	0	0	na	37	33	23.72	5	8	1.84	0	0	na
Malaysia	75	153	1.42	835	1 270	1.92	139	316	1.18	1 351	2 122	3.71	311	477	1.12
Myanmar	0	1	na	1	7	na	1	7	na	3	7	0.63	2	0	na
Philippines	3	11	0.79	22	66	1.00	16	39	1.91	82	191	3.19	29	50	1.47
Korea, DPR	0	0	na	3	10	3.57	0	1	na	0	3	na	0	1	na
Korea, Rep.	258	328	1.23	4 311	3 861	2.50	234	377	0.52	1 437	1 764	1.05	849	789	0.86
Singapore	53	82	1.17	956	834	2.42	57	80	0.38	335	316	1.10	144	244	0.86
Thailand	50	100	1.81	265	383	1.21	78	128	1.05	627	1 051	3.67	120	164	0.95
Timor-Leste	0	0	na	0	0	na	0	1	na	0	2	na	0	1	na
Viet Nam	3	20	0.62	75	208	1.11	46	128	1.91	67	350	1.27	39	121	1.13
<b>Oceania</b>	<b>271</b>	<b>285</b>	<b>1.05</b>	<b>1 524</b>	<b>1 802</b>	<b>0.85</b>	<b>528</b>	<b>688</b>	<b>0.96</b>	<b>1 041</b>	<b>1 466</b>	<b>0.73</b>	<b>810</b>	<b>952</b>	<b>0.85</b>
Australia	264	270	1.17	1 484	1 736	0.95	474	600	0.97	893	1 311	0.73	719	854	0.87
New Zealand	8	16	0.31	48	76	0.20	56	91	0.84	157	165	0.72	80	85	0.67
Cook Islands	0	0	na	0	0	na	0	0	na	0	0	na	0	0	na
Fiji	0	0	na	2	9	1.04	2	4	na	5	4	na	14	14	8.17
Micronesia	0	0	na	0	0	na	0	0	na	14	0	na	0	0	na
Papua New Guinea	0	0	na	0	0	na	0	2	na	14	2	na	0	4	na
Samoa	0	0	na	0	0	na	0	0	na	2	0	na	0	0	na
Solomon Islands	0	0	na	0	0	na	0	3	na	0	0	na	0	0	na
Tonga	0	0	na	0	0	na	0	0	na	0	0	na	0	0	na
Vanuatu	0	0	na	0	0	na	0	0	na	0	0	na	0	0	na

SI<sub>2011–19</sub>: The specialization index is measured as the proportion of output of a given country on a given topic, divided by the proportion observed at the global level. For example, a country with 2% of its output being on a research topic that represents 1% of all research worldwide would score 2.00, having twice as much output as expected, relative to the global average.

na = the total number of publications is too low to calculate the specialization index

**KEY** –: data unavailable | -n/+n: data refer to n years before or after reference year | 0: magnitude nil or negligible | na: not applicable

GDP: gross domestic product | MF: males and females | PPP\$: purchasing power parity dollars

Note: Publication counts of articles, reviews and conference papers are based on the full-counting method. Therefore, the sum across countries is higher than the global total because of co-authorship. The selected topics in the present table are examples of research topics furthering the SDG agenda. These topics are not necessarily mutually exclusive. The following are excluded from the present table because they did not publish on these topics over the period under study: Antigua and Barbuda, Comoros, Equatorial Guinea, Gabon, Grenada, Guinea-Bissau, Kiribati, Marshall Islands, Nauru, Niue, Palau, Sao Tome and Principe, St Kitts and Nevis and Tuvalu. The total for the People's Republic of China excludes its Special Administrative Regions of Hong Kong and Macao and the Taiwan Province of China.

Source: Prepared by Science-Metrix using Scopus data (Elsevier), including those for social sciences, arts and humanities

NUCLEAR FUSION			GEOTHERMAL ENERGY			HYDROGEN ENERGY			SMART GRID TECHNOLOGY			
2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	
0	0	na	2	6	na	3	9	0.21	22	64	2.01	Sri Lanka
4 232	4 806	1.02	986	2 175	0.77	11 374	17 654	1.50	8 525	16 246	1.00	Southeast Asia
0	0	na	1	1	na	5	33	3.94	18	31	2.58	Brunei Darussalam
0	0	na	0	0	na	1	0	na	1	2	na	Cambodia
2 379	3 082	0.97	593	1 339	0.77	6 539	12 342	1.52	5 437	11 532	1.09	China
4	4	na	9	22	0.31	164	326	1.08	288	442	1.38	China, Hong Kong SAR
1	0	na	1	5	na	5	64	1.15	18	62	1.21	China, Macao SAR
34	32	0.13	34	59	0.44	746	669	1.69	399	485	0.81	China, Taiwan Prov.
7	14	0.14	68	378	6.34	71	224	0.74	67	309	0.86	Indonesia
1 456	1 279	1.88	170	251	0.58	1 791	2 018	1.21	907	1 013	0.50	Japan
0	0	na	0	0	na	0	0	na	0	1	na	Lao PDR
19	28	0.13	27	54	0.53	367	664	1.67	329	650	1.27	Malaysia
1	1	na	0	0	na	0	1	na	0	3	na	Myanmar
3	4	na	9	17	2.02	13	32	0.79	5	66	1.34	Philippines
0	1	na	0	2	na	0	5	na	1	5	na	Korea, DPR
575	605	1.27	92	120	0.55	1 703	1 811	1.91	839	1 234	0.91	Korea, Rep.
13	16	0.13	10	17	0.26	307	417	1.62	378	804	2.26	Singapore
17	21	0.32	6	14	0.36	269	316	1.98	171	272	1.24	Thailand
0	0	na	0	0	na	0	0	na	0	0	na	Timor-Leste
4	5	na	3	16	0.42	23	163	1.05	26	144	0.95	Viet Nam
122	149	0.20	380	401	1.99	599	1 055	0.65	1 084	1 871	1.23	Oceania
109	137	0.20	243	233	1.33	568	1 003	0.72	959	1 711	1.27	Australia
14	12	0.26	150	177	6.44	35	62	0.22	129	155	0.93	New Zealand
0	0	na	0	0	na	0	0	na	0	1	na	Cook Islands
0	0	na	0	2	na	0	2	na	1	12	3.25	Fiji
0	0	na	0	0	na	0	0	na	0	0	na	Micronesia
0	0	na	1	0	na	0	0	na	0	0	na	Papua New Guinea
0	0	na	0	0	na	0	0	na	0	0	na	Samoa
0	0	na	0	0	na	0	0	na	0	0	na	Solomon Islands
0	0	na	0	0	na	0	0	na	0	1	na	Tonga
0	0	na	0	2	na	0	0	na	0	0	na	Vanuatu

**Table F5:** Publications on selected research topics relating to SDG 9:  
Industry, innovation and infrastructure  
Volume of output, 2012–2015 and 2016–2019, and specialization index, 2011–2019

	CARBON PRICING			ECO-INDUSTRIAL WASTE MANAGEMENT*			RADIOACTIVE WASTE MANAGEMENT			ECO-ALTERNATIVES TO PLASTIC		
	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019
<b>World</b>	<b>2 725</b>	<b>3 536</b>	<b>1.00</b>	<b>9 501</b>	<b>15 881</b>	<b>1.00</b>	<b>6 752</b>	<b>7 000</b>	<b>1.00</b>	<b>1 977</b>	<b>3 270</b>	<b>1.00</b>
<b>North America</b>	<b>750</b>	<b>837</b>	<b>0.95</b>	<b>1 564</b>	<b>1 970</b>	<b>0.50</b>	<b>1 955</b>	<b>1 862</b>	<b>1.19</b>	<b>366</b>	<b>408</b>	<b>0.62</b>
Canada	132	188	1.49	349	510	0.90	218	263	1.01	85	86	1.13
United States of America	641	681	0.88	1 261	1 517	0.44	1 770	1 639	1.21	287	328	0.55
<b>Latin America</b>	<b>97</b>	<b>127</b>	<b>0.69</b>	<b>566</b>	<b>1 050</b>	<b>1.37</b>	<b>118</b>	<b>90</b>	<b>0.29</b>	<b>201</b>	<b>358</b>	<b>2.32</b>
Argentina	6	2	na	55	75	1.25	27	16	0.59	23	29	2.30
Belize	0	0	na	0	0	na	0	0	na	0	0	na
Bolivia	0	2	na	2	2	na	0	0	na	0	0	na
Brazil	65	62	0.72	332	606	1.39	62	41	0.28	126	206	2.42
Chile	10	25	1.48	26	67	0.96	8	15	0.20	8	21	1.23
Colombia	12	9	0.91	31	91	1.51	2	4	na	20	37	3.46
Costa Rica	2	0	na	2	7	na	0	0	na	0	3	na
Ecuador	1	4	na	4	24	1.31	1	1	na	5	7	3.70
El Salvador	0	0	na	0	1	na	0	0	na	0	0	na
Guatemala	0	0	na	0	0	na	0	0	na	0	0	na
Guyana	0	0	na	0	0	na	0	0	na	0	0	na
Honduras	0	1	na	0	0	na	0	0	na	0	2	na
Mexico	5	22	0.55	126	182	1.59	19	16	0.31	25	54	1.97
Nicaragua	0	0	na	0	0	na	0	0	na	0	0	na
Panama	0	1	na	0	0	na	0	0	na	0	0	na
Paraguay	0	0	na	0	1	na	0	1	na	0	0	na
Peru	5	2	na	4	19	1.04	0	1	na	0	6	na
Suriname	0	0	na	0	0	na	0	0	na	0	0	na
Uruguay	0	1	na	1	5	na	0	0	na	1	1	na
Venezuela	0	2	na	4	5	na	1	2	na	5	8	2.57
<b>Caribbean</b>	<b>4</b>	<b>1</b>	<b>na</b>	<b>12</b>	<b>15</b>	<b>0.57</b>	<b>6</b>	<b>1</b>	<b>na</b>	<b>0</b>	<b>0</b>	<b>na</b>
Barbados	0	0	na	1	2	na	0	0	na	0	0	na
Cuba	1	1	na	9	10	0.60	5	1	na	0	0	na
Dominican Rep.	0	0	na	0	0	na	0	0	na	0	0	na
Grenada	0	0	na	0	1	na	0	0	na	0	0	na
Haiti	0	0	na	1	0	na	0	0	na	0	0	na
Jamaica	0	0	na	0	0	na	0	0	na	0	0	na
St Lucia	0	0	na	0	1	na	0	0	na	0	0	na
Trinidad & Tobago	3	0	na	1	2	na	1	0	na	0	0	na
<b>European Union</b>	<b>1 010</b>	<b>1 090</b>	<b>1.05</b>	<b>3 019</b>	<b>4 053</b>	<b>0.89</b>	<b>2 501</b>	<b>2 279</b>	<b>1.15</b>	<b>649</b>	<b>1 054</b>	<b>1.07</b>
Austria	50	76	1.77	53	86	0.70	51	44	0.64	26	28	1.35
Belgium	25	28	0.92	134	133	0.95	166	141	1.96	30	35	1.43
Bulgaria	2	4	na	20	29	1.30	19	26	1.30	1	3	na
Croatia	7	3	0.49	26	33	1.28	20	15	0.84	6	7	1.28
Cyprus	1	4	na	15	17	1.82	2	2	na	0	1	na
Czech Rep.	19	27	0.89	120	185	1.45	100	128	1.61	21	52	1.75
Denmark	30	25	0.79	95	116	0.83	13	13	0.12	5	24	0.47
Estonia	2	4	na	14	11	1.45	6	15	1.52	1	3	na
Finland	44	44	2.50	68	100	1.11	112	143	2.80	16	17	0.91
France	125	131	0.91	278	370	0.55	724	641	2.43	99	102	0.82
Germany	188	208	0.97	299	407	0.38	497	510	1.08	71	141	0.64
Greece	23	31	1.36	123	143	1.67	12	17	0.23	10	16	0.86
Hungary	3	9	0.52	46	47	1.11	40	64	1.59	10	13	1.42
Ireland	19	21	1.52	19	54	0.68	2	11	0.19	7	12	0.94
Italy	111	119	0.83	458	674	1.15	130	133	0.37	103	234	1.65
Latvia	7	7	3.64	9	23	1.57	3	2	na	5	4	2.76
Lithuania	1	6	na	16	33	1.80	43	29	5.54	3	2	na
Luxembourg	1	2	na	5	3	na	3	8	1.21	2	6	na

ECO-CONSTRUCTION MATERIALS			GREATER BATTERY EFFICIENCY			SUSTAINABLE TRANSPORTATION			
2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	
8 407	12 989	1.00	34 053	61 111	1.00	26 004	46 862	1.00	World
2 172	2 067	0.87	8 339	12 098	0.84	5 814	9 475	0.85	North America
392	479	1.31	1 039	1 708	0.82	1 076	1 831	1.18	Canada
1 825	1 634	0.80	7 479	10 647	0.84	4 871	7 869	0.81	United States of America
215	472	0.61	374	815	0.24	636	1 319	0.54	Latin America
10	25	0.34	65	107	0.42	44	75	0.35	Argentina
0	0	na	0	0	na	0	1	na	Belize
0	0	na	2	4	na	1	0	na	Bolivia
106	214	0.51	188	359	0.20	351	631	0.47	Brazil
44	81	1.59	29	90	0.32	40	120	0.54	Chile
29	48	1.10	32	96	0.39	96	206	1.27	Colombia
0	3	na	2	4	na	2	12	0.55	Costa Rica
2	22	1.14	3	39	0.51	12	92	2.08	Ecuador
0	1	na	0	1	na	0	2	na	El Salvador
0	0	na	0	0	na	1	2	na	Guatemala
0	0	na	0	1	na	0	1	na	Guyana
0	0	na	0	0	na	0	0	na	Honduras
25	66	0.51	58	127	0.22	102	198	0.52	Mexico
0	0	na	0	1	na	2	0	na	Nicaragua
0	6	na	0	5	na	3	8	1.09	Panama
0	0	na	1	3	na	1	6	na	Paraguay
3	18	1.21	2	3	na	8	27	0.80	Peru
0	0	na	0	0	na	0	1	na	Suriname
0	3	na	1	16	0.38	4	23	0.62	Uruguay
4	0	na	2	9	0.09	5	7	0.13	Venezuela
4	5	0.38	7	15	0.14	10	15	0.28	Caribbean
0	0	na	1	0	na	0	0	na	Barbados
2	2	na	4	9	0.11	5	6	0.10	Cuba
0	0	na	0	2	na	0	0	na	Dominican Rep.
0	0	na	0	0	na	0	0	na	Grenada
0	0	na	0	0	na	0	1	na	Haiti
1	1	na	0	2	na	2	2	na	Jamaica
0	0	na	0	0	na	0	0	na	St Lucia
1	2	na	2	2	na	3	8	1.74	Trinidad & Tobago
3 790	5 824	1.56	6 694	11 748	0.61	9 088	14 557	1.10	European Union
109	162	1.78	167	243	0.56	333	417	1.51	Austria
138	150	1.54	209	474	0.64	350	424	1.10	Belgium
6	18	0.55	43	81	0.76	25	88	1.01	Bulgaria
10	28	0.88	31	55	0.39	61	129	1.21	Croatia
33	49	6.80	3	37	0.70	19	36	1.25	Cyprus
113	199	1.99	141	206	0.42	171	276	0.80	Czech Rep.
125	201	1.93	229	410	0.72	238	437	1.03	Denmark
28	67	5.85	29	49	0.81	45	52	1.39	Estonia
116	172	2.27	109	191	0.53	179	304	1.05	Finland
248	296	0.63	1 074	1 441	0.62	1 088	1 618	0.92	France
303	397	0.53	2 024	3 669	1.02	2 188	3 288	1.38	Germany
144	217	2.74	74	152	0.36	156	324	1.03	Greece
39	42	1.08	20	62	0.21	89	284	1.54	Hungary
38	85	1.51	77	153	0.59	124	172	0.94	Ireland
815	1 453	3.03	832	1 253	0.57	1 092	1 961	1.13	Italy
26	72	7.23	21	31	0.89	55	91	3.14	Latvia
56	64	5.59	13	12	0.17	33	47	1.08	Lithuania
6	10	1.70	6	17	0.25	28	68	2.57	Luxembourg

**Table F5:** Publications on selected research topics relating to SDG 9: Industry, innovation and infrastructure  
Volume of output, 2012–2015 and 2016–2019, and specialization index, 2011–2019

	CARBON PRICING			ECO-INDUSTRIAL WASTE MANAGEMENT*			RADIOACTIVE WASTE MANAGEMENT			ECO-ALTERNATIVES TO PLASTIC		
	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019
Malta	0	0	na	0	0	na	0	0	na	0	1	na
Netherlands	99	109	1.42	147	150	0.47	66	71	0.35	37	54	0.88
Poland	45	44	0.94	214	391	1.50	60	67	0.43	42	93	1.51
Portugal	25	23	0.95	142	205	1.78	10	14	0.14	37	50	2.13
Romania	8	5	0.41	134	181	2.43	40	52	1.08	24	21	1.60
Slovakia	10	2	0.47	36	50	1.50	43	32	2.04	2	19	1.56
Slovenia	4	3	na	45	34	2.02	13	10	0.82	2	6	na
Spain	79	97	0.87	512	625	1.55	174	211	0.79	119	184	1.93
Sweden	79	101	2.03	112	182	0.81	252	195	2.50	41	40	1.10
United Kingdom	223	252	1.16	346	526	0.47	489	501	1.30	51	100	0.42
<b>Southeast Europe</b>	<b>6</b>	<b>1</b>	<b>na</b>	<b>57</b>	<b>71</b>	<b>1.60</b>	<b>18</b>	<b>14</b>	<b>0.78</b>	<b>4</b>	<b>9</b>	<b>0.61</b>
Albania	0	0	na	2	1	na	0	1	na	0	0	na
Bosnia & Herzegovina	0	0	na	4	5	na	0	1	na	0	1	na
Montenegro	0	0	na	0	2	na	1	0	na	0	0	na
North Macedonia	2	0	na	4	2	na	0	0	na	0	0	na
Serbia	4	1	na	48	67	1.82	17	13	0.91	4	9	0.78
<b>European Free Trade Assoc.</b>	<b>115</b>	<b>123</b>	<b>1.65</b>	<b>122</b>	<b>151</b>	<b>0.44</b>	<b>244</b>	<b>270</b>	<b>1.48</b>	<b>13</b>	<b>35</b>	<b>0.34</b>
Iceland	3	8	3.40	0	1	na	0	0	na	0	0	na
Liechtenstein	0	0	na	0	0	na	0	0	na	0	0	na
Norway	57	53	2.54	32	59	0.45	29	35	0.45	7	13	0.42
Switzerland	56	63	1.17	90	94	0.44	216	236	2.02	6	22	0.31
<b>Other Europe &amp; West Asia</b>	<b>62</b>	<b>108</b>	<b>0.31</b>	<b>584</b>	<b>1 260</b>	<b>0.95</b>	<b>528</b>	<b>807</b>	<b>1.27</b>	<b>89</b>	<b>191</b>	<b>0.69</b>
Armenia	0	0	na	0	6	na	3	2	na	0	0	na
Azerbaijan	0	2	na	2	6	na	0	2	na	0	0	na
Belarus	0	0	na	3	9	0.30	10	12	2.34	0	1	na
Georgia	0	0	na	0	0	na	1	0	na	0	0	na
Iran Islamic Rep.	29	38	0.46	269	511	1.56	24	53	0.26	49	100	1.38
Israel	3	4	na	39	52	0.55	7	11	0.16	3	9	0.30
Moldova, Rep.	0	0	na	1	3	na	1	0	na	0	0	na
Russian Federation	7	28	0.14	79	338	0.58	387	607	2.58	12	40	0.36
Turkey	23	34	0.54	172	301	1.15	41	47	0.37	22	39	0.68
Ukraine	1	4	na	21	49	0.53	65	86	2.45	3	2	na
<b>Sub-Saharan Africa</b>	<b>65</b>	<b>62</b>	<b>1.50</b>	<b>214</b>	<b>524</b>	<b>2.25</b>	<b>42</b>	<b>39</b>	<b>0.45</b>	<b>17</b>	<b>53</b>	<b>0.85</b>
Angola	0	0	na	0	0	na	0	0	na	0	0	na
Benin	0	0	na	0	3	na	0	0	na	0	0	na
Botswana	0	1	na	0	13	2.46	1	0	na	0	0	na
Burkina Faso	0	0	na	2	3	na	0	0	na	0	0	na
Burundi	0	0	na	0	3	na	0	0	na	0	0	na
Cameroon	1	2	na	2	6	na	0	1	na	0	1	na
Cabo Verde	0	0	na	0	0	na	0	0	na	0	0	na
Central African Rep.	0	0	na	0	0	na	0	0	na	0	0	na
Comoros	0	1	na	0	2	na	0	0	na	0	0	na
Congo	0	0	na	1	1	na	0	0	na	0	0	na
Côte d'Ivoire	0	1	na	3	2	na	0	0	na	2	0	na
Congo, Dem. Rep.	0	0	na	3	1	na	0	0	na	0	1	na
Djibouti	0	0	na	0	0	na	0	0	na	0	0	na
Equatorial Guinea	0	0	na	0	1	na	0	0	na	0	0	na
Eswatini	0	0	na	0	1	na	0	0	na	0	0	na
Ethiopia	3	5	na	4	37	1.99	2	2	na	0	3	na
Gabon	1	0	na	0	0	na	0	0	na	0	0	na
Gambia	0	1	na	0	1	na	0	0	na	0	0	na
Ghana	2	2	na	13	25	2.36	9	4	2.04	1	0	na
Guinea	0	0	na	0	1	na	0	0	na	0	0	na
Kenya	15	3	2.96	15	10	1.08	0	1	na	0	0	na
Lesotho	0	0	na	0	0	na	0	0	na	0	0	na

ECO-CONSTRUCTION MATERIALS			GREATER BATTERY EFFICIENCY			SUSTAINABLE TRANSPORTATION			
2012-2015	2016-2019	SI 2011-2019	2012-2015	2016-2019	SI 2011-2019	2012-2015	2016-2019	SI 2011-2019	
1	9	2.17	3	5	na	5	7	0.57	Malta
149	170	0.83	171	390	0.29	420	698	0.83	Netherlands
99	315	1.22	212	453	0.40	262	664	0.80	Poland
178	323	3.25	176	297	0.60	434	549	1.83	Portugal
116	193	2.88	99	174	0.55	231	445	1.79	Romania
89	102	4.06	26	30	0.20	46	134	0.98	Slovakia
43	68	3.08	39	73	0.49	47	82	0.95	Slovenia
305	573	1.42	618	1 138	0.54	758	1 126	0.88	Spain
188	282	1.98	340	605	0.75	421	733	1.37	Sweden
737	981	1.52	897	2 088	0.47	1 391	2 396	0.92	United Kingdom
<b>55</b>	<b>74</b>	<b>1.83</b>	<b>24</b>	<b>52</b>	<b>0.23</b>	<b>59</b>	<b>146</b>	<b>0.82</b>	<b>Southeast Europe</b>
1	3	na	1	0	na	2	0	na	Albania
3	13	1.98	1	8	na	10	22	1.06	Bosnia & Herzegovina
0	1	na	0	1	na	2	4	na	Montenegro
1	13	2.05	0	2	na	6	12	0.79	North Macedonia
50	49	1.83	22	42	0.26	42	112	0.82	Serbia
<b>219</b>	<b>376</b>	<b>1.33</b>	<b>368</b>	<b>687</b>	<b>0.55</b>	<b>417</b>	<b>658</b>	<b>0.71</b>	<b>European Free Trade Assoc.</b>
3	9	0.80	5	2	na	7	11	0.57	Iceland
0	0	na	0	0	na	2	1	na	Liechtenstein
108	171	2.06	92	219	0.48	133	286	0.82	Norway
108	197	0.99	276	471	0.60	278	364	0.66	Switzerland
<b>308</b>	<b>786</b>	<b>0.66</b>	<b>902</b>	<b>2 107</b>	<b>0.38</b>	<b>751</b>	<b>2 044</b>	<b>0.48</b>	<b>Other Europe &amp; West Asia</b>
2	2	na	3	1	na	0	0	na	Armenia
1	2	na	0	0	na	0	1	na	Azerbaijan
0	2	na	0	7	na	3	7	0.25	Belarus
0	0	na	0	1	na	4	5	na	Georgia
108	201	0.67	248	635	0.45	356	686	0.68	Iran Islamic Rep.
27	59	0.67	152	239	0.59	62	118	0.39	Israel
1	1	na	0	5	na	1	5	na	Moldova, Rep.
37	257	0.48	222	691	0.30	83	607	0.32	Russian Federation
123	241	1.06	237	444	0.40	229	533	0.62	Turkey
11	27	0.38	52	114	0.35	21	96	0.35	Ukraine
<b>84</b>	<b>239</b>	<b>1.18</b>	<b>109</b>	<b>311</b>	<b>0.29</b>	<b>140</b>	<b>302</b>	<b>0.44</b>	<b>Sub-Saharan Africa</b>
1	1	na	0	0	na	0	0	na	Angola
0	0	na	0	1	na	1	0	na	Benin
0	0	na	0	2	na	1	2	na	Botswana
2	0	na	0	3	na	0	1	na	Burkina Faso
0	0	na	0	0	na	0	2	na	Burundi
1	7	0.87	1	4	na	1	5	na	Cameroon
1	0	na	0	0	na	0	0	na	Cabo Verde
0	0	na	0	0	na	0	1	na	Central African Rep.
0	0	na	0	0	na	0	0	na	Comoros
0	0	na	0	0	na	0	0	na	Congo
0	1	na	0	0	na	0	1	na	Côte d'Ivoire
0	0	na	1	6	na	0	4	na	Congo, Dem. Rep.
0	1	na	0	0	na	0	0	na	Djibouti
0	0	na	0	1	na	0	0	na	Equatorial Guinea
0	1	na	0	0	na	0	0	na	Eswatini
0	6	na	5	29	0.22	2	24	0.33	Ethiopia
0	0	na	0	0	na	0	1	na	Gabon
0	0	na	1	0	na	0	0	na	Gambia
3	24	2.13	0	7	na	6	14	0.33	Ghana
0	0	na	0	0	na	0	0	na	Guinea
1	4	na	5	9	0.21	10	14	0.30	Kenya
0	0	na	0	0	na	0	0	na	Lesotho

**Table F5:** Publications on selected research topics relating to SDG 9: Industry, innovation and infrastructure  
Volume of output, 2012–2015 and 2016–2019, and specialization index, 2011–2019

	CARBON PRICING			ECO-INDUSTRIAL WASTE MANAGEMENT*			RADIOACTIVE WASTE MANAGEMENT			ECO-ALTERNATIVES TO PLASTIC		
	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019
Madagascar	1	0	na	0	1	na	0	0	na	0	0	na
Malawi	1	2	na	0	1	na	0	0	na	0	1	na
Mali	0	0	na	0	0	na	0	0	na	0	0	na
Mauritius	1	0	na	2	7	na	0	0	na	0	1	na
Mozambique	0	1	na	1	3	na	0	0	na	0	1	na
Namibia	0	1	na	0	2	na	0	1	na	0	0	na
Niger	0	0	na	0	0	na	0	0	na	0	0	na
Nigeria	11	5	0.92	85	209	4.75	5	6	0.29	5	27	1.92
Rwanda	0	0	na	2	2	na	0	0	na	0	1	na
Senegal	0	2	na	4	2	na	0	0	na	0	0	na
Sierra Leone	0	0	na	1	1	na	0	0	na	0	0	na
South Africa	26	37	1.91	77	213	1.85	25	24	0.63	8	19	0.69
South Sudan	0	0	na	0	1	na	0	0	na	0	1	na
Togo	0	0	na	0	1	na	0	1	na	0	0	na
Uganda	1	3	na	4	10	1.45	0	0	na	2	3	na
Tanzania	3	3	na	4	8	1.34	0	0	na	0	1	na
Zambia	0	0	na	0	1	na	0	0	na	0	0	na
Zimbabwe	1	0	na	6	15	4.11	0	0	na	0	0	na
<b>Arab States</b>	<b>42</b>	<b>84</b>	<b>0.65</b>	<b>447</b>	<b>852</b>	<b>1.79</b>	<b>96</b>	<b>140</b>	<b>0.68</b>	<b>56</b>	<b>114</b>	<b>1.02</b>
Algeria	2	1	na	42	49	1.47	4	5	0.34	6	8	1.06
Bahrain	0	0	na	0	3	na	0	1	na	0	0	na
Egypt	2	6	na	99	227	1.77	40	66	1.38	12	34	1.15
Iraq	0	0	na	31	80	2.74	6	6	0.50	1	10	1.54
Jordan	3	6	1.31	14	37	1.57	0	5	na	1	0	na
Kuwait	0	2	na	13	19	2.83	0	0	na	2	3	na
Lebanon	1	5	na	13	17	1.34	4	1	na	3	1	na
Libya	2	0	na	3	4	na	2	2	na	0	1	na
Mauritania	0	0	na	0	0	na	0	0	na	0	0	na
Morocco	0	1	na	21	47	1.15	4	8	0.44	2	8	0.57
Oman	0	2	na	14	41	3.81	1	4	na	0	4	na
Palestine	0	0	na	6	11	2.66	0	0	na	0	1	na
Qatar	1	8	na	22	43	2.40	3	3	na	0	6	na
Saudi Arabia	15	29	0.99	101	209	1.51	29	37	0.45	18	33	1.06
Sudan	1	1	na	1	2	na	1	1	na	0	1	na
Syrian Arab Rep.	0	0	na	5	5	1.70	3	7	7.49	6	2	na
Tunisia	4	6	0.38	59	73	1.87	3	1	na	3	13	0.72
United Arab Emirates	16	23	3.73	34	71	2.68	8	8	0.80	5	2	na
Yemen	0	0	na	0	6	na	0	5	na	0	0	na
<b>Central Asia</b>	<b>1</b>	<b>2</b>	<b>na</b>	<b>13</b>	<b>33</b>	<b>1.42</b>	<b>7</b>	<b>19</b>	<b>1.59</b>	<b>0</b>	<b>0</b>	<b>na</b>
Kazakhstan	1	2	na	10	25	1.75	3	14	1.70	0	0	na
Kyrgyzstan	0	0	na	0	1	na	0	1	na	0	0	na
Mongolia	0	0	na	1	2	na	1	2	na	0	0	na
Tajikistan	0	0	na	0	1	na	1	0	na	0	0	na
Turkmenistan	0	0	na	0	1	na	0	0	na	0	0	na
Uzbekistan	0	0	na	3	3	na	3	2	na	0	0	na
<b>South Asia</b>	<b>123</b>	<b>171</b>	<b>0.72</b>	<b>908</b>	<b>1 883</b>	<b>1.75</b>	<b>417</b>	<b>357</b>	<b>0.98</b>	<b>131</b>	<b>323</b>	<b>1.41</b>
Afghanistan	0	0	na	0	2	na	0	0	na	0	0	na
Bangladesh	10	1	1.05	31	53	1.78	2	4	na	3	11	1.51
Bhutan	0	0	na	0	2	na	0	0	na	0	0	na
India	102	146	0.73	727	1 391	1.60	387	334	1.04	114	272	1.40
Maldives	0	0	na	0	1	na	0	0	na	0	0	na
Nepal	2	6	na	6	5	0.83	1	0	na	1	1	na
Pakistan	5	14	0.29	132	412	3.25	27	19	0.59	14	38	1.50
Sri Lanka	6	5	2.19	18	35	3.40	0	2	na	0	3	na



ECO-CONSTRUCTION MATERIALS			GREATER BATTERY EFFICIENCY			SUSTAINABLE TRANSPORTATION			
2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	
2	1	na	0	0	na	1	0	na	Madagascar
0	2	na	2	1	na	0	1	na	Malawi
0	3	na	0	0	na	0	1	na	Mali
1	3	na	0	0	na	2	2	na	Mauritius
0	1	na	0	2	na	3	7	1.11	Mozambique
1	0	na	0	0	na	1	1	na	Namibia
0	0	na	0	1	na	0	1	na	Niger
23	95	2.07	17	46	0.22	17	47	0.32	Nigeria
1	2	na	0	4	na	0	4	na	Rwanda
0	0	na	1	3	na	1	2	na	Senegal
0	1	na	0	0	na	1	1	na	Sierra Leone
47	103	1.27	76	195	0.45	95	181	0.60	South Africa
0	0	na	0	0	na	0	1	na	South Sudan
1	0	na	0	0	na	1	0	na	Togo
0	2	na	0	3	na	6	2	na	Uganda
1	1	na	1	4	na	4	7	0.34	Tanzania
0	1	na	0	2	na	2	4	na	Zambia
1	2	na	1	3	na	2	6	na	Zimbabwe
<b>281</b>	<b>678</b>	<b>1.72</b>	<b>559</b>	<b>1 322</b>	<b>0.60</b>	<b>512</b>	<b>1 435</b>	<b>0.96</b>	<b>Arab States</b>
18	43	1.23	62	114	0.77	91	129	1.23	Algeria
2	8	1.88	4	2	na	4	4	na	Bahrain
68	149	1.64	120	257	0.45	67	207	0.46	Egypt
13	36	1.29	8	46	0.27	8	77	0.60	Iraq
10	44	2.37	6	56	0.40	13	47	0.69	Jordan
6	23	2.58	1	10	0.16	15	18	0.65	Kuwait
28	36	3.90	24	36	0.56	35	69	1.43	Lebanon
2	4	na	1	5	na	9	7	1.38	Libya
0	0	na	0	0	na	0	0	na	Mauritania
14	50	1.47	38	195	1.09	25	182	1.43	Morocco
10	23	3.32	3	8	0.19	11	27	0.92	Oman
1	8	na	1	8	0.37	6	8	0.88	Palestine
18	36	3.30	55	110	1.49	34	118	2.42	Qatar
50	104	1.14	178	341	0.54	88	242	0.60	Saudi Arabia
0	4	na	0	5	na	2	4	na	Sudan
3	0	na	1	6	na	4	7	0.85	Syrian Arab Rep.
0	10	0.15	48	112	0.61	89	218	1.53	Tunisia
51	138	6.52	58	123	1.15	57	186	2.06	United Arab Emirates
0	3	na	0	6	na	0	2	na	Yemen
<b>8</b>	<b>21</b>	<b>0.98</b>	<b>28</b>	<b>113</b>	<b>0.79</b>	<b>4</b>	<b>39</b>	<b>0.46</b>	<b>Central Asia</b>
5	19	1.30	26	104	1.12	3	35	0.65	Kazakhstan
2	0	na	0	0	na	0	1	na	Kyrgyzstan
0	2	na	1	6	na	1	2	na	Mongolia
0	0	na	0	2	na	0	0	na	Tajikistan
0	0	na	0	0	na	0	0	na	Turkmenistan
1	0	na	1	1	na	0	1	na	Uzbekistan
<b>244</b>	<b>695</b>	<b>0.68</b>	<b>1 187</b>	<b>3 586</b>	<b>0.79</b>	<b>849</b>	<b>3 438</b>	<b>0.96</b>	<b>South Asia</b>
0	1	na	0	0	na	0	0	na	Afghanistan
11	29	1.21	28	93	0.81	35	133	1.43	Bangladesh
0	0	na	0	0	na	1	0	na	Bhutan
205	554	0.65	1 091	3 188	0.82	754	2 989	0.97	India
0	0	na	0	0	na	0	0	na	Maldives
6	7	0.93	1	1	na	4	7	0.25	Nepal
15	65	0.56	54	263	0.43	42	272	0.66	Pakistan
8	40	4.06	14	48	0.98	18	40	1.42	Sri Lanka

**Table F5:** Publications on selected research topics relating to SDG 9: Industry, innovation and infrastructure  
Volume of output, 2012–2015 and 2016–2019, and specialization index, 2011–2019

	CARBON PRICING			ECO-INDUSTRIAL WASTE MANAGEMENT*			RADIOACTIVE WASTE MANAGEMENT			ECO-ALTERNATIVES TO PLASTIC		
	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019
<b>Southeast Asia</b>	<b>757</b>	<b>1 629</b>	<b>1.11</b>	<b>3 315</b>	<b>6 794</b>	<b>1.20</b>	<b>1 749</b>	<b>2 247</b>	<b>0.86</b>	<b>655</b>	<b>1 190</b>	<b>1.08</b>
Brunei Darussalam	0	1	na	0	11	2.02	0	1	na	0	0	na
Cambodia	1	1	na	1	6	na	0	0	na	0	0	na
China	527	1 312	1.35	2 186	4 574	1.28	803	1 174	0.67	230	442	0.62
China, Hong Kong SAR	29	41	1.41	123	211	1.58	14	14	0.23	4	18	0.61
China, Macao SAR	0	1	na	8	18	1.32	0	0	na	0	1	na
China, Taiwan Prov.	33	63	0.93	163	239	1.04	40	68	0.54	36	32	0.74
Indonesia	12	26	0.69	55	341	2.67	17	47	0.76	6	155	5.44
Japan	95	105	0.49	183	293	0.30	571	563	1.60	156	143	1.08
Lao PDR	3	0	na	1	0	na	0	0	na	0	0	na
Malaysia	17	45	0.87	331	671	3.99	21	33	0.35	102	206	6.11
Myanmar	0	0	na	0	1	na	0	0	na	1	0	na
Philippines	4	5	na	14	47	2.56	2	4	na	6	13	4.52
Korea, DPR	0	0	na	0	0	na	0	0	na	0	0	na
Korea, Rep.	59	92	0.74	300	495	0.88	315	402	1.59	62	101	0.96
Singapore	12	27	0.66	53	174	1.22	5	4	na	7	13	0.57
Thailand	20	30	1.44	79	198	2.19	7	9	0.23	83	145	9.12
Timor-Leste	0	0	na	0	1	na	0	0	na	0	0	na
Viet Nam	2	8	0.39	18	93	1.63	7	12	0.43	1	9	0.53
<b>Oceania</b>	<b>270</b>	<b>221</b>	<b>2.38</b>	<b>373</b>	<b>658</b>	<b>1.05</b>	<b>87</b>	<b>103</b>	<b>0.29</b>	<b>71</b>	<b>81</b>	<b>0.91</b>
Australia	248	197	2.48	335	617	1.12	83	95	0.32	51	60	0.75
New Zealand	27	28	1.66	40	47	0.59	5	8	0.09	20	21	2.01
Fiji	1	0	na	1	1	na	0	0	na	0	1	na
Micronesia	1	0	na	0	0	na	0	0	na	0	0	na
Papua New Guinea	0	0	na	0	1	na	0	0	na	0	0	na
Samoa	0	0	na	1	0	na	0	0	na	0	0	na
Solomon Islands	0	0	na	0	0	na	0	0	na	0	0	na

\*Eco-industrial waste management excludes nuclear waste

SI<sub>2011–19</sub>: The specialization index is measured as the proportion of output of a given country on a given topic, divided by the proportion observed at the global level. For example, a country with 2% of its output being on a research topic that represents 1% of all research worldwide would score 2.00, having twice as much output as expected, relative to the global average.

na = the total number of publications is too low to calculate the specialization index

**KEY** –: data unavailable | -n/+n: data refer to n years before or after reference year | 0: magnitude nil or negligible | na: not applicable

GDP: gross domestic product | MF: males and females | PPP\$: purchasing power parity dollars

Note: Publication counts of articles, reviews and conference papers are based on the full-counting method. Therefore, the sum across countries is higher than the global total because of co-authorship. The selected topics in the present table are examples of research topics furthering the SDG agenda. These topics are not necessarily mutually exclusive. The following are excluded from the present table because they did not publish on these topics over the period under study: Antigua and Barbuda, Bahamas, Chad, Cook Islands, Dominica, Eritrea, Guinea-Bissau, Kiribati, Liberia, Marshall Islands, Nauru, Niue, Palau, Sao Tome and Principe, Seychelles, Somalia, St Kitts and Nevis, St Vincent and the Grenadines, Tonga, Tuvalu and Vanuatu. The total for the People's Republic of China excludes its Special Administrative Regions of Hong Kong and Macao and the Taiwan Province of China.

Source: Prepared by Science-Metrix using Scopus data (Elsevier), including those for social sciences, arts and humanities

ECO-CONSTRUCTION MATERIALS			GREATER BATTERY EFFICIENCY			SUSTAINABLE TRANSPORTATION			
2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	
1 583	3 214	0.66	19 461	37 844	1.84	9 929	19 502	1.25	Southeast Asia
0	6	na	2	6	na	12	22	1.92	Brunei Darussalam
1	4	na	1	5	na	0	5	na	Cambodia
614	1 493	0.45	12 946	29 008	2.12	5 613	12 871	1.25	China
185	305	4.00	451	1 020	1.99	228	506	1.46	China, Hong Kong SAR
0	13	0.81	7	41	0.52	27	47	1.37	China, Macao SAR
126	156	0.91	634	828	1.03	529	631	1.13	China, Taiwan Prov.
25	213	1.91	92	429	0.93	114	610	1.83	Indonesia
197	282	0.41	2 241	2 742	0.99	1 534	1 945	0.94	Japan
1	0	na	1	0	na	0	0	na	Lao PDR
212	449	3.24	212	475	0.68	369	700	1.53	Malaysia
1	0	na	0	2	na	0	10	2.06	Myanmar
7	23	1.62	10	44	0.63	13	67	1.40	Philippines
0	0	na	1	8	na	0	0	na	Korea, DPR
195	294	0.68	2 866	4 164	2.34	1 406	2 138	1.63	Korea, Rep.
86	162	1.77	923	1 215	3.11	349	542	1.73	Singapore
22	85	0.89	86	210	0.60	97	237	0.89	Thailand
0	0	na	0	0	na	0	0	na	Timor-Leste
4	48	0.80	36	122	0.64	30	124	1.00	Viet Nam
438	719	1.65	1 013	2 140	0.78	847	1 314	0.85	Oceania
364	618	1.57	992	2 077	0.87	731	1 135	0.84	Australia
86	113	2.22	19	62	0.18	124	192	0.96	New Zealand
0	0	na	3	5	na	3	2	na	Fiji
0	0	na	0	0	na	0	0	na	Micronesia
0	2	na	0	1	na	3	0	na	Papua New Guinea
0	0	na	0	0	na	0	0	na	Samoa
0	1	na	0	0	na	0	0	na	Solomon Islands

**Table F6:** Publications on selected research topics relating to SDG 13: Climate action  
Volume of output, 2012–2015 and 2016–2019, and specialization index, 2011–2019

	NATIONAL AND URBAN GREENHOUSE GAS EMISSIONS			CARBON CAPTURE AND STORAGE			LOCAL IMPACT OF CLIMATE-RELATED HAZARDS AND DISASTERS		
	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019
<b>World</b>	<b>857</b>	<b>1 495</b>	<b>1.00</b>	<b>8 731</b>	<b>9 286</b>	<b>1.00</b>	<b>1 079</b>	<b>1 830</b>	<b>1.00</b>
<b>North America</b>	<b>244</b>	<b>335</b>	<b>0.85</b>	<b>2 907</b>	<b>2 480</b>	<b>1.25</b>	<b>437</b>	<b>733</b>	<b>1.53</b>
Canada	37	65	1.17	482	451	1.50	119	200	3.06
United States of America	209	285	0.81	2 507	2 098	1.21	341	582	1.32
<b>Latin America</b>	<b>33</b>	<b>85</b>	<b>0.87</b>	<b>156</b>	<b>274</b>	<b>0.41</b>	<b>75</b>	<b>143</b>	<b>1.15</b>
Argentina	1	3	na	21	17	0.37	7	7	0.81
Bolivia	0	1	na	0	0	na	2	1	na
Brazil	19	50	0.86	77	155	0.40	20	38	0.56
Chile	1	3	na	8	15	0.23	7	19	2.34
Colombia	2	10	1.02	10	22	0.43	8	20	2.04
Costa Rica	0	2	na	0	4	na	2	7	na
Ecuador	2	2	na	2	1	na	3	6	2.97
El Salvador	0	0	na	0	0	na	0	1	na
Guatemala	0	0	na	0	0	na	4	0	na
Guyana	0	0	na	0	0	na	0	1	na
Honduras	0	1	na	0	0	na	0	0	na
Mexico	9	16	1.20	38	67	0.62	20	29	1.77
Nicaragua	0	0	na	0	0	na	0	0	na
Panama	1	3	na	1	5	na	3	5	na
Paraguay	0	0	na	2	0	na	0	0	na
Peru	0	5	na	0	2	na	8	13	5.85
Uruguay	0	0	na	1	1	na	0	4	na
Venezuela	0	1	na	1	1	na	2	4	na
<b>Caribbean</b>	<b>0</b>	<b>2</b>	<b>na</b>	<b>10</b>	<b>4</b>	<b>0.75</b>	<b>6</b>	<b>11</b>	<b>3.23</b>
Bahamas	0	0	na	0	0	na	0	2	na
Barbados	0	0	na	0	1	na	1	1	na
Cuba	0	1	na	1	1	na	1	3	na
Dominica	0	0	na	0	0	na	0	1	na
Dominican Rep.	0	0	na	0	0	na	0	1	na
Haiti	0	0	na	0	0	na	0	1	na
Jamaica	0	1	na	1	0	na	0	1	na
Trinidad & Tobago	0	0	na	8	2	6.32	4	1	na
<b>European Union</b>	<b>260</b>	<b>400</b>	<b>0.82</b>	<b>3 311</b>	<b>3 197</b>	<b>1.17</b>	<b>361</b>	<b>632</b>	<b>0.89</b>
Austria	18	21	1.20	46	90	0.65	8	16	0.49
Belgium	1	10	0.20	78	110	0.87	9	36	0.93
Bulgaria	1	0	na	5	5	0.22	1	3	na
Croatia	1	1	na	12	12	0.62	1	0	na
Cyprus	0	2	na	3	9	1.09	1	3	na
Czech Rep.	2	7	na	17	36	0.26	5	9	0.27
Denmark	12	20	1.20	94	86	0.95	13	34	1.34
Estonia	2	2	na	13	12	1.53	3	4	na
Finland	22	12	2.38	75	90	1.46	16	23	1.39
France	25	40	0.47	446	309	0.98	34	81	0.67
Germany	46	81	0.66	637	506	1.01	47	100	0.57
Greece	2	17	1.37	62	54	0.76	7	14	1.09
Hungary	0	3	na	13	21	0.47	2	5	na
Ireland	13	9	2.26	22	35	0.47	8	7	0.98
Italy	25	46	0.68	334	344	0.86	23	61	0.55
Latvia	9	11	13.67	2	2	na	0	0	na
Lithuania	2	2	na	5	5	0.36	1	1	na
Luxembourg	1	0	na	1	3	na	0	0	na
Malta	0	0	na	0	0	na	1	0	na
Netherlands	16	51	1.00	396	262	1.89	39	71	1.30
Poland	5	14	0.47	136	122	0.88	6	16	0.46
Portugal	5	5	0.59	52	56	0.64	21	20	1.31
Romania	6	7	0.90	64	57	1.28	7	10	1.24

NEW TECHNOLOGIES TO PROTECT FROM CLIMATE-RELATED HAZARDS			LOCAL DISASTER RISK REDUCTION STRATEGIES			CLIMATE-READY CROPS			
2012-2015	2016-2019	SI 2011-2019	2012-2015	2016-2019	SI 2011-2019	2012-2015	2016-2019	SI 2011-2019	
314	510	1.00	384	655	1.00	1 660	3 109	1.00	<b>World</b>
95	136	1.10	117	204	1.17	396	625	0.65	<b>North America</b>
18	31	1.58	16	47	1.72	46	66	0.43	Canada
82	108	1.04	101	169	1.10	364	581	0.68	United States of America
11	27	0.69	24	36	0.77	189	378	1.90	<b>Latin America</b>
0	2	na	3	0	na	8	20	1.12	Argentina
0	0	na	1	1	na	1	2	na	Bolivia
4	8	0.41	3	11	0.36	71	133	1.50	Brazil
1	0	na	0	4	na	11	2	0.67	Chile
2	5	na	5	4	na	45	78	4.45	Colombia
0	2	na	1	0	na	3	3	na	Costa Rica
0	0	na	2	1	na	0	2	na	Ecuador
1	0	na	0	0	na	0	0	na	El Salvador
0	1	na	1	0	na	0	0	na	Guatemala
0	0	na	0	0	na	0	0	na	Guyana
1	1	na	0	0	na	1	2	na	Honduras
4	11	1.38	3	12	1.49	57	133	3.42	Mexico
1	0	na	2	0	na	1	4	na	Nicaragua
1	0	na	1	0	na	0	1	na	Panama
0	1	na	0	0	na	0	0	na	Paraguay
1	3	na	3	1	na	9	13	3.27	Peru
1	0	na	2	3	na	2	3	na	Uruguay
0	0	na	0	1	na	3	2	na	Venezuela
2	2	na	2	6	na	1	5	na	<b>Caribbean</b>
0	0	na	0	2	na	0	0	na	Bahamas
1	0	na	1	1	na	0	1	na	Barbados
1	1	na	0	2	na	1	2	na	Cuba
0	0	na	0	0	na	0	0	na	Dominica
0	0	na	0	0	na	0	0	na	Dominican Rep.
0	0	na	0	0	na	0	0	na	Haiti
1	1	na	0	0	na	0	1	na	Jamaica
0	0	na	1	1	na	0	1	na	Trinidad & Tobago
118	224	1.30	157	265	1.20	504	864	0.78	<b>European Union</b>
6	3	na	13	15	2.91	11	14	0.36	Austria
4	18	1.85	4	16	1.80	32	48	1.35	Belgium
0	2	na	0	0	na	2	2	na	Bulgaria
0	1	na	1	0	na	3	5	na	Croatia
1	4	na	0	0	na	1	8	na	Cyprus
1	1	na	4	0	na	11	23	0.51	Czech Rep.
5	19	2.30	11	7	1.25	27	29	0.89	Denmark
1	1	na	1	1	na	2	2	na	Estonia
5	3	na	0	3	na	5	22	0.58	Finland
11	18	0.60	13	25	0.73	57	78	0.45	France
19	37	0.96	33	44	0.95	81	142	0.54	Germany
9	11	3.59	1	2	na	5	15	0.46	Greece
2	0	na	1	1	na	4	10	0.74	Hungary
1	2	na	3	4	na	4	20	1.08	Ireland
18	39	1.55	21	26	0.98	78	137	0.98	Italy
1	0	na	0	2	na	0	0	na	Latvia
3	0	na	0	0	na	0	1	na	Lithuania
2	0	na	0	1	na	3	1	na	Luxembourg
1	1	na	0	0	na	0	0	na	Malta
19	36	2.92	20	45	2.74	38	79	0.86	Netherlands
1	7	na	5	5	0.31	38	60	1.40	Poland
4	5	na	3	12	1.17	27	30	1.37	Portugal
2	2	na	6	5	1.99	4	10	0.54	Romania

**Table F6:** Publications on selected research topics relating to SDG 13: Climate action  
Volume of output, 2012–2015 and 2016–2019, and specialization index, 2011–2019

	NATIONAL AND URBAN GREENHOUSE GAS EMISSIONS			CARBON CAPTURE AND STORAGE			LOCAL IMPACT OF CLIMATE-RELATED HAZARDS AND DISASTERS		
	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019
Slovakia	2	0	na	11	6	0.25	0	2	na
Slovenia	0	0	na	5	9	0.29	0	3	na
Spain	19	34	0.64	301	360	1.16	33	57	0.61
Sweden	18	35	1.34	186	196	1.60	21	32	0.95
United Kingdom	64	124	1.09	999	1 204	2.13	160	232	1.84
<b>Southeast Europe</b>	<b>6</b>	<b>1</b>	<b>1.41</b>	<b>3</b>	<b>10</b>	<b>0.14</b>	<b>2</b>	<b>2</b>	<b>na</b>
Albania	1	0	na	1	0	na	0	1	na
Bosnia & Herzegovina	0	0	na	0	0	na	1	1	na
Montenegro	0	0	na	0	0	na	0	1	na
North Macedonia	1	0	na	0	0	na	0	0	na
Serbia	4	1	na	2	10	0.18	1	1	na
<b>European Free Trade Assoc.</b>	<b>25</b>	<b>45</b>	<b>1.18</b>	<b>673</b>	<b>654</b>	<b>3.70</b>	<b>36</b>	<b>67</b>	<b>0.96</b>
Iceland	2	0	na	21	16	5.49	2	2	na
Norway	13	22	1.81	533	470	9.16	18	41	1.65
Switzerland	10	24	0.84	128	185	1.01	19	24	0.62
<b>Other Europe &amp; West Asia</b>	<b>18</b>	<b>51</b>	<b>0.39</b>	<b>148</b>	<b>306</b>	<b>0.27</b>	<b>13</b>	<b>39</b>	<b>0.18</b>
Armenia	0	0	na	2	0	na	0	0	na
Azerbaijan	0	0	na	0	0	na	0	0	na
Belarus	0	0	na	0	1	na	0	0	na
Georgia	0	0	na	0	0	na	0	1	na
Iran Islamic Rep.	8	11	0.40	80	173	0.58	4	7	0.14
Israel	2	3	na	14	20	0.20	7	6	0.62
Moldova, Rep.	0	1	na	1	0	na	0	0	na
Russian Federation	6	15	0.31	18	59	0.12	2	17	0.19
Turkey	2	15	0.56	30	48	0.24	0	6	na
Ukraine	0	6	na	4	7	0.09	0	2	na
<b>Sub-Saharan Africa</b>	<b>14</b>	<b>35</b>	<b>1.44</b>	<b>42</b>	<b>104</b>	<b>0.46</b>	<b>112</b>	<b>236</b>	<b>8.12</b>
Benin	1	3	na	0	1	na	3	1	na
Botswana	0	1	na	1	2	na	2	9	21.12
Burkina Faso	0	1	na	0	0	na	1	3	na
Burundi	0	0	na	0	0	na	1	1	na
Cameroon	0	2	na	0	1	na	11	3	9.35
Cabo Verde	0	0	na	0	0	na	0	0	na
Central African Rep.	0	0	na	0	0	na	1	1	na
Chad	0	0	na	0	0	na	1	0	na
Comoros	0	0	na	0	0	na	0	3	na
Congo	0	0	na	0	0	na	1	1	na
Côte d'Ivoire	0	1	na	0	0	na	0	2	na
Congo, Dem. Rep.	0	0	na	0	0	na	1	0	na
Eritrea	0	0	na	0	1	na	0	0	na
Ethiopia	0	4	na	0	1	na	13	30	13.79
Gabon	0	0	na	0	0	na	1	0	na
Gambia	0	0	na	0	0	na	0	0	na
Ghana	3	6	na	0	9	na	15	25	21.75
Guinea	0	0	na	0	0	na	0	0	na
Kenya	1	3	na	0	4	na	19	34	18.30
Lesotho	0	0	na	0	0	na	0	1	na
Madagascar	1	0	na	0	2	na	2	5	na
Malawi	1	1	na	0	0	na	3	6	na
Mali	0	1	na	0	0	na	3	3	na
Mauritius	2	1	na	0	0	na	0	2	na
Mozambique	0	1	na	0	0	na	1	1	na
Namibia	0	0	na	0	0	na	2	1	na
Niger	0	0	na	0	0	na	3	1	na
Nigeria	0	7	na	8	25	0.52	13	23	3.76
Rwanda	0	0	na	0	0	na	0	2	na

NEW TECHNOLOGIES TO PROTECT FROM CLIMATE-RELATED HAZARDS			LOCAL DISASTER RISK REDUCTION STRATEGIES			CLIMATE-READY CROPS			
2012-2015	2016-2019	SI 2011-2019	2012-2015	2016-2019	SI 2011-2019	2012-2015	2016-2019	SI 2011-2019	
1	2	na	2	1	na	3	9	0.65	Slovakia
1	1	na	0	0	na	3	4	na	Slovenia
11	26	1.28	9	16	0.46	56	83	0.86	Spain
11	13	1.93	20	23	3.21	7	34	0.41	Sweden
37	56	1.71	48	92	2.01	138	227	0.99	United Kingdom
<b>1</b>	<b>2</b>	<b>na</b>	<b>1</b>	<b>4</b>	<b>na</b>	<b>13</b>	<b>15</b>	<b>1.24</b>	<b>Southeast Europe</b>
1	1	na	0	0	na	1	0	na	Albania
0	1	na	0	0	na	1	1	na	Bosnia & Herzegovina
0	0	na	0	0	na	0	0	na	Montenegro
0	0	na	0	1	na	0	1	na	North Macedonia
0	0	na	1	3	na	12	14	1.43	Serbia
<b>15</b>	<b>25</b>	<b>1.67</b>	<b>20</b>	<b>36</b>	<b>1.94</b>	<b>31</b>	<b>68</b>	<b>0.78</b>	<b>European Free Trade Assoc.</b>
1	0	na	1	1	na	0	1	na	Iceland
9	12	2.69	3	12	1.49	7	16	0.48	Norway
7	14	1.21	17	24	2.08	24	52	0.95	Switzerland
<b>7</b>	<b>18</b>	<b>0.30</b>	<b>5</b>	<b>15</b>	<b>0.21</b>	<b>90</b>	<b>214</b>	<b>0.71</b>	<b>Other Europe &amp; West Asia</b>
0	1	na	0	0	na	1	2	na	Armenia
0	0	na	0	0	na	0	1	na	Azerbaijan
0	0	na	0	0	na	1	1	na	Belarus
0	1	na	0	0	na	0	1	na	Georgia
3	4	na	0	7	na	42	67	1.10	Iran Islamic Rep.
0	2	na	3	2	na	13	34	1.20	Israel
0	0	na	0	0	na	1	0	na	Moldova, Rep.
1	4	na	0	2	na	10	44	0.30	Russian Federation
3	5	na	2	3	na	25	69	0.90	Turkey
0	1	na	0	2	na	0	5	na	Ukraine
<b>26</b>	<b>54</b>	<b>6.57</b>	<b>22</b>	<b>51</b>	<b>4.07</b>	<b>144</b>	<b>411</b>	<b>7.20</b>	<b>Sub-Saharan Africa</b>
0	1	na	0	0	na	7	7	17.20	Benin
0	2	na	2	1	na	2	3	na	Botswana
1	3	na	1	0	na	3	10	10.77	Burkina Faso
1	0	na	0	0	na	0	4	na	Burundi
0	2	na	0	0	na	1	5	na	Cameroon
0	1	na	0	0	na	0	0	na	Cabo Verde
0	0	na	0	0	na	0	0	na	Central African Rep.
0	0	na	0	0	na	0	0	na	Chad
0	0	na	0	0	na	0	0	na	Comoros
0	0	na	0	0	na	0	1	na	Congo
1	0	na	1	0	na	0	5	na	Côte d'Ivoire
0	0	na	0	0	na	0	5	na	Congo, Dem. Rep.
0	0	na	0	0	na	0	0	na	Eritrea
2	6	na	4	5	na	16	48	9.76	Ethiopia
0	0	na	0	0	na	0	0	na	Gabon
0	0	na	0	1	na	0	3	na	Gambia
0	7	na	1	7	na	6	28	10.65	Ghana
0	0	na	0	0	na	1	0	na	Guinea
8	10	25.38	7	6	11.26	39	93	23.62	Kenya
0	0	na	0	0	na	0	0	na	Lesotho
0	0	na	0	0	na	1	1	na	Madagascar
0	1	na	2	3	na	5	18	14.53	Malawi
0	2	na	2	2	na	4	22	50.02	Mali
0	0	na	0	0	na	0	4	na	Mauritius
0	0	na	1	2	na	2	9	11.79	Mozambique
1	0	na	1	0	na	1	2	na	Namibia
0	0	na	0	1	na	8	2	30.95	Niger
5	2	na	2	4	na	25	60	5.14	Nigeria
0	0	na	0	1	na	3	14	15.30	Rwanda

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	NATIONAL AND URBAN GREENHOUSE GAS EMISSIONS			CARBON CAPTURE AND STORAGE			LOCAL IMPACT OF CLIMATE-RELATED HAZARDS AND DISASTERS		
	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019
Senegal	0	0	na	0	0	na	1	7	na
Seychelles	0	0	na	0	0	na	0	1	na
Sierra Leone	0	0	na	0	0	na	0	1	na
Somalia	0	0	na	0	1	na	0	0	na
South Africa	7	7	0.94	31	60	0.69	20	95	5.54
South Sudan	0	0	na	0	0	na	0	0	na
Togo	0	0	na	0	0	na	0	1	na
Uganda	1	0	na	2	0	na	1	12	7.09
Tanzania	0	1	na	1	1	na	10	19	21.37
Zambia	0	1	na	0	0	na	4	2	na
Zimbabwe	1	3	na	0	0	na	6	8	23.45
<b>Arab States</b>	<b>15</b>	<b>19</b>	<b>0.50</b>	<b>207</b>	<b>338</b>	<b>0.87</b>	<b>16</b>	<b>17</b>	<b>0.35</b>
Algeria	0	1	na	10	9	0.39	2	1	na
Bahrain	0	0	na	0	1	na	0	0	na
Egypt	1	2	na	6	21	0.13	4	5	na
Iraq	0	0	na	5	28	0.26	0	0	na
Jordan	0	2	na	0	12	0.37	1	0	na
Kuwait	0	0	na	7	7	1.48	0	0	na
Lebanon	1	0	na	0	2	na	2	1	na
Libya	0	0	na	1	1	na	1	0	na
Morocco	0	1	na	4	2	na	2	2	na
Oman	1	1	na	7	4	0.65	1	1	na
Palestine	0	0	na	0	0	na	1	0	na
Qatar	3	0	na	26	49	4.30	0	2	na
Saudi Arabia	7	8	1.01	69	145	1.83	1	4	na
Sudan	1	0	na	0	1	na	1	1	na
Syrian Arab Rep.	0	0	na	1	1	na	1	0	na
Tunisia	1	1	na	3	5	na	4	2	na
United Arab Emirates	2	4	na	76	76	4.47	0	2	na
Yemen	0	0	na	0	1	na	0	0	na
<b>Central Asia</b>	<b>0</b>	<b>2</b>	<b>na</b>	<b>1</b>	<b>6</b>	<b>na</b>	<b>4</b>	<b>4</b>	<b>na</b>
Kazakhstan	0	2	na	0	6	na	0	1	na
Kyrgyzstan	0	0	na	0	0	na	1	4	na
Mongolia	0	0	na	1	0	na	0	0	na
Tajikistan	0	0	na	0	0	na	0	0	na
Uzbekistan	0	0	na	0	0	na	4	0	na
<b>South Asia</b>	<b>22</b>	<b>59</b>	<b>0.49</b>	<b>245</b>	<b>474</b>	<b>0.55</b>	<b>83</b>	<b>200</b>	<b>1.29</b>
Afghanistan	0	0	na	0	0	na	0	0	na
Bangladesh	2	5	na	1	7	na	18	43	10.19
Bhutan	0	1	na	0	0	na	0	3	na
India	16	41	0.43	230	397	0.58	48	104	0.90
Maldives	0	0	na	0	0	na	0	0	na
Nepal	2	2	na	0	1	na	9	21	17.44
Pakistan	4	12	0.78	14	63	0.41	7	33	1.90
Sri Lanka	0	4	na	0	6	na	2	7	na
<b>Southeast Asia</b>	<b>364</b>	<b>800</b>	<b>1.46</b>	<b>2 218</b>	<b>3 239</b>	<b>0.83</b>	<b>143</b>	<b>316</b>	<b>0.36</b>
Brunei Darussalam	0	1	na	0	6	na	0	0	na
Cambodia	1	1	na	0	0	na	1	2	na
China	240	614	1.73	1 300	2 049	0.79	32	79	0.13
China, Hong Kong SAR	14	17	1.61	14	21	0.19	4	15	0.75
China, Macao SAR	0	2	na	0	1	na	0	2	na
China, Taiwan Prov.	11	18	0.93	87	104	0.64	5	9	0.27
Indonesia	9	27	2.11	9	59	0.51	24	69	4.21
Japan	39	57	0.60	354	302	0.62	38	51	0.45
Lao PDR	0	0	na	1	1	na	1	1	na
Malaysia	14	23	1.38	98	217	1.51	16	28	1.19



NEW TECHNOLOGIES TO PROTECT FROM CLIMATE-RELATED HAZARDS			LOCAL DISASTER RISK REDUCTION STRATEGIES			CLIMATE-READY CROPS			
2012-2015	2016-2019	SI 2011-2019	2012-2015	2016-2019	SI 2011-2019	2012-2015	2016-2019	SI 2011-2019	
0	1	na	0	1	na	2	10	5.33	Senegal
0	0	na	0	0	na	0	0	na	Seychelles
0	0	na	0	0	na	0	1	na	Sierra Leone
0	0	na	0	0	na	0	0	na	Somalia
6	18	4.25	7	18	2.82	26	109	4.11	South Africa
0	0	na	0	0	na	1	0	na	South Sudan
0	0	na	0	0	na	0	1	na	Togo
1	2	na	1	2	na	9	39	16.40	Uganda
2	3	na	1	1	na	5	24	8.13	Tanzania
0	0	na	0	1	na	12	27	28.45	Zambia
1	5	na	1	1	na	11	42	38.44	Zimbabwe
<b>7</b>	<b>12</b>	<b>0.72</b>	<b>4</b>	<b>8</b>	<b>0.40</b>	<b>50</b>	<b>138</b>	<b>0.90</b>	<b>Arab States</b>
0	1	na	0	0	na	0	5	na	Algeria
0	2	na	0	0	na	0	0	na	Bahrain
2	2	na	2	3	na	8	26	0.65	Egypt
0	3	na	0	0	na	2	9	0.93	Iraq
1	0	na	0	1	na	2	10	1.75	Jordan
0	0	na	0	0	na	0	0	na	Kuwait
1	1	na	0	0	na	1	4	na	Lebanon
0	0	na	0	0	na	0	1	na	Libya
2	1	na	1	1	na	9	18	1.06	Morocco
0	1	na	1	0	na	0	19	1.93	Oman
0	0	na	0	0	na	0	0	na	Palestine
0	1	na	0	1	na	0	2	na	Qatar
1	0	na	0	2	na	12	39	1.10	Saudi Arabia
0	0	na	0	0	na	5	6	5.12	Sudan
0	0	na	0	0	na	8	1	10.36	Syrian Arab Rep.
0	0	na	0	0	na	3	8	0.69	Tunisia
0	0	na	0	0	na	4	7	1.11	United Arab Emirates
0	0	na	0	0	na	0	0	na	Yemen
<b>1</b>	<b>2</b>	<b>na</b>	<b>1</b>	<b>1</b>	<b>na</b>	<b>3</b>	<b>24</b>	<b>3.47</b>	<b>Central Asia</b>
0	2	na	0	0	na	2	15	4.11	Kazakhstan
0	0	na	0	0	na	0	1	na	Kyrgyzstan
0	0	na	1	1	na	0	1	na	Mongolia
0	0	na	0	0	na	0	1	na	Tajikistan
1	0	na	0	0	na	1	8	3.01	Uzbekistan
<b>21</b>	<b>44</b>	<b>1.07</b>	<b>26</b>	<b>51</b>	<b>0.97</b>	<b>367</b>	<b>752</b>	<b>3.53</b>	<b>South Asia</b>
0	0	na	0	0	na	0	1	na	Afghanistan
4	10	6.34	6	13	10.11	25	46	5.85	Bangladesh
0	0	na	0	0	na	0	0	na	Bhutan
17	33	1.00	14	26	0.58	271	567	3.07	India
0	0	na	0	0	na	0	1	na	Maldives
1	3	na	4	5	17.30	10	17	6.01	Nepal
0	1	na	2	11	1.65	71	146	7.92	Pakistan
0	1	na	1	2	na	6	5	2.89	Sri Lanka
<b>57</b>	<b>96</b>	<b>0.48</b>	<b>71</b>	<b>117</b>	<b>0.45</b>	<b>442</b>	<b>793</b>	<b>0.68</b>	<b>Southeast Asia</b>
0	0	na	0	1	na	0	0	na	Brunei Darussalam
0	1	na	0	0	na	2	2	na	Cambodia
10	32	0.22	17	41	0.21	253	520	0.72	China
3	5	na	0	7	na	7	10	0.52	China, Hong Kong SAR
0	0	na	0	1	na	0	0	na	China, Macao SAR
4	5	na	7	7	0.88	8	9	0.15	China, Taiwan Prov.
3	10	2.35	4	16	2.75	9	31	1.16	Indonesia
13	21	0.54	19	18	0.52	70	73	0.37	Japan
0	2	na	1	0	na	2	2	na	Lao PDR
6	5	1.43	2	9	0.84	23	25	0.84	Malaysia

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	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019
Myanmar	0	0	na	0	1	na	1	3	na
Philippines	7	12	5.37	27	39	3.56	11	23	13.85
Korea, DPR	0	1	na	0	1	na	0	0	na
Korea, Rep.	38	53	1.25	359	484	1.46	4	21	0.18
Singapore	8	11	0.66	59	80	1.08	8	12	0.40
Thailand	6	19	2.17	24	56	0.75	9	18	1.42
Timor-Leste	0	0	na	0	0	na	2	0	na
Viet Nam	2	5	na	3	13	0.29	11	26	4.78
<b>Oceania</b>	<b>57</b>	<b>99</b>	<b>1.66</b>	<b>607</b>	<b>673</b>	<b>2.09</b>	<b>192</b>	<b>247</b>	<b>4.59</b>
Australia	46	80	1.49	595	658	2.35	180	213	4.62
New Zealand	13	20	2.81	24	19	0.37	14	32	2.57
Fiji	0	0	na	1	0	na	6	15	73.47
Kiribati	0	0	na	0	0	na	0	1	na
Marshall Islands	0	0	na	0	0	na	0	1	na
Micronesia	0	0	na	0	0	na	2	4	na
Niue	0	0	na	0	0	na	0	1	na
Palau		0	na	0	0	na	0	2	na
Papua New Guinea	0	0	na	0	0	na	1	4	na
Samoa	0	0	na	0	0	na	1	1	na
Solomon Islands	0	0	na	0	0	na	3	5	na
Tonga	0	0	na	0	0	na	0	2	na
Tuvalu	0	0	na	0	0	na	0	0	na
Vanuatu	0	0	na	0	0	na	1	4	na

SI<sub>2011–19</sub>: The specialization index is measured as the proportion of output of a given country on a given topic, divided by the proportion observed at the global level. For example, a country with 2% of its output being on a research topic that represents 1% of all research worldwide would score 2.00, having twice as much output as expected, relative to the global average.

na = the total number of publications is too low to calculate the specialization index

**KEY** –: data unavailable | -n/+n: data refer to n years before or after reference year | 0: magnitude nil or negligible | na: not applicable

GDP: gross domestic product | MF: males and females | PPP\$: purchasing power parity dollars

Note: Publication counts of articles, reviews and conference papers are based on the full-counting method. Therefore, the sum across countries is higher than the global total because of co-authorship. The selected topics in the present table are examples of research topics furthering the SDG agenda. These topics are not necessarily mutually exclusive. The following are excluded from the present table because they did not publish on these topics over the period under study: Angola, Antigua and Barbuda, Belize, Cook Islands, Djibouti, Equatorial Guinea, Eswatini, Grenada, Guinea-Bissau, Liberia, Liechtenstein, Mauritania, Nauru, Sao Tome and Principe, St Kitts and Nevis, St Lucia, St Vincent and the Grenadines, Suriname and Turkmenistan. The total for the People's Republic of China excludes its Special Administrative Regions of Hong Kong and Macao and the Taiwan Province of China.

Source: Prepared by Science-Metrix using Scopus data (Elsevier), including those for social sciences, arts and humanities

NEW TECHNOLOGIES TO PROTECT FROM CLIMATE-RELATED HAZARDS			LOCAL DISASTER RISK REDUCTION STRATEGIES			CLIMATE-READY CROPS			
2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	
2	0	na	0	0	na	0	3	na	Myanmar
8	10	20.08	3	12	18.44	35	71	17.68	Philippines
0	0	na	0	0	na	0	0	na	Korea, DPR
3	9	0.49	8	4	0.31	40	44	0.45	Korea, Rep.
1	1	na	3	2	na	5	8	0.33	Singapore
8	9	2.27	9	3	1.47	20	34	1.69	Thailand
0	0	na	0	0	na	0	1	na	Timor-Leste
3	4	na	6	8	3.97	14	24	2.61	Viet Nam
<b>36</b>	<b>47</b>	<b>2.96</b>	<b>61</b>	<b>104</b>	<b>5.28</b>	<b>138</b>	<b>250</b>	<b>1.74</b>	<b>Oceania</b>
31	42	3.07	54	95	5.45	121	235	1.79	Australia
6	5	2.24	8	10	2.88	14	15	1.17	New Zealand
0	1	na	4	4	na	1	2	na	Fiji
0	0	na	0	1	na	0	0	na	Kiribati
0	0	na	0	0	na	0	0	na	Marshall Islands
0	1	na	0	0	na	0	1	na	Micronesia
0	0	na	0	0	na	0	0	na	Niue
0	0	na	0	0	na	0	0	na	Palau
0	0	na	0	1	na	0	2	na	Papua New Guinea
0	0	na	1	0	na	0	1	na	Samoa
0	0	na	0	0	na	0	0	na	Solomon Islands
0	0	na	0	1	na	0	0	na	Tonga
0	0	na	0	1	na	0	0	na	Tuvalu
0	0	na	2	1	na	2	0	na	Vanuatu

**Table F7:** Publications on selected research topics relating to SDG 14: Life below water  
Volume of output, 2012–2015 and 2016–2019, and specialization index, 2011–2019

	COASTAL EUTROPHICATION			FLOATING PLASTIC DEBRIS IN THE OCEAN			OCEAN ACIDIFICATION		
	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019
<b>World</b>	<b>4 876</b>	<b>6 314</b>	<b>1.00</b>	<b>379</b>	<b>1 948</b>	<b>1.00</b>	<b>1 535</b>	<b>2 070</b>	<b>1.00</b>
<b>North America</b>	<b>1 320</b>	<b>1 714</b>	<b>1.04</b>	<b>90</b>	<b>328</b>	<b>0.66</b>	<b>660</b>	<b>843</b>	<b>1.46</b>
Canada	206	336	1.15	24	79	1.18	87	161	1.19
United States of America	1 173	1 463	1.02	74	268	0.58	599	744	1.50
<b>Latin America</b>	<b>268</b>	<b>414</b>	<b>1.11</b>	<b>45</b>	<b>163</b>	<b>1.70</b>	<b>73</b>	<b>154</b>	<b>0.76</b>
Argentina	32	47	1.24	3	12	1.49	3	8	0.18
Belize	0	0	na	0	0	na	0	1	na
Bolivia	0	2	na	0	0	na	1	0	na
Brazil	144	201	1.00	29	93	1.80	17	59	0.49
Chile	45	51	2.06	11	28	4.04	31	46	4.57
Colombia	6	17	0.44	1	12	1.38	3	3	na
Costa Rica	3	7	3.16	0	6	na	2	2	na
Ecuador	1	9	0.89	0	3	na	0	8	na
El Salvador	0	2	na	0	0	na	0	0	na
Guatemala	0	1	na	0	0	na	1	0	na
Honduras	0	0	na	0	0	na	0	0	na
Mexico	37	67	1.03	0	13	0.49	17	25	0.85
Nicaragua	1	1	na	0	0	na	0	0	na
Panama	3	2	na	0	0	na	3	10	9.38
Paraguay	0	0	na	0	0	na	0	0	na
Peru	1	11	1.57	0	6	na	0	2	na
Suriname	0	0	na	0	0	na	0	0	na
Uruguay	10	20	6.19	3	3	na	1	0	na
Venezuela	0	3	na	0	0	na	1	1	na
<b>Caribbean</b>	<b>5</b>	<b>7</b>	<b>0.68</b>	<b>1</b>	<b>3</b>	<b>na</b>	<b>1</b>	<b>3</b>	<b>na</b>
Bahamas	0	0	na	0	1	na	0	0	na
Barbados	0	1	na	0	0	na	0	2	na
Cuba	4	6	0.69	0	0	na	0	1	na
Dominica	0	0	na	0	0	na	0	0	na
Dominican Rep.	0	0	na	0	0	na	0	0	na
Grenada	0	0	na	1	0	na	0	0	na
Haiti	0	0	na	0	0	na	0	0	na
Jamaica	1	0	na	0	1	na	0	0	na
St Kitts & Nevis	0	0	na	0	0	na	0	0	na
St Lucia	0	0	na	0	0	na	0	0	na
Trinidad & Tobago	0	0	na	0	1	na	1	0	na
<b>European Union</b>	<b>1 387</b>	<b>1 655</b>	<b>0.81</b>	<b>196</b>	<b>1 036</b>	<b>1.74</b>	<b>730</b>	<b>928</b>	<b>1.28</b>
Austria	18	44	0.47	4	20	1.40	3	3	na
Belgium	47	59	0.66	19	29	1.57	30	25	1.20
Bulgaria	6	10	0.87	1	1	na	0	0	na
Croatia	9	8	0.59	2	16	2.12	1	2	na
Cyprus	1	7	na	2	6	na	1	1	na
Czech Rep.	17	27	0.42	1	10	0.33	1	4	na
Denmark	93	141	1.92	8	38	1.77	17	27	0.71
Estonia	12	16	2.33	0	1	na	2	5	na
Finland	66	77	1.75	0	19	1.43	11	29	0.86
France	204	232	0.76	30	127	1.28	123	171	1.12
Germany	205	260	0.49	38	183	1.42	250	284	1.83
Greece	51	44	1.30	9	31	2.09	11	17	0.72
Hungary	19	9	0.64	0	2	na	1	0	na
Ireland	49	52	1.76	10	34	3.57	10	11	0.51
Italy	140	211	0.69	31	183	2.28	77	130	0.99
Latvia	1	2	na	0	0	na	0	0	na
Lithuania	15	11	2.13	1	0	na	0	0	na
Luxembourg	1	2	na	0	0	na	0	0	na
Malta	1	1	na	1	4	na	0	1	na

SUSTAINABLY MANAGE MARINE TOURISM			SUSTAINABLY MANAGE FISHERIES AND AQUACULTURE			ECOSYSTEM-BASED APPROACHES IN MARINE ENVIRONMENTS			
2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	
644	1 123	1.00	16 278	19 154	1.00	671	709	1.00	World
203	349	1.19	3 122	3 040	0.66	217	175	1.02	North America
64	109	2.32	767	771	1.19	50	36	1.37	Canada
155	285	1.03	2 498	2 410	0.59	179	151	0.98	United States of America
73	115	2.11	2 037	2 473	2.76	60	111	2.22	Latin America
11	6	2.34	100	100	1.08	6	3	0.94	Argentina
1	3	na	1	0	na	4	3	na	Belize
0	0	na	2	1	na	0	0	na	Bolivia
24	44	1.46	992	1 299	2.46	20	68	1.95	Brazil
10	18	4.41	419	449	7.29	11	12	3.46	Chile
4	9	1.30	63	78	1.32	4	12	2.08	Colombia
2	1	na	18	24	4.61	4	1	na	Costa Rica
2	7	6.72	22	61	2.73	2	3	na	Ecuador
0	0	na	2	1	na	0	0	na	El Salvador
0	0	na	4	1	na	1	0	na	Guatemala
0	1	na	2	3	na	0	0	na	Honduras
21	33	3.33	465	534	3.72	11	15	2.14	Mexico
0	0	na	3	1	na	0	0	na	Nicaragua
2	1	na	2	7	1.20	1	0	na	Panama
0	0	na	1	1	na	0	0	na	Paraguay
0	4	na	32	48	3.12	2	5	na	Peru
0	0	na	1	0	na	1	0	na	Suriname
2	2	na	11	17	1.07	6	0	na	Uruguay
0	1	na	23	21	2.01	2	1	na	Venezuela
7	12	6.66	50	48	1.78	8	8	7.52	Caribbean
1	3	na	1	0	na	0	0	na	Bahamas
1	4	na	0	0	na	3	2	na	Barbados
1	4	na	30	32	1.90	2	2	na	Cuba
0	0	na	1	0	na	0	0	na	Dominica
0	0	na	1	0	na	0	0	na	Dominican Rep.
0	0	na	2	9	3.04	0	0	na	Grenada
0	0	na	1	0	na	0	0	na	Haiti
0	1	na	2	0	na	1	1	na	Jamaica
0	0	na	7	3	14.05	0	0	na	St Kitts & Nevis
0	0	na	0	0	na	0	1	na	St Lucia
4	1	na	6	4	1.66	2	3	na	Trinidad & Tobago
258	401	1.12	4 639	5 015	0.84	350	348	1.58	European Union
6	6	0.56	74	78	0.43	1	7	na	Austria
5	5	0.50	210	239	0.97	14	18	1.71	Belgium
1	4	na	25	37	1.06	5	2	na	Bulgaria
7	11	4.64	77	72	1.82	8	3	3.88	Croatia
1	4	na	7	12	0.60	0	1	na	Cyprus
2	8	0.69	114	187	0.97	0	1	na	Czech Rep.
13	9	0.87	310	358	1.76	13	17	1.56	Denmark
5	5	4.96	12	16	0.53	1	7	na	Estonia
8	14	1.55	87	112	0.81	8	11	1.23	Finland
26	45	0.65	648	660	0.75	60	57	1.47	France
43	43	0.54	426	572	0.35	24	51	0.54	Germany
8	28	2.43	203	169	1.55	26	21	4.30	Greece
2	0	na	66	67	0.91	0	0	na	Hungary
3	11	1.37	129	117	1.34	4	15	2.57	Ireland
31	76	1.47	503	606	0.76	58	64	1.92	Italy
1	3	na	4	12	0.60	2	5	na	Latvia
2	4	na	9	17	0.40	6	6	3.55	Lithuania
0	0	na	4	1	na	0	0	na	Luxembourg
0	6	na	6	9	1.14	1	3	na	Malta

**Table F7:** Publications on selected research topics relating to SDG 14: Life below water  
Volume of output, 2012–2015 and 2016–2019, and specialization index, 2011–2019

	COASTAL EUTROPHICATION			FLOATING PLASTIC DEBRIS IN THE OCEAN			OCEAN ACIDIFICATION		
	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019
Netherlands	151	155	1.13	25	122	2.55	57	63	0.84
Poland	88	119	1.09	1	22	0.57	7	15	0.19
Portugal	82	88	1.70	17	87	5.03	34	84	3.28
Romania	10	14	0.35	3	6	na	1	1	na
Slovakia	5	7	0.38	0	1	na	0	0	na
Slovenia	4	15	0.52	3	20	4.18	2	2	na
Spain	210	210	1.06	24	135	1.96	88	105	1.17
Sweden	114	114	1.25	6	40	1.38	83	95	2.32
United Kingdom	196	278	0.53	52	242	2.07	278	294	2.16
<b>Southeast Europe</b>	<b>15</b>	<b>15</b>	<b>0.81</b>	<b>1</b>	<b>6</b>	<b>na</b>	<b>0</b>	<b>0</b>	<b>na</b>
Albania	0	0	na	0	1	na	0	0	na
Bosnia & Herzegovina	0	0	na	0	1	na	0	0	na
Montenegro	1	3	na	0	6	na	0	0	na
North Macedonia	1	2	na	1	0	na	0	0	na
Serbia	15	10	0.88	0	1	na	0	0	na
<b>European Free Trade Assoc.</b>	<b>114</b>	<b>92</b>	<b>0.70</b>	<b>14</b>	<b>71</b>	<b>1.18</b>	<b>114</b>	<b>168</b>	<b>1.94</b>
Iceland	2	2	na	1	1	na	4	7	2.62
Norway	79	53	1.39	8	51	2.31	92	124	4.54
Switzerland	34	40	0.37	6	19	0.65	21	40	0.66
<b>Other Europe &amp; West Asia</b>	<b>124</b>	<b>209</b>	<b>0.37</b>	<b>3</b>	<b>75</b>	<b>0.36</b>	<b>32</b>	<b>45</b>	<b>0.15</b>
Armenia	0	0	na	0	0	na	0	0	na
Azerbaijan	0	0	na	0	0	na	0	0	na
Belarus	0	3	na	0	0	na	0	0	na
Georgia	0	0	na	0	0	na	0	0	na
Iran Islamic Rep.	37	50	0.40	0	22	0.39	0	1	na
Israel	25	21	0.60	0	11	0.52	25	27	1.27
Moldova, Rep.	0	1	na	0	0	na	0	0	na
Russian Federation	35	77	0.31	0	15	0.17	3	11	0.09
Turkey	25	48	0.41	3	27	0.75	4	6	0.09
Ukraine	3	13	0.28	0	0	na	0	0	na
<b>Sub-Saharan Africa</b>	<b>59</b>	<b>92</b>	<b>0.83</b>	<b>12</b>	<b>47</b>	<b>1.72</b>	<b>8</b>	<b>16</b>	<b>0.19</b>
Angola	0	0	na	0	0	na	0	0	na
Benin	0	0	na	0	0	na	0	0	na
Botswana	0	2	na	0	0	na	0	1	na
Burkina Faso	2	1	na	0	0	na	0	0	na
Burundi	0	0	na	0	0	na	0	0	na
Cameroon	0	1	na	0	0	na	0	1	na
Cabo Verde	0	1	na	1	0	na	0	0	na
Comoros	1	0	na	0	0	na	0	0	na
Congo	0	0	na	0	0	na	0	0	na
Côte d'Ivoire	3	7	4.32	0	1	na	0	1	na
Congo, Dem. Rep.	0	1	na	0	0	na	0	0	na
Eritrea	0	0	na	0	0	na	0	0	na
Ethiopia	2	8	0.96	0	0	na	0	0	na
Gabon	1	0	na	0	0	na	0	0	na
Gambia	0	1	na	0	0	na	0	0	na
Guinea	0	0	na	0	0	na	0	0	na
Guinea-Bissau	0	0	na	0	0	na	0	0	na
Kenya	4	5	na	0	3	na	1	3	na
Liberia	0	0	na	0	1	na	0	0	na
Madagascar	0	0	na	0	0	na	0	0	na
Malawi	0	0	na	0	1	na	0	0	na
Mali	0	0	na	0	0	na	0	0	na
Mauritius	2	1	na	0	1	na	0	0	na
Mozambique	0	1	na	0	0	na	0	0	na
Namibia	0	1	na	0	0	na	1	0	na

SUSTAINABLY MANAGE MARINE TOURISM			SUSTAINABLY MANAGE FISHERIES AND AQUACULTURE			ECOSYSTEM-BASED APPROACHES IN MARINE ENVIRONMENTS			
2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	
15	17	0.65	246	311	0.64	23	29	1.45	Netherlands
5	9	0.34	225	208	0.74	6	9	0.30	Poland
31	41	4.28	318	432	2.36	34	50	6.22	Portugal
2	2	na	43	40	0.53	14	7	2.79	Romania
0	2	na	10	15	0.17	0	0	na	Slovakia
1	0	na	40	31	0.79	0	1	na	Slovenia
48	92	2.30	1 034	1 024	1.80	59	77	2.71	Spain
13	22	1.13	172	207	0.63	21	27	1.98	Sweden
70	117	1.12	809	906	0.67	95	87	1.51	United Kingdom
<b>2</b>	<b>6</b>	<b>0.99</b>	<b>44</b>	<b>53</b>	<b>0.69</b>	<b>1</b>	<b>1</b>	<b>na</b>	<b>Southeast Europe</b>
0	1	na	4	9	2.89	1	0	na	Albania
0	0	na	2	7	0.28	0	0	na	Bosnia & Herzegovina
0	3	na	3	9	1.01	0	1	na	Montenegro
0	0	na	4	5	na	0	0	na	North Macedonia
2	2	na	34	36	0.66	0	0	na	Serbia
<b>23</b>	<b>41</b>	<b>1.37</b>	<b>1 117</b>	<b>1 185</b>	<b>3.25</b>	<b>23</b>	<b>30</b>	<b>0.91</b>	<b>European Free Trade Assoc.</b>
1	3	na	54	65	5.70	0	1	na	Iceland
17	27	3.18	1 024	1 064	9.34	15	19	2.06	Norway
5	11	0.32	84	100	0.24	8	10	0.34	Switzerland
<b>24</b>	<b>46</b>	<b>0.46</b>	<b>815</b>	<b>963</b>	<b>0.63</b>	<b>21</b>	<b>31</b>	<b>0.46</b>	<b>Other Europe &amp; West Asia</b>
0	0	na	3	1	na	0	0	na	Armenia
0	0	na	0	0	na	0	0	na	Azerbaijan
0	0	na	3	4	na	0	0	na	Belarus
0	1	na	2	2	na	4	0	na	Georgia
7	6	0.33	345	418	1.03	4	9	0.46	Iran Islamic Rep.
4	7	0.69	102	131	0.89	4	5	na	Israel
0	0	na	1	1	na	0	0	na	Moldova, Rep.
5	8	0.20	111	148	0.21	3	10	0.21	Russian Federation
8	24	1.13	238	255	0.90	6	8	0.65	Turkey
0	1	na	20	20	0.20	2	1	na	Ukraine
<b>27</b>	<b>49</b>	<b>2.97</b>	<b>309</b>	<b>439</b>	<b>1.45</b>	<b>30</b>	<b>33</b>	<b>2.45</b>	<b>Sub-Saharan Africa</b>
0	0	na	0	1	na	0	0	na	Angola
0	1	na	8	11	3.12	0	0	na	Benin
0	0	na	2	1	na	0	0	na	Botswana
0	0	na	0	8	na	0	0	na	Burkina Faso
0	0	na	1	1	na	0	0	na	Burundi
0	0	na	5	10	0.88	3	0	na	Cameroon
0	1	na	0	1	na	0	0	na	Cabo Verde
0	0	na	1	0	na	0	0	na	Comoros
0	0	na	1	0	na	0	0	na	Congo
0	0	na	4	11	3.95	0	0	na	Côte d'Ivoire
0	0	na	0	4	na	0	0	na	Congo, Dem. Rep.
0	0	na	3	0	na	0	0	na	Eritrea
1	2	na	6	14	0.41	1	0	na	Ethiopia
0	0	na	1	0	na	0	0	na	Gabon
1	1	na	17	31	2.17	1	2	na	Gambia
0	1	na	0	0	na	0	1	na	Guinea
0	0	na	0	0	na	0	2	na	Guinea-Bissau
2	6	na	40	52	3.46	8	3	4.37	Kenya
0	0	na	0	0	na	0	0	na	Liberia
0	1	na	5	7	2.87	0	0	na	Madagascar
0	0	na	10	9	3.03	0	0	na	Malawi
0	0	na	1	2	na	0	0	na	Mali
2	0	na	3	1	na	0	0	na	Mauritius
2	2	na	4	10	1.47	1	2	na	Mozambique
0	1	na	6	5	3.13	0	0	na	Namibia

**Table F7:** Publications on selected research topics relating to SDG 14: Life below water  
Volume of output, 2012–2015 and 2016–2019, and specialization index, 2011–2019

	COASTAL EUTROPHICATION			FLOATING PLASTIC DEBRIS IN THE OCEAN			OCEAN ACIDIFICATION		
	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019
Niger	0	0	na	0	0	na	0	0	na
Nigeria	3	2	na	0	12	1.60	0	0	na
Rwanda	1	0	na	0	0	na	0	0	na
Sao Tome & Principe	0	1	na	0	0	na	0	0	na
Senegal	1	0	na	0	0	na	0	0	na
Seychelles	0	0	na	1	0	na	1	1	na
Sierra Leone	0	0	na	0	0	na	0	0	na
Somalia	0	0	na	0	0	na	0	0	na
South Africa	35	55	1.16	10	29	2.60	5	8	0.34
Togo	0	0	na	0	0	na	0	0	na
Uganda	2	3	na	0	0	na	0	0	na
Tanzania	2	4	na	0	3	na	0	1	na
Zambia	1	0	na	0	0	na	0	0	na
Zimbabwe	2	0	na	0	0	na	0	0	na
<b>Arab States</b>	<b>148</b>	<b>174</b>	<b>0.95</b>	<b>3</b>	<b>39</b>	<b>0.56</b>	<b>26</b>	<b>57</b>	<b>0.30</b>
Algeria	7	13	0.78	0	2	na	0	2	na
Bahrain	1	1	na	0	0	na	0	0	na
Egypt	29	37	0.81	0	2	na	3	7	0.20
Iraq	12	10	0.81	0	0	na	0	0	na
Jordan	1	5	na	0	0	na	1	0	na
Kuwait	4	3	na	0	1	na	1	3	na
Lebanon	3	13	1.16	0	3	na	1	4	na
Libya	0	0	na	0	0	na	0	0	na
Mauritania	0	0	na	0	0	na	0	0	na
Morocco	3	10	0.55	0	5	na	1	3	na
Oman	7	6	2.32	0	2	na	3	1	na
Qatar	0	17	1.58	0	4	na	2	2	na
Saudi Arabia	36	33	0.61	2	11	0.83	12	33	0.75
Sudan	0	0	na	0	0	na	0	0	na
Syrian Arab Rep.	1	0	na	0	0	na	0	0	na
Tunisia	37	22	1.67	0	6	na	2	0	na
United Arab Emirates	18	15	2.05	1	3	na	1	5	na
Yemen	1	1	na	0	0	na	0	0	na
<b>Central Asia</b>	<b>0</b>	<b>4</b>	<b>na</b>	<b>1</b>	<b>2</b>	<b>na</b>	<b>0</b>	<b>0</b>	<b>na</b>
Kazakhstan	0	4	na	0	1	na	0	0	na
Kyrgyzstan	0	0	na	0	0	na	0	0	na
Mongolia	0	0	na	1	1	na	0	0	na
Tajikistan	0	0	na	0	0	na	0	0	na
Uzbekistan	0	0	na	0	0	na	0	0	na
<b>South Asia</b>	<b>112</b>	<b>185</b>	<b>0.40</b>	<b>6</b>	<b>45</b>	<b>0.31</b>	<b>20</b>	<b>23</b>	<b>0.13</b>
Bangladesh	7	8	0.33	0	3	na	1	2	na
India	90	151	0.40	5	33	0.29	18	18	0.14
Maldives	0	0	na	0	3	na	0	0	na
Nepal	0	0	na	0	0	na	0	0	na
Pakistan	14	21	0.36	1	2	na	1	2	na
Sri Lanka	1	7	1.12	1	5	na	0	1	na
<b>Southeast Asia</b>	<b>2 070</b>	<b>2 951</b>	<b>1.37</b>	<b>50</b>	<b>479</b>	<b>0.67</b>	<b>225</b>	<b>467</b>	<b>0.45</b>
Brunei Darussalam	2	0	na	0	1	na	2	4	na
Cambodia	0	2	na	0	0	na	0	1	na
China	1 573	2 311	1.72	7	286	0.61	104	280	0.43
China, Hong Kong SAR	34	64	1.09	2	31	2.04	22	37	1.87
China, Macao SAR	5	6	2.03	0	0	na	0	1	na
China, Taiwan Prov.	47	45	0.40	2	9	0.28	20	22	0.36
Indonesia	7	37	0.50	1	41	3.24	3	8	0.18
Japan	201	196	0.57	17	43	0.41	69	97	0.63
Lao PDR	0	0	na	0	0	na	0	0	na



SUSTAINABLY MANAGE MARINE TOURISM			SUSTAINABLY MANAGE FISHERIES AND AQUACULTURE			ECOSYSTEM-BASED APPROACHES IN MARINE ENVIRONMENTS			
2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	
0	0	na	2	0	na	0	0	na	Niger
0	4	na	62	95	1.89	1	0	na	Nigeria
0	0	na	2	1	na	0	0	na	Rwanda
0	0	na	0	0	na	0	0	na	Sao Tome & Principe
0	0	na	4	8	0.79	2	5	na	Senegal
2	1	na	0	1	na	2	1	na	Seychelles
0	0	na	2	1	na	0	0	na	Sierra Leone
0	0	na	0	1	na	0	0	na	Somalia
17	31	4.28	101	117	1.09	12	19	3.19	South Africa
0	1	na	1	0	na	0	0	na	Togo
0	1	na	16	23	1.44	0	0	na	Uganda
2	2	na	17	47	3.29	2	3	na	Tanzania
0	0	na	7	10	2.18	0	0	na	Zambia
0	0	na	2	3	na	0	0	na	Zimbabwe
<b>10</b>	<b>20</b>	<b>0.58</b>	<b>358</b>	<b>544</b>	<b>0.82</b>	<b>16</b>	<b>22</b>	<b>0.82</b>	<b>Arab States</b>
0	4	na	9	21	0.21	1	3	na	Algeria
0	1	na	2	3	na	0	0	na	Bahrain
4	5	0.92	148	326	1.86	9	3	1.41	Egypt
0	0	na	8	26	0.43	0	0	na	Iraq
1	1	na	4	6	0.17	0	0	na	Jordan
0	0	na	11	6	0.90	1	2	na	Kuwait
0	0	na	9	10	0.62	1	1	na	Lebanon
0	0	na	2	2	na	0	0	na	Libya
0	1	na	0	0	na	0	2	na	Mauritania
1	2	na	10	14	0.24	2	4	na	Morocco
0	0	na	13	12	1.00	0	0	na	Oman
0	1	na	10	8	0.23	0	2	na	Qatar
2	4	na	75	91	0.47	2	3	na	Saudi Arabia
0	1	na	2	1	na	0	0	na	Sudan
1	1	na	2	1	na	0	0	na	Syrian Arab Rep.
0	1	na	70	56	1.16	2	4	na	Tunisia
1	2	na	4	10	0.13	0	1	na	United Arab Emirates
1	0	na	2	3	na	0	0	na	Yemen
<b>0</b>	<b>0</b>	<b>na</b>	<b>5</b>	<b>12</b>	<b>0.33</b>	<b>0</b>	<b>0</b>	<b>na</b>	<b>Central Asia</b>
0	0	na	1	7	na	0	0	na	Kazakhstan
0	0	na	1	0	na	0	0	na	Kyrgyzstan
0	0	na	1	2	na	0	0	na	Mongolia
0	0	na	0	2	na	0	0	na	Tajikistan
0	0	na	2	1	na	0	0	na	Uzbekistan
<b>14</b>	<b>24</b>	<b>0.26</b>	<b>1 068</b>	<b>1 233</b>	<b>1.03</b>	<b>14</b>	<b>17</b>	<b>0.28</b>	<b>South Asia</b>
2	6	na	114	165	3.68	2	3	na	Bangladesh
9	9	0.15	850	940	0.98	12	13	0.30	India
1	2	na	2	0	na	0	1	na	Maldives
0	0	na	5	8	0.67	0	0	na	Nepal
1	2	na	87	104	0.93	0	0	na	Pakistan
1	5	na	20	30	1.33	1	0	na	Sri Lanka
<b>69</b>	<b>221</b>	<b>0.46</b>	<b>5 156</b>	<b>7 625</b>	<b>1.06</b>	<b>83</b>	<b>103</b>	<b>0.32</b>	<b>Southeast Asia</b>
2	0	na	8	2	1.14	1	0	na	Brunei Darussalam
0	0	na	7	15	2.31	1	0	na	Cambodia
11	34	0.13	2 817	4 538	1.02	36	38	0.23	China
6	9	1.14	61	95	0.54	0	1	na	China, Hong Kong SAR
0	1	na	0	5	na	0	0	na	China, Macao SAR
14	11	1.06	216	229	0.79	3	4	na	China, Taiwan Prov.
6	101	10.50	115	479	2.50	12	22	2.70	Indonesia
7	18	0.20	742	795	0.76	12	18	0.32	Japan
0	1	na	2	4	na	1	0	na	Lao PDR

**Table F7:** Publications on selected research topics relating to SDG 14: Life below water  
Volume of output, 2012–2015 and 2016–2019, and specialization index, 2011–2019

	COASTAL EUTROPHICATION			FLOATING PLASTIC DEBRIS IN THE OCEAN			OCEAN ACIDIFICATION		
	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019
Malaysia	40	73	0.96	7	23	1.33	3	10	0.23
Myanmar	3	0	na	0	1	na	0	0	na
Philippines	17	19	4.00	1	7	na	3	4	na
Korea, DPR	0	0	na	0	0	na	0	0	na
Korea, Rep.	184	283	1.31	15	45	0.85	12	35	0.34
Singapore	24	55	0.91	1	4	na	5	6	0.11
Thailand	23	29	0.80	1	7	na	3	4	na
Timor-Leste	0	0	na	0	0	na	0	0	na
Viet Nam	12	27	1.12	0	10	0.92	0	1	na
<b>Oceania</b>	<b>280</b>	<b>314</b>	<b>1.40</b>	<b>40</b>	<b>159</b>	<b>2.22</b>	<b>351</b>	<b>443</b>	<b>5.74</b>
Australia	231	264	1.25	36	142	2.30	311	405	5.63
New Zealand	61	67	2.33	8	25	1.63	56	83	6.41
Cook Islands	1	2	na	0	0	na	0	0	na
Fiji	1	1	na	1	0	na	2	1	na
Kiribati	1	0	na	0	0	na	0	0	na
Marshall Islands	0	0	na	0	0	na	0	0	na
Micronesia	0	0	na	0	0	na	0	0	na
Palau	1	0	na	0	0	na	4	4	na
Papua New Guinea	0	0	na	0	0	na	0	1	na
Samoa	0	0	na	0	2	na	0	0	na
Solomon Islands	0	0	na	0	0	na	0	2	na
Tonga	0	1	na	0	0	na	0	0	na
Tuvalu	0	0	na	0	0	na	0	0	na
Vanuatu	0	0	na	0	0	na	0	1	na

SI<sub>2011–19</sub>: The specialization index is measured as the proportion of output of a given country on a given topic, divided by the proportion observed at the global level. For example, a country with 2% of its output being on a research topic that represents 1% of all research worldwide would score 2.00, having twice as much output as expected, relative to the global average.

na = the total number of publications is too low to calculate the specialization index

**KEY** –: data unavailable | -n/+n: data refer to n years before or after reference year | 0: magnitude nil or negligible | na: not applicable

GDP: gross domestic product | MF: males and females | PPP\$: purchasing power parity dollars

Note: Publication counts of articles, reviews and conference papers are based on the full-counting method. Therefore, the sum across countries is higher than the global total because of co-authorship. The selected topics in the present table are examples of research topics furthering the SDG agenda. These topics are not necessarily mutually exclusive. The following are excluded from the present table because they did not publish on these topics over the period under study: Afghanistan, Antigua and Barbuda, Bhutan, Central African Republic, Chad, Djibouti, Equatorial Guinea, Eswatini, Gambia, Guyana, Lesotho, Liechtenstein, Nauru, Niue, Palestine, South Sudan, St Vincent and the Grenadines and Turkmenistan. The total for the People's Republic of China excludes its Special Administrative Regions of Hong Kong and Macao and the Taiwan Province of China.

Source: Prepared by Science-Metrix using Scopus data (Elsevier), including those for social sciences, arts and humanities

SUSTAINABLY MANAGE MARINE TOURISM			SUSTAINABLY MANAGE FISHERIES AND AQUACULTURE			ECOSYSTEM-BASED APPROACHES IN MARINE ENVIRONMENTS			
2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	
13	21	1.65	372	487	2.14	7	4	0.47	Malaysia
0	0	na	2	6	na	0	0	na	Myanmar
3	10	8.25	103	180	9.02	11	4	8.75	Philippines
0	0	na	1	0	na	0	0	na	Korea, DPR
6	11	0.30	430	549	0.85	4	7	0.25	Korea, Rep.
1	4	na	68	84	0.49	2	3	na	Singapore
5	9	1.00	346	426	4.00	7	5	0.99	Thailand
0	0	na	0	1	na	0	0	na	Timor-Leste
2	3	na	208	270	4.42	3	4	na	Viet Nam
<b>122</b>	<b>173</b>	<b>5.17</b>	<b>991</b>	<b>1 064</b>	<b>1.66</b>	<b>92</b>	<b>96</b>	<b>3.43</b>	<b>Oceania</b>
108	160	5.38	830	909	1.57	83	82	3.30	Australia
19	17	3.15	176	190	2.17	8	16	3.90	New Zealand
0	0	na	0	0	na	0	0	na	Cook Islands
1	5	na	11	11	4.54	2	1	na	Fiji
0	0	na	0	0	na	0	0	na	Kiribati
0	0	na	0	1	na	0	0	na	Marshall Islands
0	0	na	2	0	na	1	0	na	Micronesia
0	2	na	0	0	na	1	0	na	Palau
1	2	na	0	5	na	1	0	na	Papua New Guinea
0	0	na	0	0	na	0	0	na	Samoa
0	1	na	2	5	na	0	1	na	Solomon Islands
0	0	na	0	5	na	0	0	na	Tonga
0	0	na	1	0	na na	0	0	na	Tuvalu
1	0	na	0	0	na	0	0	na	Vanuatu

**Table F8:** Publications on selected research topics relating to SDG 15: Life on land  
Volume of output, 2012–2015 and 2016–2019, and specialization index, 2011–2019

	SUSTAINABLE USE OF TERRESTRIAL ECOSYSTEMS			STATUS OF TERRESTRIAL BIODIVERSITY			MINIMIZE POACHING AND TRAFFICKING OF PROTECTED SPECIES			TACKLE INVASIVE ALIEN SPECIES		
	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019
<b>World</b>	<b>91 137</b>	<b>123 204</b>	<b>1.00</b>	<b>70 888</b>	<b>89 396</b>	<b>1.00</b>	<b>458</b>	<b>818</b>	<b>1.00</b>	<b>11 644</b>	<b>14 875</b>	<b>1.00</b>
<b>North America</b>	<b>29 355</b>	<b>35 473</b>	<b>1.13</b>	<b>24 106</b>	<b>28 445</b>	<b>1.24</b>	<b>151</b>	<b>267</b>	<b>0.94</b>	<b>4 953</b>	<b>5 657</b>	<b>1.63</b>
Canada	5 238	6 418	1.35	4 616	5 390	1.56	20	54	1.26	853	982	1.75
United States of America	25 639	31 041	1.10	20 832	24 748	1.19	138	229	0.89	4 371	4 991	1.61
<b>Latin America</b>	<b>12 670</b>	<b>17 738</b>	<b>2.78</b>	<b>9 567</b>	<b>13 327</b>	<b>2.77</b>	<b>53</b>	<b>99</b>	<b>2.20</b>	<b>1 086</b>	<b>1 596</b>	<b>1.84</b>
Argentina	1 477	1 975	3.26	1 260	1 628	3.60	11	13	2.59	279	353	4.67
Belize	15	23	13.93	11	21	16.01	0	0	na	3	1	na
Bolivia	144	153	11.80	97	113	11.02	1	3	na	3	6	2.85
Brazil	6 560	9 280	2.60	4 825	6 942	2.55	24	48	2.06	449	742	1.48
Chile	785	1 168	2.21	667	944	2.43	5	6	2.51	165	197	3.00
Colombia	788	1 356	2.50	608	998	2.47	1	8	na	42	75	1.04
Costa Rica	289	400	8.91	214	286	8.14	2	2	na	14	21	3.62
Ecuador	345	760	5.00	246	520	4.27	2	3	na	34	55	2.88
El Salvador	7	11	3.41	6	6	3.05	0	0	na	1	1	na
Guatemala	51	59	5.44	29	49	5.04	2	1	na	1	4	na
Guyana	12	32	8.83	10	16	6.42	0	0	na	1	0	na
Honduras	30	33	7.18	20	19	5.02	0	1	na	0	4	na
Mexico	2 320	3 136	2.92	1 715	2 334	2.86	6	17	1.41	121	204	1.23
Nicaragua	25	21	5.77	13	13	3.90	0	0	na	1	0	na
Panama	279	354	11.13	227	330	12.35	1	2	na	30	37	9.52
Paraguay	24	58	4.20	12	40	3.32	1	2	na	0	3	na
Peru	283	526	3.59	181	378	3.44	2	10	11.19	6	11	0.55
Suriname	12	21	5.58	7	14	3.92	0	0	na	0	1	na
Uruguay	130	185	2.65	121	162	3.18	1	0	na	25	25	3.44
Venezuela	213	195	2.60	182	161	2.80	1	5	na	26	15	1.80
<b>Caribbean</b>	<b>195</b>	<b>256</b>	<b>1.22</b>	<b>168</b>	<b>218</b>	<b>1.32</b>	<b>2</b>	<b>3</b>	<b>na</b>	<b>43</b>	<b>48</b>	<b>2.02</b>
Antigua & Barbuda	0	2	na	1	3	na	0	0	na	0	1	na
Bahamas	10	19	4.18	8	16	4.63	0	0	na	6	4	13.71
Barbados	7	12	1.90	2	6	0.69	0	0	na	2	1	na
Cuba	102	104	0.86	87	90	0.94	0	2	na	12	23	1.30
Dominica	1	4	na	3	2	na	0	0	na	0	0	na
Dominican Rep.	23	27	4.40	15	23	4.39	0	0	na	4	1	na
Grenada	5	4	na	7	5	0.75	1	1	na	6	0	na
Haiti	7	7	1.36	3	4	na	0	0	na	0	1	na
Jamaica	21	27	1.93	20	19	1.67	1	0	na	4	5	3.32
St Kitts & Nevis	4	9	2.50	3	13	3.68	0	0	na	0	3	na
St Lucia	3	4	na	1	4	na	0	0	na	1	0	na
St Vincent & Grenadines	0	1	na	1	1	na	0	0	na	1	1	na
Trinidad & Tobago	24	48	1.99	25	43	2.54	0	0	na	13	9	2.63
<b>European Union</b>	<b>34 953</b>	<b>44 703</b>	<b>1.11</b>	<b>28 312</b>	<b>34 053</b>	<b>1.16</b>	<b>198</b>	<b>347</b>	<b>1.12</b>	<b>4 176</b>	<b>5 563</b>	<b>1.10</b>
Austria	1 142	1 563	1.05	873	1 156	1.00	6	7	0.58	101	217	0.92
Belgium	1 519	2 003	1.17	1 230	1 593	1.22	3	14	0.74	196	267	1.17
Bulgaria	275	338	1.42	261	271	1.61	0	2	na	56	74	2.65
Croatia	269	404	1.21	229	347	1.28	4	4	na	65	101	2.30
Cyprus	49	115	0.85	34	94	0.70	1	0	na	8	26	0.94
Czech Rep.	1 571	2 022	1.60	1 343	1 745	1.79	1	8	na	270	402	2.07
Denmark	1 176	1 706	0.91	1 068	1 455	1.07	8	14	1.04	115	169	0.67
Estonia	308	395	2.92	304	366	3.83	0	0	na	39	66	2.76
Finland	1 277	1 750	1.82	1 139	1 383	1.95	3	7	0.98	113	169	1.23
France	4 588	5 782	0.88	4 136	5 130	1.08	25	25	0.58	633	861	1.04
Germany	6 520	8 819	0.92	5 296	6 879	0.95	26	54	0.62	657	926	0.72
Greece	624	797	0.88	504	590	0.84	2	2	na	98	151	0.95
Hungary	651	815	1.57	553	706	1.79	1	4	na	95	144	1.88
Ireland	435	601	0.85	342	490	0.90	2	0	na	91	113	1.31
Italy	3 968	5 651	1.03	3 061	4 170	1.02	19	30	0.71	634	919	1.30

USE OF ECOSYSTEM-BASED APPROACHES IN PROTECTED AREAS ON LAND			EXTENT OF WATER-RELATED ECOSYSTEMS			SOCIO-ECOLOGICAL IMPACT OF TERRESTRIAL PROTECTED AREAS			
2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	
523	614	1.00	514	725	1.00	2 033	2 737	1.00	World
249	221	1.65	201	275	1.51	791	979	1.29	North America
94	88	4.96	44	62	2.35	152	171	1.46	Canada
170	157	1.18	168	226	1.39	697	886	1.26	United States of America
40	63	1.57	18	41	0.75	229	368	2.27	Latin America
3	3	na	1	8	na	22	51	2.82	Argentina
0	0	na	0	0	na	1	3	na	Belize
1	1	na	0	0	na	5	5	21.71	Bolivia
18	24	1.16	8	20	0.61	120	174	1.92	Brazil
4	6	2.26	2	4	na	15	30	2.39	Chile
5	6	1.22	2	4	na	18	33	2.29	Colombia
1	1	na	0	1	na	11	6	8.63	Costa Rica
1	2	na	0	0	na	12	26	6.74	Ecuador
0	0	na	0	0	na	0	0	na	El Salvador
0	1	na	0	0	na	3	2	na	Guatemala
0	0	na	0	0	na	1	1	na	Guyana
0	0	na	0	0	na	1	1	na	Honduras
7	16	2.17	5	4	0.77	36	73	2.48	Mexico
0	0	na	0	0	na	1	0	na	Nicaragua
0	1	na	0	0	na	1	5	na	Panama
0	2	na	0	0	na	1	2	na	Paraguay
1	3	na	0	0	na	8	15	3.80	Peru
2	0	na	0	0	na	1	1	na	Suriname
1	1	na	0	0	na	2	7	na	Uruguay
0	2	na	0	0	na	2	5	na	Venezuela
1	3	na	0	0	na	4	4	na	Caribbean
0	0	na	0	0	na	0	0	na	Antigua & Barbuda
0	0	na	0	0	na	0	0	na	Bahamas
0	0	na	0	0	na	0	0	na	Barbados
0	0	na	0	0	na	0	0	na	Cuba
0	0	na	0	0	na	0	0	na	Dominica
0	0	na	0	0	na	0	0	na	Dominican Rep.
0	0	na	0	0	na	0	0	na	Grenada
0	0	na	0	0	na	0	0	na	Haiti
0	1	na	0	0	na	0	0	na	Jamaica
0	0	na	0	0	na	0	0	na	St Kitts & Nevis
0	1	na	0	0	na	0	0	na	St Lucia
0	0	na	0	0	na	0	0	na	St Vincent & Grenadines
1	1	na	0	0	na	0	0	na	Trinidad & Tobago
192	264	1.18	129	154	0.66	817	1 108	1.11	European Union
6	8	1.17	7	7	0.84	29	39	0.91	Austria
6	14	1.78	7	8	1.12	24	42	0.77	Belgium
1	3	na	1	1	na	3	7	0.64	Bulgaria
2	0	na	0	2	na	3	11	0.72	Croatia
0	0	na	1	0	na	1	2	na	Cyprus
7	4	1.31	0	2	na	30	36	1.16	Czech Rep.
6	10	0.71	7	5	0.90	39	37	0.84	Denmark
1	3	na	1	1	na	5	6	2.89	Estonia
6	10	1.20	3	3	na	64	61	3.09	Finland
23	37	0.78	17	23	0.65	91	125	0.69	France
21	59	0.81	37	40	0.80	157	222	0.92	Germany
2	7	na	9	5	1.76	26	23	1.36	Greece
0	9	na	7	4	1.76	16	19	1.59	Hungary
1	5	na	1	2	na	6	10	0.46	Ireland
15	24	0.83	13	14	0.42	73	143	0.96	Italy

**Table F8:** Publications on selected research topics relating to SDG 15: Life on land  
Volume of output, 2012–2015 and 2016–2019, and specialization index, 2011–2019

	SUSTAINABLE USE OF TERRESTRIAL ECOSYSTEMS			STATUS OF TERRESTRIAL BIODIVERSITY			MINIMIZE POACHING AND TRAFFICKING OF PROTECTED SPECIES			TACKLE INVASIVE ALIEN SPECIES		
	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019
Latvia	117	232	2.01	94	142	1.54	0	0	na	10	31	1.85
Lithuania	135	242	1.27	110	199	1.45	0	0	na	53	83	3.52
Luxembourg	88	110	0.97	69	77	0.93	1	3	na	6	11	0.48
Malta	14	44	0.89	17	35	0.90	0	1	na	19	13	4.43
Netherlands	2 588	3 296	0.99	1 965	2 310	0.94	18	37	1.65	212	261	0.65
Poland	1 856	2 945	1.25	1 475	2 195	1.25	3	9	0.46	239	430	1.36
Portugal	1 467	2 157	1.54	1 179	1 612	1.48	4	12	0.82	270	368	2.22
Romania	630	835	1.12	387	489	0.78	1	2	na	46	69	0.59
Slovakia	422	641	1.64	331	451	1.57	0	0	na	46	78	1.64
Slovenia	252	400	1.17	197	338	1.20	0	0	na	38	66	1.35
Spain	4 462	6 034	1.34	3 841	4 607	1.43	16	28	0.91	607	841	1.43
Sweden	1 908	2 689	1.20	1 623	2 117	1.31	8	14	0.54	174	211	0.67
United Kingdom	8 036	10 230	1.12	6 606	7 994	1.17	98	192	3.27	801	1 124	0.90
<b>Southeast Europe</b>	<b>410</b>	<b>544</b>	<b>1.06</b>	<b>308</b>	<b>406</b>	<b>1.01</b>	<b>2</b>	<b>3</b>	<b>na</b>	<b>59</b>	<b>99</b>	<b>1.28</b>
Albania	31	33	1.90	29	30	2.28	0	0	na	3	10	2.53
Bosnia & Herzegovina	41	82	0.99	34	56	1.03	0	0	na	3	14	0.98
Montenegro	23	52	1.47	21	49	1.66	0	0	na	8	20	3.61
North Macedonia	47	42	0.66	34	39	0.70	1	0	na	2	7	na
Serbia	327	418	1.07	236	287	0.97	2	3	na	50	63	1.24
<b>European Free Trade Assoc.</b>	<b>3 428</b>	<b>4 545</b>	<b>1.23</b>	<b>3 021</b>	<b>3 763</b>	<b>1.39</b>	<b>16</b>	<b>40</b>	<b>1.40</b>	<b>431</b>	<b>542</b>	<b>1.17</b>
Iceland	90	137	1.58	71	100	1.56	1	1	na	12	15	1.20
Liechtenstein	7	4	0.89	4	5	na	0	0	na	0	1	na
Norway	1 114	1 500	1.25	1 047	1 298	1.58	11	21	2.56	105	148	0.93
Switzerland	2 313	3 063	1.21	1 973	2 486	1.30	5	19	0.86	320	389	1.29
<b>Other Europe &amp; West Asia</b>	<b>3 184</b>	<b>6 562</b>	<b>0.53</b>	<b>2 935</b>	<b>5 074</b>	<b>0.57</b>	<b>16</b>	<b>27</b>	<b>0.34</b>	<b>468</b>	<b>828</b>	<b>0.52</b>
Armenia	22	41	0.57	21	40	0.66	0	0	na	3	4	na
Azerbaijan	10	20	0.28	11	10	0.29	0	0	na	2	3	na
Belarus	26	81	0.47	31	67	0.55	0	0	na	13	23	1.34
Georgia	45	79	1.33	42	64	1.44	1	1	na	9	8	1.28
Iran Islamic Rep.	798	1 400	0.46	510	886	0.38	2	13	0.35	33	52	0.11
Israel	412	582	0.54	417	539	0.73	2	1	na	108	142	1.02
Moldova, Rep.	13	14	0.59	13	9	0.67	0	0	na	1	4	na
Russian Federation	1 118	3 002	0.60	1 251	2 445	0.72	12	8	0.47	180	420	0.70
Turkey	715	1 145	0.50	584	844	0.49	0	3	na	101	143	0.40
Ukraine	150	419	0.46	190	375	0.62	0	1	na	51	85	0.94
<b>Sub-Saharan Africa</b>	<b>5 119</b>	<b>7 537</b>	<b>3.60</b>	<b>3 637</b>	<b>5 096</b>	<b>3.24</b>	<b>81</b>	<b>169</b>	<b>11.66</b>	<b>569</b>	<b>1 003</b>	<b>3.95</b>
Angola	12	23	3.38	10	21	3.88	0	0	na	0	0	na
Benin	92	177	8.05	75	105	6.90	0	2	na	6	18	3.08
Botswana	78	180	6.36	81	151	6.79	1	5	na	1	15	3.03
Burkina Faso	64	127	4.13	53	71	3.27	0	2	na	3	3	na
Burundi	13	15	8.14	9	10	6.25	1	0	na	1	3	na
Cameroon	249	322	3.68	165	214	2.93	0	7	na	7	11	0.90
Cabo Verde	8	5	4.74	5	3	na	0	1	na	0	1	na
Central African Rep.	22	23	5.47	14	9	4.49	0	1	na	2	1	na
Chad	4	13	2.72	2	9	2.77	0	0	na	0	1	na
Comoros	2	8	7.91	2	8	11.39	0	0	na	0	0	na
Congo	57	58	5.60	37	44	5.30	1	1	na	1	3	na
Côte d'Ivoire	85	141	5.16	58	76	3.90	3	4	na	3	4	na
Congo, Dem. Rep.	86	104	5.23	63	82	4.80	1	2	na	2	1	na
Djibouti	1	6	na	1	5	na	0	0	na	1	1	na
Equatorial Guinea	6	7	7.03	5	5	7.75	0	1	na	0	0	na
Eritrea	4	12	4.53	2	3	na	0	0	na	0	0	na
Eswatini	24	29	6.67	26	26	8.85	0	0	na	1	5	na
Ethiopia	342	721	4.82	199	325	3.11	0	2	na	14	20	1.47
Gabon	69	84	7.37	47	65	7.17	0	7	na	4	5	2.87

USE OF ECOSYSTEM-BASED APPROACHES IN PROTECTED AREAS ON LAND			EXTENT OF WATER-RELATED ECOSYSTEMS			SOCIO-ECOLOGICAL IMPACT OF TERRESTRIAL PROTECTED AREAS			
2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	
1	0	na	0	0	na	2	2	na	Latvia
1	2	na	0	0	na	2	10	1.10	Lithuania
0	0	na	1	2	na	0	2	na	Luxembourg
0	0	na	0	1	na	0	0	na	Malta
24	22	1.65	15	15	0.78	62	86	0.98	Netherlands
1	11	0.24	6	2	na	39	51	0.98	Poland
10	17	1.77	1	4	na	57	78	2.54	Portugal
5	3	na	5	4	1.67	23	20	1.62	Romania
2	4	na	1	2	na	10	20	2.09	Slovakia
0	3	na	2	1	na	8	13	1.49	Slovenia
24	43	1.47	13	7	0.43	105	158	1.37	Spain
20	37	3.22	7	9	0.76	36	50	1.02	Sweden
67	65	1.59	18	25	0.44	256	334	1.27	United Kingdom
<b>0</b>	<b>2</b>	<b>na</b>	<b>1</b>	<b>4</b>	<b>na</b>	<b>4</b>	<b>20</b>	<b>1.12</b>	<b>Southeast Europe</b>
0	0	na	0	0	na	0	1	na	Albania
0	0	na	0	0	na	1	3	na	Bosnia & Herzegovina
0	0	na	0	0	na	0	1	na	Montenegro
0	0	na	0	0	na	0	2	na	North Macedonia
0	2	na	1	4	na	3	18	1.32	Serbia
<b>26</b>	<b>28</b>	<b>1.74</b>	<b>12</b>	<b>15</b>	<b>0.50</b>	<b>73</b>	<b>115</b>	<b>1.09</b>	<b>European Free Trade Assoc.</b>
1	2	na	0	0	na	1	2	na	Iceland
0	0	na	0	0	na	0	0	na	Liechtenstein
13	18	3.13	3	2	na	30	40	1.36	Norway
13	8	1.00	10	13	0.67	44	79	0.96	Switzerland
<b>20</b>	<b>19</b>	<b>0.41</b>	<b>26</b>	<b>28</b>	<b>0.50</b>	<b>47</b>	<b>117</b>	<b>0.33</b>	<b>Other Europe &amp; West Asia</b>
0	0	na	0	0	na	0	5	na	Armenia
0	0	na	0	0	na	0	2	na	Azerbaijan
0	0	na	0	0	na	1	0	na	Belarus
0	0	na	1	1	na	1	5	na	Georgia
5	1	na	11	11	0.84	14	39	0.43	Iran Islamic Rep.
5	4	1.34	1	1	na	11	18	0.77	Israel
0	0	na	0	0	na	0	0	na	Moldova, Rep.
8	7	0.37	10	10	0.33	10	35	0.22	Russian Federation
2	7	0.49	3	6	na	9	14	0.25	Turkey
0	1	na	0	0	na	3	8	0.27	Ukraine
<b>25</b>	<b>34</b>	<b>3.41</b>	<b>16</b>	<b>26</b>	<b>2.75</b>	<b>200</b>	<b>291</b>	<b>6.15</b>	<b>Sub-Saharan Africa</b>
0	0	na	0	0	na	0	3	na	Angola
1	0	na	1	0	na	2	7	17.63	Benin
0	0	na	0	1	na	5	21	19.33	Botswana
0	1	na	0	1	na	1	5	na	Burkina Faso
0	0	na	0	0	na	0	0	na	Burundi
1	1	na	0	0	na	2	14	4.44	Cameroon
0	0	na	0	0	na	0	0	na	Cabo Verde
0	1	na	0	0	na	0	0	na	Central African Rep.
0	0	na	0	0	na	0	1	na	Chad
0	0	na	0	0	na	2	0	na	Comoros
0	0	na	0	0	na	2	4	na	Congo
0	0	na	0	0	na	1	6	na	Côte d'Ivoire
0	1	na	0	0	na	2	5	na	Congo, Dem. Rep.
0	0	na	0	0	na	0	0	na	Djibouti
0	0	na	0	0	na	1	0	na	Equatorial Guinea
0	0	na	0	1	na	0	0	na	Eritrea
1	0	na	0	0	na	0	0	na	Eswatini
0	1	na	1	1	na	4	17	3.87	Ethiopia
0	0	na	0	0	na	1	3	na	Gabon

**Table F8:** Publications on selected research topics relating to SDG 15: Life on land  
Volume of output, 2012–2015 and 2016–2019, and specialization index, 2011–2019

	SUSTAINABLE USE OF TERRESTRIAL ECOSYSTEMS			STATUS OF TERRESTRIAL BIODIVERSITY			MINIMIZE POACHING AND TRAFFICKING OF PROTECTED SPECIES			TACKLE INVASIVE ALIEN SPECIES		
	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019
Gambia	4	5	0.59	5	7	0.84	0	2	na	0	0	na
Ghana	160	316	3.28	84	179	2.19	2	9	11.63	3	18	0.82
Guinea	10	18	3.21	7	23	4.80	0	1	na	0	0	na
Guinea-Bissau	6	7	2.84	5	8	3.65	0	3	na	0	1	na
Kenya	624	857	6.61	402	559	5.55	15	28	40.11	30	71	3.48
Lesotho	2	7	2.80	0	5	na	0	0	na	1	2	na
Liberia	6	14	2.35	7	15	3.89	0	0	na	0	0	na
Madagascar	227	254	16.72	156	179	15.08	2	4	na	7	25	7.79
Malawi	49	67	2.55	25	25	1.21	0	0	na	1	1	na
Mali	32	59	3.25	19	21	1.66	0	0	na	2	4	na
Mauritius	37	43	3.11	25	29	2.70	0	0	na	14	14	8.93
Mozambique	35	105	4.23	25	60	3.30	1	1	na	2	3	na
Namibia	88	130	8.41	78	105	10.23	1	1	na	1	6	na
Niger	32	41	5.61	16	20	2.66	0	0	na	1	6	na
Nigeria	264	506	1.19	166	298	0.90	3	8	1.34	5	32	0.32
Rwanda	38	85	4.81	26	38	3.16	1	2	na	3	6	3.03
Sao Tome & Principe	2	4	na	2	3	na	0	0	na	0	1	na
Senegal	65	89	1.74	60	74	2.03	0	3	na	6	18	2.21
Seychelles	17	15	8.84	15	14	12.19	1	2	na	5	7	36.75
Sierra Leone	12	18	3.08	11	14	2.71	0	1	na	0	0	na
Somalia	0	1	na	0	2	na	0	0	na	0	0	na
South Africa	2 214	3 243	3.49	1 752	2 504	3.50	35	81	10.45	451	775	6.75
South Sudan	3	3	na	1	1	na	0	0	na	0	0	na
Togo	26	55	4.71	18	32	3.32	0	6	na	0	1	na
Uganda	229	259	3.79	146	155	2.85	4	8	13.75	9	13	1.52
Tanzania	316	422	6.13	216	269	5.53	13	12	43.11	10	20	2.06
Zambia	71	126	5.21	59	82	5.01	4	1	na	1	6	na
Zimbabwe	177	252	9.09	108	188	8.67	6	9	56.18	6	23	5.65
<b>Arab States</b>	<b>1 303</b>	<b>2 265</b>	<b>0.53</b>	<b>914</b>	<b>1 491</b>	<b>0.46</b>	<b>4</b>	<b>16</b>	<b>0.38</b>	<b>143</b>	<b>238</b>	<b>0.38</b>
Algeria	166	296	0.81	105	221	0.74	0	3	na	8	19	0.30
Bahrain	9	17	0.61	4	5	0.29	0	0	na	0	2	na
Egypt	239	437	0.38	173	316	0.34	1	1	na	34	58	0.40
Iraq	35	151	0.47	15	82	0.32	0	0	na	9	9	0.37
Jordan	82	126	0.73	48	57	0.46	0	2	na	7	7	0.27
Kuwait	27	47	0.50	12	17	0.21	0	1	na	3	1	na
Lebanon	38	88	0.50	25	52	0.34	0	1	na	18	17	0.71
Libya	11	27	0.46	11	20	0.62	0	0	na	4	7	1.51
Mauritania	6	9	2.27	5	11	3.87	0	2	na	0	0	na
Morocco	162	289	0.69	115	193	0.55	2	2	na	6	13	0.15
Oman	42	73	0.83	31	51	0.80	0	0	na	2	7	na
Palestine	15	28	1.07	5	17	0.67	0	0	na	0	0	na
Qatar	39	82	0.57	31	44	0.39	0	0	na	3	5	na
Saudi Arabia	246	406	0.34	209	301	0.35	1	2	na	29	61	0.31
Sudan	25	42	0.87	21	26	0.83	0	0	na	2	6	na
Syrian Arab Rep.	32	17	0.91	14	11	0.65	0	0	na	4	9	2.76
Tunisia	207	246	0.63	170	204	0.71	0	1	na	34	41	0.69
United Arab Emirates	100	192	0.67	53	106	0.40	0	2	na	3	10	0.21
Yemen	10	12	0.52	6	8	0.44	0	0	na	1	2	na
<b>Central Asia</b>	<b>165</b>	<b>352</b>	<b>1.27</b>	<b>126</b>	<b>222</b>	<b>1.11</b>	<b>3</b>	<b>5</b>	<b>na</b>	<b>12</b>	<b>22</b>	<b>0.51</b>
Kazakhstan	38	150	0.92	32	91	0.76	0	2	na	7	7	0.38
Kyrgyzstan	15	32	2.03	11	21	1.92	0	1	na	0	2	na
Mongolia	85	130	5.77	62	76	4.98	1	2	na	4	6	1.68
Tajikistan	7	13	1.15	6	12	1.55	2	1	na	0	3	na
Turkmenistan	3	1	na	2	3	na	0	0	na	0	0	na
Uzbekistan	21	39	0.74	15	24	0.62	0	0	na	1	6	na



USE OF ECOSYSTEM-BASED APPROACHES IN PROTECTED AREAS ON LAND			EXTENT OF WATER-RELATED ECOSYSTEMS			SOCIO-ECOLOGICAL IMPACT OF TERRESTRIAL PROTECTED AREAS			
2012-2015	2016-2019	SI 2011-2019	2012-2015	2016-2019	SI 2011-2019	2012-2015	2016-2019	SI 2011-2019	
0	0	na	0	0	na	1	0	na	Gambia
2	1	na	2	1	na	9	11	4.84	Ghana
0	0	na	0	0	na	1	3	na	Guinea
0	0	na	0	0	na	0	0	na	Guinea-Bissau
6	2	na	1	6	na	19	29	8.03	Kenya
0	0	na	0	0	na	0	1	na	Lesotho
0	0	na	0	0	na	1	3	na	Liberia
0	0	na	0	0	na	12	14	32.09	Madagascar
0	0	na	1	0	na	1	3	na	Malawi
0	0	na	0	1	na	0	0	na	Mali
0	0	na	1	0	na	1	2	na	Mauritius
0	1	na	0	0	na	1	5	na	Mozambique
0	0	na	0	0	na	5	10	19.23	Namibia
0	1	na	0	0	na	1	4	na	Niger
0	0	na	1	4	na	5	7	0.67	Nigeria
0	0	na	0	0	na	2	3	na	Rwanda
0	0	na	0	0	na	0	0	na	Sao Tome & Principe
1	1	na	0	0	na	1	6	na	Senegal
0	0	na	0	0	na	1	0	na	Seychelles
0	0	na	0	0	na	0	4	na	Sierra Leone
0	0	na	0	0	na	0	0	na	Somalia
12	20	4.66	9	10	3.22	96	132	7.08	South Africa
0	0	na	0	0	na	0	0	na	South Sudan
0	0	na	0	0	na	1	0	na	Togo
0	3	na	0	1	na	9	17	6.56	Uganda
2	1	na	0	0	na	27	18	16.29	Tanzania
0	0	na	0	1	na	4	9	15.40	Zambia
0	1	na	1	1	na	6	18	18.88	Zimbabwe
<b>6</b>	<b>6</b>	<b>0.24</b>	<b>6</b>	<b>11</b>	<b>0.46</b>	<b>15</b>	<b>38</b>	<b>0.25</b>	<b>Arab States</b>
1	0	na	0	2	na	3	3	na	Algeria
1	0	na	0	1	na	0	1	na	Bahrain
3	1	na	1	3	na	2	5	na	Egypt
0	0	na	2	2	na	0	6	na	Iraq
0	1	na	0	0	na	2	2	na	Jordan
0	0	na	0	0	na	0	0	na	Kuwait
0	0	na	1	1	na	1	4	na	Lebanon
0	0	na	0	0	na	0	1	na	Libya
0	0	na	0	0	na	0	1	na	Mauritania
0	3	na	0	0	na	3	8	0.25	Morocco
0	0	na	0	1	na	0	1	na	Oman
0	0	na	0	1	na	0	0	na	Palestine
0	1	na	0	0	na	1	0	na	Qatar
4	2	na	1	2	na	3	1	na	Saudi Arabia
0	0	na	1	0	na	1	1	na	Sudan
0	0	na	0	0	na	0	0	na	Syrian Arab Rep.
1	0	na	0	1	na	1	6	na	Tunisia
1	0	na	0	0	na	2	4	0.68	United Arab Emirates
0	0	na	0	0	na	0	0	na	Yemen
<b>0</b>	<b>2</b>	<b>na</b>	<b>1</b>	<b>2</b>	<b>na</b>	<b>4</b>	<b>10</b>	<b>1.46</b>	<b>Central Asia</b>
0	1	na	0	0	na	1	2	na	Kazakhstan
0	0	na	0	1	na	0	0	na	Kyrgyzstan
0	1	na	0	0	na	2	8	13.36	Mongolia
0	0	na	0	0	na	0	0	na	Tajikistan
0	0	na	0	0	na	0	0	na	Turkmenistan
0	0	na	1	1	na	1	1	na	Uzbekistan

**Table F8:** Publications on selected research topics relating to SDG 15: Life on land  
Volume of output, 2012–2015 and 2016–2019, and specialization index, 2011–2019

	SUSTAINABLE USE OF TERRESTRIAL ECOSYSTEMS			STATUS OF TERRESTRIAL BIODIVERSITY			MINIMIZE POACHING AND TRAFFICKING OF PROTECTED SPECIES			TACKLE INVASIVE ALIEN SPECIES		
	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019
<b>South Asia</b>	<b>4 094</b>	<b>6 735</b>	<b>0.77</b>	<b>2 776</b>	<b>4 033</b>	<b>0.64</b>	<b>29</b>	<b>82</b>	<b>1.23</b>	<b>191</b>	<b>371</b>	<b>0.28</b>
Afghanistan	3	11	1.09	4	5	1.16	1	1	na	0	0	na
Bangladesh	238	349	1.43	120	214	0.98	2	4	na	3	17	0.29
Bhutan	22	72	12.56	15	51	14.10	0	2	na	0	3	na
India	3 159	5 094	0.71	2 170	3 036	0.59	21	61	1.15	151	273	0.26
Maldives	3	8	5.55	1	3	na	0	0	na	0	0	na
Nepal	234	427	5.25	125	210	3.41	3	9	21.72	9	27	2.60
Pakistan	398	676	0.85	314	446	0.84	2	5	na	18	47	0.27
Sri Lanka	123	254	2.34	84	160	1.89	0	2	na	14	19	1.74
<b>Southeast Asia</b>	<b>15 190</b>	<b>27 849</b>	<b>0.55</b>	<b>10 117</b>	<b>17 174</b>	<b>0.46</b>	<b>70</b>	<b>184</b>	<b>0.43</b>	<b>1 345</b>	<b>2 208</b>	<b>0.35</b>
Brunei Darussalam	35	63	1.88	24	49	1.92	0	0	na	3	6	na
Cambodia	64	128	6.55	42	85	5.51	2	7	na	0	6	na
China	8 995	17 152	0.56	5 935	10 610	0.46	20	46	0.21	856	1 463	0.37
China, Hong Kong SAR	257	521	0.45	165	330	0.36	7	16	2.12	21	44	0.28
China, Macao SAR	26	29	0.39	18	14	0.26	0	0	na	0	1	na
China, Taiwan Prov.	569	727	0.33	396	461	0.27	3	6	na	59	54	0.21
Indonesia	791	2 949	2.47	382	1 276	1.33	11	45	4.73	29	73	0.47
Japan	2 249	2 812	0.36	1 788	2 239	0.40	8	21	0.15	282	366	0.39
Lao PDR	106	123	11.42	56	67	7.59	1	2	na	2	3	na
Malaysia	1 050	1 668	1.06	595	930	0.73	16	31	2.31	33	51	0.24
Myanmar	34	134	5.37	26	112	5.92	0	5	na	1	3	na
Philippines	267	448	3.02	175	294	2.69	4	5	na	19	31	1.98
Korea, DPR	5	2	na	2	1	na	0	0	na	0	0	na
Korea, Rep.	834	1 322	0.28	618	937	0.27	2	3	na	74	131	0.20
Singapore	332	619	0.45	242	419	0.39	5	12	1.13	37	45	0.32
Thailand	582	909	1.05	389	598	0.88	4	13	1.48	24	46	0.32
Timor-Leste	5	9	5.56	1	3	na	0	0	na	0	1	na
Viet Nam	302	625	1.30	152	369	0.97	1	17	3.75	6	35	0.31
<b>Oceania</b>	<b>7 843</b>	<b>9 529</b>	<b>2.28</b>	<b>6 201</b>	<b>7 215</b>	<b>2.33</b>	<b>46</b>	<b>91</b>	<b>2.45</b>	<b>1 353</b>	<b>1 672</b>	<b>3.32</b>
Australia	6 607	8 154	2.20	5 148	6 120	2.22	39	85	2.53	1 043	1 287	2.84
New Zealand	1 464	1 676	2.78	1 269	1 347	3.04	9	12	1.98	386	501	6.52
Cook Islands	3	1	na	2	1	na	0	0	na	0	1	na
Fiji	36	60	3.78	28	39	3.42	0	0	na	9	10	6.36
Kiribati	1	1	na	1	1	na	0	0	na	0	0	na
Marshall Islands	1	2	na	1	0	na	0	0	na	0	1	na
Micronesia	6	4	6.42	3	1	na	0	0	na	0	0	na
Niue	1	0	na	0	0	na	0	0	na	0	0	na
Palau	6	5	6.85	2	2	na	0	0	na	0	2	na
Papua New Guinea	46	68	5.93	30	68	5.65	0	0	na	3	5	na
Samoa	6	4	3.65	4	2	na	0	0	na	3	2	na
Solomon Islands	10	17	6.71	7	8	4.90	0	0	na	3	3	na
Tonga	0	2	na	0	0	na	0	0	na	0	0	na
Tuvalu	0	1	na	0	0	na	0	0	na	0	1	na
Vanuatu	6	5	4.47	3	2	na	0	0	na	0	0	na

SI<sub>2011–19</sub>: The specialization index is measured as the proportion of output of a given country on a given topic, divided by the proportion observed at the global level. For example, a country with 2% of its output being on a research topic that represents 1% of all research worldwide would score 2.00, having twice as much output as expected, relative to the global average.

na = the total number of publications is too low to calculate the specialization index

**KEY** –: data unavailable | -n/+n: data refer to n years before or after reference year | 0: magnitude nil or negligible | na: not applicable

GDP: gross domestic product | MF: males and females | PPP\$: purchasing power parity dollars

USE OF ECOSYSTEM-BASED APPROACHES IN PROTECTED AREAS ON LAND			EXTENT OF WATER-RELATED ECOSYSTEMS			SOCIO-ECOLOGICAL IMPACT OF TERRESTRIAL PROTECTED AREAS			
2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	2012–2015	2016–2019	SI 2011–2019	
12	18	0.39	26	49	0.77	98	163	0.67	South Asia
0	0	na	0	0	na	0	0	na	Afghanistan
2	1	na	2	2	na	3	10	1.13	Bangladesh
0	1	na	0	0	na	4	8	53.21	Bhutan
9	16	0.36	20	39	0.71	75	103	0.56	India
0	0	na	0	0	na	3	0	na	Maldives
1	2	na	3	3	na	11	38	17.09	Nepal
0	0	na	2	5	na	7	9	0.54	Pakistan
1	0	na	2	0	na	1	4	na	Sri Lanka
77	106	0.42	176	282	1.09	282	486	0.40	Southeast Asia
1	0	na	0	0	na	0	4	na	Brunei Darussalam
1	0	na	1	1	na	2	5	na	Cambodia
47	58	0.41	143	210	1.39	167	248	0.37	China
0	0	na	2	1	na	5	13	0.46	China, Hong Kong SAR
0	0	na	0	0	na	0	0	na	China, Macao SAR
1	2	na	2	2	na	6	12	0.19	China, Taiwan Prov.
5	14	2.40	2	23	2.86	28	80	2.71	Indonesia
14	18	0.50	5	12	0.25	38	51	0.25	Japan
1	0	na	1	0	na	0	4	na	Lao PDR
2	6	na	8	12	1.85	24	33	0.85	Malaysia
1	0	na	0	0	na	4	4	na	Myanmar
1	1	na	2	6	na	4	9	1.58	Philippines
0	0	na	0	0	na	0	0	na	Korea, DPR
5	3	na	5	9	0.37	11	18	0.15	Korea, Rep.
0	3	na	3	4	na	9	20	0.46	Singapore
2	3	na	4	2	na	12	22	0.98	Thailand
0	0	na	0	0	na	0	0	na	Timor-Leste
0	2	na	1	12	2.69	4	19	1.05	Viet Nam
35	52	1.94	30	38	1.67	295	349	3.71	Oceania
29	45	1.73	28	36	1.80	267	326	3.93	Australia
8	7	2.60	2	5	na	33	27	2.17	New Zealand
0	0	na	0	0	na	0	0	na	Cook Islands
2	1	na	0	0	na	2	2	na	Fiji
0	0	na	0	0	na	0	0	na	Kiribati
0	0	na	0	0	na	0	0	na	Marshall Islands
0	0	na	0	0	na	0	0	na	Micronesia
0	0	na	0	0	na	0	0	na	Niue
0	0	na	0	0	na	0	0	na	Palau
0	0	na	0	0	na	1	0	na	Papua New Guinea
2	0	na	0	0	na	0	0	na	Samoa
0	0	na	0	0	na	3	0	na	Solomon Islands
0	0	na	0	0	na	0	0	na	Tonga
0	0	na	0	0	na	0	0	na	Tuvalu
0	0	na	0	0	na	0	0	na	Vanuatu

Note: Publication counts of articles, reviews and conference papers are based on the full-counting method. Therefore, the sum across countries is higher than the global total because of co-authorship. The selected topics in the present table are examples of research topics furthering the SDG agenda. These topics are not necessarily mutually exclusive. Nauru was excluded from this table because no Nauruan researchers published on these topics in the period under study. The total for the People's Republic of China excludes its Special Administrative Regions of Hong Kong and Macao and the Taiwan Province of China.

Source: Prepared by Science-Metrix using Scopus data (Elsevier), including those for social sciences, arts and humanities

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