

The Power of Data to Advance the SDGs

Mapping research for the Sustainable Development Goals



 **RELX Group**
SDG Resource Centre



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Foreword

Kumsal Bayazit
CEO, Elsevier
September 2020

Five years ago, the [United Nations Sustainable Development Goals](#) (SDGs) set an ambitious target to achieve a sustainable and fair future for people worldwide by 2030. With only 10 years left, we all need to ramp up our efforts to make sure the targets are met.

The global research community is the backbone of this grand societal challenge. Its commitment to finding evidence-based answers is a driving force for advances in global health and wellbeing, poverty reduction, and life expectancy.

The Coronavirus pandemic has shown the critical role science plays in society. It is also a strong headwind for the progress towards the SDGs with its devastating impact on lives, livelihoods and resources. Now, more than ever, we need all the tools available to help researchers, research and public health leaders, funders make quality decisions, based on quality data and insights.

Elsevier is deeply committed to contributing to this critical global effort, both through actions within our organization and through our unique strengths in quality information, data and analytical tools to help all stakeholders in research, healthcare and public policy make the targets set by the UN SDGs a reality. We aim to do this by enabling key insights that help identify gaps, opportunities for action, and ways of measuring the impact of research on society.

Since the launch of the SDGs, Elsevier has worked closely with the research community to map the ever-changing landscape of sustainability science. Together with [SciDev.net](#), we developed the 2015 report [Sustainability Science in the Global Research Landscape](#), a research analytics report that highlighted the tremendous growth in sustainability science, with nearly 380,000 scholarly papers published between 2011-2015 - twice the average growth rate of all publications over the same period.

Our latest report, [The Power of Data to Advance the SDGs](#), shows that over the last five years SDG-related publications have reached a staggering 4.1 million articles. This presents both opportunities and challenges for our communities. We want to help them navigate

this body of data so important decisions can be made based on the rich scientific knowledge. The report maps the latest sustainability research and initiatives within each SDG area with unique, easy-to-digest data and expert insights. The full methodology of the SDG search queries used to inform the analyses are [freely available on Mendeley Data](#). We encourage the research community to make use of the datasets and take advantage of the full range of tools on Scopus and SciVal.

Despite the challenges faced by the world today, there are rays of light emerging from the data. We're seeing the strongest international collaboration in environmental and climate-related research. There is also robust academic-corporate collaboration in the clean energy field, an indicator of rapid transition to application. The data also show that more interdisciplinary collaboration is needed across different areas of SDG research and a deeper integration of sex and gender dimensions.

In our latest report, you will also find some of the initiatives driven by the [Elsevier Foundation](#) with our many partners around the world that contribute to global health, inclusion and diversity, reducing inequality and climate impact. Together with RELX, our parent company, we've provided the [RELX SDG Resource Centre](#) as a free hub that brings together cutting-edge information and data that support progress with the SDGs.

I would like to call upon the research and health communities, policymakers and funders to explore the findings of our SDG report and share your feedback so that, together, we can evolve our understanding of the science and concrete actions needed to advance these mission-critical goals. At Elsevier, we are on this important journey with you and will continue to contribute our expertise, content, data and analytics towards achieving the ultimate goal of a sustainable and fair future for all.

Executive Summary

“It is our goal to do everything we can to ensure that our unique strengths in content, data, and analytics help researchers and health professionals make the targets set by the United Nations in 2015 a reality.”

Kumsal Bayazit
CEO, Elsevier

The Power of Research to Advance the SDGs

Mapping research data to address existing gaps and further progress towards the 2030 Sustainable Development Goals

In 2015, the United Nations Sustainable Development Goals (SDGs) set an ambitious 2030 target to achieve a sustainable and equitable future for our planet. 2020 marks five years since the launch of the SDGs, and the start of the ten remaining years we have left to achieve them. Research provided by the global research community forms the essential basis for society to make gains in life expectancy, poverty reduction and global health that we have seen in the last century. Research leads the way to change.

As an information analytics company and academic publisher specializing in science and health, Elsevier shares its insights in content, data and analytics to strengthen the understanding of the research community's global sustainable development efforts. The Power of Data to Advance the SDGs includes unique insights and initiatives, many of which Elsevier has developed together with partners, to help map the state of research within each SDG area. To better understand the scope and reach of sustainability research, Elsevier's data science teams have worked with experts to create a Scopus [search query](#) for each SDG used in SciVal to generate pre-defined research areas and to help researchers and institutions track and demonstrate progress towards the targets of the SDGs. The report transforms these search queries into easy to digest infographics highlighting the high-level research trends for each. The findings are accompanied with research and NGO expert insights in 4 focus areas: Gender Equality, Good Health and Well-being, Reduced Inequalities and Climate Action. The experts take a deep look into what has been achieved thus far on these SDGs and what is still missing to achieve real progress on them.

Key Insights

- Most of the research relating to SDGs stems from **high income countries** while only a very low percentage across the first 16 SDGs originates from low income countries. The SDGs most researched are SDGs with strong relevance for industrialised countries. SDGs that directly seek to reduce the burden of the poorest, however, see limited publication activity.
- There were over 4 million articles related to specific SDGs published between 2015 – 2019. The SDG with the **most publications** was **SDG3 “Good Health”** with a little over 3 million related articles, followed by SDG7 “Clean Energy” (383,000) and SDG13 “Climate Action” (180,000). SDG1 “End Poverty” had the least amount of related publications with a little over 11,000 articles published.
- The SDGs that experienced the **most growth** in terms of number of publications were related to **responsible consumption and sustainability**. SDG11 “Sustainable Cities” grew by 13.1%, followed closely by SDG12 “Responsible Consumption” (11.6%).
- Articles with the most impact, using the **Field Weighted Citation Index**, came from **SDG7 “Clean Energy”**, with publications cited 49% more than the world's average. SDG12 “Responsible Consumption”, SDG13 “Climate Action” and SDG6 “Clean Water” also show a strong impact. The lowest impact in terms of article citation was SDG4 “Quality Education”; papers were cited 4% less than the world's average.
- The SDGs that showed the **strongest international collaboration** – i.e. a group of international researchers working and authoring together – were related to **environmental issues**. SDG13 “Climate Action” showed 34.5% of papers featuring international collaboration, followed by SDG14 “Life Below Water” (31.7%) and SDG15 “Life on Land” (32.5%). Papers regarding SDG2 “Zero Hunger” on the other hand only feature 11.2% international collaborations.
- Articles that featured an **academic corporate collaboration**, which usually results in quick translation of research findings into practical use, was highest for **SDG7 “Clean Energy”** (3.9%) and lowest for SDG4 “Quality Education” (0.5%).

A new angle: Sex and Gender play a role across all SDGs

While some SDGs might not have an obvious link to or need for sex or gender analysis, there is growing recognition that sex and gender must be factored in to ensure precise results and impactful policy. The [International Center for Study and Research \(ICSR\)](#) has developed an approach to detect and visualize the volume and proportion of research publications that include sex and/or gender topical research. Using the new SciVal matching tool methodology, the research centre has identified articles that take into account sex and/or gender in the first 16 SDGs.

The extent to which sex and/or gender research factors into SDG research varies both within individual and across these 16 SDGs. SDG5 “Gender Equality” and SDG3 “Good Health and Well-being” are the only two SDGs with greater than 60% of the publications factoring in sex and/or gender. The remaining 14 SDGs have fewer than 40% of publications that include sex and/or gender research.

Research as a catalyst for progress on SDGs

Five years into the launch of the SDGs, The Power of Data to Advance the SDGs provides valuable insight into the role scholarly output plays in enhancing societal change. However, the research trends presented in the report also raise questions that warrant further exploration. This holds true particularly around SDGs lagging behind in article output, collaboration, or impact. The expert interviews provide a qualitative insight into ways to address these existing shortcomings:

- **Focus on synergies between SDGs:** All 17 SDGs are interconnected, resulting in potential synergies between the goals. The Power of Data to Advance the SDGs encourages us to take a holistic approach that involves all genders, nationalities, disciplines to help understand these synergies and give each SDG the attention it needs to reach the 2030 goals.
- **Closing the gap between science, policy and society:** The Power of Data to Advance the SDGs tells us that research is rapidly expanding in certain SDGs such as Clean Energy and Climate Action. Nevertheless, according to the United Nations, the world is not on track to achieve any of its targets before 2030. This points to the need for increased cooperation between science, policy and society to ensure that research results are translated into concrete action.
- **Highlight the need for leadership:** The overall body of research related to SDGs continues to grow, whilst this is positive, the expert interviews uncover the need for strong effective leadership to champion the SDGs.

Quick glance findings

In a joint RELX and Elsevier collaboration, a first set of infographics was produced – presenting an overview of scholarly output, growth, impact and collaboration, with analyses of intersecting topic areas. In this report, we present new, updated infographics for each of the first SDGs (excluding SDG17).

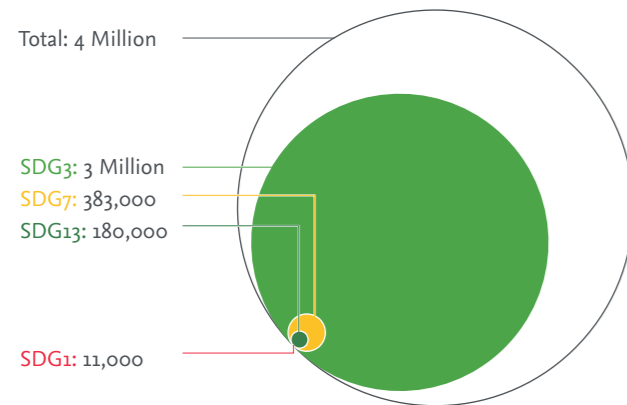
Where to find the report

Full methodology documentation of the SDG search queries that informed these projects is freely accessible on [Mendeley Data](#). We encourage the research community to make use of these datasets to create their own analytics projects, taking advantage of the full range of Scopus and SciVal features.

SDG Key Data Insights

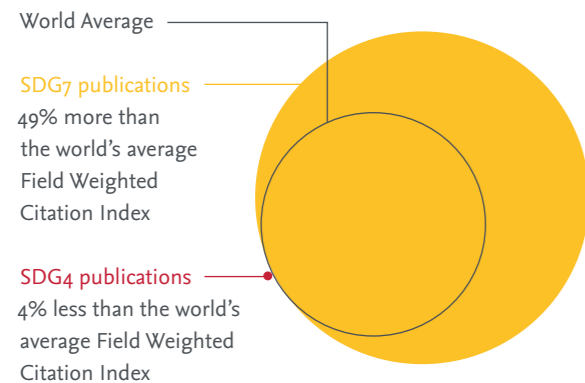
Total articles published

There were over 4 million articles that related to specific SDGs goals published between 2015 – 2019.



The SDG with the most publications was SDG3, Good Health with a little over 3 million related articles. This was followed by SDG7, Clean Energy (383,000) and SDG13, Climate Action (180,000). SDG1, Zero Poverty had the least amount of related publications during this period with a little over 11,000 related articles published.

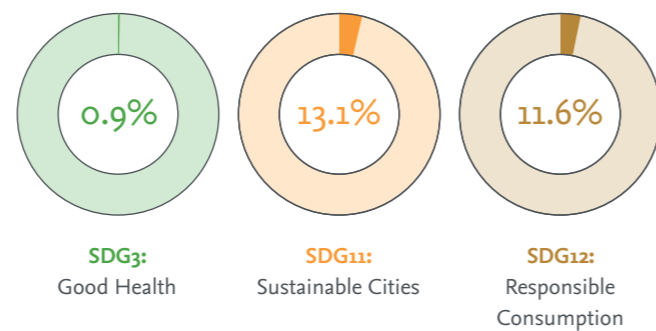
Which SDGs had the publications with the most impact



Articles that have the most impact, in terms of Field Weighted Citation Index, were from SDG7, Clean Energy, with publications cited 49% more than the world's average. With SDG12, Responsible Consumption, SDG13, Climate Action and SDG6 Clean Water all featuring high FWCI. The lowest impact in terms of article citation, was SDG4, Quality Education, whose papers were cited 4% less than the world's average.

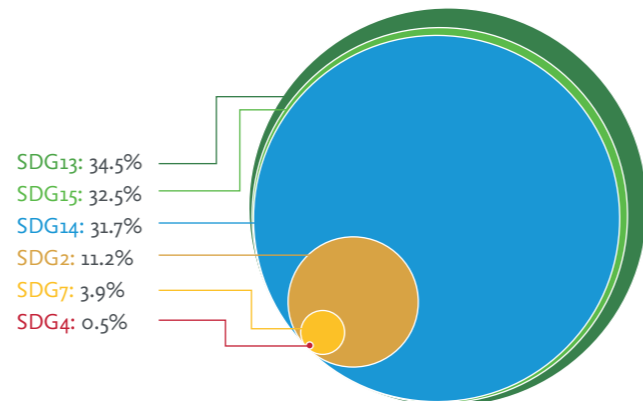
SDGs with the most growth in number of publications

The SDGs that experienced the most growth in terms of number of publications were related to responsible consumption and sustainability.



SDG11, Sustainable Cities, had the most growth (13.1%), followed closely by SDG12, Responsible Consumption (11.6%). The SDG with the least amount of growth was SDG3, Good Health, only grew 0.9%.

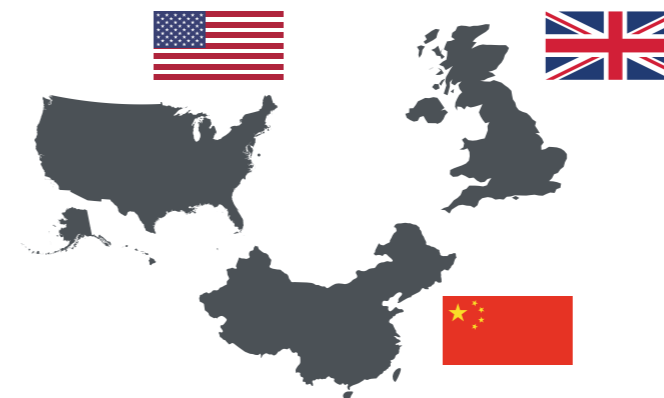
Most International Collaborations



The SDGs that had the most international collaboration were related to environment. SDG13, Climate Action had 34.5% of papers featuring international collaborations, followed by SDG14, Life Below Water (31.7%) and SDG15, Life on Land (32.5%). While SDG2, Zero Hunger, had only 11.2% of the papers featuring international collaborations. In terms of articles that featured an academic corporate collaboration was highest for SDG7 Clean Energy (3.9%) and lowest for SDG4, Quality Education (0.5%).

Where did the research come from

When looking at the country of origin for research papers, every article related to the SDGs were primarily from high and middle income countries. The United States, China and United Kingdom were all ranked with the top 3 for almost all SDGs.



SDG16, Justice, Peace and Strong Institutions and SDG5 Gender Equality had the highest proportion of papers from high income countries with 78%.



SDG1, No Poverty, featured the highest contribution from low-income countries with 2.1% SDGs that featured the lowest proportion of papers from low income countries were SDG14, Life Below Water (0.04%) followed by SDG7, Clean Energy (0.1%) SDG12, Responsible Consumption (0.2%).

Summary of Key Trends

Gender equality matters to achieving all 17 SDGs
The extent to which sex and/or gender research factors into SDG research varies across the first 16 SDGs:



SDG5 Gender Equality and SDG3 Good Health and Well-being are the only two SDGs with greater than 60% of the publications factoring in sex and/or gender.

The remaining 14 SDGs have fewer than 40% of publications that include sex and/or gender research.



Climate action and SDGs related to the environment have not only a large volume of related research but features papers that are among the highest cited, 37% above the world's average. It is also an area where we see the most international collaboration, with just under half of the papers related SDG13, featuring an international collaboration.



Sustainability is another rapidly growing area, featuring the most growth in publications between 2015 – 2019, and SDG12, **Responsible Consumption** also has papers that are cited 36% more than the world's average. These SDG goals also feature high percentage of international collaborations, however very few papers related to SDG11 and SDG12 originate from low income countries.



Energy is another area that has a large total number of publications that are well cited. Additionally, articles related to SDG7, Clean Energy, grew 9.1%, and featured the highest amount of academic corporate collaboration across all other SDGs (3.9%). However, it also had the lowest amount of research contributed by low income countries.

Our Commitment to the SDGs

Championing the Sustainability Agenda

Championing the Sustainability Agenda

The global research and health communities work hard to improve the world. The gains in life expectancy, poverty reduction and global health that we have seen in the last century have been possible thanks to their work. As the UN Sustainability Agenda demonstrates, however, there is still more to be done. At Elsevier, we support that agenda and the researchers helping to deliver it. From our business practices to rich research content and analytics capabilities, building research capacity in developing countries and advancing diversity and inclusion in science, we work in close partnership with the global research and health communities to make unique contributions to sustainable development.

Collaborating closely with these communities means we can respond quickly to genuine needs faced by those in the field. And it allows us to think ahead and address challenges that researchers and healthcare professionals may face in the future.

Adopting sustainable business practices

As people in the science and health communities work to meet the UN Sustainability Agenda, we recognize that we too have a role to play, and to ensure our business practices align with the SDGs. As an early signatory of the UN Global Compact (UNGC) RELX, Elsevier's parent company, recognizes its principles – encompassing labour, environment, anti-corruption and human rights. By serving on the boards of the UNGC networks in the UK and Netherlands, RELX's leadership has been recognized with a [LEAD company status](#).

We can support researchers and healthcare professionals with products, services, tools, research and events that advance awareness, knowledge and implementation of the SDGs. To make these tools easy to find, we created the free [RELX SDG Resource Centre](#) in 2017. The Centre showcases the latest in science, law, business and events that can help drive forward the SDGs, drawing on content from across the company and from key partners – such as UNDP, UNEP and the Global Partnership for Sustainable Development Data.

Expertise as a catalyst for change

In 2019, researchers published more than 496,000 articles with Elsevier, to which we add digital data structuring and data linking, metadata enhancements, publication hosting, security and archiving in perpetuity. In this way, we help researchers discover and build on each other's work, and make it easier for institutions to track and measure their contributions to the SDG agenda. We also launched more than 108 new journals in sustainability science, including publications such as [One Earth](#), that seek to understand and address today's environmental grand challenges. [The Lancet Commissions](#) are a call to action for professional and academic leaders to advocate for major reform in health-related areas. The latest [Lancet Countdown](#) on health and climate change seeks to ensure that the health of newborns is not defined by a changing climate and tracks 41 indicators to provide an assessment of how the world is responding.

Making a meaningful contribution to the SDGs

We recognize that the sustainability agenda is very broad and varied. In order to make a meaningful contribution, we have chosen to focus on four goals, which are an integral part of our mission and our corporate responsibility efforts.

Elsevier Focus SDGs



Health is our most valuable asset and we believe that everyone deserves access to the best possible care. We strive to make healthcare safer and more integrated while improving training for caregivers. We support researchers and clinicians to produce rigorous research and improve the quality of healthcare, paving the way for moonshot solutions and real innovation. The Elsevier Foundation promotes tech-enabled, inclusive partnerships to increase access to training and care for those who need it most. To address the current situation, our [COVID-19 Center](#) provides free expert, curated information for the research and health community.



Our mission is to help science and healthcare realize its full potential through quality content, data, analytics and inclusion. But if research has blind spots, algorithms discriminate, or medical treatments don't take into consideration the gender dimension of research, we cannot truly serve our communities. By bringing together the best minds, cooperating on meaningful partnerships and supporting inclusive initiatives, we will be able to truly [collaborate for the good of society](#).



Science and research are key drivers for positive global societal change. As a partner in the research ecosystem, we have a role to play in [reducing inequalities](#): we do this as a founding partner of [Research4life](#), by driving accessibility initiatives, and by supporting open science. Over the past 15 years, we have also supported partnerships through the [Elsevier Foundation](#), [our corporate foundation](#), to increase opportunities, visibility and inclusion for STEM re-researchers from developing countries, women scientists and underserved youth.



The world is at a defining moment where we are experiencing dramatic changes to our ecosystems, and the scientific consensus overwhelmingly points to human activity as a major contributing factor. We are using data, content and subject expertise to provide the scientific community with unique insights into how research can accelerate efforts to mitigate the effects of climate change. We are [committed](#) to sponsor activities including reducing deforestation and protecting rainforests, and we believe in robust and equitable policies on climate. We engage with governments on regulations and share best practices through the European Network for Sustainable Business.

Matching SDGs to Research

Advancing the 17 Sustainable Development Goals is vital to the success of the United Nations' 2030 Agenda for Sustainable Development and both research and funding institutions have a vital supporting role to play in this critical task. Many universities are establishing SDGs as targets in their research output, and they're increasingly being used in rankings such as the [Times Higher Education Impact Rankings](#)¹.

The SDG queries

To support this effort, Elsevier's data science teams have worked with experts to create an initial [Scopus](#) search query for each SDG. The queries were built in-house, taking a targeted and expert-informed approach to ensure that they reflected specific targets and indicators and using a framework for development the teams believed would generate the most valid queries.

In the next step, each search query was used on [SciVal](#) to generate pre-defined research areas, which describe the work research institutions are doing on each SDG and the outcomes. This enables SciVal users to investigate, understand and analyze SDG research globally in more detail. In addition, they are able to benchmark in these SDG fields compared to peers and competitors, see how these fields are characterized, and whether they can use them to further develop existing partnerships or identify potential new research partners. The queries also play an important role in the ability to examine a department's contributions and impact in SDG fields, and to use the analyses to demonstrate this contribution and impact – especially in the case of funding proposals.



Investigate, understand and analyze SDG research globally in SciVal with pre-defined Research Areas for the UN Sustainable Development Goals

“It’s been so gratifying to develop a strategy to identify the research that supports the achievement of the Sustainable Development Goals. Although the goals themselves are broad, the targets and indicators allow us to focus and refine the relevant research to include. I am looking forward to receiving feedback from the researcher community so we can iterate on these queries.”

Bamini Jayabalasingham

Senior Analytical Product Manager, Elsevier.

Identifying SDG-related publications

The process of refining the publications mapped to each SDG, is an ongoing activity. Feedback from the research community is crucial to improving the accuracy of the mapping. To gather consensus on the mapped publications, the SciVal team established the “SDG Research Mapping Initiative” in 2019, partnering with the University of Southern Denmark, the Vrije Universiteit Amsterdam (through the Aurora Universities Network) and the University of Auckland – working together to share best practices. These universities are collaborating with some of Elsevier's data scientists, bring their own data and expertise to improve the publication mapping both via search queries and machine learning techniques. Human curated datasets from Aurora and Pontificia Universidad Católica de Chile will also be used to help validate the methodologies.

Ultimately, the SDG Research Mapping Initiative will help generate the next iteration of SDG publication sets, with the aim of publishing them by the end of 2020.

As a follow up step, the search queries were made available to the larger research community. Full details of the methodology and results for each SDG search query are [freely available on Mendeley](#)² and the data can be accessed through Elsevier's [International Center for the Study of Research \(ICSR\) Lab](#)³ for use in scholarly research evaluation methods that identify publications representative of the SDGs.

Results from this project will demonstrate which of the SDGs are supported by a strong body of research and ensure that this knowledge is available for reference. They will also highlight any gaps in the knowledge base, helping to inform decisions about future lines of investigation.



Help expand a public dataset of research that supports the UN SDGs

How you can help

To help validate our SDG mapping, we need your expertise! If you are passionate about specific SDGs, you can give feedback on publications that are currently mapped to them, or upload your own publications via our online tool.

Who gets to decide what research supports the UN SDGs? We think it should be you.

Visit: sdgresources.relx.com/match-research-to-sdgs for more information.

Gender across the SDGs

Analyzing sex and gender factors in SDG research

In recent years, there has been growing recognition of the benefits of incorporating sex and/or gender analysis into research with calls for this dimension to be considered from the research design stage.

It has also become evident, particularly through a report by UN Women 2018, that the targets for the United Nations' Sustainable Development Goals (SDGs) must be viewed from a gender perspective to ensure that gender-responsive policies and accountability processes are developed and the outcomes to achieve the goals benefit women and men equally. Indeed, any action plans put in place to achieve the goals would slow progress without this consideration.

Attention to sex and gender has increased in many areas of life in recent years, but this important dimension is still often missing from published research, especially where the authors of publications are not women. Taken together with recent findings from [The Researcher Journey Through a Gender Lens Elsevier's 2020 report](#), demonstrating that while there has been some progress with regards to increasing women's representation in research, women's inclusion in the research enterprise overall compared with men's is still lacking in significant ways, suggests that the situation is unlikely to change without much greater attention on this issue in research institutions.

Several of the SDGs are written with a recognition of the role of sex and gender in achieving outcomes and are specified in their targets and the indicators used to measure progress. But while the UN has recognized a need for "systematic mainstreaming of a gender perspective", this is not the case across all of the goals. With SDG outcomes fixed to a 2030 target date, building an understanding of how sex and gender are embedded within the research supporting all SDGs is an immediate imperative. To establish a baseline understanding based on published research studies, the [International Center for the Study of Research \(ICSR\)](#) has developed an approach to detect and visualize the volume and in proportion of research publications that include sex and/or gender in topical research.

Methodology

Expanding on previous studies that investigated gender in research from a topical perspective using the Scopus database, we have developed a keyword search-based approach to identify publications that explicitly include terms related to sex and/or gender topical research. These publications are matched to the corpus of publications reflecting research related to each of 16 SDGs (excluding SDG17: Partnership for the Goals) that have been previously defined on the basis of expert-informed Scopus keyword searches, which are publicly available.

In this study, we consider sex and gender together. While they are separate concepts, they are also related and the keyword search that we have developed incorporates terms that relate to both.

For each of the 16 SDGs included in this study, a corpus consisting of the publications identified by the keyword searches was extracted from Scopus. A second corpus consisting of the publications identified by each SDG keyword search AND the selected sex and gender keyword search was also extracted from Scopus. Publications in the first corpus that also appear in the second were tagged as such after matching using Scopus unique publication identifiers. This tagging was used as the basis for calculating the proportion of each SDG's publications that include those related to sex and/or gender research topics as well as for developing topical maps that allow to examine research clusters— areas of research that are closely related to one another—within each SDG.

Conclusions

The ICSR research valuably provides an evidence-based method to identify where there is significant or little sex and/or gender research within each SDG. Findings from the analyses can be used to assess where progress has been made in terms of integrating sex and/or gender into SDGs and inform where new research and implementation measures are still needed.

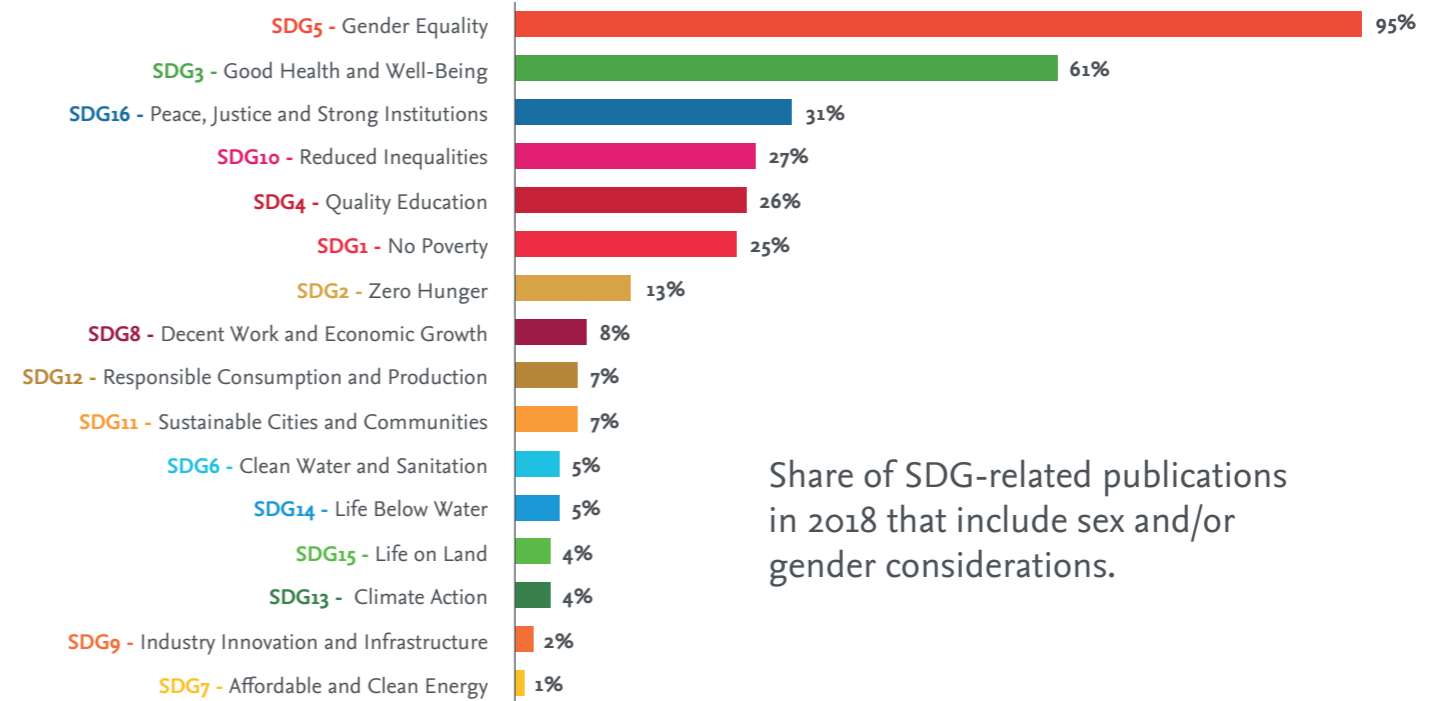
The extent to which sex and/or gender research factors into research relevant to SDG targets and indicators varies both within individual and across the first 16 SDGs, but most SDGs have a low proportion of publications related to sex and/or gender. More specifically:

- SDG5 Gender Equality and SDG3 Good Health and Well-being are the only two SDGs with greater than 60% of the publications factoring in sex and/or gender.
- The remaining 14 SDGs have fewer than 40% of publications that include sex and/or gender research.

While some SDGs might not have an obvious link to or need for sex and/or gender analysis, there is growing recognition that sex and/or gender must be factored in to the research design stage for all SDGs, to ensure rigorous results and inclusive and impactful policy.

Learn more about the study carried out to analyze sex and gender factors in SDG research: Herbert, Rachel and Falk-Krzesinski, Holly J. and Plume, Andrew, Sustainability Through a Gender Lens: The Extent to Which Research on UN Sustainable Development Goals (SDGs) Includes Sex and Gender Consideration (September 8, 2020).

Available at [SSRN](#) or through [DOI](#).



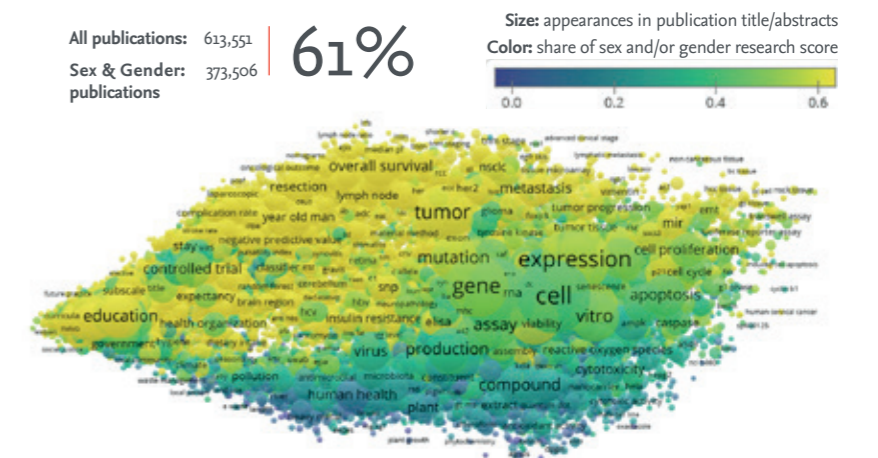
Share of SDG-related publications in 2018 that include sex and/or gender considerations.



Good Health and Well-Being

The map represents SDG3-related publications that included keywords related to sex and/or gender research in 2018.

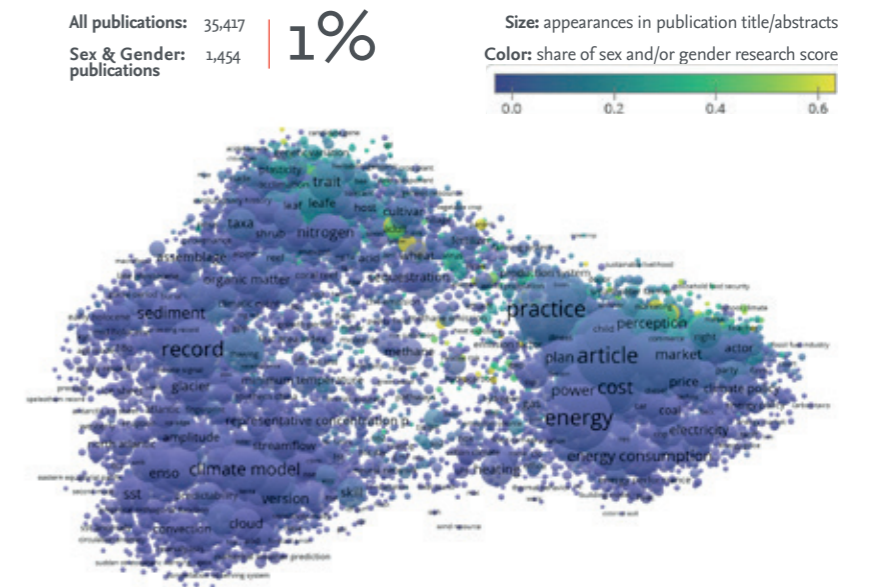
Node size indicates count of keyword occurrences. The color scale indicates the proportion of publications that took into consideration sex and/or gender aspects in specific topical clusters. The map shows fundamental research topics (bottom clusters) demonstrated a considerable lack of attention to sex and/or gender, with respect to clinic & practice topics (top clusters).



Climate Action

The map represents SDG13-related publications that included keywords related to sex and/or gender research in 2018. Node size indicates count of keyword occurrences. The color scale indicates the proportion of publications that took into consideration sex and/or gender aspects in specific topical clusters. The map shows that there is almost no consideration of sex and/or gender in climate research – despite [experts have underscored](#) how promoting gender equality can be a successful strategy to strengthen climate action.

The map shows that there is almost no consideration of sex and/or gender in climate research – despite [experts have underscored](#) how promoting gender equality can be a successful strategy to strengthen climate action.



Elsevier Atlas Award

Research for a better world

Science impacts everyone's world. With over 2,500 journals publishing articles from across science, technology and health, our mission is to share research and stories that make a real difference. Each month since 2015, *Atlas* showcases research that has the potential to significantly impact people's lives around the world. The Award's goal is to provide a platform where researchers, public and policy makers can meet and be informed on the latest research that helps achieve common goals for the planet and ultimately support its successful implementation. As part of the Atlas Prize, the Elsevier Atlas team organizes a special award ceremony at the author's institution, with a press release and an article translating the often complex research into an accessible format for the general public.

The Atlas Advisory Board members each serve for a year. They represent a distinguished group of experts from academia, policymaking and NGOs, all of whom are deeply involved in the implementation of science in society on a global scale. Current Board Members come from UNESCO, ITOCA, OWSD and the Ban Ki-moon Centre for Global Citizens, among others. Board members select the most impactful article from a monthly nominations list to receive the *Atlas* award.

Meet the 2020 winners



Annelieke van Dijk, Mariëtte de Haan and Micha de Winter for their June 2020 article in the *International Journal of Educational Research*: “Voicing versus silencing: education for peace in contexts of violence” While most curricula addressing violence and peace are developed in privileged contexts, this paper reconsiders existing approaches to peace education

from the perspective of communities affected by high levels of violence. This paper presents a context-based approach in a dynamic environment, in recognition of reality and resilience promising wide applicability.



Jinhu Bian and Ainong Li for their May 2020 article in the *ISPRS Journal of Photogrammetry and Remote Sensing*: “Global high-resolution mountain green cover index mapping based on Landsat images and Google Earth Engine” Mountains provide essential ecosystem services to billions of people and are home to a majority of the global biodiversity hotspots.

However, they are particularly sensitive to climate and environmental changes. This new mountain green cover index proposed method used Landsat observations to advance our understanding of global mountain changes.



Lawrence A. Palinkas and Marleen Wong for their March 2020 article in *Current Opinion in Psychology*: “Global climate change and mental health” Although several empirical studies and systematic reviews have documented the mental health impacts of global climate change, the range of impacts has not been well understood. This review examines mental health

impacts of climate-related events representing both direct (i.e. heat stress) and indirect (i.e. economic loss, threats to health and well-being, displacement and forced migration, collective violence and civil conflict, and alienation from a degraded environment) consequences of global climate change.



Philippe Terheggen, Elsevier's Managing Director for Journals, with Arman Aghahosseini at the Elsevier SDG Inspiration Day. (Photo ©Todd Fredericks)

On November 25, 2019, we held our first *Elsevier SDG Inspiration Day*, in partnership between Elsevier, the Elsevier Foundation and Global Compact Netherlands. The day centered on the theme of “The Power of Data to Advance the SDGs” and welcomed speakers from international NGOs, academia and the industry. A special ceremony was held to present the Atlas Award to Arman Aghahosseini on behalf of his research team for their May 2019 article in *Renewable and Sustainable Energy Reviews*: “Analysing the feasibility of powering the Americas with renewable energy and inter-regional grid interconnections by 2030”

This Atlas Award-winning team of researchers has made progress in exploring the best ways to reach SDG7 in the Americas. Their analysis shows that it is feasible to power the Americas with renewable energy. In addition to increasing the share of renewable energies, including solar and wind, another key in their approach is to bolster the energy system with national and international grid interconnections.

SDG Focus Interviews

By combining our unique insights in content, data and analytics with the expertise of our partners in the research and health communities, we believe that it is possible to achieve significant progress in our core SDG focus areas of health, gender, reducing inequalities, and climate action.





The World Health Organization made health a fundamental human right 50 years ago, and it makes up a core part of the sustainable development goals. Health determines many other basic

human rights such as access to safe drinking water and sanitation, nutritious foods, adequate housing, education and safe working conditions and is central to achieving the sustainable future envisage by the SDG goals. However, today, health inequalities persist and are being exacerbated by the COVID-19 pandemic all over the world. The question remains: what action do we need to achieve good health by 2030?

Biography

A passionate advocate for pro-poor Universal Health Coverage, Githinji Gitahi joined Amref Health Africa as the Global Chief Executive Officer in June 2015. Amref Health Africa, founded in 1957, is the largest African-led international organization on the continent and reaches more than 11million people each year through 150 health-focused projects across 35 countries.

Until his appointment to Amref Health Africa, Dr Gitahi was the Vice President and Regional Director for Africa, Smile Train International. Prior to that, Dr Gitahi was Managing Director for Monitor Publications in Uganda as well as General Manager for Marketing and Circulation in East Africa for the Nation Media Group. He held progressively senior positions at GlaxoSmithKline and worked at the Avenue Group and in the insurance industry. Dr Gitahi is Co-Chair of the UHC2030 Steering Committee, a global World Bank and World Health Organization (WHO) initiative for Universal Health Coverage (UHC).

He is member of the Board of Directors of The Standard Group in Kenya and was recently appointed as a member of the Board of Trustees of Safaricom Foundation. He is also a member of the Governing Board of the Africa Centre's for Disease Control and prevention (Africa CDC), a specialized technical institution under the African Union. Dr Gitahi Bachelor's Degree in Medicine from the University of Nairobi; a Master's degree in Business Administration, majoring in Marketing, from United States International University and has a Certificate for Strategic Perspectives for Nonprofit Management from Harvard University.

SDG Focus Interviews

SDG3 Good health & well-being

Dr. Githinji Gitahi
Global CEO Amref
Health Africa



What lessons about global health have been learnt from COVID-19 in Africa and is this a major setback for the sustainable goals?

COVID was an unexpected 'expected' global event. The Global health community always knew that a pandemic was not if, but when, and prepared for it more in talk than in action. Because of this, health systems in Africa were found weak and wanting. Responding to a pandemic requires both a strong, resilient and equitable foundational health system as well as a well-coordinated crisis response. However, African countries were found wanting in disease surveillance and diagnostic capacity, in financial access, in health commodity supply chain, digital health, human resources and community preparedness.

Moving forward, it's clear that both at a national and a regional level, collaboration has become stronger with regional bodies like the [Africa CDC](#) and [WHO](#) Afro finding urgent relevance and acceptance in national strategies. Africa won't waste the crisis and will emerge stronger.

SDG3, Good Health, interlinks and underpins many other SDG goals. How important is it to have a broader approach for health in order to achieve the sustainability agenda?

The wider sustainable agenda cannot happen without healthy societies and indeed we cannot achieve healthy societies without sustainable development. The two are therefore interdependent. However, health is actually the basis for human capital. It is essential for sustainable development and is therefore a good starting point to see it as 'ground zero' for the SDGs.

A basic social-economic principle should be that 'Healthy adults earn and healthy children learn' and this is Human Capital 101!

Many of the SDG3 targets are dedicated to tackling pressing issues surrounding maternal health and child mortality rates, which highlights the need for good practice and policy. How should we be bridging the gap between research, policy and implementation?

Governance is the glue that joins all these elements together. Through stewardship of resources like research and a good understanding of optimization of financial resources, good governance enables policies that are within scope and needs of communities for the singular achievement of desired health outcomes. Investing in governance, including leadership and management of health resources is an area which remains underinvested, yet it's what doubles the return on limited resources – more health for the money.

There is strong evidence to suggest that inequities lead to greater health issues and that these can be transferred from one generation to the next. To achieve SDG3, what approaches should we be taking to reduce inequalities related to health?

In health, as a human right and a public good, it's best to consider inequities rather than inequalities. Inequities, which are largely a result of denial of social justice result from poor governance and exclusion and the main way to overcome them is through improving good governance and strengthening citizen accountability from works through strengthening civil society. But to address and enable citizen accountability, we need data to show patterns of exclusion and resulting inequities.

On the other hand, inequalities are more likely to arise in market-based approaches in healthcare which has consistently shown large scale failure resulting in impoverishment of poor households. Universal Health Coverage which is an equity approach to access of needed health services is a global commitment to address both inequities and inequalities by ensuring that no one is left behind.

5 GENDER EQUALITY



From the growing body of research focused on the SDGs—over 4 million articles in the past 5 years—and the recent analysis from the International Center for the Study of Research, it is obvious that

many researchers have not recognized the need for sex and/or gender analysis in their work. The UN underscores the need to improve SDG implementation to achieve gender equality by prioritizing interventions that increase women’s empowerment and their human rights. However, the scope of improving SDG outcomes for both women and men, and for the environment on which they depend, is much broader than just issues of empowerment. All SDGs would benefit from applying a gender perspective when planning implementation strategies for the next 10 years to ensure that the outcomes benefit everyone equally. We have asked Elizabeth Pollitzer, Director of Portia and the founder of the Gender Summits, to weigh in on these emerging and urgent issues and share insights into what this means for the future of SDG research.

Biography

Elizabeth Pollitzer trained originally in Biophysics and obtained PhD in Information Science from the University of London (Kings’ College). She spent more than 20 years as researcher and lecturer in the Department of Computing at Imperial College, London. Elizabeth is director of Portia, a not-for-profit organisation she co-founded in 2001 with several women scientists and engineers at Imperial College. The aim was to use scientific evidence to advance understanding and actions towards greater awareness of how gender issues impact on science values, knowledge, and quality of outcomes. Elizabeth Pollitzer has been adviser and evaluator for a range of research and innovation EU initiatives and programs since 2005, and has reviewed research papers and project proposals for a number of journals and research funding organisations. In 2011, she established the Gender Summit platform for dialogue, which brings scientists, policy makers, gender experts, as well as decision makers and stakeholders in science endeavours to jointly examine new scientific evidence and agree when, why, and how biological and/or socio-cultural differences between females and males influence quality of research outcomes, and where improvements are needed. She is member of the Elsevier Inclusion and Diversity Board.

SDG Focus Interviews

SDG5 Gender Equality

Dr. Elizabeth Pollitzer
Director, Portia



Why is it critical that sex or gender analysis be incorporated into SDG areas of research?

The UN progress reports paint a mixed picture: in some cases, clear improvements have been made but in others the progress has stalled, or even reversed. SDG5 is not an exception, and neither is SDG10 (Reducing Inequalities). Gender and other inequalities have not been given the priority status they deserve in analyzing relationships between SDGs to help policy makers devise impactful implementation strategies. There are some exceptions such as [The Global Sustainable Development Report 2019](#), produced by a distinguished panel of scientists to advise the UN on how science can help advance SDG implementation efforts. but even here, the extensive gender research on how biological sex and socio-economic characteristics influence outcomes has been overlooked. This is not only an issue for humans, biological sex also influences outcomes for other species. For instance, the stability of natural ecosystems depends on maintaining the proportions of males and females in the right balance. The processes controlling reproduction and maturation are very sensitive to environmental stresses. When the wellbeing of natural ecosystems becomes disturbed, it will affect all of the ecosystem services that support people’s livelihoods and wellbeing. In short, sex and gender analysis is relevant to all SDGs.

How would you characterize the status quo and what is the most effective way to change this?

One way to accelerate progress in SDG implementation is to identify synergies within and among different SDGs, and to prioritize those interventions that promise to achieve multiple SDG targets simultaneously. In most existing analyses, gender and other inequalities (SDGs 5,10) have been omitted or assumed to be of little importance. The approach needed to embed gender across all SDGs must be strategic. Relying just on SDG5 to improve the lives of women means that women will not benefit from the implementations of all other SDGs. We have sufficient research evidence to bring gender knowledge into SDG and sustainability research. This should be combined with awareness raising and education connecting different SDGs into clusters as well as assembling relevant actors to devise interventions that can achieve several improvements together rather than pursue each SDG target separately.

In which of the SDG areas of research is this gender “blind spot” most present?

SDG and sustainability research today suffers from gender blindness, and unless this changes the implementation of SDGs will not achieve the successes it could. A study by van Soest et al 2019. reviewed many approaches to establish useful interconnections between different SDGs and concluded that SDGs 2, 6, 7, 8, 9, 13, and 17 are most often included in the models and SDG5 and SDG10 the least. The study included a survey of the experts developing the models which suggested that key interactions exist especially between the human development cluster (SDGs 1, 3, 4, 5, 8, 10) and resource use clusters (SDGs 2, 6, 7, 8), and in the Earth system cluster (SDGs 13, 14, 15). To fully exploit these interactions, researchers working in the SDG and sustainability areas should collaborate with gender researchers and practitioners working in areas of the relevant SDGs, i.e. food production, water, energy, consumption, climate, life on earth, life under water.

What role do you envision the Gender Summits playing in this process?

The Gender Summits started with the mission to improve quality of research by removing biases and gaps in knowledge that produce worse outcomes for women than for men. Since 2015, this mission expanded to include advancing gender knowledge into SDGs implementation efforts and to identify interactions between SDGs based on gender dimension connections. Gender Summit involve many actors in the research and development areas. Together, these experts can identify what knowledge is available and what is still missing but necessary to accelerate progress across all SDGs. This will help to ensure that improvements benefit women and men equally. In addition, their expertise covers both biological and socio-cultural aspects, which help to verify claims of equality in SDG policies and interventions while pinpointing the sources and consequences of disparities in outcomes for women and men.



Wealth and privilege are unequally distributed around the world. For countries to thrive, equal opportunities must be available to all, not just the few. Regardless of gender, religion, ethnicity, orientation

or level of wealth, everyone has a right to develop, contribute and flourish. The world of research is no exception. For us to be able to tackle the hardest challenges, we need to create an inclusive ecosystem that welcomes all researchers.

Biography

Professor Geraldine Richmond is the Presidential Chair in Science and Professor of Chemistry at the University of Oregon. Her research has relevance to current issues in energy production, environmental remediation and atmospheric chemistry. Her teaching activities in the classroom and beyond focus on science literacy, science policy and building a strong and diverse science and engineering workforce in the U.S. and globally. Throughout her career she has been actively involved in efforts to increase the number and success of women in science and engineering. Richmond is a member of the National Academy of Sciences, the American Academy of Arts and Sciences and is a Fellow of the American Chemical Society (ACS), the American Physical Society (APS), the Association for the Advancement of Science (AAAS) and the Association for Women in Science. Richmond recently finished her term as President of AAAS and President of Sigma Xi, the Honorary Scientific Research Society. She currently serves as a Presidential Appointee to the U.S. National Science Board. She is the founding and current director of COACH, a grass-roots organization formed in 1998 that has helped in the career advancement of thousands of scientists and engineers in the U.S., Asia, Africa and Latin America. She is also a member of the Elsevier Foundation (www.elsevierfoundation.org) Board which works to advance diversity in science, research in developing countries and technology for development.

SDG Focus Interviews

SDG10 Reduced Inequalities

Dr. Geraldine Richmond
Presidential Chair in Science
and Professor of Chemistry,
University of Oregon



From your experience, what is one practical step that can be taken to make the research community more fair and inclusive for women scientists, scientists of color and those from developing countries?

There must be a concerted effort to increase the diversity in leadership roles in the scientific enterprise which includes women, scientists of color and other underrepresented groups. My experience is that an inclusive and fair workplace is more likely to happen if you have effective leaders in charge that have personally experienced discrimination and the type of culture that leads to unfair practices. Having been a practicing research chemist and educator for 40 years now, I have often been despondent in watching how the biases, discrimination and divisive culture in our laboratories and institutions have ruined or held back the scientific careers of those in underrepresented groups. It is only now that I am beginning to see real change in the hiring and advancement of women in the chemistry field in the U.S. and it parallels the increased number of women chemists in leadership roles. This includes women as science and engineering department heads, deans, provost and presidents, women in editorial roles and on their advisory boards, women elected to prestigious and learned societies, CEOs and policy makers. Although the numbers are smaller, I see a similar impact when those of color and those of different gender identity rise to leadership roles. In addition, their visibility as a leader allows all of those from STEM underrepresented groups to imagine themselves climbing up the career ladder, to stay engaged and to be innovative. In the international realm, it is critically important that scientist and engineers from developing countries be included and given meaningful leadership roles. Their voices and leadership are critical for advancing global science and innovation in this increasingly global society of today.

What can those in leadership positions do to advance progress?

Those in leadership roles have to talk-the-talk and walk-the-walk. They must work with their unit or organization to develop a set of expectations and policies for creating and sustaining a fair and inclusive workplace, develop plans for implementation, create metrics to evaluate progress and routinely measure the level of success in achieving these metrics. They also must lead the effort to weave diversity, equity and inclusion into the fabric of the institution, including all institutional messaging.

Your work with COACH and Water First looks at empowering women, especially in developing countries, to become leaders in their fields and build stronger research collaborations. Can you tell us more about these experiences and why you decided to work in this area?

In developing countries the talents of women scientists and engineers are underutilized and underappreciated. These are talents that COACH believes we cannot afford to waste. Having a mentor to provide guidance, or a role model to emulate is nearly non-existent. This is the void that COACH is working to fill, helping women advance in their careers by providing career guidance and mentoring while also helping them to expand their international networks and collaborations. In many of these countries one gains scientific credibility through international collaborations and networks. Unfortunately, these are largely dominated by men, leaving women with little opportunity for career advancement through these channels. Furthermore, the male-dominated views can lead to very different outcomes without women's voices and perspectives. For example, through our Water First efforts in Africa to network together women scientists working resources we consistently hear their impatience with the lack of progress in their country on water security issues. They attribute this to the male dominated leadership that spends all their time developing policy with no plan for implementation. The women in contrast are the ones that are working in their laboratories on water issues or taking care of water needs in their families and communities, yet they feel that they have no influence. A wonderful exception to this is a Tunisian woman, Dr. Akica Bahri woman who has been part of our Water First! effort over the years. In January 2020 she was appointed as Secretary of State for Water Resources in Tunisia. In 2019, our long-time Water First participant, Dr. Jackie King from South Africa who was awarded the 2019 Water Stockholm Prize "for her game-changing contributions to global river management."



Our planet’s ecosystems and climate are experiencing unprecedented rates of change. The science tells us that we are not on track to limit an increase in average global temperatures and

that our greenhouse gas emissions continue to rise.

Additionally, we read on the news and experience firsthand the consequence of climate change in the form of extreme storms, heatwaves, droughts and floods – just to name a few. Unfortunately, climate change is a wicked problem. There is no one single solution. There is no silver bullet. We need to break down the silos between individual disciplines and adopt a more integrated approach. Action is needed.

Biography

Inspired by David Attenborough documentaries as a child, Lewis has been amazed by the natural world from an early age. Undergraduate and master’s degrees in Earth Science and Climate Change nurtured this interest, but it was doctoral and post-doctoral research on Antarctica that centered his focus on environmental change. Following over 5 years with the Nature Research Group, Lewis joined Cell Press as the launch Editor-in-Chief of the journal One Earth, a home for high-quality research that seeks to understand and address today’s environmental grand challenges. One Earth aspires to break down barriers between disciplines and stimulate the cross-pollination of ideas with a platform that unites communities, fosters dialogue, and encourages transformative research.

SDG Focus Interviews

SDG13 Climate Action

Dr. Lewis Collins
Editor in Chief,
One Earth



The commitments made under the Paris Agreement, that aim to limit global warming to well below 2 degrees and ideally no more than 1.5 degrees are not on track. What can scientists do to help accelerate progress?

Science has already identified the cause, the consequences, and in many cases, viable solutions to avert the climate crisis. The efforts of scientists over the past few decades have been nothing short of monumental. And yet despite these efforts, despite the mountain of scientific literature, the overwhelming evidence, and the stark warnings the science has largely been ignored. Science has had to battle against those with vested interests in fossil fuels, climate deniers, and powerful entities. Seeds of mistrust have been sown and today science is far too often questioned rather than accepted for the truth it represents. This means that in addition to advancing our understanding of the complexity of climate change, science must also fight to make itself heard. Ensuring that science is communicated effectively, is grounded in real world examples, and is heard and acted upon by the right people, is one of the greatest challenges facing those working in climate research today. Many argue that a transdisciplinary approach, where scientists work with other stakeholders outside academia, is most effective. By engaging local communities, business leaders, and policy makers early in the research process, the co-creation of knowledge can generate bonds of trust that are needed to successfully execute climate action.

The people most affected by climate change are those who have contributed the least and have the fewest resources to adapt. How important is it that we address the impacts of climate change both locally and globally?

As with the ongoing pandemic, it is often uttered that we are ‘all in this together’ – nothing could be further from the truth. Climate change sees the vulnerable suffer the most, it accentuates inequalities in both space and time and poses a very real threat to the 2030 Agenda pledge to leave no-one behind. Climate change is a problem primarily borne from the economic development of higher income countries in the Global North. It is right that these nations should have a greater mitigation role in addressing climate change and provide the resources necessary to assist lower income nations in their climate adaptation efforts. This is precisely what is outlined in the

UNFCCC’s Common but Differentiated Responsibilities and Respective Capabilities principle. However, we unfortunately cannot afford for the developing nations of the world to repeat the past mistakes of the Global North. It is essential that we divorce economic growth from resource extraction and plot a greener more sustainable pathway to development. Although only a handful of countries have submitted enhanced greenhouse gas emission reduction plans we are seeing local and regional efforts to mitigate climate change increase. Over 2000 businesses, cities, investors, regions and universities have now committed to achieving net-zero emissions targets by 2050. Greater investment in local solutions to address this very global problem will be essential, especially in light of the continued delays in decarbonization commitments at an international level.

How can we spur innovation, scale up solutions and bring down costs?

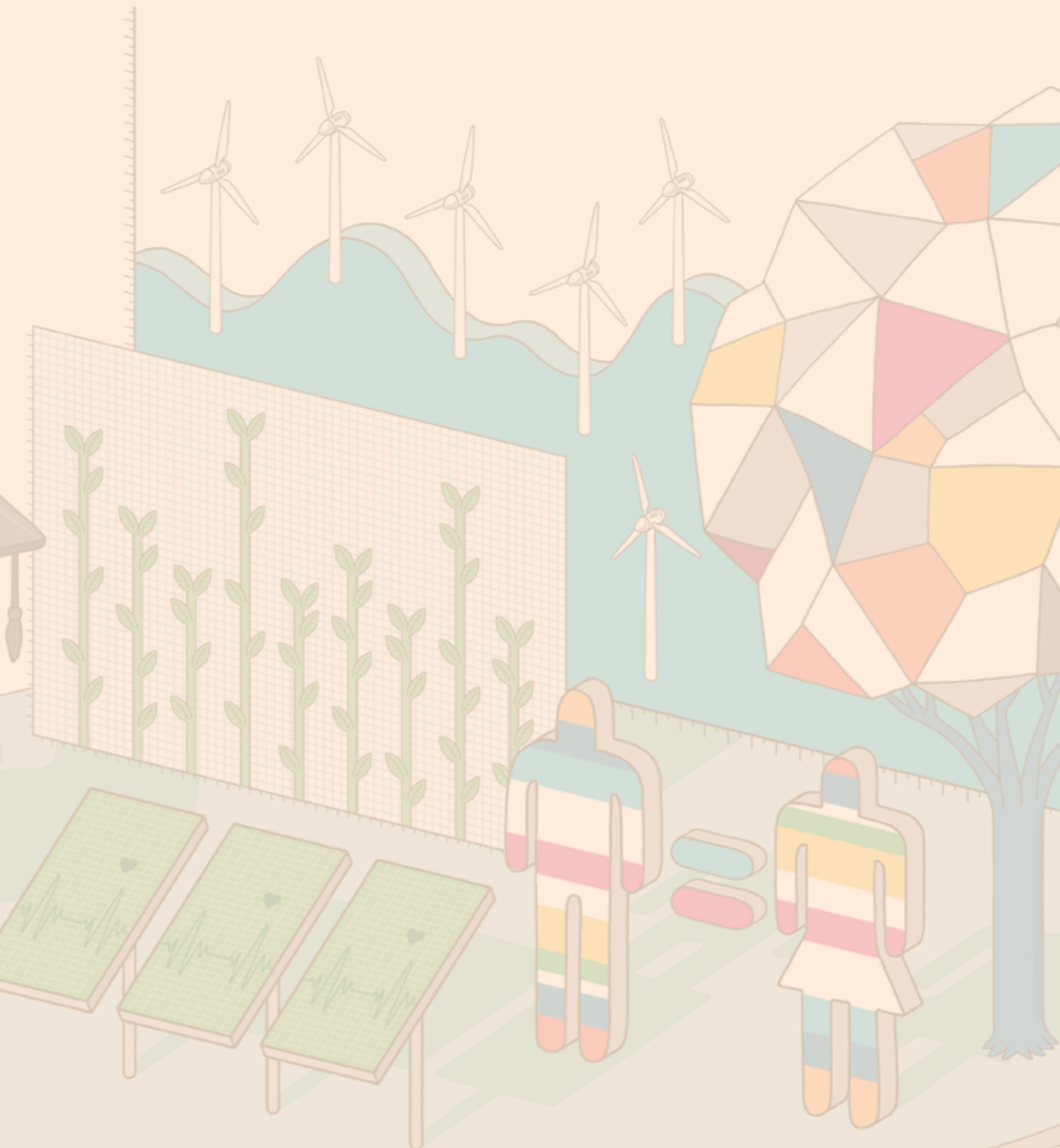
Our most pressing challenge at present is to ensure we rebuild in a better way as we recover from the COVID-19 pandemic and economic downturn and this need provides fantastic opportunities to invest in a green recovery. We must resist the temptation to reinvest in fossil fuel infrastructure. While climate mitigation and adaptation will prove costly, the costs of inaction are considerably higher. Anyone familiar with Project Drawdown (and if you aren’t, then check it out) will be aware that we largely already have the solutions necessary to address climate change. Sure, further refinement and innovation are welcome, assuming this doesn’t compromise other sustainable development goals, but while some technological bottlenecks remain it is largely policy barriers that prevent the application and scaling of climate solutions. As discussed in a recent One Earth paper from the Stanford Woods Institute for the Environment, scaling solutions requires coalitions of public, private, and civil society actors. Although many would argue that the current market driven economic system we have is flawed, it remains the only system we have. Learning how to successfully leverage market power, incentivize collaboration, and punish inaction via this system likely represents our best chance to rebuild better and successfully address the climate emergency we all face.

SDG Graphics and Research Trends

Over the past five years, we have used data and analytics to help the research and healthcare communities navigate the sea of research and to put collaboration, both interdisciplinary and international, at the heart of scientific progress on the SDGs.

Click the SDG to navigate directly to each section

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



SDG₁ No Poverty



Will the Sustainable Development Goals address the links between poverty and the natural environment?

Judith Schleicher, Marije Schaafsma, Bhaskar Vira | DOI: [10.1016/j.resconrec.2019.104507](https://doi.org/10.1016/j.resconrec.2019.104507)

The relationships between the natural environment and poverty have been a central theme in the sustainability and development literatures. However, they have been less influential in mainstream international development and conservation policies, which often neglect or fail to adequately address these relationships.

This paper examines how the Sustainable Development Goals (SDGs) may influence the framing of environment–poverty relationships. The authors argue that the SDGs’ comprehensive nature could provide an opportunity for better environment–poverty integration. To realise this potential, SDG-related activities will need to challenge the institutional status quo; transform how we measure, understand and implement development; design interventions that reflect local visions of development; make trade-offs between SDGs explicit; and address ultimate drivers of environmental degradation and poverty.

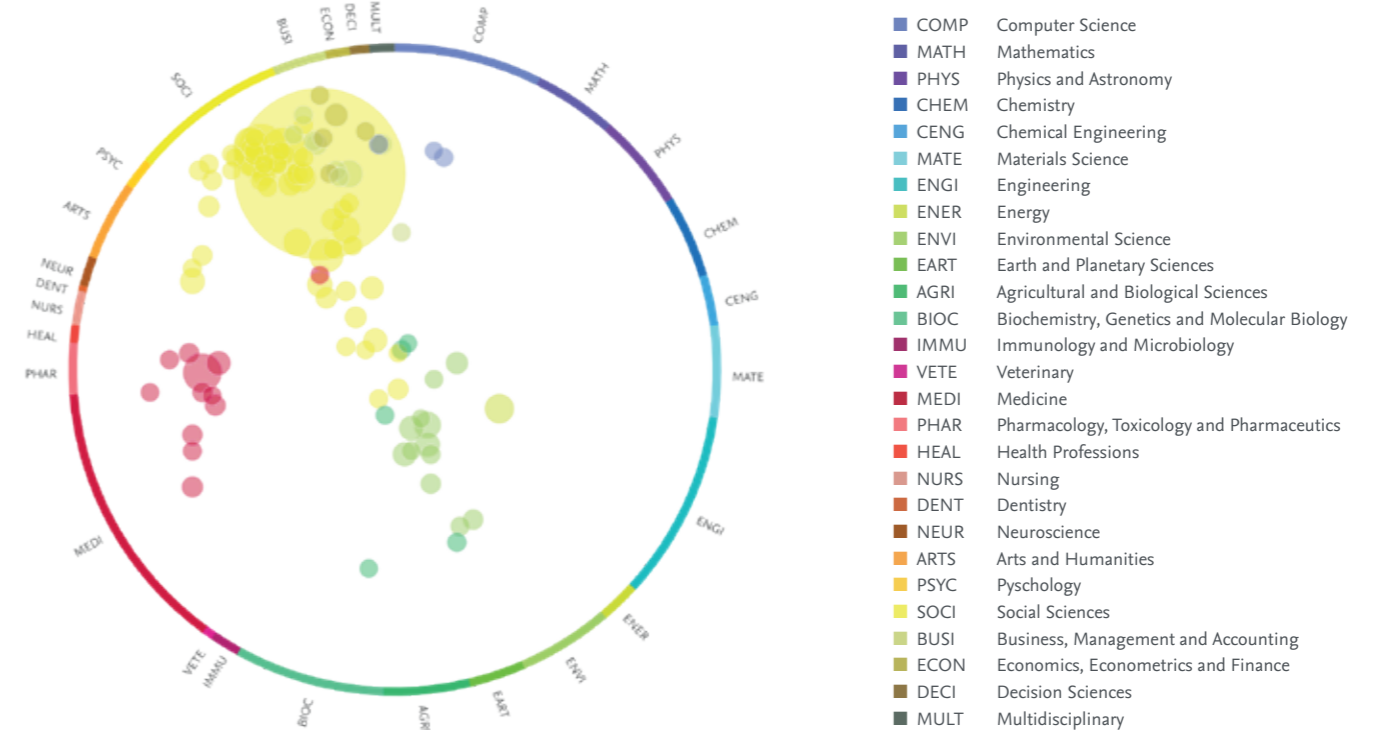
“We have the content, we have the international reach. We have the ambition, we have the people, and we have an incredible capacity to innovate. We can use all of that to advocate for better policies and better action to reach these goals”

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Highlights

- The SDGs offer opportunities for closer environment–poverty integration.
- To be transformative, the SDGs need a broadening of measures and indicators.
- Indicators should include constituent roles of environment in wellbeing and poverty.
- A need to encourage locally shared visions of development that lead to action.
- The SDGs should make trade-offs and drivers of environmental loss and poverty explicit.

The [United Nations](#) state that baseline projections suggest that 6% of the global population will still be living in extreme poverty by 2030 – with the COVID-19 pandemic threatening to increase it to 8%. This projection means that unless urgent action is taken, the target will not be achieved. Poverty has many different interconnected elements and has been explored in the scientific literature across many different disciplines. Explore research output, impact and collaboration on SDG₁, and see which research trends are shaping the global conversation.



Investigate, understand and analyse SDG research globally with SciVal Research Areas for the UN Sustainable Development Goals (SDGs). Research Areas queries can help researchers and institutions track and demonstrate progress towards the targets of the SDGs. The Topic Wheel presented here clusters publications 2010–2019 into global, unique research topics based on citation patterns.

Research linked to [SDG₁](#) is most prominent within Social Sciences and Medicine, and in lesser part Environmental and Agricultural Sciences. The 17 Perspective Abstract in the page before offers a complementary view of how Poverty and the Environment are linked, and would benefit from an even closer integration.

Expert Insights

High-quality health systems in the Sustainable Development Goals era: time for a revolution

Although health outcomes have improved in low-income and middle-income countries in the past several decades, a new reality is at hand. Changing health needs, growing public expectations, and ambitious new health goals are raising the bar for health systems to produce better health outcomes and greater social value. But staying on current trajectory will not suffice to meet these demands. What is needed are high-quality health systems that optimize health care in each given context by consistently delivering care that improves or maintains health, by being valued and trusted by all people, and by responding to changing population needs.

In this [Lancet Global Health Commission](#), the authors assert that providing health services without guaranteeing a minimum level of quality is ineffective, wasteful, and unethical. Moving to a high-quality health system—one that improves health and generates confidence and economic benefits—is primarily a political, not technical, decision. National governments need to invest in high-quality health systems for their own people and make such systems accountable to people through legislation, education about rights, regulation, transparency, and greater public participation. Countries will know that they are on the way towards a high-quality, accountable health system when health workers and policymakers choose to receive health care in their own public institutions.

Many of the SDGs are inextricably linked: progress towards one Goal depends on and affects other Goals. The implications of this are clear: the science supporting the SDGs must be multidisciplinary, international and have considered the relevance of sex and gender factors. The 19 papers commissioned for the [Elsevier SDG Perspectives Project](#) look at the SDGs from environmental, social sciences and health perspectives, and offer nuanced insights into the ambitions, achievements and limitations of the 2030 Agenda. These articles have been published in Special Issues of [Current Opinion in Environmental Sustainability](#), [World Development](#) and [Health Policy](#) and provide complementary insights to each SDG infographic.

SDG1 No Poverty

2015-2019
Output, Impact, Collaboration

Research supporting SDG1 has grown since 2015, with a compound annual growth rate of 4.5% compared to nearly 3.5% for research in all fields.

The US produces the most research supporting SDG1, followed by the United Kingdom, China, India and Australia. Seven of the 10 most prolific locations are high income locations (accounting for more than 6,300 publications); two are upper-middle income locations (China and South Africa) and one is a lower-middle income location (India). Four low income locations featured in the top 50: Ethiopia (122 publications), Tanzania (82 publications), Uganda (70 publications) and Nepal (58 publications).

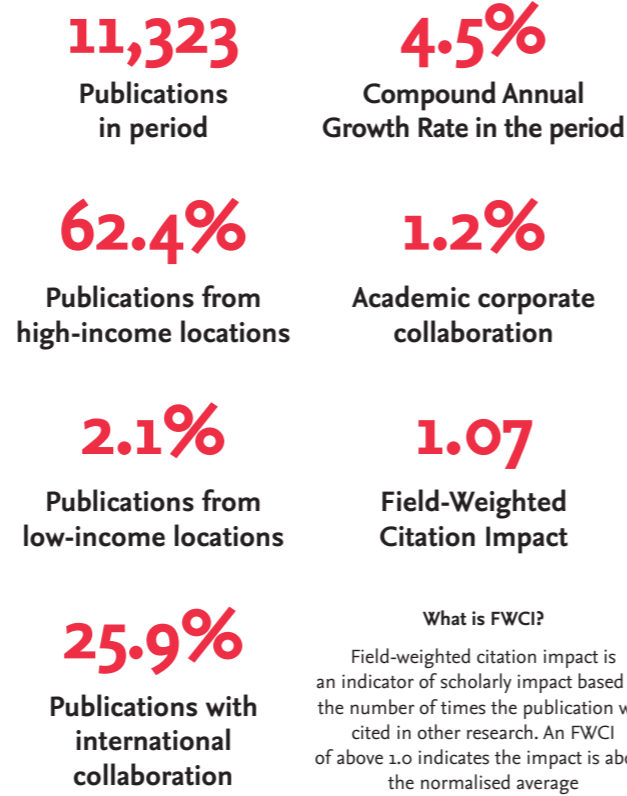
The top five locations for which research on SDG1 represents the largest share of their research portfolio are Ghana, Kenya, Ethiopia, Bangladesh and Nigeria.

International collaboration yielded 26% of research on SDG1. High income locations collaborated with low income locations on 7% of their total SDG1 research, while nearly 70% of the related output from low income locations came from collaboration with high income locations.

As a measure of academic impact measured by citation, the field weighted citation impact (FWCI) for SDG1 research was above average for four out of five years, with an average of 1.07 over the period.

This analysis builds on Elsevier's [Sustainability Science in a Global Landscape](#) report, which was released in 2015 to coincide with the launch of the SDGs. See a [2017 update](#) on key findings on the RELX SDG Resource Centre. Help us to provide insight into SDG research. [Click here to review the research](#)
[See the methodology and definitions](#)

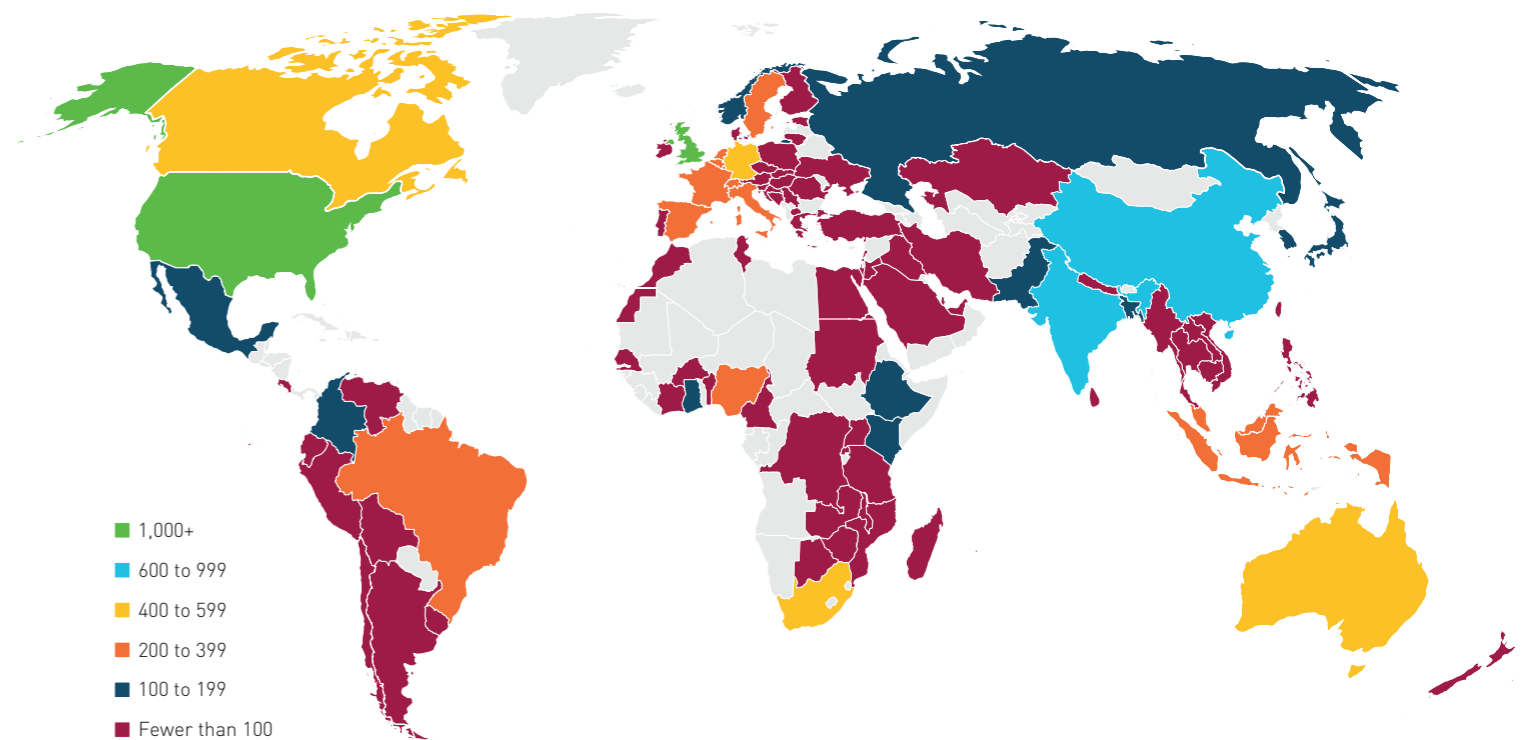
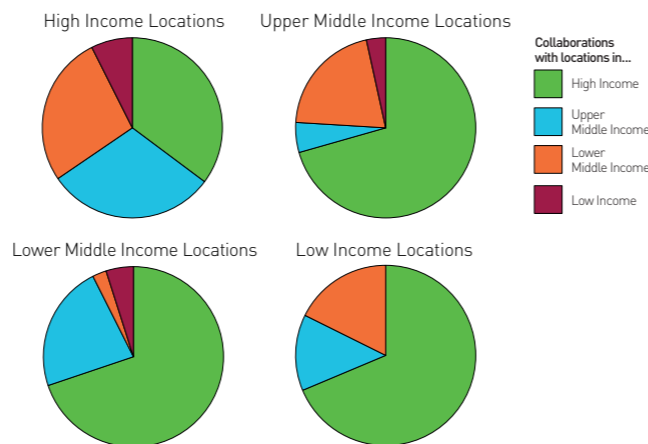
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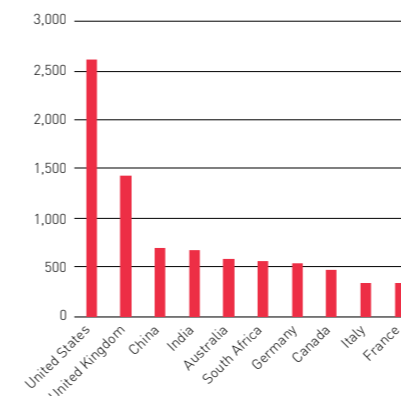
Key themes in SDG1 Research



International collaboration between income groups by location

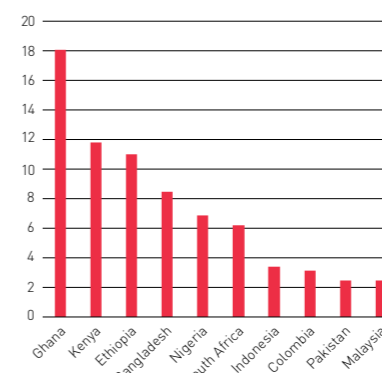


Top 10 locations by publication

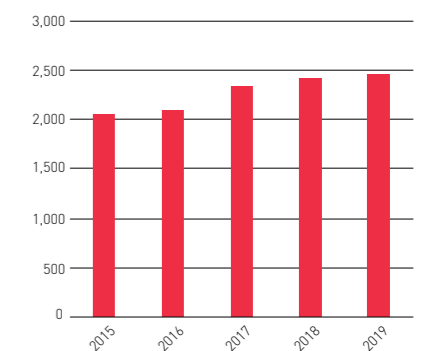


Top 10 locations by RAI

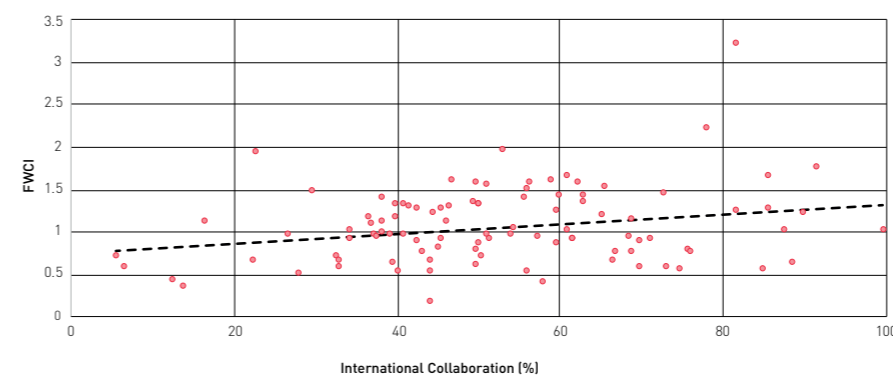
*(Relative Activity Index)



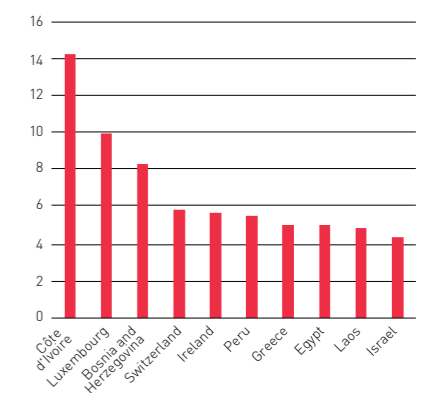
Volume of publications supporting SDG1



International collaboration and research impact



Top 10 locations for corporate-academic collaboration



SDG2 Zero Hunger



Development pathways toward “zero hunger”

Jennifer Blesh⁴, Lesli Hoey⁵, Andrew D. Jones⁶,
Harriet Friedmann⁷ & Ivette Perfecto⁸

DOI: [10.1016/j.worlddev.2019.02.004](https://doi.org/10.1016/j.worlddev.2019.02.004)

Globally, industrial agriculture threatens critical ecosystem processes on which crop production depends, while 815 million people are undernourished and many more suffer from malnutrition. The second Sustainable Development Goal seeks to simultaneously address global environmental sustainability and food security challenges. The authors conducted an integrated literature review organized around three disciplinary perspectives central to realizing SDG2: ecology and agricultural sciences, nutrition and public health, and political economy and policy science. By applying a food systems lens, their review identifies several limitations in the way SDG2 is applied by researchers including a productionist perspective, limited attention to ecological processes on farms, a definition of food security that lacks a food systems perspective, and a lack of attention to historical and structural factors that shape opportunities for equity and food security in different contexts. It also considers possibilities for expanding the research agenda and associated implications for development practice. The authors argue that the pathway to achieving Zero Hunger should center on place-based, adaptive, participatory solutions that simultaneously attend to local institutional capacities, agroecosystem diversification and

ecological management, and the quality of local diets. Two conceptual frameworks – social-ecological systems and sustainable diets – offer systems-based lenses for integrated analysis of agriculture and food security, which could inform the development of effective policies.

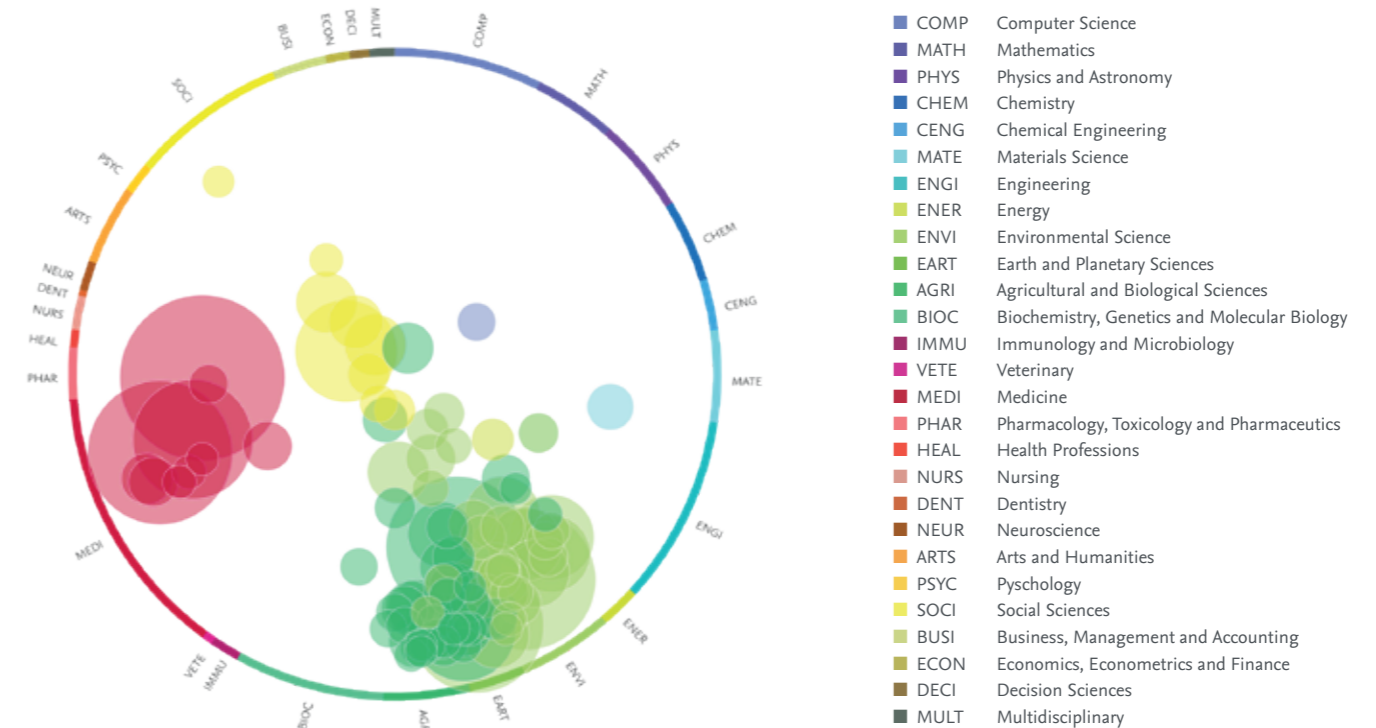
“SDG2 reflects an emerging public consensus that collective action is needed to address the global environmental, public health, and social equity crises confronting the current food system. (...) However, our review of the literature referencing SDG2 from three disciplinary areas suggests that scholars are generally not linking these dimensions when they study food systems..”

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- 6 Department of Nutritional Sciences, School of Public Health, 1415 Washington Heights, University of Michigan, Ann Arbor, MI 48109, USA
- 7 Munk School of Global Affairs, University of Toronto, 315 Bloor St. W, Toronto, ON M5S0A7, Canada
- 8 School for Environment and Sustainability, 440 Church St., University of Michigan, Ann Arbor, MI 48109, USA

Highlights

- Scholars referencing SDG2 generally do not link ecology, nutrition, and policy science dimensions of food systems.
- Future research should include stronger engagement with relevant concepts from ecology, nutrition, and policy science.
- Achieving SDG2 requires attention to institutional capacities, ecosystem-based management, and the quality of diets.
- A social-ecological systems approach and the sustainable diets framework could inform effective SDG2 policies.

According to the [United Nations](#) “the world is not on track to achieve Zero Hunger by 2030. If recent trends continue, the number of people affected by hunger would surpass 840 million by 2030. [...] The COVID-19 pandemic could now double that number, putting an additional 130 million people at risk of suffering acute hunger by the end of 2020.” Explore research output, impact and collaboration on SDG2, and see which research trends are shaping the global conversation.



Investigate, understand and analyse SDG research globally with SciVal Research Areas for the UN Sustainable Development Goals (SDGs). Research Areas queries can help researchers and institutions track and demonstrate progress towards the targets of the SDGs. The Topic Wheel presented here clusters publications 2010-2019 into global, unique research topics based on citation patterns.

Research linked to [SDG2](#) is most prominent within Environmental Sciences, Medicine and Social Sciences. The 17 Perspective Abstract in the page before offers a complementary view, arguing that in order to drive progress and develop effective policies, SDG2 research should be closely linked to Decision Sciences.

Expert Insights

Food in the Anthropocene: the EAT–Lancet Commission on healthy diets from sustainable food systems

Food systems have the potential to nurture human health and support environmental sustainability, however our current trajectories threaten both. The [EAT–Lancet Commission](#) addresses the need to feed a growing global population a healthy diet while also defining sustainable food systems that will minimize damage to our planet. The Commission quantitatively describes a universal healthy reference diet, based on an increase in consumption of healthy

foods (such as vegetables, fruits, whole grains, legumes, and nuts), and a decrease in consumption of unhealthy foods (such as red meat, sugar, and refined grains) that would provide major health benefits, and also increase the likelihood of attainment of the Sustainable Development Goals. This is set against the backdrop of defined scientific boundaries that would ensure a safe operating space within six Earth systems, towards sustaining a healthy planet.

Many of the SDGs are inextricably linked: progress towards one Goal depends on and affects other Goals. The implications of this are clear: the science supporting the SDGs must be multidisciplinary, international and have considered the relevance of sex and gender factors. The 19 papers commissioned for the [Elsevier SDG Perspectives Project](#) look at the SDGs from environmental, social sciences and health perspectives, and offer nuanced insights into the ambitions, achievements and limitations of the 2030 Agenda. These articles have been published in Special Issues of [Current Opinion in Environmental Sustainability](#), [World Development](#) and [Health Policy](#) and provide complementary insights to each SDG infographic.

SDG2 Zero Hunger

2015-2019

Output, Impact, Collaboration

Research supporting SDG2 has grown since 2015, with a compound annual growth rate of 9.6% compared to nearly 3.5% for research in all fields.

The US produces the most research supporting SDG2, followed by the China, India, UK and Brazil. Seven of the 10 most prolific locations are high income locations (accounting for more than 26,000 publications); two are upper-middle income locations (China and Brazil) and one is a lower-middle income location (India). Two low income locations featured in the top 50: Ethiopia (1,065 publications) and Tanzania (501 publications).

The top five locations for which research on SDG2 represents the largest share of their research portfolio are Niger, Mali, Zimbabwe, Kenya, and Burkina Faso.

International collaboration yielded 11% of research on SDG2. High income locations collaborated with low income locations on 7% of their total SDG2 research, while 60% of the related output from low income locations came from collaboration with high income locations.

As a measure of academic impact measured by citation, the field weighted citation impact (FWCI) for SDG2 research was above average every year, with an average of 1.14 over the period.

This analysis builds on Elsevier's [Sustainability Science in a Global Landscape](#) report, which was released in 2015 to coincide with the launch of the SDGs. See a [2017 update](#) on key findings on the RELX SDG Resource Centre. Help us to provide insight into SDG research. [Click here to review the research](#)

[See the methodology and definitions](#)

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93,390
Publications
in period

9.6%
Compound Annual
Growth Rate in the period

55.1%
Publications from
high-income locations

1.3%
Academic corporate
collaboration

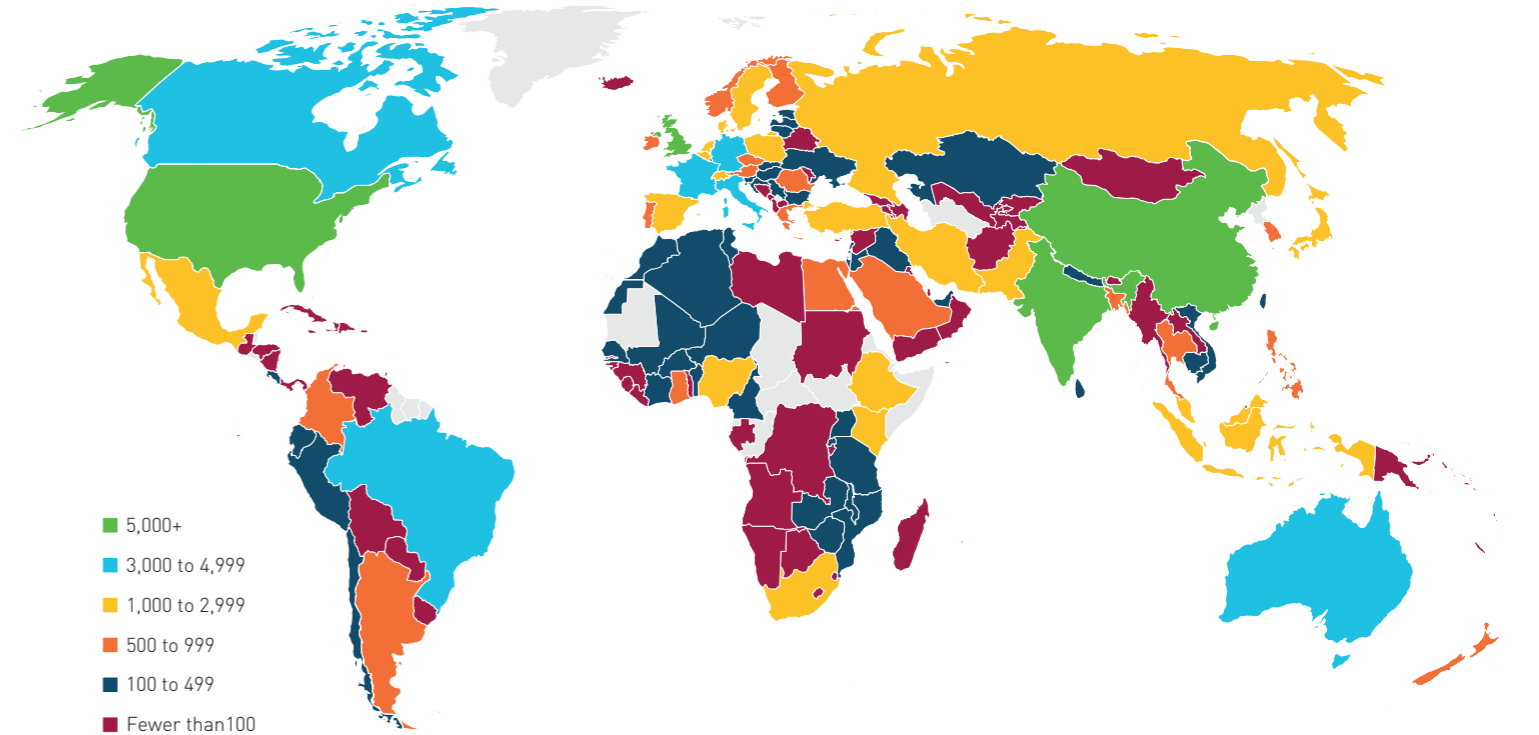
2.0%
Publications from
low-income locations

1.14
Field-Weighted
Citation Impact

11.2%
Publications with
international
collaboration

What is FWCI?

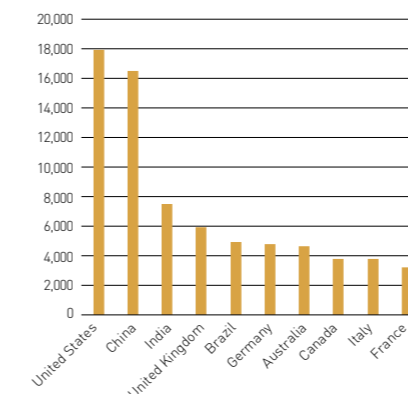
Field-weighted citation impact is an indicator of scholarly impact based on the number of times the publication was cited in other research. An FWCI of above 1.0 indicates the impact is above the normalised average



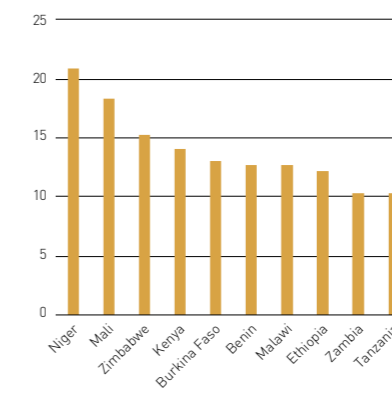
Key themes in SDG2 Research



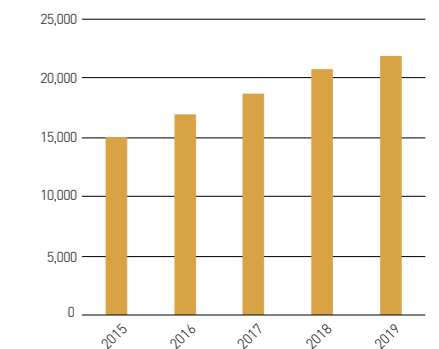
Top 10 locations by publication



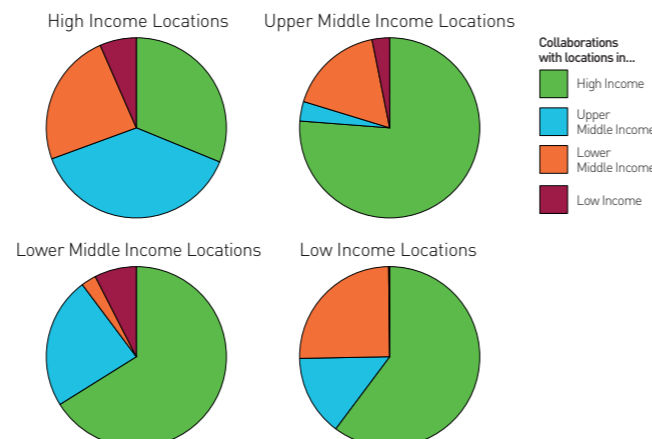
Top 10 locations by RAI
*(Relative Activity Index)



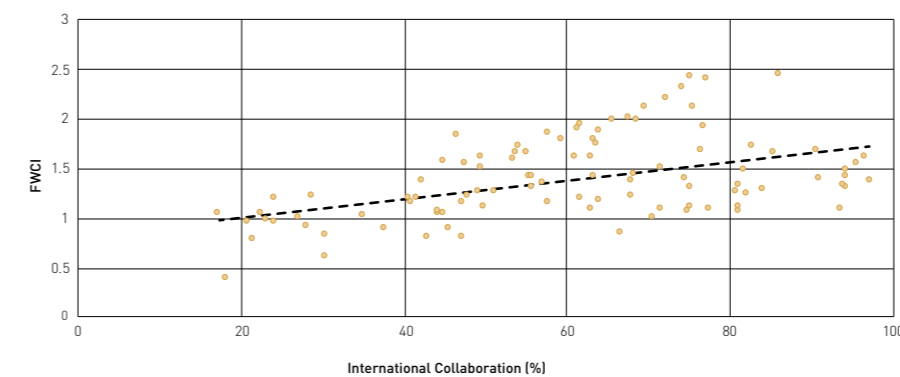
Volume of publications supporting SDG2



International collaboration between income groups by location

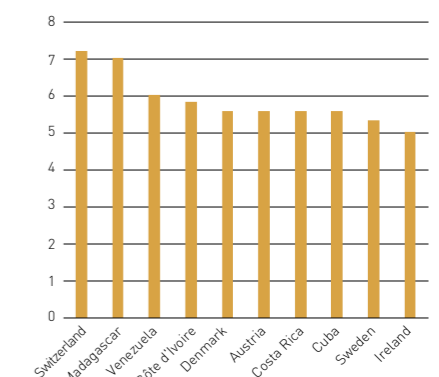


International collaboration and research impact



*Relative Activity Index is a measure of the proportion of the country's research output in the subject, relative to the proportion seen globally

Top 10 locations for corporate-academic collaboration



SDG₃ Good health & well-being



New partnerships, new perspectives: The relevance of sexual and reproductive health and rights for sustainable development

Susannah H. Mayhea⁹, Karen Newman¹⁰,
David Johnson¹¹, Emily Clark¹², Michael Hammer¹³,
Vik Moha¹⁴ & Sarah Ssali¹⁵

DOI: [10.1016/j.healthpol.2019.03.010](https://doi.org/10.1016/j.healthpol.2019.03.010)

In the light of the opportunities presented by the Sustainable Development Goals (SDGs) debate is being reignited to understand the connections between human population dynamics (including rapid population growth) and sustainable development. Sustainable development is seriously affected by human population dynamics yet programme planners too often fail to consider them in development programming, casting doubt on the sustainability of such programming. Some innovative initiatives are attempting to cross sector boundaries once again, such as the Population Health and Environment (PHE) programs, which are integrated programs encompassing family planning service provision with broader public health services and environmental conservation activities. These initiatives take on greater prominence in the context of the SDGs since they explicitly seek to provide cross-sector programming and governance to improve both human and planetary wellbeing. Yet such initiatives remain under-researched and under promoted.

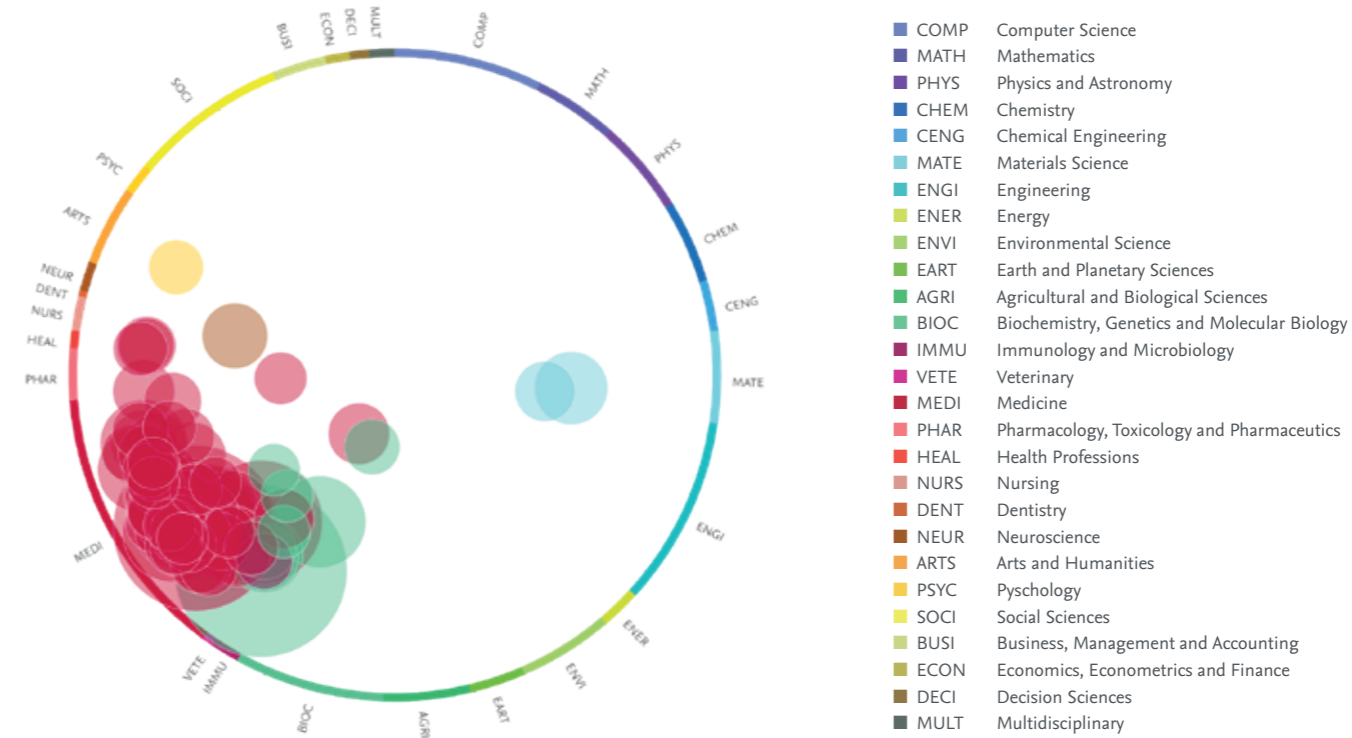
“It is complex to integrate different policy and service delivery approaches across sector boundaries. These difficulties are not only technical, they also rooted in siloed thinking and programme practice in the way that donors, governments, administrations and agencies engage with the challenge that is increasingly framed as One Health or, more pretentiously, Planetary Health. We need innovation to break those silos and forge ahead with new perspectives and new partnerships if we are to generate successful sustainability and rights-based programs for the interconnected challenges that lie between where we are now, and sustainable development for what Dr Halfdan Mahler used to call Spaceship Earth.”

- | | |
|--|---|
| 9 London School of Hygiene & Tropical Medicine, Faculty of Public Health and Policy United Kingdom | 13 Philosophy, International Relations and Environment (SPIRE), Keele University, United Kingdom; and World Animal Protection, United Kingdom |
| 10 Independent consultant | 14 Blue Ventures, United Kingdom |
| 11 Population and Sustainability Network, Margaret Pyke Trust, United Kingdom | 15 Makerere University, Uganda |
| 12 Blue Ventures, United Kingdom | |

Highlights

- Human population dynamics seriously affect sustainable development.
- Sustainable Development programs often fail to consider human population dynamics.
- Some innovative initiatives are providing cross sector programs to achieve sustainable development.
- Commitment to cross-sector integration is needed to generate new partnerships to achieve the Sustainable Development Goals.

The [United Nations](#) mention that in the past decade “significant strides were made in increasing life expectancy ... But more efforts are needed to fully eradicate a wide range of diseases and address many different persistent and emerging health issues.” In addition, “health emergencies such as COVID-19 pose a global risk and have shown the critical need for preparedness.” Explore research output, impact and collaboration on SDG₃, and see which research trends are shaping the global conversation.



Investigate, understand and analyse SDG research globally with SciVal Research Areas for the UN Sustainable Development Goals (SDGs). Research Areas queries can help researchers and institutions track and demonstrate progress towards the targets of the SDGs. The Topic Wheel presented here clusters publications 2010-2019 into global, unique research topics based on citation patterns.

Research linked to [SDG₃](#) is most prominent within Medicine and Biochemistry. The 17 Perspective Abstract in the page before offers a complementary view, highlighting cross-sector programs that encompass Population, Health and the Environment – with the latter being too often neglected in SDG₃ research.

Expert Insights

A future for the world's children? A WHO-UNICEF-Lancet Commission

The health and wellbeing of children now and in the future depends on overcoming new challenges that are escalating at such speed as to threaten the progress and successes of the past two decades in child health. The climate emergency is rapidly undermining the future survival of all species, and the likelihood of a world in which all children enjoy their right to health appears increasingly out of reach. A second existential threat that is more insidious has emerged:

predatory commercial exploitation that is encouraging harmful and addictive activities that are extremely deleterious to young people's health. The [WHO-UNICEF-Lancet Commission](#) lays the foundations for a new global movement for child health that addresses these two crises and presents high-level recommendations that position children at the centre of the Sustainable Development Goals (SDGs).

Many of the SDGs are inextricably linked: progress towards one Goal depends on and affects other Goals. The implications of this are clear: the science supporting the SDGs must be multidisciplinary, international and have considered the relevance of sex and gender factors. The 19 papers commissioned for the [Elsevier SDG Perspectives Project](#) look at the SDGs from environmental, social sciences and health perspectives, and offer nuanced insights into the ambitions, achievements and limitations of the 2030 Agenda. These articles have been published in Special Issues of [Current Opinion in Environmental Sustainability](#), [World Development](#) and [Health Policy](#) and provide complementary insights to each SDG infographic.

SDG3 Good health & well-being

2015-2019

Output, Impact, Collaboration

Research supporting SDG3 has grown since 2015, with a compound annual growth rate of 0.9% compared to nearly 3.5% for research in all fields.

The US produces the most research supporting SDG3, followed by China, the United Kingdom, Germany and Italy. Eight of the 10 most prolific locations are high income locations (accounting for more than 2.2 million publications); one is an upper-middle income location (China) and one is a lower-middle income location (India). No low income locations featured in the top 50.

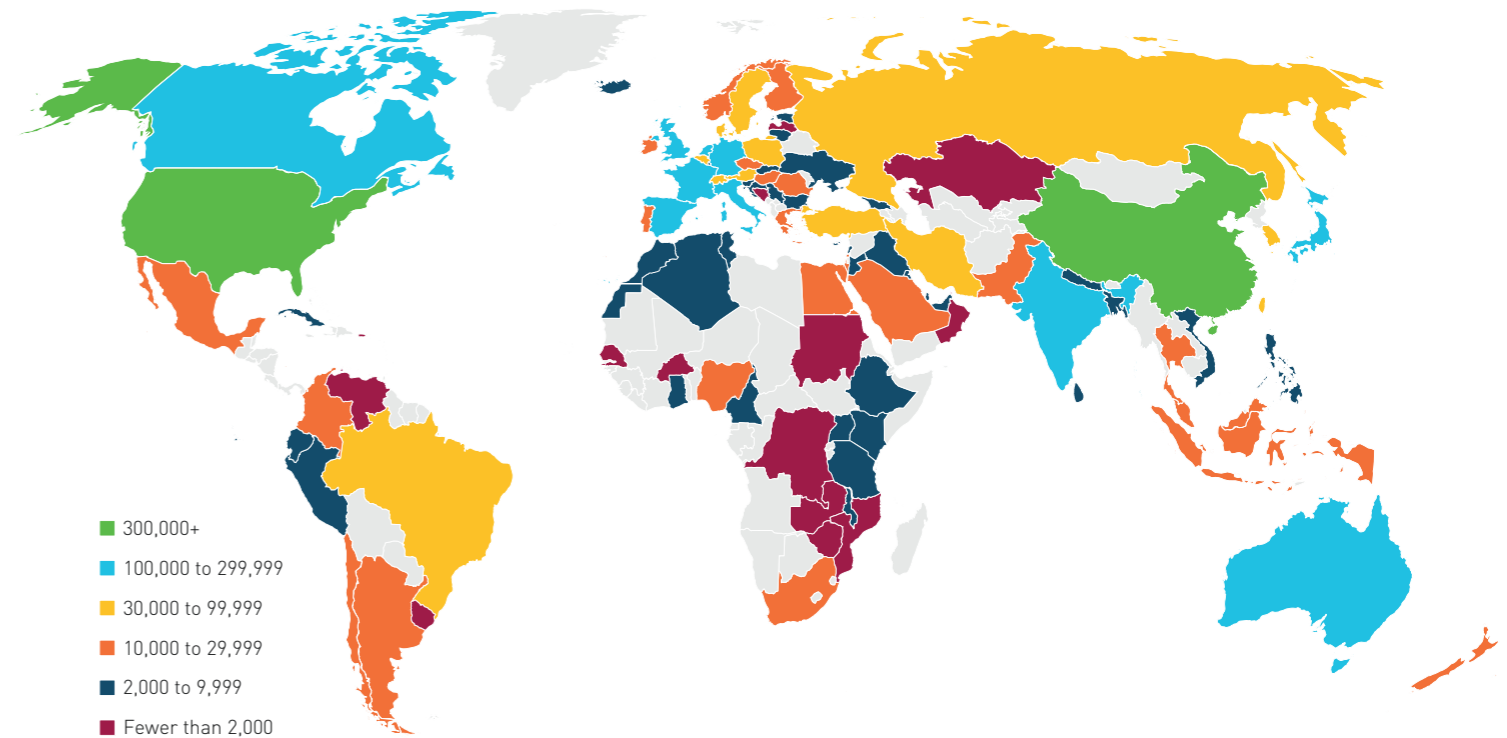
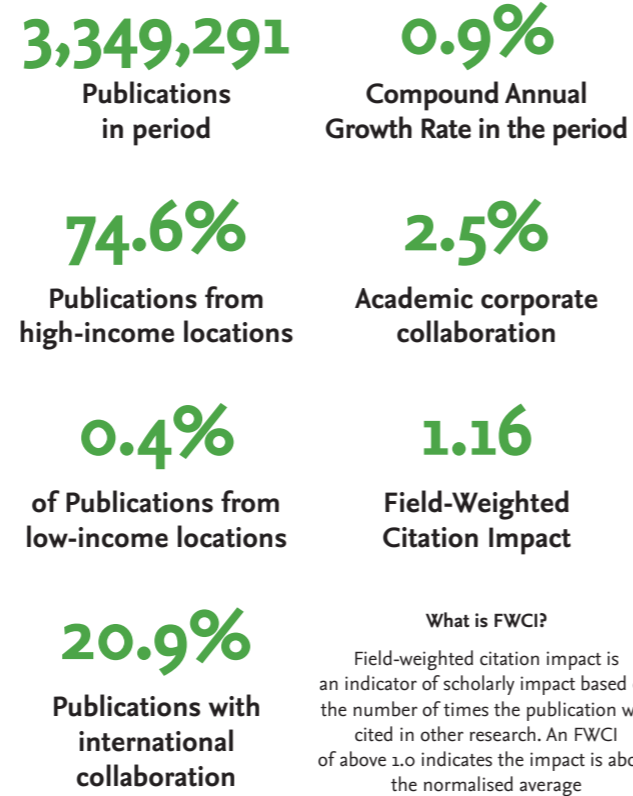
The top five locations for which research on SDG3 represents the largest share of their research portfolio are Uganda, Ethiopia, Kenya, Ghana and Lebanon.

International collaboration yielded 21% of research on SDG3. High income locations collaborated with low income locations on 2% of their total SDG3 research, while 66% of the related output from low income locations came from collaboration with high income locations.

As a measure of academic impact measured by citation, the field weighted citation impact (FWCI) for SDG3 research was above average every year, with an average of 1.16 over the period.

This analysis builds on Elsevier's [Sustainability Science in a Global Landscape](#) report, which was released in 2015 to coincide with the launch of the SDGs. See a [2017 update](#) on key findings on the RELX SDG Resource Centre. Help us to provide insight into SDG research. [Click here to review the research](#)
[See the methodology and definitions](#)

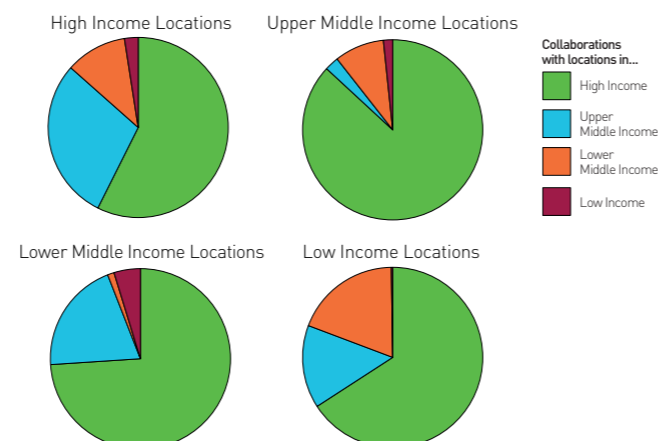
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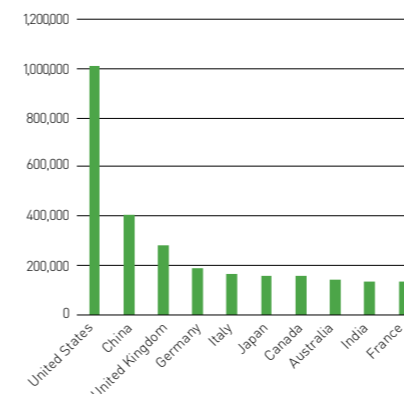
Key themes in SDG3 Research



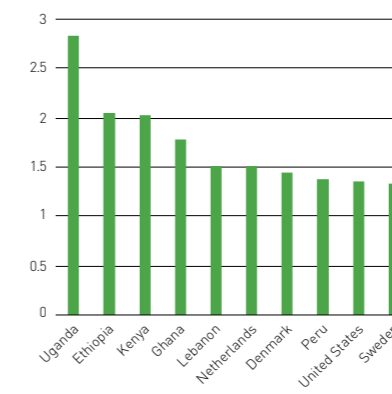
International collaboration between income groups by location



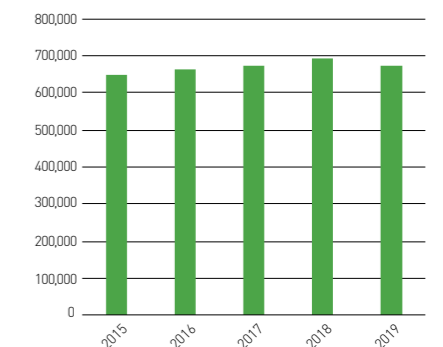
Top 10 locations by publication



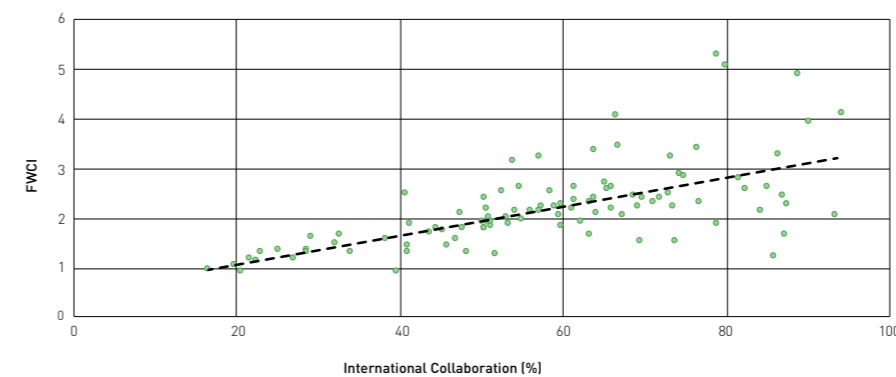
Top 10 locations by RAI *(Relative Activity Index)



Volume of publications supporting SDG3

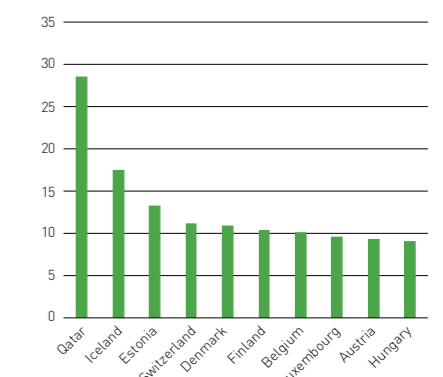


International collaboration and research impact



*Relative Activity Index is a measure of the proportion of the country's research output in the subject, relative to the proportion seen globally

Top 10 locations for corporate-academic collaboration



SDG4 Quality Education



The politics of quality reforms and the challenges for SDGs in education

Barbara Bruns¹⁶, Isabel Harbaugh Macdonald¹⁷ & Ben Ross Schneider¹⁸

DOI: [10.1016/j.worlddev.2019.02.008](https://doi.org/10.1016/j.worlddev.2019.02.008)

Understanding the politics of education reform is crucial to assess the challenges facing the SDG of quality education. This article surveys the small academic literature on the politics of reform as well as a wide range of empirical research on reform experiences across the world, with an emphasis on recent reforms in Latin America. The authors focus on teacher policy reforms, which play a central role in raising learning in primary and secondary schools, but pose three special challenges. First, they are contentious, often threatening the institutional interests of well-organized and politically powerful teacher unions. Second, implementation is opaque, as impact depends on classroom-level change that is difficult for reformers to monitor. And, third, benefits are long-term, usually well beyond the political tenure of reform champions. A close review of all major stakeholders – teacher unions, business, NGOs, religious authorities, international development agencies, and others – is a crucial first step to understanding potential sources of opposition and support.

Strategic issues in policy design and implementation include: consultation, sequencing, compensation, negotiation, communication, and sustaining reforms.

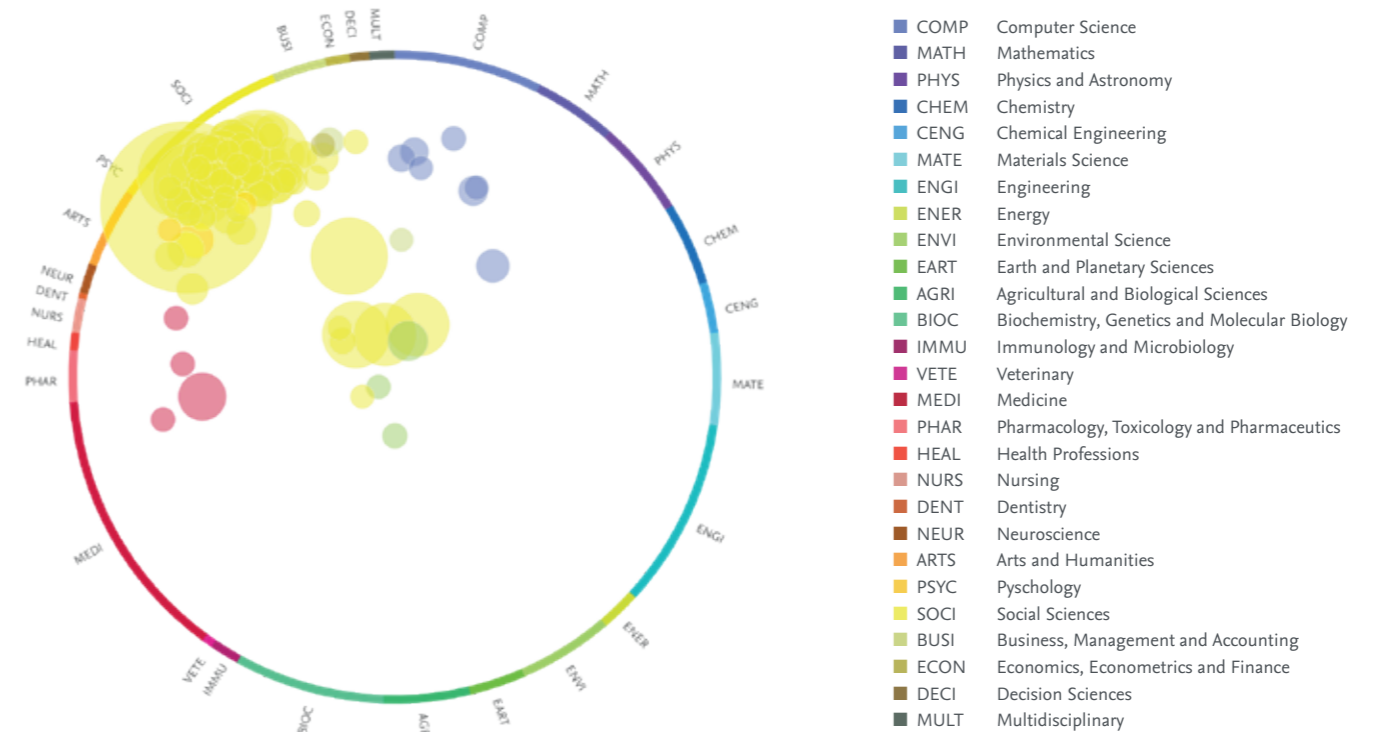
“The first and most definitive conclusion of this survey is that academic researchers have largely neglected the politics of education reform and left a gap in the knowledge base that reformers need for the design of more effective strategies. Even as research evidence accumulates on interventions that can improve education outcomes, little research exists on system-wide reforms, such as changes to core teacher policies, that cannot be evaluated experimentally.”

¹⁶ Center for Global Development and Georgetown University, United States
¹⁷ Kennedy School of Government, Harvard University, United States
¹⁸ Department of Political Science, MIT, United States

Highlights

- Main stakeholders in education politics, including teacher unions, business, parents, civil society, and policy networks.
- Key areas of design and implementation of education reform, such as sequencing and compensation.
- Strategies for building support for education reform through consultation, negotiation, and communication strategies.

According to the [United Nations](#) over the past decade, major progress was made towards increasing access to education and school enrollment rates at all levels, particularly for girls. Nevertheless, about 260 million children were still out of school in 2018.” And with the COVID-19 pandemic, “nearly 369 million children who rely on school meals needed to look to other sources for daily nutrition.” Explore research output, impact and collaboration on SDG4, and see which research trends are shaping the global conversation.



Investigate, understand and analyse SDG research globally with SciVal Research Areas for the UN Sustainable Development Goals (SDGs). Research Areas queries can help researchers and institutions track and demonstrate progress towards the targets of the SDGs. The Topic Wheel presented here clusters publications 2010-2019 into global, unique research topics based on citation patterns.

Research linked to SDG4 is most prominent within Social Sciences, followed by Computer Sciences and Medicine. The 17 Perspective Abstract in the page before offers a complementary view, arguing that in order to drive strategic policy design and implementation, SDG4 research should be closely linked to Decision Sciences.

Expert Insights

The Elsevier Foundation Data Analytics Preparatory Program

Women hold just 26% of data science-related jobs, and less than 1 in 10 women in that workforce are minorities, according to a 2017 report by the American Association of University Women. Through its programming Girls Inc., a non-profit serving girls ages 6-18 at more than 1,400 sites in 400 cities across the US and Canada, has prepared girls to study in STEM fields and attain college and postgraduate degrees. Over the past 4 years, Girls Inc of New York City (GYNYC) has introduced hundreds of high school girls to the field of data analytics. However, the demand for more programming, serving more girls at an even earlier age, has become a critical priority.

To achieve this, [GINYC has partnered with the Elsevier Foundation](#) to launch a first-of-its-kind introduction to data analytics for girls as young as 8th grade using a social justice lens – aiming to create a strong data skills pipeline for talented young women. GINYC serves a vulnerable population which has been particularly hard hit by the breakdown in social and financial safety nets due to the COVID-19 pandemic. Within a week of New York City schools closing, they were able to deliver all of their programs virtually and are working as quickly as possible to equip their girls with the necessary tablets, internet and technical skills.

Many of the SDGs are inextricably linked: progress towards one Goal depends on and affects other Goals. The implications of this are clear: the science supporting the SDGs must be multidisciplinary, international and have considered the relevance of sex and gender factors. The 19 papers commissioned for the [Elsevier SDG Perspectives Project](#) look at the SDGs from environmental, social sciences and health perspectives, and offer nuanced insights into the ambitions, achievements and limitations of the 2030 Agenda. These articles have been published in Special Issues of [Current Opinion in Environmental Sustainability](#), [World Development](#) and [Health Policy](#) and provide complementary insights to each SDG infographic.

SDG4 Quality Education

2015-2019

Output, Impact, Collaboration

Research supporting SDG4 has grown since 2015, with a compound annual growth rate of 7.6% compared to nearly 3.5% for research in all fields.

The US produces the most research supporting SDG4, followed by the United Kingdom, Australia, Brazil and the Russian Federation. Six of the 10 most prolific locations are high income locations (accounting for more than 13,400 publications) and four are upper-middle income locations (Brazil, Russian Federation, China and South Africa). No low income locations featured in the top 50.

The top five locations for which research on SDG4 represents the largest share of their research portfolio are Kazakhstan, South Africa, New Zealand, Australia and Nigeria.

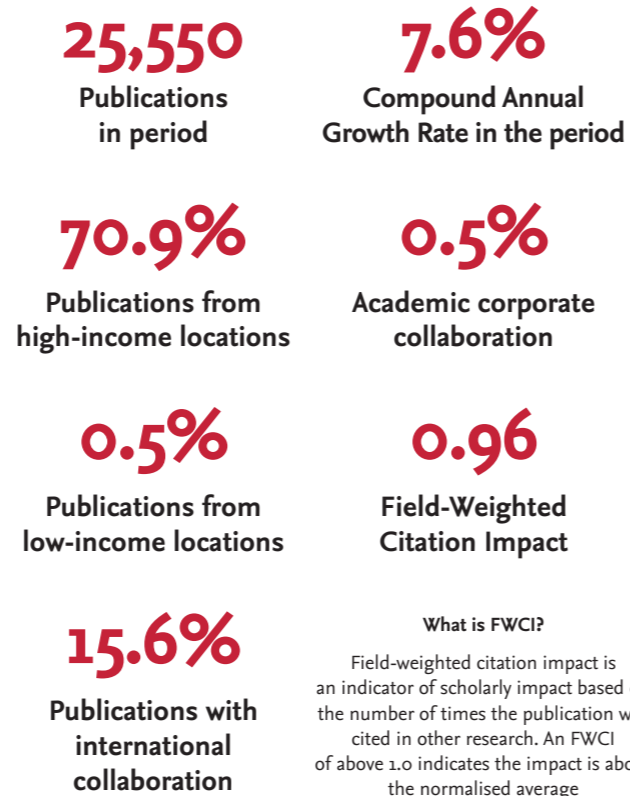
International collaboration yielded 16% of research on SDG4. High income locations collaborated with low income locations on 3% of their total SDG4 research, while 73% of the related output from low income locations came from collaboration with high income locations.

As a measure of academic impact measured by citation, the field weighted citation impact (FWCI) for SDG4 research was below average for four out of five years, with an average of 0.96 over the period.

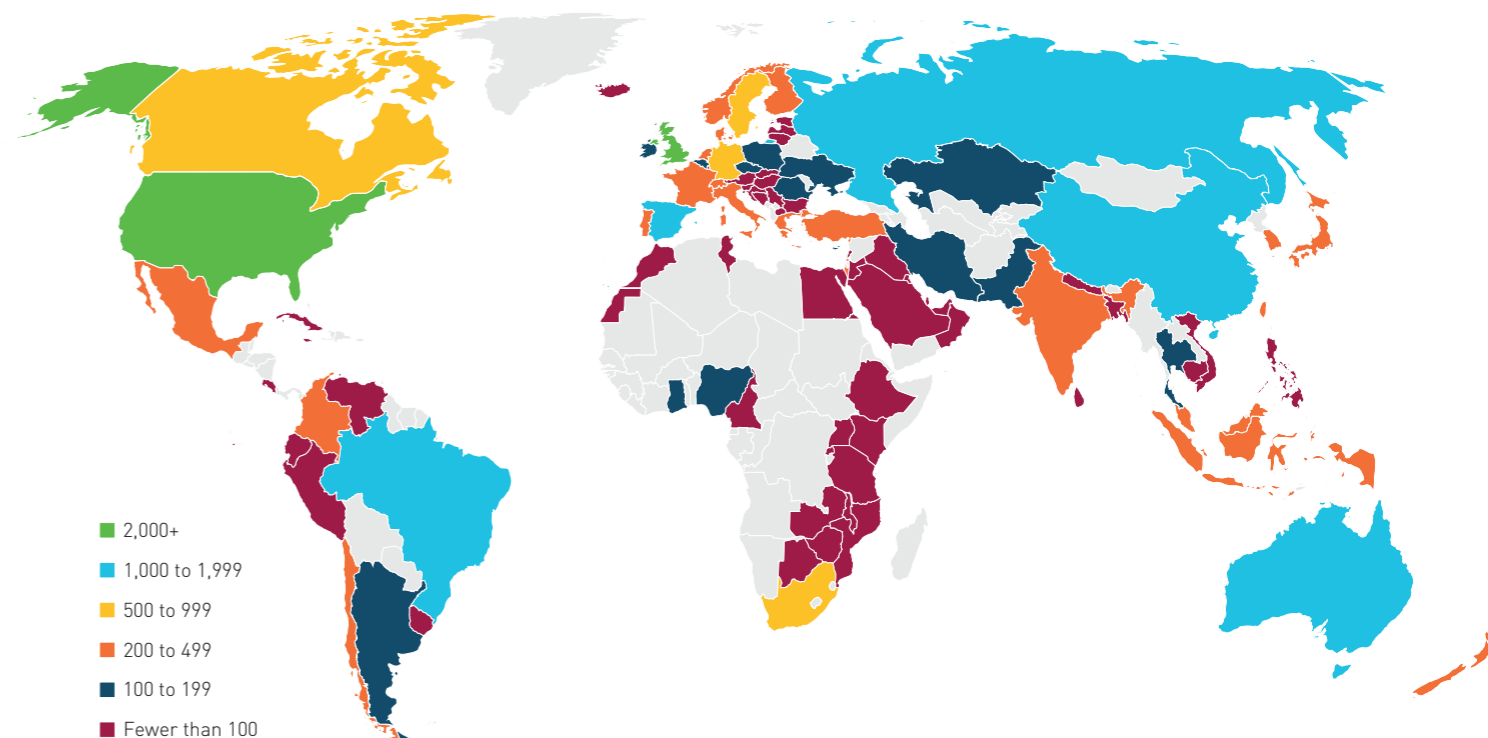
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[See the methodology and definitions](#)

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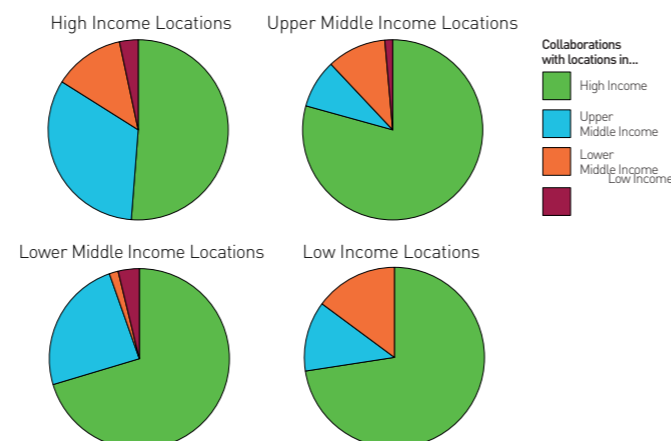
What is FWCI?
Field-weighted citation impact is an indicator of scholarly impact based on the number of times the publication was cited in other research. An FWCI of above 1.0 indicates the impact is above the normalised average



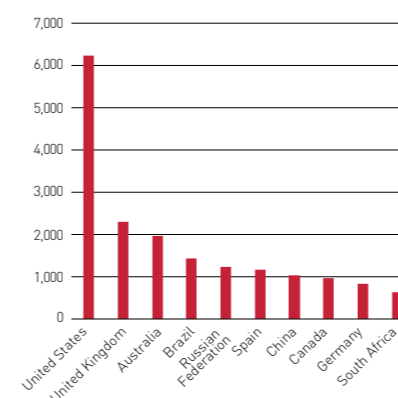
Key themes in SDG4 Research



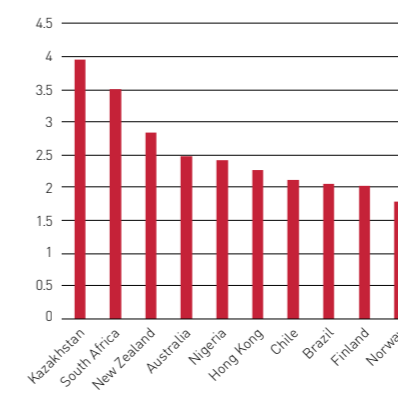
International collaboration between income groups by location



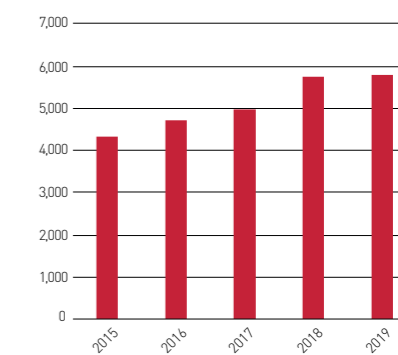
Top 10 locations by publication



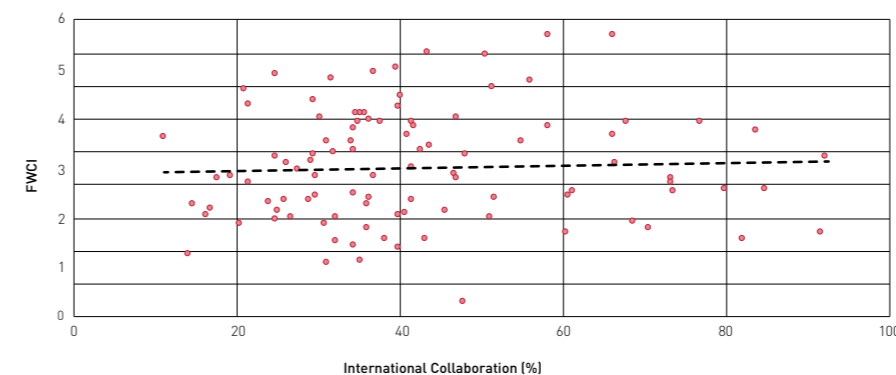
Top 10 locations by RAI *(Relative Activity Index)



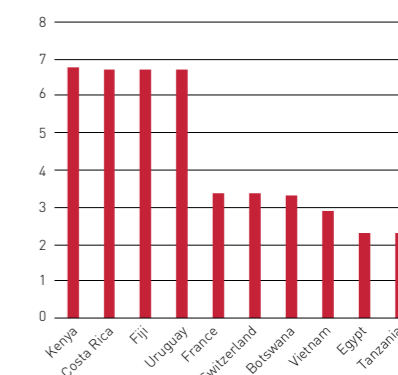
Volume of publications supporting SDG4



International collaboration and research impact



Top 10 locations for corporate-academic collaboration



SDG5 Gender Equality



Gender equality, food security and the sustainable development goals

Bina Agarwal^{19,20}

DOI: [10.1016/j.cosust.2018.07.002](https://doi.org/10.1016/j.cosust.2018.07.002)

This paper examines the potential and limitations of SDG5 (Gender Equality) in helping to achieve household food security. The potential lies in the attention it pays to women's access to land and natural resources, which can significantly enhance women's ability to produce and procure food. Its limitations lie in a lack of attention to the production constraints that women farmers face; its failure to recognise forests and fisheries as key sources of food; and its lack of clarity on which natural resources women need access to and why. Moreover, other goals which bear on food security as important providers of nutrition, such as SDG15 as it relates to forests and SDG14 as it relates to fish resources, make no mention of gender equality, nor does SDG13 (Climate action) recognise the vulnerabilities of women farmers. A bold interpretation of SDG5 and establishing synergies with other SDGs could provide ways forward. This includes not only SDGs which recognise the importance of gender equality, such as SDGs 1, 2, and 13 on poverty, hunger, and climate change respectively, but also SDGs 14 and 15 whose silence on gender could prove detrimental not just to attaining food security, but also to furthering their stated objectives of resource conservation.

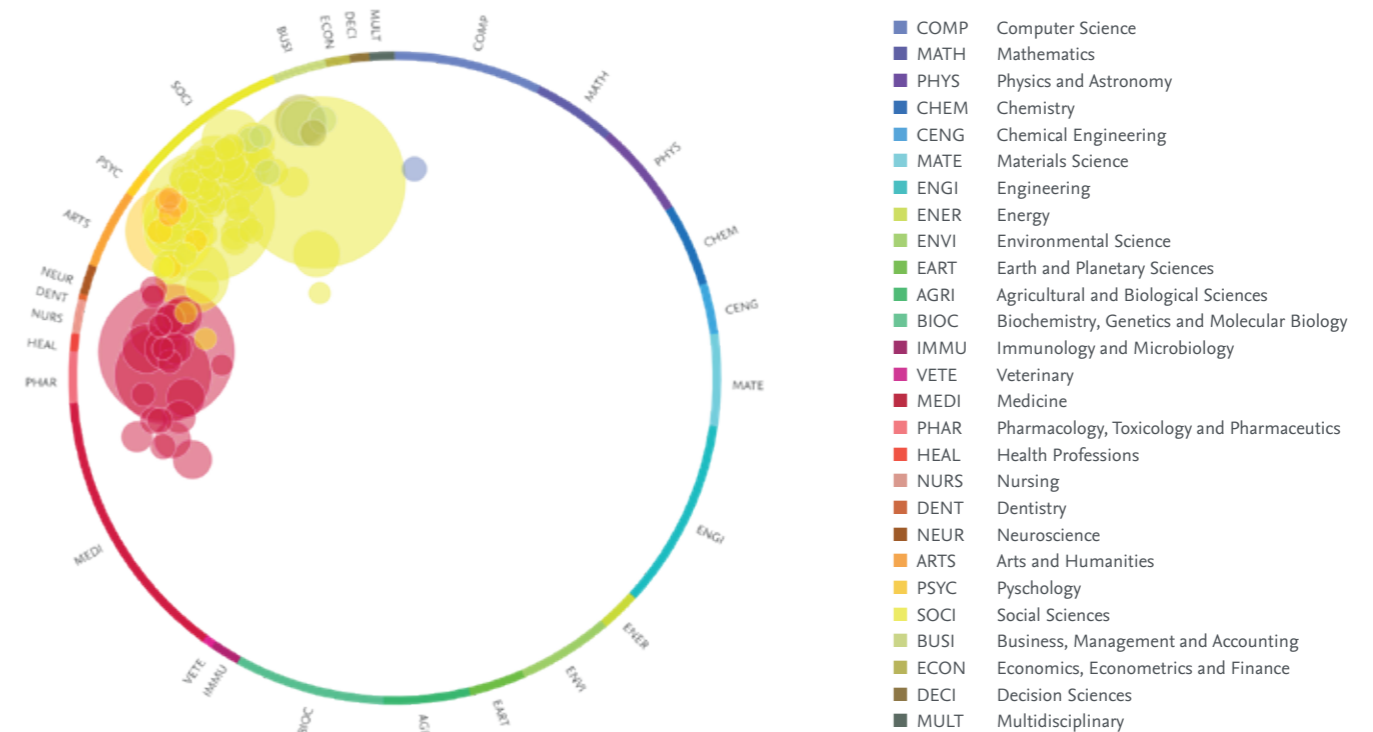
"SDG5 on gender equality, has substantial potential for improving both household and national food security, but much depends on how imaginatively and broadly governments interpret key elements, such as equality of access to land, to natural resources such as forests, fisheries and irrigation water, and to the control and management of these resources. Even with this broader interpretation, however, the gender equality goal may have limited impact, unless efforts are made to establish synergies with other SDGs and draw in civil society practitioners as partners in the implementation of key SDGs."

¹⁹ Global Development Institute, University of Manchester, Manchester M13 9PL, United Kingdom
²⁰ Institute of Economic Growth, University Enclave, Delhi 110007, India

Highlights

- SDG5 has the potential of enhancing food security, but also limitations.
- The potential lies in its attention to women's access to land and natural resources.
- Limitations stem from women's limited access to irrigation, credit, and other inputs.
- Limitations also lie in SDG5 not recognising forests and fisheries as key sources of food.
- Ways forward include stretching SDG5, teaming up with other SDGs, and creating synergies.

Gender equality is not only a fundamental human right, but a necessary foundation for a peaceful, prosperous and sustainable world" state the [United Nations](#). But while significant progress has been made in the last decades, many challenges remain and "the effects of the COVID-19 pandemic could reverse the limited progress that has been made on gender equality and women's rights." Explore research output, impact and collaboration on SDG5, and see which research trends are shaping the global conversation.



Investigate, understand and analyse SDG research globally with SciVal Research Areas for the UN Sustainable Development Goals (SDGs). Research Areas queries can help researchers and institutions track and demonstrate progress towards the targets of the SDGs. The Topic Wheel presented here clusters publications 2010-2019 into global, unique research topics based on citation patterns.

Research linked to SDG5 is most prominent within Social Sciences and Medicine. However, links to Environmental, Agricultural and Biological Sciences are often neglected. The 17 Perspective Abstract in the page before offers a complementary view of how Gender Equality and Food Security would benefit from a closer integration.

Expert Insights

Women and Health: the key for sustainable development

Sexual and reproductive health and rights (SRHR) are essential for sustainable development because of their links to gender equality and women's wellbeing, their impact on maternal, newborn, child, and adolescent health, and their roles in shaping future economic development and environmental sustainability. Yet progress towards fulfilling SRHR for all has been stymied because of weak political commitment, inadequate resources, persistent discrimination against women and girls, and an unwillingness to address issues related to sexuality openly and comprehensively. To address this unfinished agenda, this 2018 [Guttmacher-Lancet Commission](#) proposes a new,

comprehensive definition of sexual and reproductive health and rights, an associated essential package of health services, and outlines actions needed beyond the health sector to change social norms, laws, and policies to uphold human rights. Not only are the necessary investments modest and affordable for most low-income and middle-income countries, the benefits of investing in sexual and reproductive health services pay dividends over many years, making it easier to achieve other development goals.

Many of the SDGs are inextricably linked: progress towards one Goal depends on and affects other Goals. The implications of this are clear: the science supporting the SDGs must be multidisciplinary, international and have considered the relevance of sex and gender factors. The 19 papers commissioned for the [Elsevier SDG Perspectives Project](#) look at the SDGs from environmental, social sciences and health perspectives, and offer nuanced insights into the ambitions, achievements and limitations of the 2030 Agenda. These articles have been published in Special Issues of [Current Opinion in Environmental Sustainability](#), [World Development](#) and [Health Policy](#) and provide complementary insights to each SDG infographic.

SDG5 Gender Equality

2015-2019

Output, Impact, Collaboration

Research supporting SDG5 has grown since 2015, with a compound annual growth rate of 7.4% compared to nearly 3.5% for research in all fields.

The US produces the most research supporting SDG5, followed by the United Kingdom, Australia, Canada and Spain. Seven of the 10 most prolific locations are high income locations (accounting for more than 25,000 publications); two are upper-middle income locations (South Africa and Brazil) and one is a lower-middle income location (India). Three low income locations featured in the top 50: Ethiopia (188 publications), Uganda (185 publications) and Tanzania (133 publications).

The top five locations for which research on SDG5 represents the largest share of their research portfolio are Uganda, Kenya, Tanzania, Nepal and Ghana.

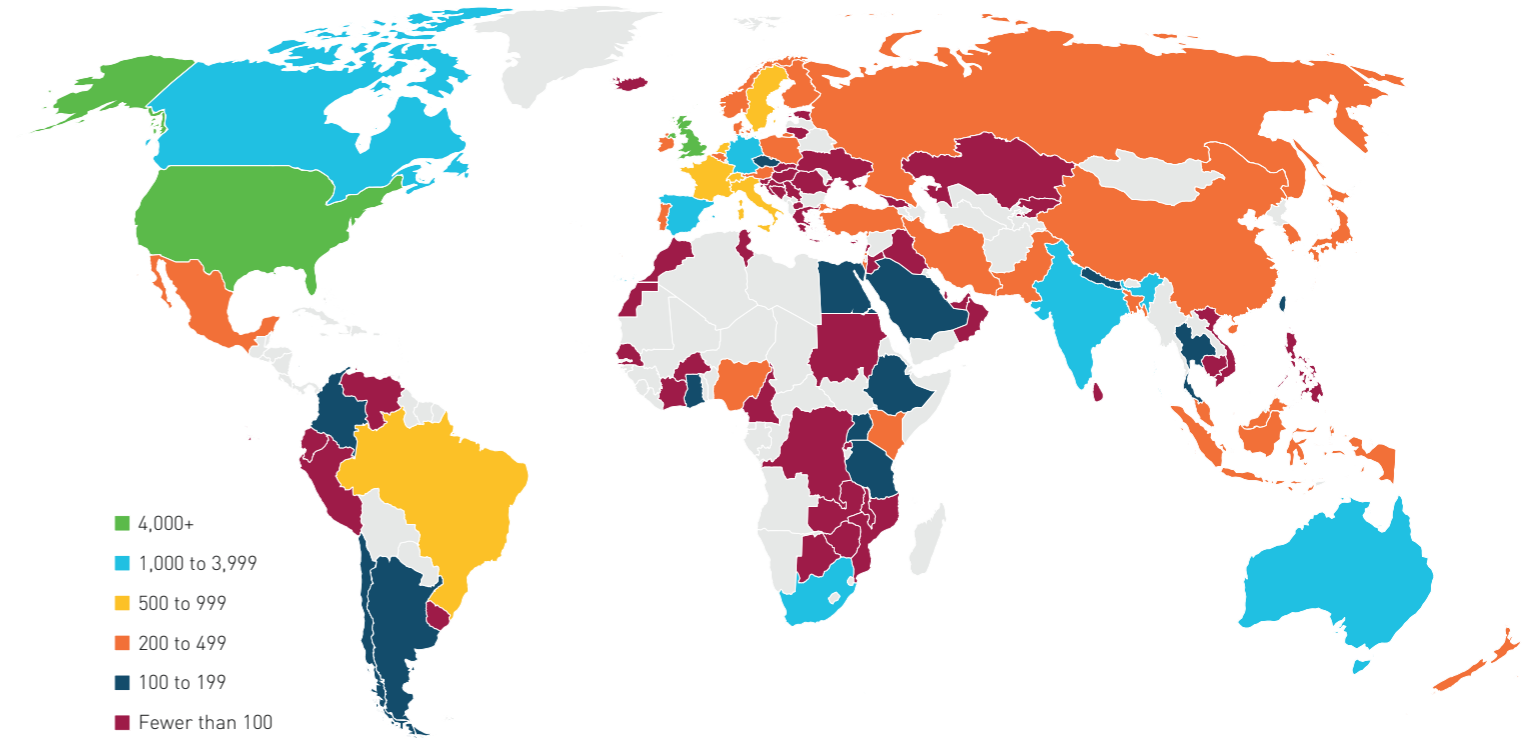
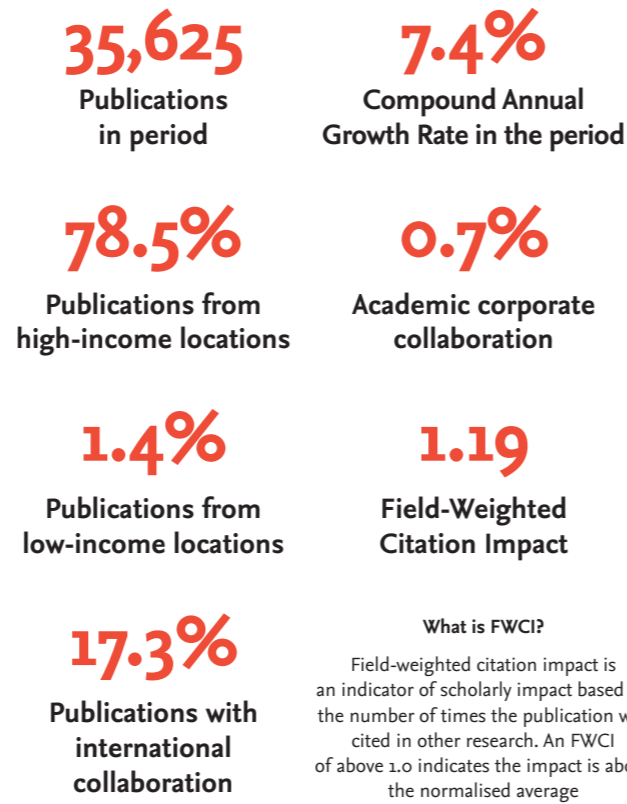
International collaboration yielded 17% of research on SDG5. High income locations collaborated with low income locations on 7% of their total SDG5 research, while nearly 72% of the related output from low income locations came from collaboration with high income locations.

As a measure of academic impact measured by citation, the field weighted citation impact (FWCI) for SDG5 research was above average every year, with an average of 1.19 over the period.

This analysis builds on Elsevier's [Sustainability Science in a Global Landscape](#) report, which was released in 2015 to coincide with the launch of the SDGs. See a [2017 update](#) on key findings on the RELX SDG Resource Centre. Help us to provide insight into SDG research. [Click here to review the research](#)

[See the methodology and definitions](#)

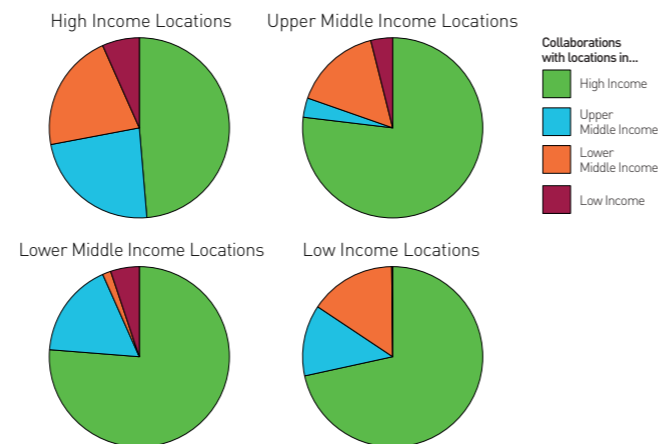
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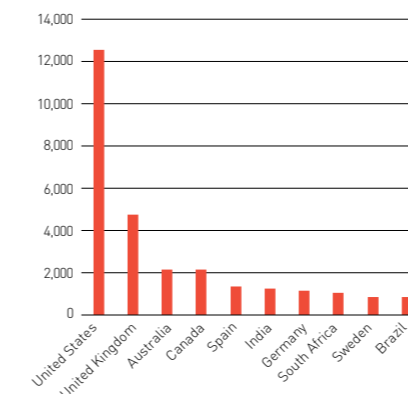
Key themes in SDG5 Research



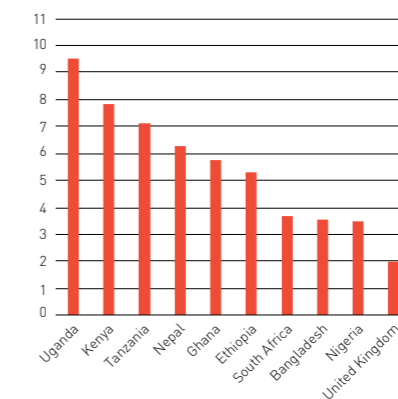
International collaboration between income groups by location



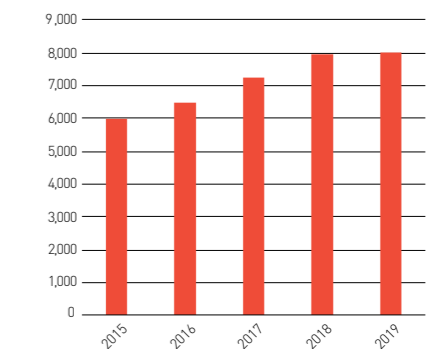
Top 10 locations by publication



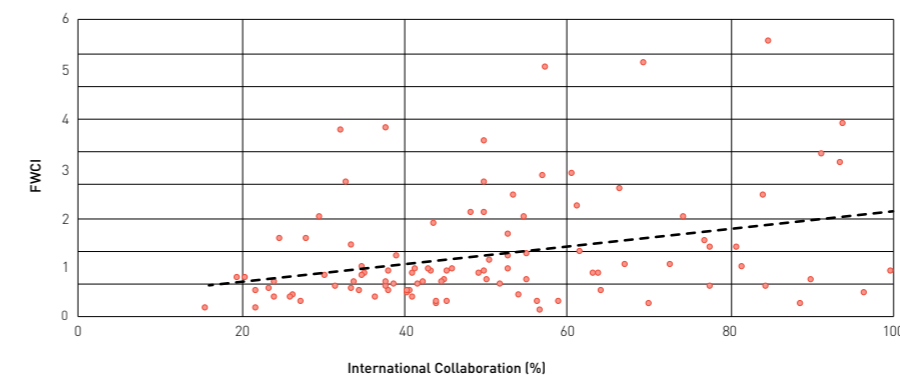
Top 10 locations by RAI *(Relative Activity Index)



Volume of publications supporting SDG5

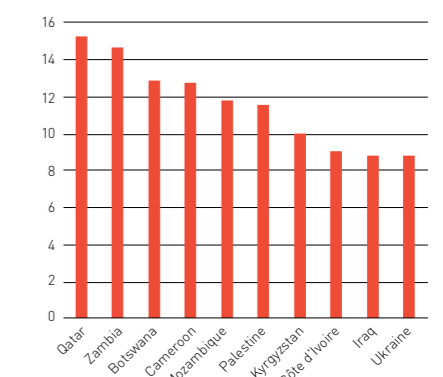


International collaboration and research impact



*Relative Activity Index is a measure of the proportion of the country's research output in the subject, relative to the proportion seen globally

Top 10 locations for corporate-academic collaboration



SDG6 Clean water and sanitation



Reconciling global aspirations and local realities: Challenges facing the Sustainable Development Goals for water and sanitation

Veronica Herrera²³

DOI: [10.1016/j.worlddev.2019.02.009](https://doi.org/10.1016/j.worlddev.2019.02.009)

This article assesses governance challenges at the local level associated with Sustainable Development Goal (SDG) 6, which pledges to ensure sustainable water and sanitation for all. The majority of developing countries manage services at the subnational level, making the quality of local governance the key ingredient for improvements in the sector. This article first reviews prior shortcomings in global monitoring efforts and how SDG6 was formulated to address them. The analysis then examines local governance challenges facing SDG6 and potential barriers to implementation. These barriers manifest as both contradictions within SDG6 itself as well as contradictions between SDG6 and the Sustainable Development Agenda more broadly. As SDG monitoring rubrics undergo further reformulations, it may be necessary to prioritize between goals and targets, or otherwise stagger the timing of their promotion and implementation.

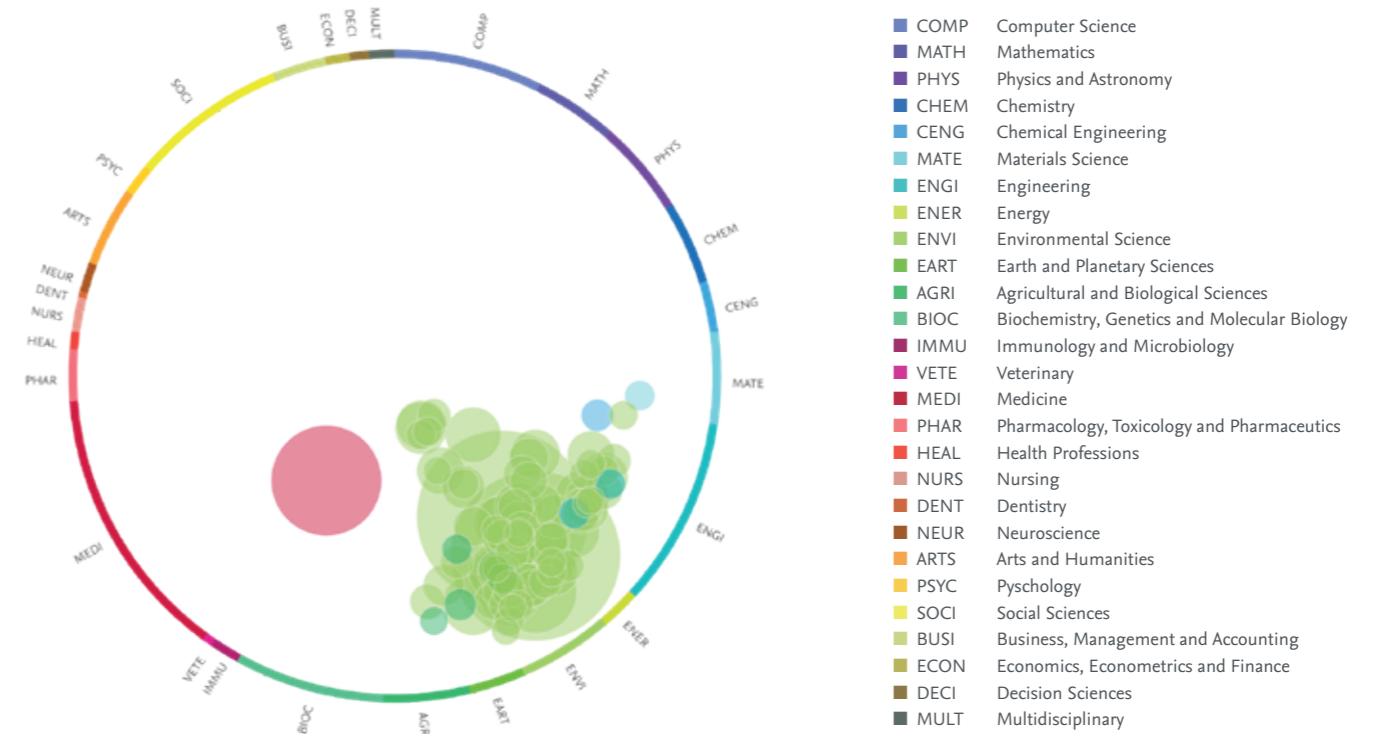
“Working more directly with local governments is important, as they are involved not only in administering services and collecting data, but also in opening or closing spaces for citizen participation in water governance.”

²¹ Institute of Water Policy, Lee Kuan Yew School of Public Policy, National University of Singapore, 469A Bukit Timah Road, Tower Block, Level 2, Singapore 259770, Singapore
²² Lee Kuan Yew School of Public Policy, National University of Singapore, 469A Bukit Timah Road, Tower Block, Level 2, Singapore 259770, Singapore
²³ University of Connecticut, United States

Highlights

- Most developing countries manage W&S at the subnational level, yet global monitoring rarely considers local governance.
- This review identifies potential barriers to implementation of SDG6 with a focus on local governance.
- This review also analyzes contradictions within SDG6 as well as across other SDGs.

The United Nations note that while substantial progress has been made in increasing access to clean drinking water and sanitation, billions of people, mostly in rural areas, still lack these basic services.” 1 in 3 people don’t have access to safe drinking water and 1 in 4 healthcare facilities lacks basic water services – and the COVID-19 pandemic has “demonstrated the critical importance of sanitation, hygiene and adequate access to clean water for preventing and containing diseases.” Explore research output, impact and collaboration on SDG6, and see which research trends are shaping the global conversation.



Investigate, understand and analyse SDG research globally with SciVal Research Areas for the UN Sustainable Development Goals (SDGs). Research Areas queries can help researchers and institutions track and demonstrate progress towards the targets of the SDGs. The Topic Wheel presented here clusters publications 2010-2019 into global, unique research topics based on citation patterns.

Research linked to SDG6 is most prominent within Environmental Sciences, followed by Medicine. The 17 Perspective Abstract in the page before argue that water is to be considered as a prerequisite to each one of the SDGs, and should be more closely linked to each of the Goals, with a special focus on Decision Sciences.

Expert Insights

RELX Environmental Challenge

Each year the RELX Environmental Challenge is awarded to projects that best demonstrate how they can provide sustainable access to safe water or sanitation. Projects needs to be scalable and set a benchmark for innovation, address non-discrimination/equity of access and have community-level engagement. In 2019, the \$50,000 first prize winner, SolarSack, presented a project that uses ultraviolet radiation from direct sunlight to purify water at an exceptionally low cost, providing safe and affordable drinking water for those living in poverty.

The \$25,000 second prize winner, Christopher Mtalimanja, is an educator and disability-rights activist who has worked in ten countries across Africa managing projects and advising on special needs and inclusive education. The project will advance a dry bio latrine system at three primary schools in Malawi, where waste is both transformed into fertilizer, and transferred to a digester to produce energy.

Many of the SDGs are inextricably linked: progress towards one Goal depends on and affects other Goals. The implications of this are clear: the science supporting the SDGs must be multidisciplinary, international and have considered the relevance of sex and gender factors. The 19 papers commissioned for the Elsevier SDG Perspectives Project look at the SDGs from environmental, social sciences and health perspectives, and offer nuanced insights into the ambitions, achievements and limitations of the 2030 Agenda. These articles have been published in Special Issues of Current Opinion in Environmental Sustainability, World Development and Health Policy and provide complementary insights to each SDG infographic.

SDG6 Clean water and sanitation

2015-2019

Output, Impact, Collaboration

Research supporting SDG6 has grown since 2015, with a compound annual growth rate of 8.1% compared to nearly 3.5% for research in all fields.

China produces the most research supporting SDG6, followed by the US, India, the United Kingdom and Australia. Seven of the 10 most prolific locations are high income locations (accounting for more than 22,700 publications); two are upper-middle income locations (China and Brazil) and one is a lower-middle income location (India). No low income locations featured in the top 50.

The top five locations for which research on SDG6 represents the largest share of their research portfolio are Tanzania, Ethiopia, Nepal, Kenya and Sri Lanka.

International collaboration yielded 29% of research on SDG6. High income locations collaborated with low income locations on 3% of their total SDG6 research, while nearly 63% of the related output from low income locations came from collaboration with high income locations.

As a measure of academic impact measured by citation, the field weighted citation impact (FWCI) for SDG6 research was above average every year, with an average of 1.31 over the period.

This analysis builds on Elsevier's [Sustainability Science in a Global Landscape](#) report, which was released in 2015 to coincide with the launch of the SDGs. See a [2017 update](#) on key findings on the RELX SDG Resource Centre. Help us to provide insight into SDG research. [Click here to review the research](#)
[See the methodology and definitions](#)

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46,074

Publications in period

8.1%

Compound Annual Growth Rate in the period

58.8%

Publications from high-income locations

2.2%

Academic corporate collaboration

0.7%

Publications from low-income locations

1.31

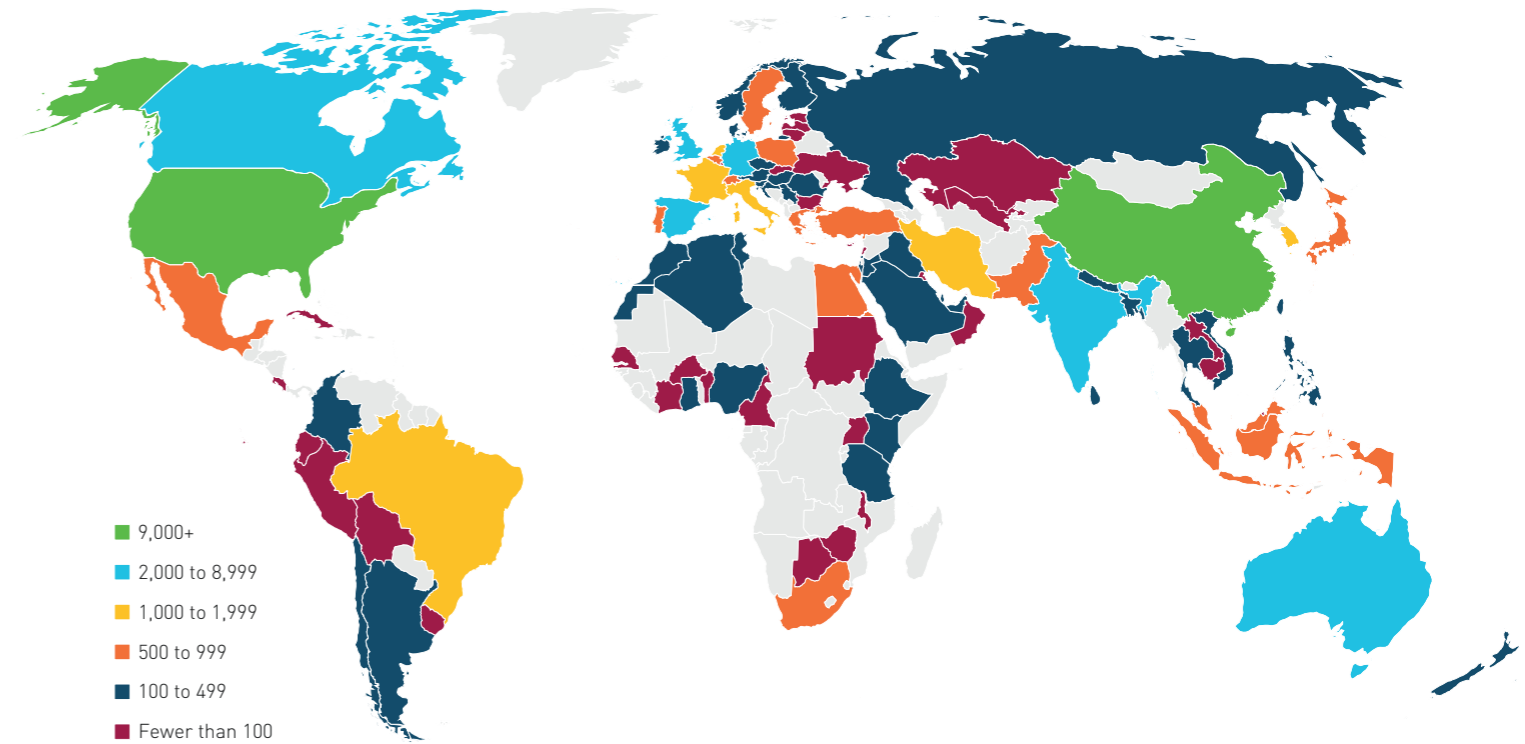
Field-Weighted Citation Impact

28.6%

Publications with international collaboration

What is FWCI?

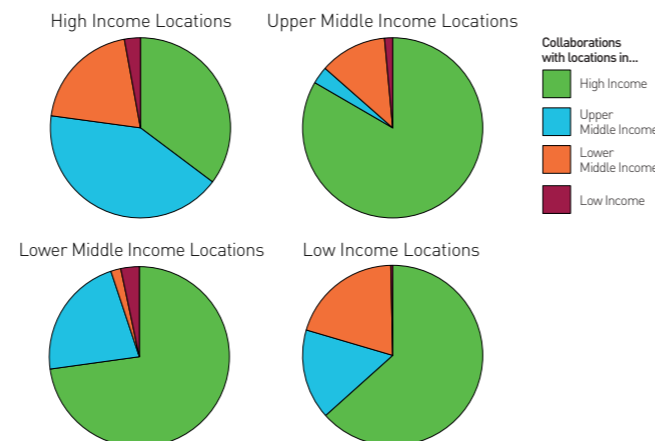
Field-weighted citation impact is an indicator of scholarly impact based on the number of times the publication was cited in other research. An FWCI of above 1.0 indicates the impact is above the normalised average



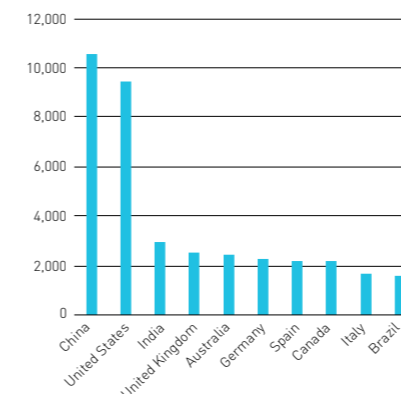
Key themes in SDG6 Research



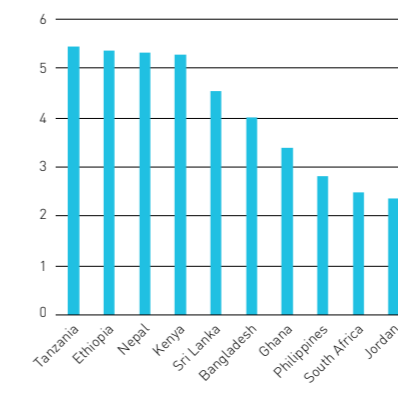
International collaboration between income groups by location



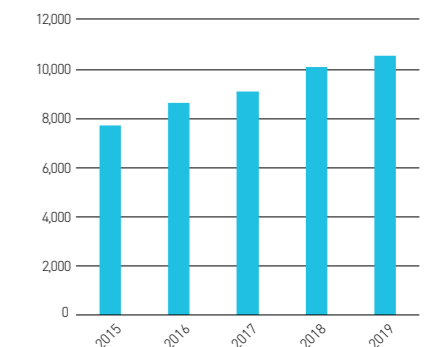
Top 10 locations by publication



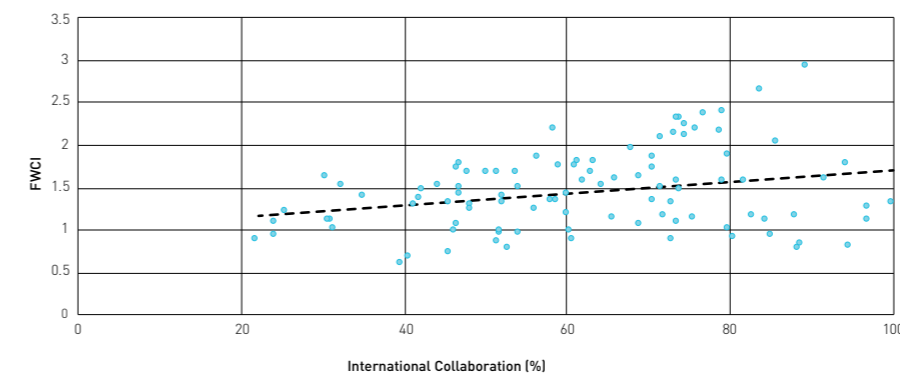
Top 10 locations by RAI *(Relative Activity Index)



Volume of publications supporting SDG6

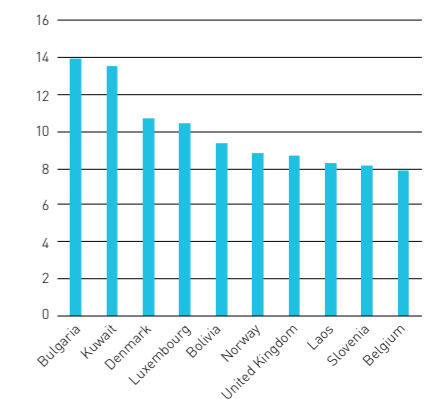


International collaboration and research impact



*Relative Activity Index is a measure of the proportion of the country's research output in the subject, relative to the proportion seen globally

Top 10 locations for corporate-academic collaboration



SDG7 Affordable and Clean Energy



Of temporality and plurality: an epistemic and governance agenda for accelerating just transitions for energy access and sustainable development

Laurence L Delina²⁴ & Benjamin K Sovacool²⁵ DOI: [10.1016/j.cosust.2018.05.016](https://doi.org/10.1016/j.cosust.2018.05.016)

The complementarity of sustainable energy transitions and energy access provision are one of the key characteristics of both the Sustainable Development Goals and the Paris Agreement on climate change. In this perspective piece, the authors offer an epistemic and governance agenda to advance the imperative of speed in meeting both ambitions and to acknowledge the plurality of disciplines, actors, and institutions involved. Recognizing that the processes required to achieve these global goals entail navigating tensions, we suggest that shifts in ways knowledge is produced and transitions are governed could be based on a justice framework.

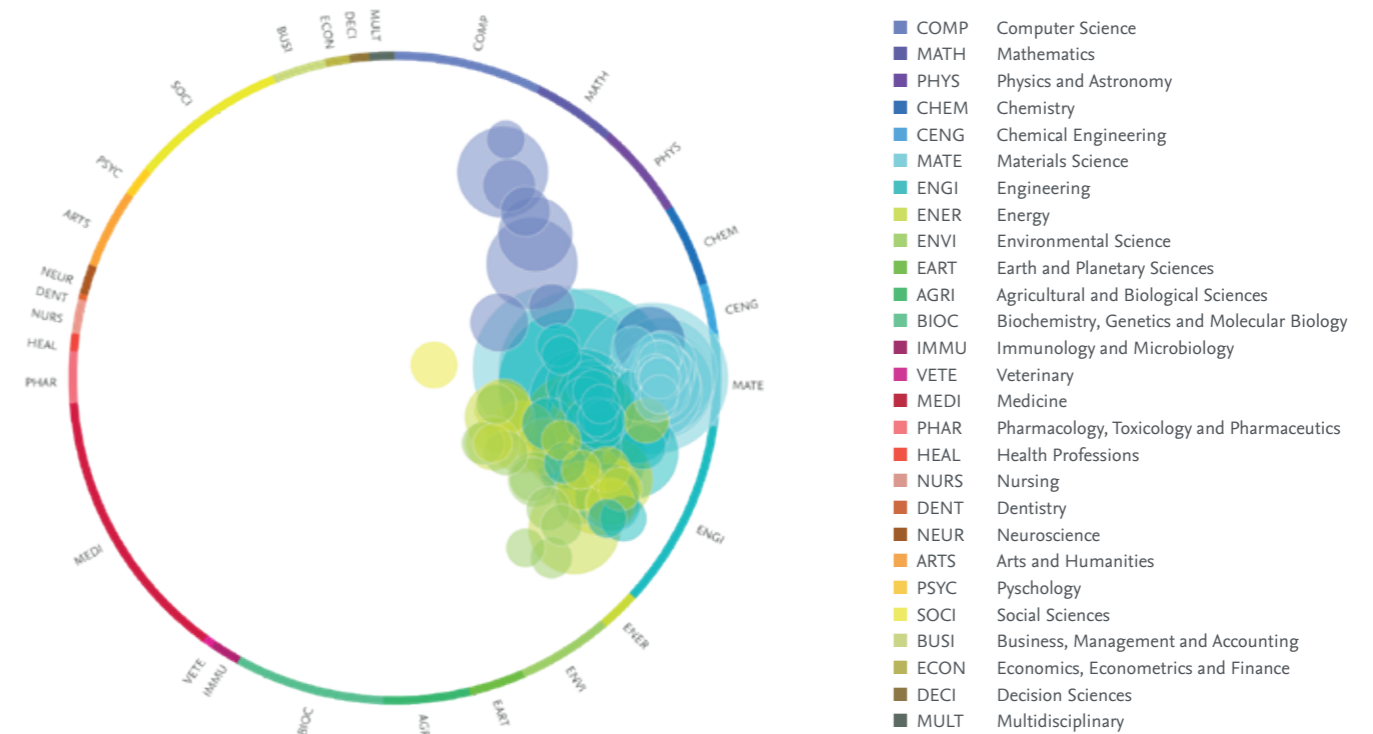
“Navigating the shifts needed to achieve these new ideals, as we have argued in this article, may necessitate transformations in the practice of knowledge-making and governing. This reminds us that the processes of both energy transition and access require not only harmonizing sociotechnical systems, but epistemically bridging disciplines and building cognitive resources as well.”

²⁴ Frederick S. Pardee Center for the Study of the Longer-Range Future, Boston University, United States
²⁵ SPRU-Science Policy Research Unit, University of Sussex, United Kingdom

Highlights

- Sociotechnical energy systems, produced across a variety of levels and spaces, need to be understood using multiple approaches for generating new knowledge and to be governed as a polycentric system.
- Need to transform the practice of knowledge-making and governance in the energy sector.
- Processes of both energy transition and access need to epistemically bridge disciplines and build cognitive resources.

According to the [United Nations](#) “energy is becoming more sustainable and widely available. Access to electricity in poorer countries has begun to accelerate, energy efficiency continues to improve, and renewable energy is making impressive gains in the electricity sector” – nevertheless, 13% of the global population still lacks access to modern electricity. Explore research output, impact and collaboration on SDG7, and see which research trends are shaping the global conversation.



Investigate, understand and analyse SDG research globally with SciVal Research Areas for the UN Sustainable Development Goals (SDGs). Research Areas queries can help researchers and institutions track and demonstrate progress towards the targets of the SDGs. The Topic Wheel presented here clusters publications 2010-2019 into global, unique research topics based on citation patterns.

Research linked to [SDG7](#) is most prominent within Engineering and Mathematics, followed by Computer Sciences and Energy. The 17 Perspective Abstract in the page before offers a complementary view, arguing that to transform the practice of knowledge-making and governance in the energy sector, SDG7 research should be closely linked to Decision Sciences.

Expert Insights

Gendered energy poverty and energy justice in rural Bangladesh
Elsevier Atlas Award nominated paper – July/August 2019

There is a substantial literature analyzing the role of electricity as a catalyst for economic development. However, there are significant knowledge gaps in whether such systems are or can indeed be designed in a gender sensitive way to promote equal opportunity for socially inclusive entrepreneurship at the local level. This [Atlas-nominated paper](#) develops a framework which shows

how electricity systems can be designed to become favorable and economically empowering for both men and women, and demonstrates how local value chains can benefit from this electric inclusiveness. The study also provides recommendations for strategic action and identify points of intervention in policy, planning, design and operation of electricity systems.

Many of the SDGs are inextricably linked: progress towards one Goal depends on and affects other Goals. The implications of this are clear: the science supporting the SDGs must be multidisciplinary, international and have considered the relevance of sex and gender factors. The 19 papers commissioned for the [Elsevier SDG Perspectives Project](#) look at the SDGs from environmental, social sciences and health perspectives, and offer nuanced insights into the ambitions, achievements and limitations of the 2030 Agenda. These articles have been published in Special Issues of [Current Opinion in Environmental Sustainability](#), [World Development](#) and [Health Policy](#) and provide complementary insights to each SDG infographic.

SDG7 Affordable and Clean Energy

2015-2019

Output, Impact, Collaboration

Research supporting SDG7 has grown since 2015, with a compound annual growth rate of 9.1% compared to nearly 3.5% for research in all fields.

China produces the most research supporting SDG7, followed by the US, India, Germany and the United Kingdom. Eight of the 10 most prolific locations are high income locations (accounting for more than 167,700 publications); one is an upper-middle income location (China) and one is a lower-middle income location (India). No low income locations featured in the top 50.

The top five locations for which research on SDG7 represents the largest share of their research portfolio are Morocco, Algeria, Latvia, Qatar and Mauritius.

International collaboration yielded 23% of research on SDG7. High income locations collaborated with low income locations on less than 1% of their total SDG7 research, while 51% of the related output from low income locations came from collaboration with high income locations.

As a measure of academic impact measured by citation, the field weighted citation impact (FWCI) for SDG7 research was above average every year, with an average of 1.49 over the period.

This analysis builds on Elsevier's [Sustainability Science in a Global Landscape](#) report, which was released in 2015 to coincide with the launch of the SDGs. See a [2017 update](#) on key findings on the RELX SDG Resource Centre. Help us to provide insight into SDG research. [Click here to review the research](#)

[See the methodology and definitions](#)

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383,354
Publications in period

9.1%
Compound Annual Growth Rate in the period

57.2%
Publications from high-income locations

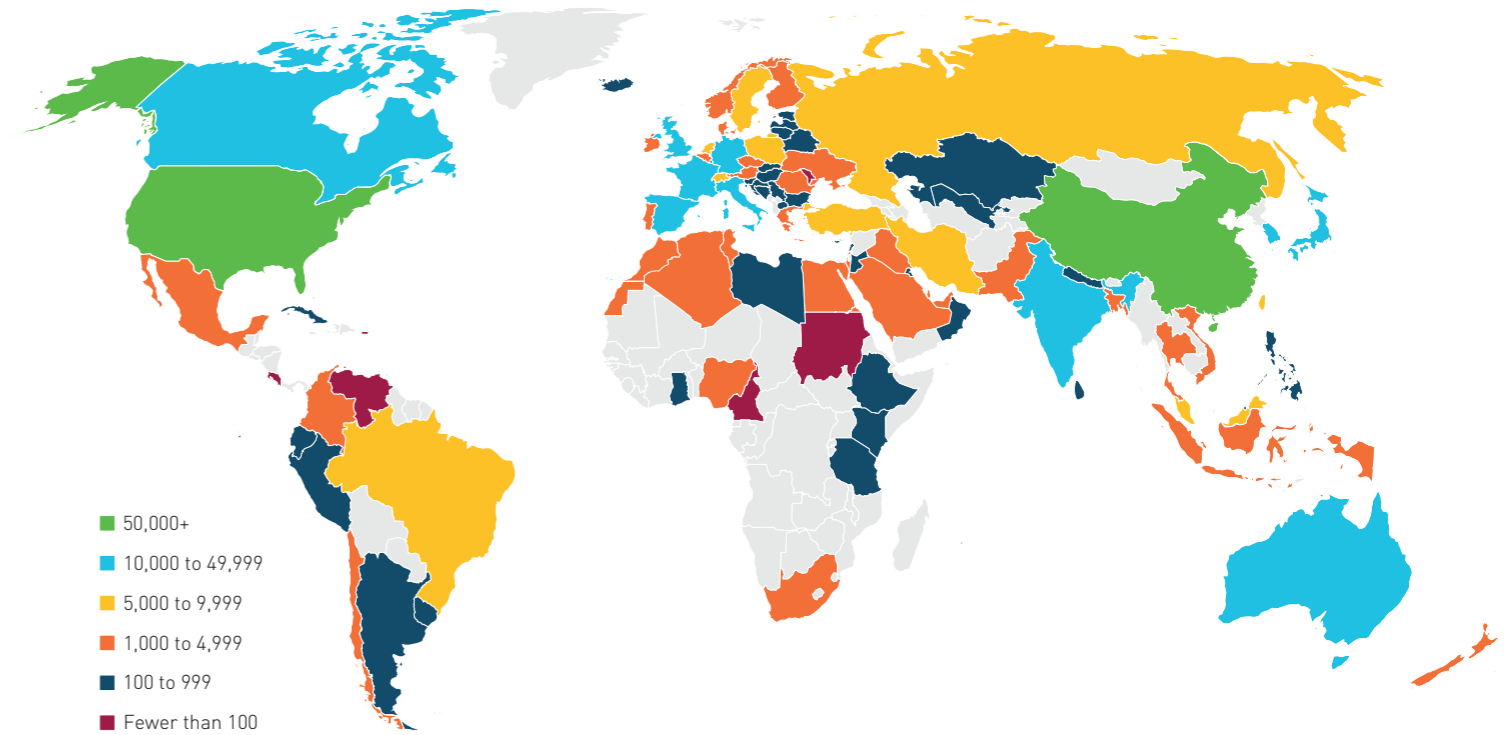
3.9%
Academic corporate collaboration

0.1%
Publications from low-income locations

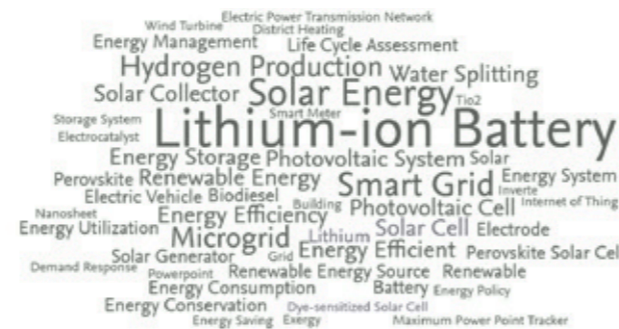
1.49
Field-Weighted Citation Impact

22.6%
Publications with international collaboration

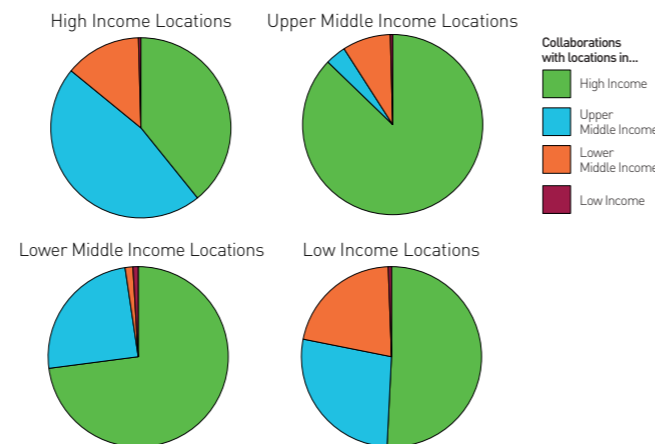
What is FWCI?
Field-weighted citation impact is an indicator of scholarly impact based on the number of times the publication was cited in other research. An FWCI of above 1.0 indicates the impact is above the normalised average



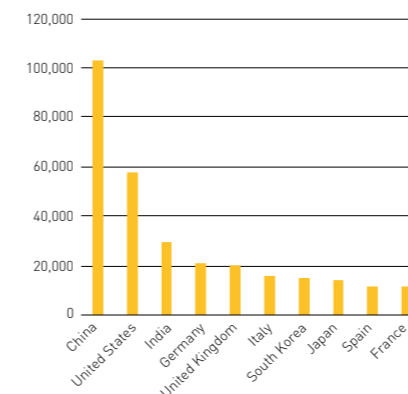
Key themes in SDG7 Research



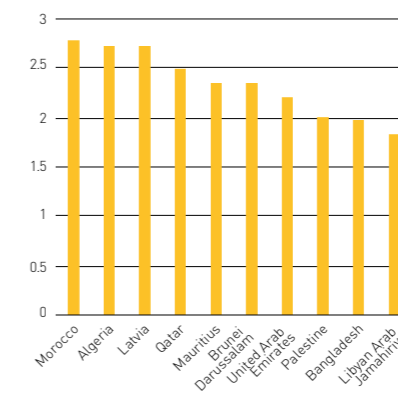
International collaboration between income groups by location



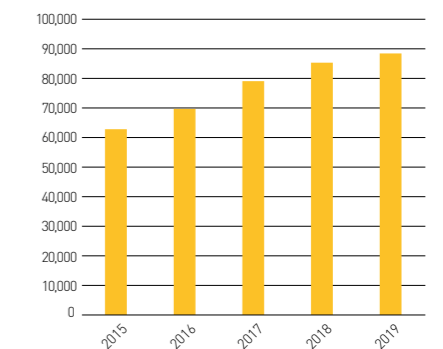
Top 10 locations by publication



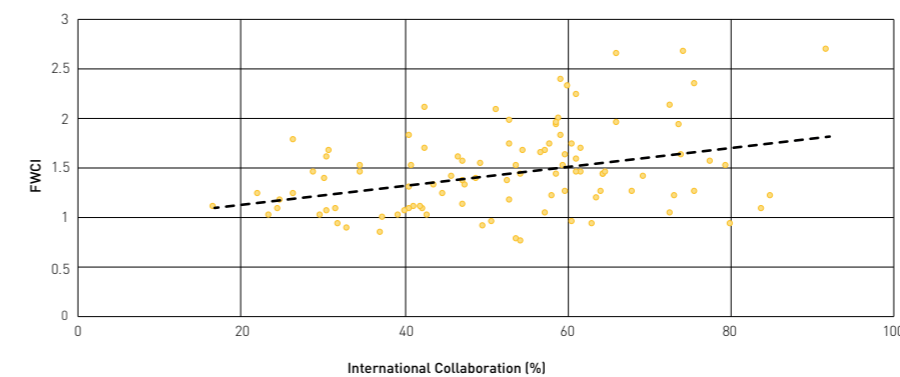
Top 10 locations by RAI *(Relative Activity Index)



Volume of publications supporting SDG7

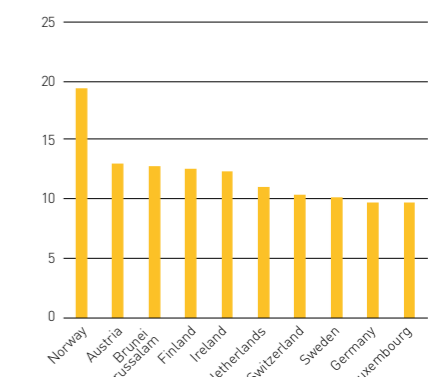


International collaboration and research impact

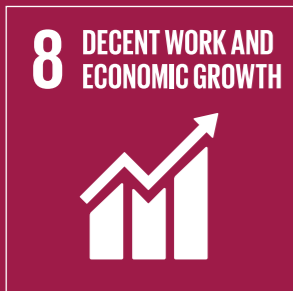


*Relative Activity Index is a measure of the proportion of the country's research output in the subject, relative to the proportion seen globally

Top 10 locations for corporate-academic collaboration



SDG8 Decent work and economic growth



Decent work and economic growth – A gendered analysis

Shirin M. Rai²⁶, Benjamin D. Brown²⁷,
Kanchana N. Ruwanpura²⁸

DOI: [10.1016/j.worlddev.2018.09.006](https://doi.org/10.1016/j.worlddev.2018.09.006)

SDG8 calls for promoting ‘sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all’. Even as it highlights the importance of labour rights for all, it also makes visible some significant tensions. The authors note, for example, that despite many critiques of narrow economic measures of growth, the focus here remains on GDP and per capita growth. This is problematic, Rai et al. argue, because the GDP productive boundary excludes much of social reproductive work. This puts SDG8 in tension with SDG5 which calls for the recognition of the value of unpaid care and domestic work. There has been a significant increase in the rate of working women in the formal and informal sector. However, there has not been a subsequent gender shift in the doing of social reproductive work. In this paper the authors argue that SDG8’s focus on decent work and economic growth is inadequate; that productive employment and decent work for all men and women by 2030 needs to take into account the value and costs of social reproduction.

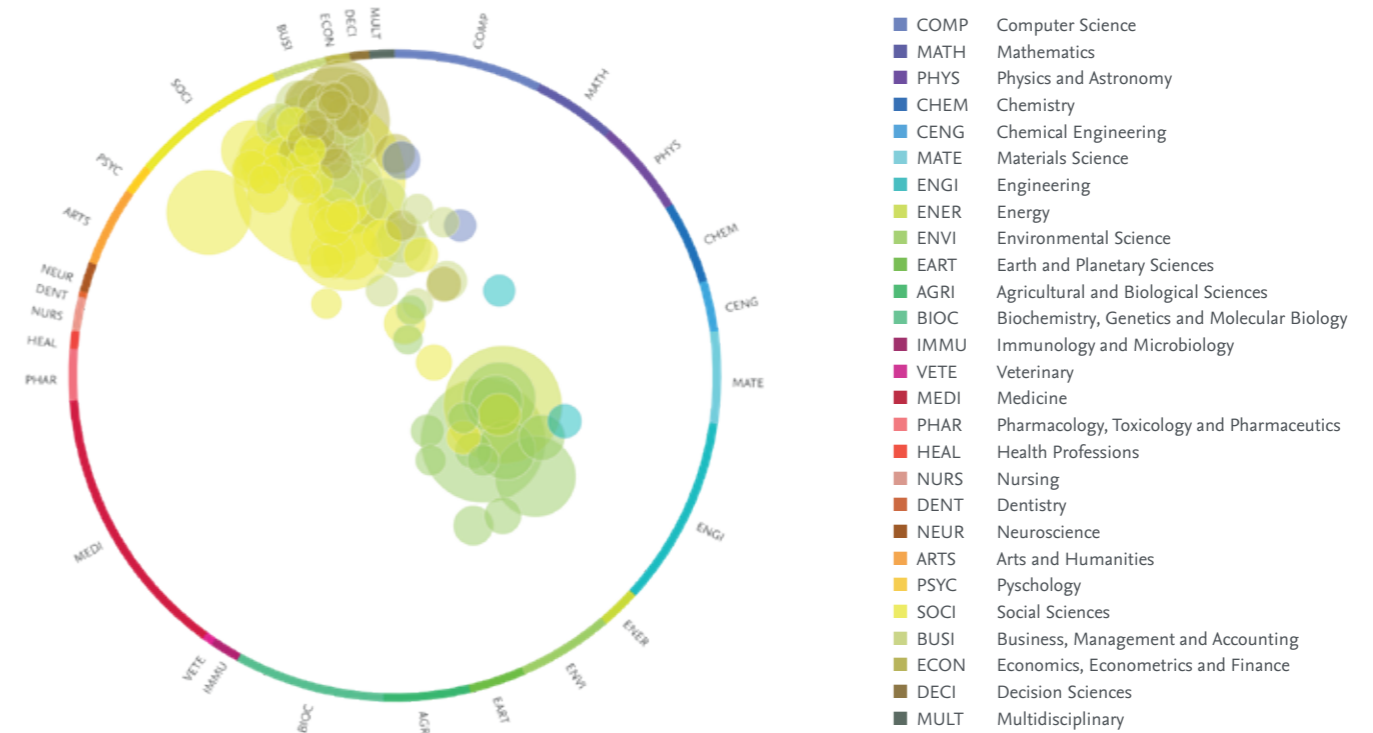
“Women’s wage employment while considered a panacea in the SDGs, we argue, can actually increase the depletion of women if not replenished through state social infrastructural support, redistribution of gender care roles and the recognition of domestic labour. The language of growth itself needs to be challenged as reflected in the debates about degrowth and epistemic decolonisation if we are to make development environmentally sustainable, gender just and economically equitable.”

²⁶ Department of Politics and International Studies, University of Warwick, Coventry CV4 7AL, United Kingdom
²⁷ Institute of Geography, University of Edinburgh, Drummond St, Edinburgh EH8 9XP, United Kingdom
²⁸ Institute of Geography, University of Edinburgh, Drummond St, Edinburgh EH8 9XP, United Kingdom

Highlights

- Issues of paid and unpaid social reproductive work need to be aligned to sustain decent work agenda.
- Growth indicators for SDG8 targets neglect the value and costs of social reproduction.
- Decent work agenda is unsustainable if it neglects persistent gender inequality globally (SDG5).

In 2017, the global unemployment rate was 5.6%, down from 6.4% in 2000, but the gender pay gap stands at 23% globally. “Now, the economic and financial shocks associated with COVID-19 are derailing the already tepid economic growth and compounding heightened risks from other factors” state the [United Nations](#). Explore research output, impact and collaboration on SDG8, and see which research trends are shaping the global conversation.



Investigate, understand and analyse SDG research globally with SciVal Research Areas for the UN Sustainable Development Goals (SDGs). Research Areas queries can help researchers and institutions track and demonstrate progress towards the targets of the SDGs. The Topic Wheel presented here clusters publications 2010-2019 into global, unique research topics based on citation patterns.

Research linked to [SDG8](#) is most prominent within Social Sciences and Economics, followed by Environmental Sciences and Energy. The 17 Perspective Abstract in the page before offers a complementary view of how the Decent Work agenda is unsustainable if it neglects persistent gender inequality globally, and excludes women’s social reproductive work.

Expert Insights

Poverty and the varieties of entrepreneurship in the pursuit of prosperity

Elsevier Atlas Award winning paper – September 2019

The assumption that entrepreneurship leads to income improvement and improvement in life circumstances underpins many of the support programs and interventions offered to entrepreneurs in developing countries. It’s based on a hedonic perspective: more money equals a better life. In this [Atlas-winning paper](#), the authors revisit the entrepreneurship and poverty relationship under a eudaimonic perspective – where non-financial factors are considered important elements of success. “We always think of success as

meaning money; if we push back from that idea a little bit and broaden it, it might actually change a lot of assumptions that we make about how we support entrepreneurs. It might open up a new line of inquiry or a new line of thinking. I think that slight change of perspective makes an enormous difference.” Dr. Jonathan Kimmitt, co-author of the study.

Many of the SDGs are inextricably linked: progress towards one Goal depends on and affects other Goals. The implications of this are clear: the science supporting the SDGs must be multidisciplinary, international and have considered the relevance of sex and gender factors. The 19 papers commissioned for the [Elsevier SDG Perspectives Project](#) look at the SDGs from environmental, social sciences and health perspectives, and offer nuanced insights into the ambitions, achievements and limitations of the 2030 Agenda. These articles have been published in Special Issues of [Current Opinion in Environmental Sustainability](#), [World Development](#) and [Health Policy](#) and provide complementary insights to each SDG infographic.

SDG8

Decent work and economic growth

2015-2019

Output, Impact, Collaboration

Research supporting SDG8 has grown since 2015, with a compound annual growth rate of 9.2% compared to nearly 3.5% for research in all fields.

The US produces the most research supporting SDG8, followed by China, the United Kingdom, Russia and Germany. Six of the 10 most prolific locations are high income locations (accounting for more than 37,000 publications); three are upper-middle income locations (China, Russia and Malaysia) and one is a lower-middle income location (India). No low income locations featured in the top 50.

The top five locations for which research on SDG8 represents the largest share of their research portfolio are Ghana, Zimbabwe, Nigeria, Kazakhstan and South Africa.

International collaboration yielded 21% of research on SDG8. High income locations collaborated with low income locations on 2% of their total SDG8 research, while nearly 58% of the related output from low income locations came from collaboration with high income locations.

As a measure of academic impact measured by citation, the field weighted citation impact (FWCI) for SDG8 research was above average every year, with an average of 1.14 over the period.

This analysis builds on Elsevier's [Sustainability Science in a Global Landscape](#) report, which was released in 2015 to coincide with the launch of the SDGs. See a [2017 update](#) on key findings on the RELX SDG Resource Centre. Help us to provide insight into SDG research. [Click here to review the research](#)

[See the methodology and definitions](#)

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89,498

Publications in period

9.2%

Compound Annual Growth Rate in the period

61.0%

Publications from high-income locations

1.1%

Academic corporate collaboration

0.3%

Publications from low-income locations

1.14

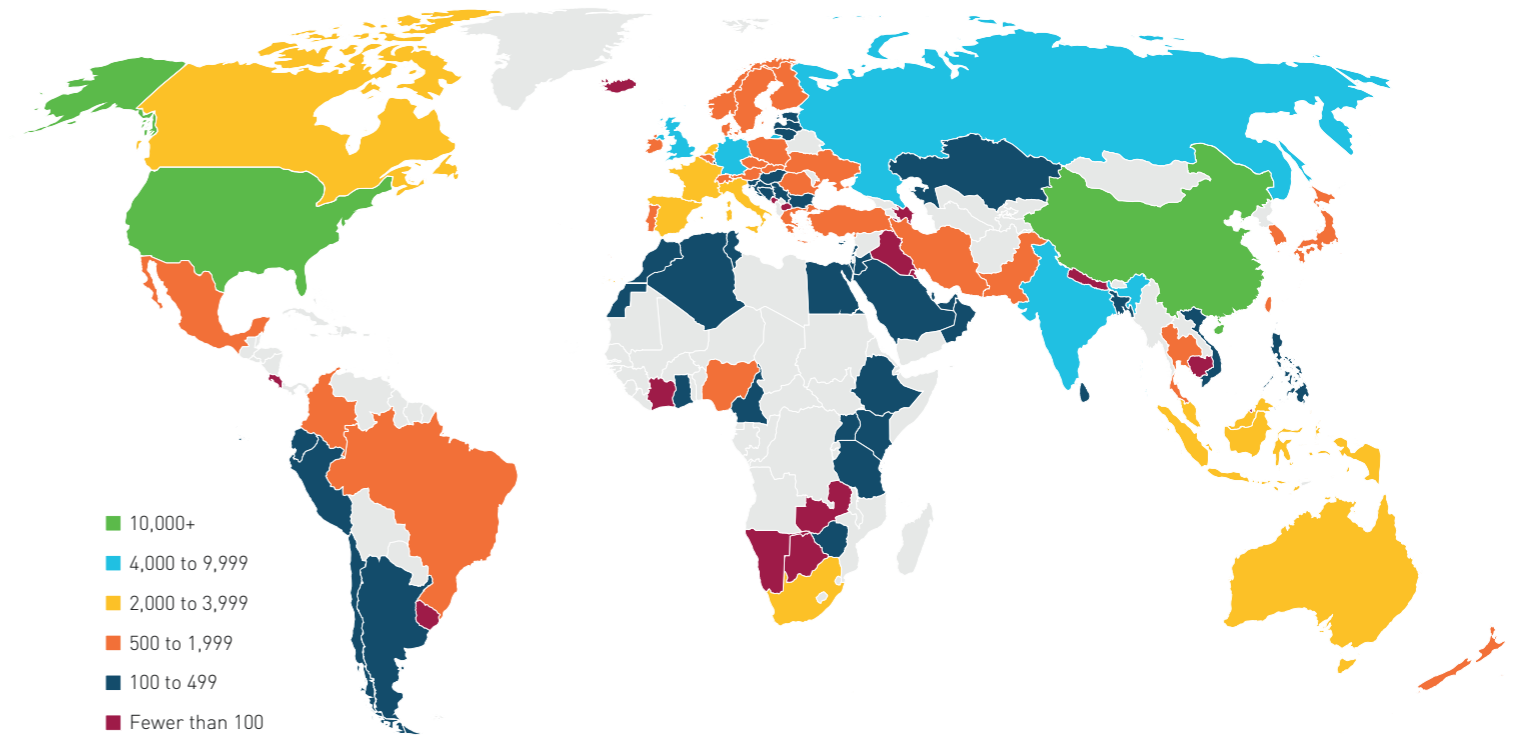
Field-Weighted Citation Impact

20.8%

Publications with international collaboration

What is FWCI?

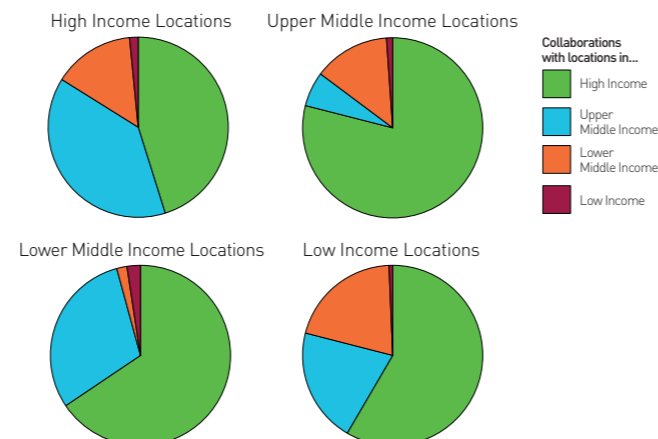
Field-weighted citation impact is an indicator of scholarly impact based on the number of times the publication was cited in other research. An FWCI of above 1.0 indicates the impact is above the normalised average



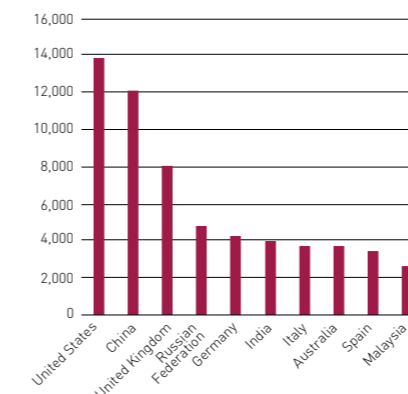
Key themes in SDG8 Research



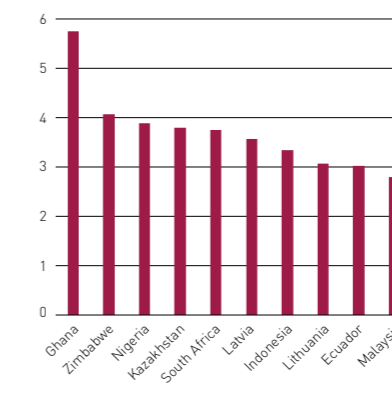
International collaboration between income groups by location



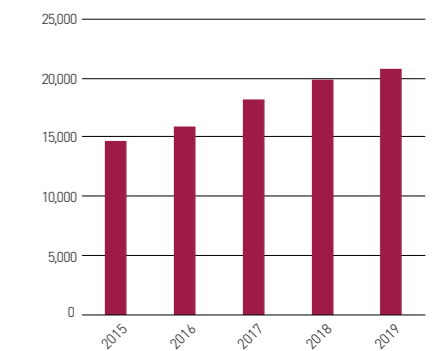
Top 10 locations by publication



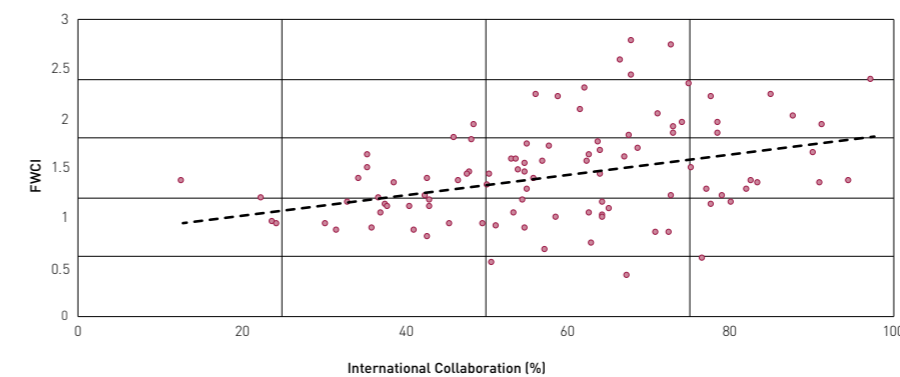
Top 10 locations by RAI *(Relative Activity Index)



Volume of publications supporting SDG8

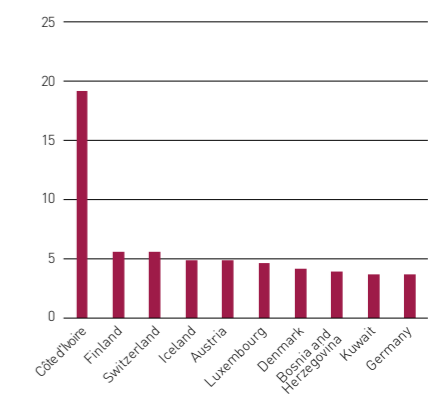


International collaboration and research impact



*Relative Activity Index is a measure of the proportion of the country's research output in the subject, relative to the proportion seen globally

Top 10 locations for corporate-academic collaboration



SDG9 Industry, Innovation and Infrastructure



“Stop talking around projects and talk about solutions”:
Positioning health within infrastructure policy to achieve
the sustainable development goals

Patrick Harris²⁹, Emily Riley³⁰, Angus Dawson³¹,
Sharon Friel³² & Kenny Lawson³³

DOI: [10.1016/j.healthpol.2018.11.013](https://doi.org/10.1016/j.healthpol.2018.11.013)

Infrastructure is a global multi-trillion dollar market presenting many opportunities and risks for sustainable development. This article aims to foster better conceptualisation of the connections and tensions between infrastructure policy and public health in the light of the Sustainable Development Goals, especially SDG3 and SDG9, based on findings from interviews with a purposive sample of senior practicing Australian infrastructure policy makers. The authors use an institutional framework to explore the ideas, actors, rules and mandates, and procedures underpinning the inclusion of health in infrastructure policy. The tendency to default to infrastructure as essential for economic success has fundamental challenges for the SDGs, particularly the politically driven pursuit of ‘mega-project’ legacies, sector-specific siloed governance arrangements, and inadequate conceptualisations of costs and benefits. Public health and infrastructure policy are mutually re-enforcing given they both concern the public interest with implications for all 17 SDGs. Positioning health and wellbeing as fundamental societal outcomes from infrastructure decisions would go a long way to helping achieve the SDGs.

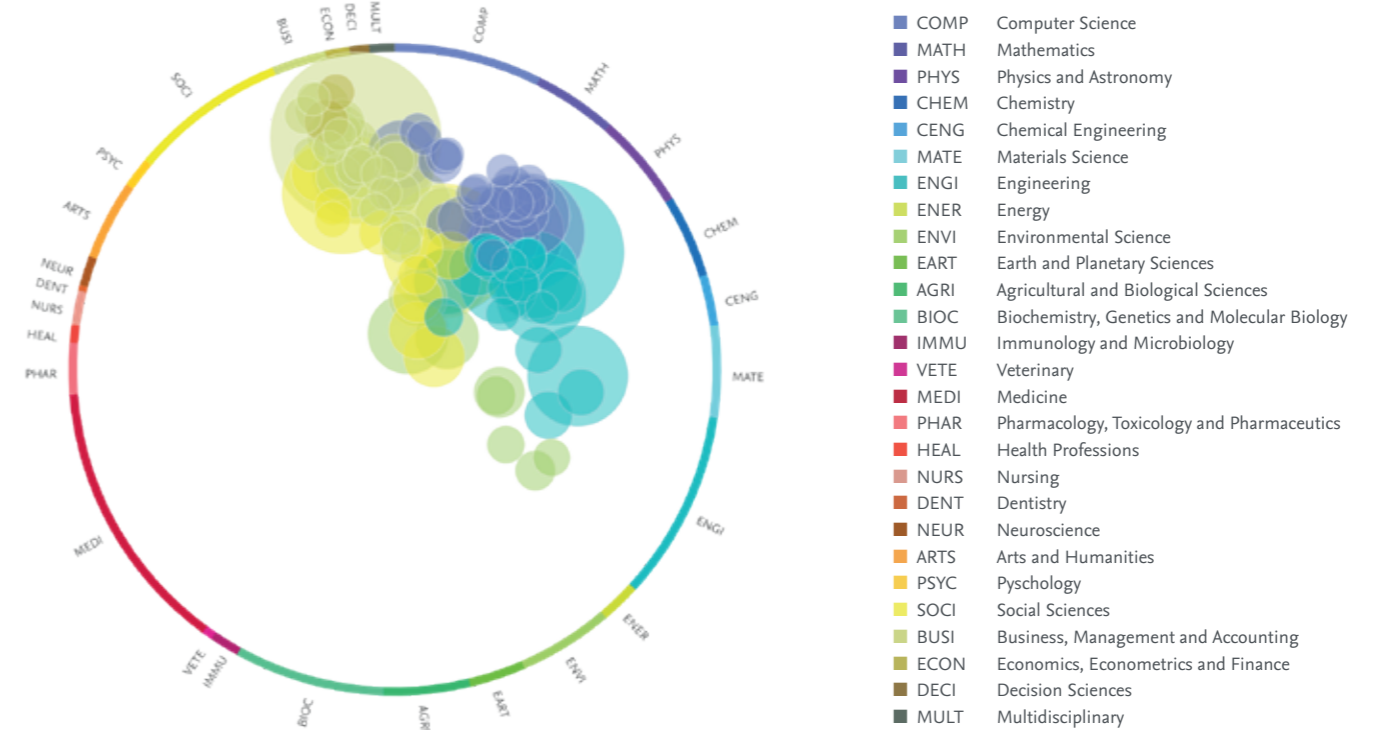
“The policy goals of public health and infrastructure are mutually re-enforcing given that they both fundamentally concern the public interest. Achieving public health goals through infrastructure policy has clear connections to most if not all the SDGs.”

²⁹ Menzies Centre for Health Policy, Sydney School of Public Health, Level 2 The Hub, Charles Perkins Centre D17, The University of Sydney, NSW, Australia
³⁰ Level 2 The Hub, Charles Perkins Centre D17, The University of Sydney, NSW, Australia
³¹ Sydney Health Ethics, Sydney School of Public Health, Level 1, Medical Foundation Building K25, The University of Sydney, NSW, Australia
³² School of Regulation and Global Governance (RegNet) College of Asia and The Pacific Director, Menzies Centre for Health Policy, H.C. Coombs Extension Building #8 Fellows Road, The Australian National University Canberra, ACT, 0200, Australia
³³ Centre for Health Research, Western Sydney University, School of Medicine, Australia

Highlights

- Infrastructure (SDG9) plays a society shaping role synergistic with a public health agenda (SDG3).
- Political power causes ‘project fever’; costly projects often detrimental to the public interest.
- Public health is novel for and insufficiently considered in infrastructure policy.
- Health and well-being focussed infrastructure policy will improve decisions in the public interest.

In 2018, 96 per cent of the world’s population lived within reach of a mobile-cellular signal, and in 2019, the amount of new renewable power capacity was the highest ever. However, the [United Nations](#) mention that “least developed countries, in particular, need to accelerate the development of their manufacturing sector if they are to meet the 2030 target, and scale up investment in scientific research and innovation.” Explore research output, impact and collaboration on SDG9, and see which research trends are shaping the global conversation.



Investigate, understand and analyse SDG research globally with SciVal Research Areas for the UN Sustainable Development Goals (SDGs). Research Areas queries can help researchers and institutions track and demonstrate progress towards the targets of the SDGs. The Topic Wheel presented here clusters publications 2010-2019 into global, unique research topics based on citation patterns.

Research linked to SDG9 is most prominent within Business and Engineering, followed by Computer Sciences. The 17 Perspective Abstract in the page before offers a complementary view, highlighting the connections and tensions between Infrastructure Policy and Public Health, as well as arguing for a closer connection with Decision Sciences.

Expert Insights

The relation between research priorities and societal demands: The case of rice

Elsevier Atlas Award winning paper – October 2019

To what extent is scientific research related to societal needs? To answer this crucial question systematically we need to contrast indicators of research priorities with indicators of societal needs. This [Atlas-winning](#) paper focuses on rice research and technology between 1983 and 2012. It combines quantitative methods that allow investigation of the relation between ‘revealed’ research priorities and ‘revealed’ societal demands, measured respectively by research output and national accounts of rice use and farmers’ and consumers’ rice-related needs. The authors employ new bibliometric data,

methods and indicators to identify countries’ main rice research topics (priorities) from publications, estimating the relation between revealed research priorities and revealed demands. They found that societal demands explain a country’s research trajectory to a limited extent. While some research priorities are aligned to societal demands, confirming that science is partly related to societal needs, there is a relevant number of misalignments between the focus of rice research and revealed demands, crucially related to human consumption and nutrition.

Many of the SDGs are inextricably linked: progress towards one Goal depends on and affects other Goals. The implications of this are clear: the science supporting the SDGs must be multidisciplinary, international and have considered the relevance of sex and gender factors. The 19 papers commissioned for the [Elsevier SDG Perspectives Project](#) look at the SDGs from environmental, social sciences and health perspectives, and offer nuanced insights into the ambitions, achievements and limitations of the 2030 Agenda. These articles have been published in Special Issues of [Current Opinion in Environmental Sustainability](#), [World Development](#) and [Health Policy](#) and provide complementary insights to each SDG infographic.

SDG9 Industry, Innovation and Infrastructure

2015-2019

Output, Impact, Collaboration

Research supporting SDG9 has grown since 2015, with a compound annual growth rate of 9.1% compared to nearly 3.5% for research in all fields.

China produces the most research supporting SDG9, followed by the US, the United Kingdom, India and Italy. Six of the 10 most prolific locations are high income locations (accounting for more than 15,000 publications); two are upper-middle income locations (China and Malaysia) and two are lower-middle income locations (India and Indonesia). No low income locations featured in the top 50.

The top five locations for which research on SDG9 represents the largest share of their research portfolio are Indonesia, Malaysia, Philippines, Kazakhstan and Nigeria.

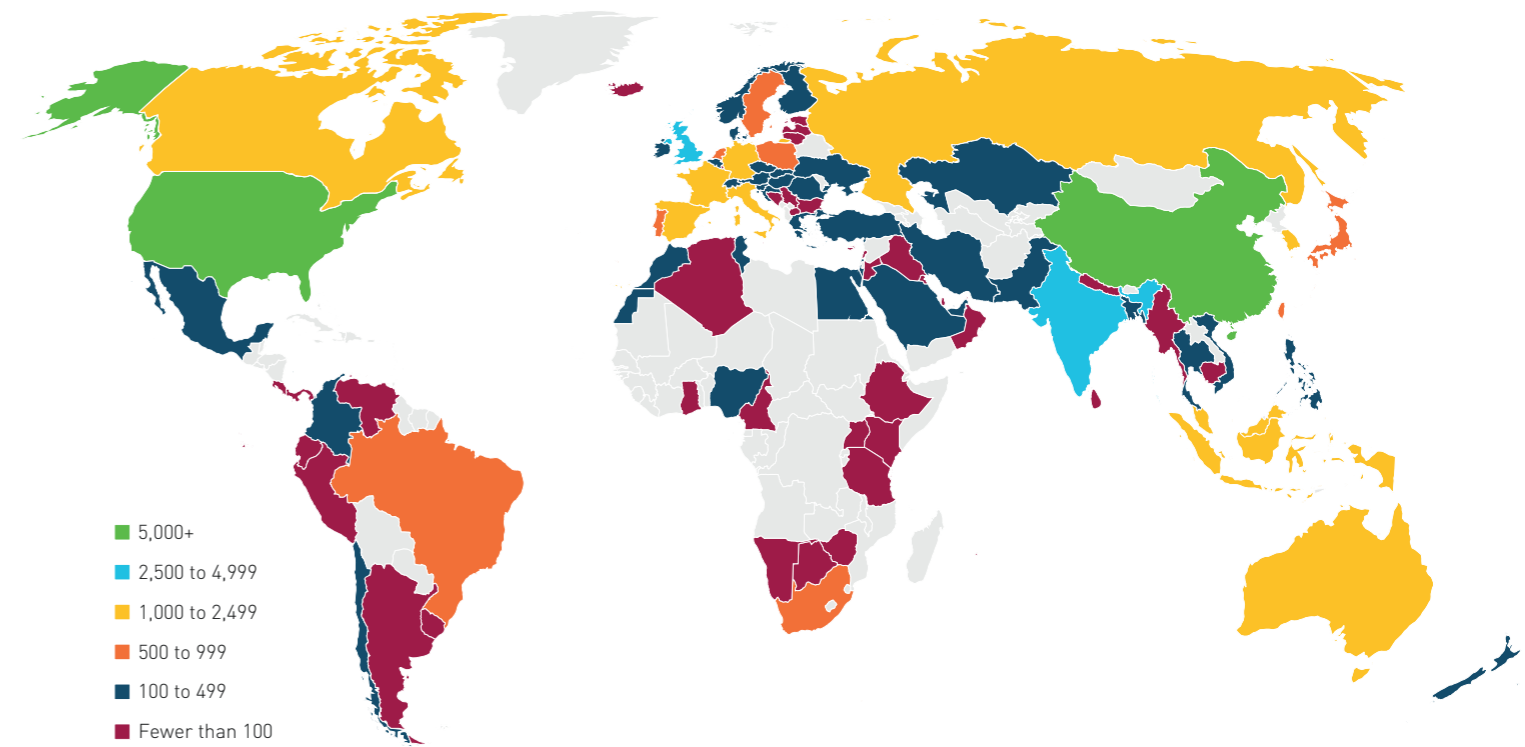
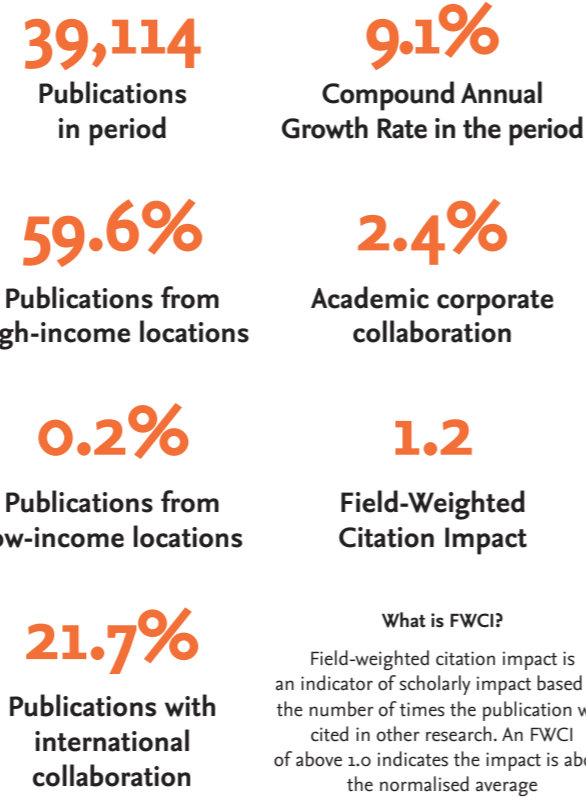
International collaboration yielded 22% of research on SDG9. High income locations collaborated with low income locations on 1% of their total SDG9 research, while nearly 52% of the related output from low income locations came from collaboration with high income locations.

As a measure of academic impact measured by citation, the field weighted citation impact (FWCI) for SDG9 research was above average every year, with an average of 1.2 over the period.

This analysis builds on Elsevier's [Sustainability Science in a Global Landscape](#) report, which was released in 2015 to coincide with the launch of the SDGs. See a [2017 update](#) on key findings on the RELX SDG Resource Centre. Help us to provide insight into SDG research. [Click here to review the research](#)

[See the methodology and definitions](#)

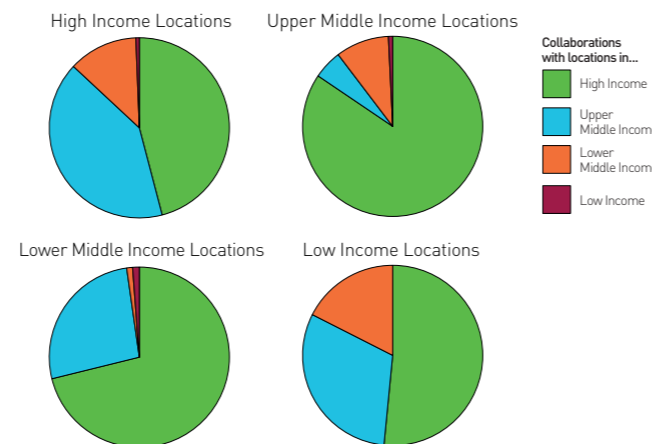
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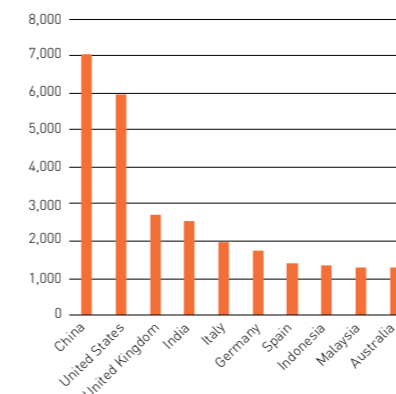
Key themes in SDG9 Research



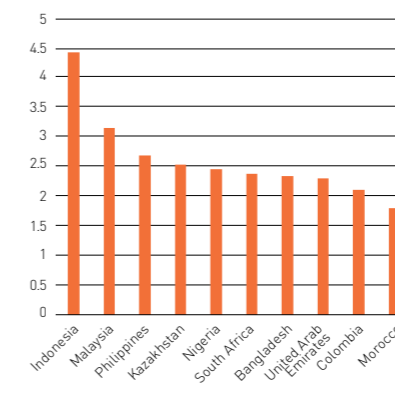
International collaboration between income groups by location



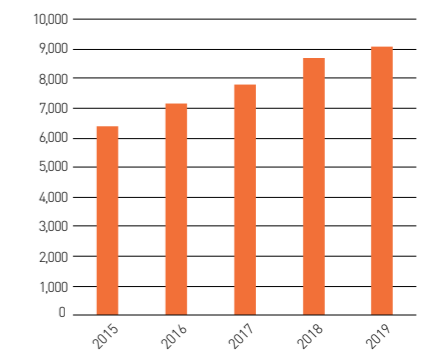
Top 10 locations by publication



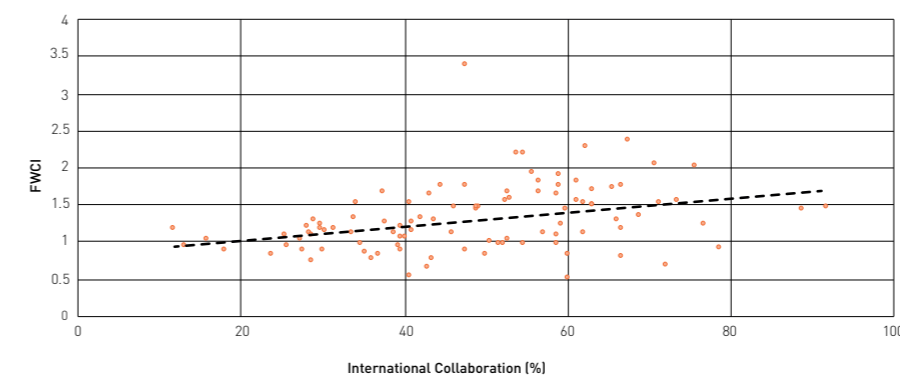
Top 10 locations by RAI *(Relative Activity Index)



Volume of publications supporting SDG9

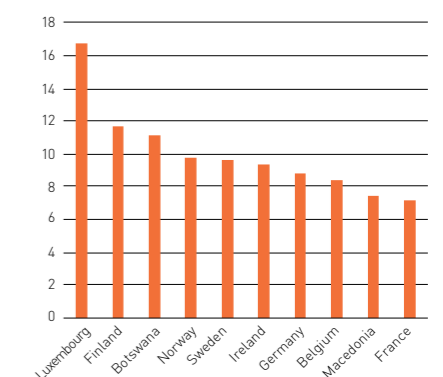


International collaboration and research impact



*Relative Activity Index is a measure of the proportion of the country's research output in the subject, relative to the proportion seen globally

Top 10 locations for corporate-academic collaboration



SDG10 Reduced Inequalities



Mobility equity in a globalized world: Reducing inequalities in the sustainable development agenda

Andres Hackl³⁴

DOI: [10.1016/j.worlddev.2018.08.005](https://doi.org/10.1016/j.worlddev.2018.08.005)

Human mobility and inequality have determined one another throughout modern history, from the effects of labour migration to processes of urbanisation. The Sustainable Development Goals now offer an opportunity to re-examine this complex relationship in a globalized world. Drawing on major research evidence and key debates, this review article proposes a framework of mobility equity as part of SDG10, which foresees the reduction of inequalities within and among countries by 2030. The main question addressed is how forms of social, human and digital mobility, including migration, can contribute to reduced inequalities and positive development outcomes. The reviewed research underpins the need for an approach that prioritizes equality of opportunity over equality of outcomes. Mobility equity offers such an approach and rests on two main foundations: people's equal capacity and freedom to be mobile in empowering ways, and the equal and inclusive regulation of mobility in all its forms, including human, social and digital mobility. This article provides new ideas for thinking about research and policy-making within the wider inequality-mobility nexus of global development.

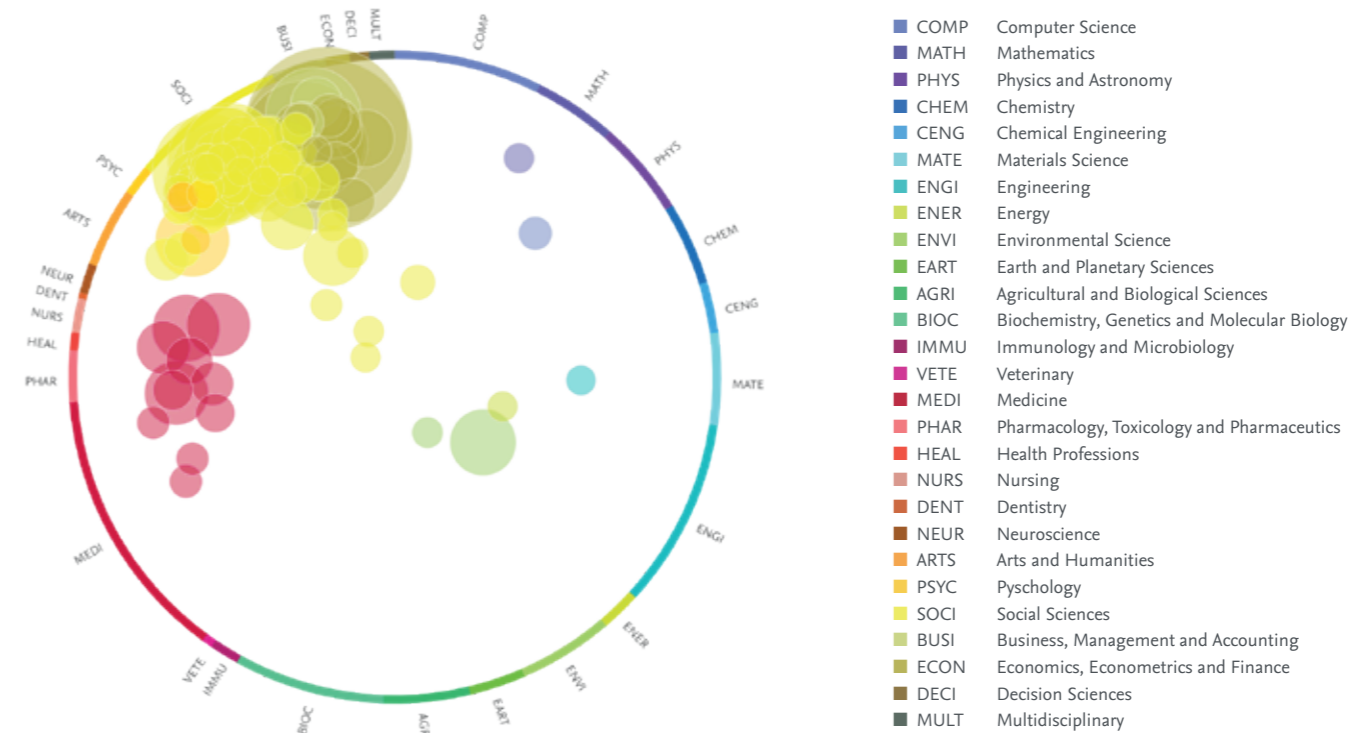
“Mobility equity, I argue, is ultimately a precondition for reduced inequalities within and between countries. It does not simply call for more movement or more mobility, but for a more equal and just distribution of the access to human, social and digital mobility.”

³⁴ Social Anthropology, School of Social and Political Science, University of Edinburgh, United Kingdom

Highlights

- Well-managed human and social mobility can contribute to reduced inequalities within and among countries.
- Mobility equity is a precondition for reduced inequalities within the sustainable development agenda.
- Mobility equity includes the freedom to be mobile in empowering ways, and the just regulation of mobility regimes.
- More research is needed about how social, human and digital mobility are mutually implicated and linked to inequality.
- Mobility equity must become a core component of policies that tackle inequalities within and among countries.

According to the [United Nations](#) “inequality within and among countries is a persistent cause for concern. [...] COVID-19 has deepened existing inequalities, hitting the poorest and most vulnerable communities the hardest. [...] At the same time, social, political and economic inequalities have amplified the impacts of the pandemic.” Explore research output, impact and collaboration on SDG10, and see which research trends are shaping the global conversation.



Investigate, understand and analyse SDG research globally with SciVal Research Areas for the UN Sustainable Development Goals (SDGs). Research Areas queries can help researchers and institutions track and demonstrate progress towards the targets of the SDGs. The Topic Wheel presented here clusters publications 2010-2019 into global, unique research topics based on citation patterns.

Research linked to [SDG10](#) is most prominent within Business, Social Sciences and Medicine. The word cloud showcasing the top 50 key phrases by relevance further informs the trends within academia; with Migration appearing as a significant trend. The 17 Perspective Abstract in the page before offers a complementary view, discusses the linkages between mobility and inequalities and how distinct forms of social, human and digital mobility can contribute to reduced inequalities and positive development outcome.

Expert Insights

High-quality health systems in the Sustainable Development Goals era: time for a revolution

With one billion people on the move or having moved in 2018, migration is a global reality. International migration has increased to 258 million, and the numbers of refugees and people displaced by conflict, natural disasters and climate change are at their highest levels: 22 and 40 million, respectively. Despite negative political narratives, migration is not overwhelming high-income countries—instead, it takes place mostly between low-income and middle-income countries and most people are migrating for work. But migration has also become a political lightning rod. This [UCL-Lancet Commission](#) steps into this political debate to provide [evidence for cooperation and action](#)

on what is one of the most pressing issues of the 21st century. The Commission's foundation is that migration and health are inextricably linked—and key to sustainable development. It provides a framework of migration as a dynamic process, providing evidence of the multiple factors that could be beneficial or detrimental to individuals and systems along the migration journey—at origin, transit, destination and return. It documents the devastating impacts of forced migration, especially on girls and women, but also the overall benefits to the health of individuals and populations that migration generates. Using the lens of health the Commission shows that migration policies can be both ethical and feasible—calling for governments, international agencies, and professionals to promote health in global mobility.

Many of the SDGs are inextricably linked: progress towards one Goal depends on and affects other Goals. The implications of this are clear: the science supporting the SDGs must be multidisciplinary, international and have considered the relevance of sex and gender factors. The 19 papers commissioned for the [Elsevier SDG Perspectives Project](#) look at the SDGs from environmental, social sciences and health perspectives, and offer nuanced insights into the ambitions, achievements and limitations of the 2030 Agenda. These articles have been published in Special Issues of [Current Opinion in Environmental Sustainability](#), [World Development](#) and [Health Policy](#) and provide complementary insights to each SDG infographic.

SDG10 Reduced Inequalities

2015-2019
Output, Impact, Collaboration

Research supporting SDG10 has grown since 2015, with a compound annual growth rate of 4.2% compared to nearly 3.5% for research in all fields.

The US produces the most research supporting SDG10, followed by the United Kingdom, Germany, China and Canada. Eight of the 10 most prolific locations are high income locations (accounting for more than 31,700 publications); one is an upper-middle income location (China) and one is a lower-middle income location (India). No low income locations featured in the top 50.

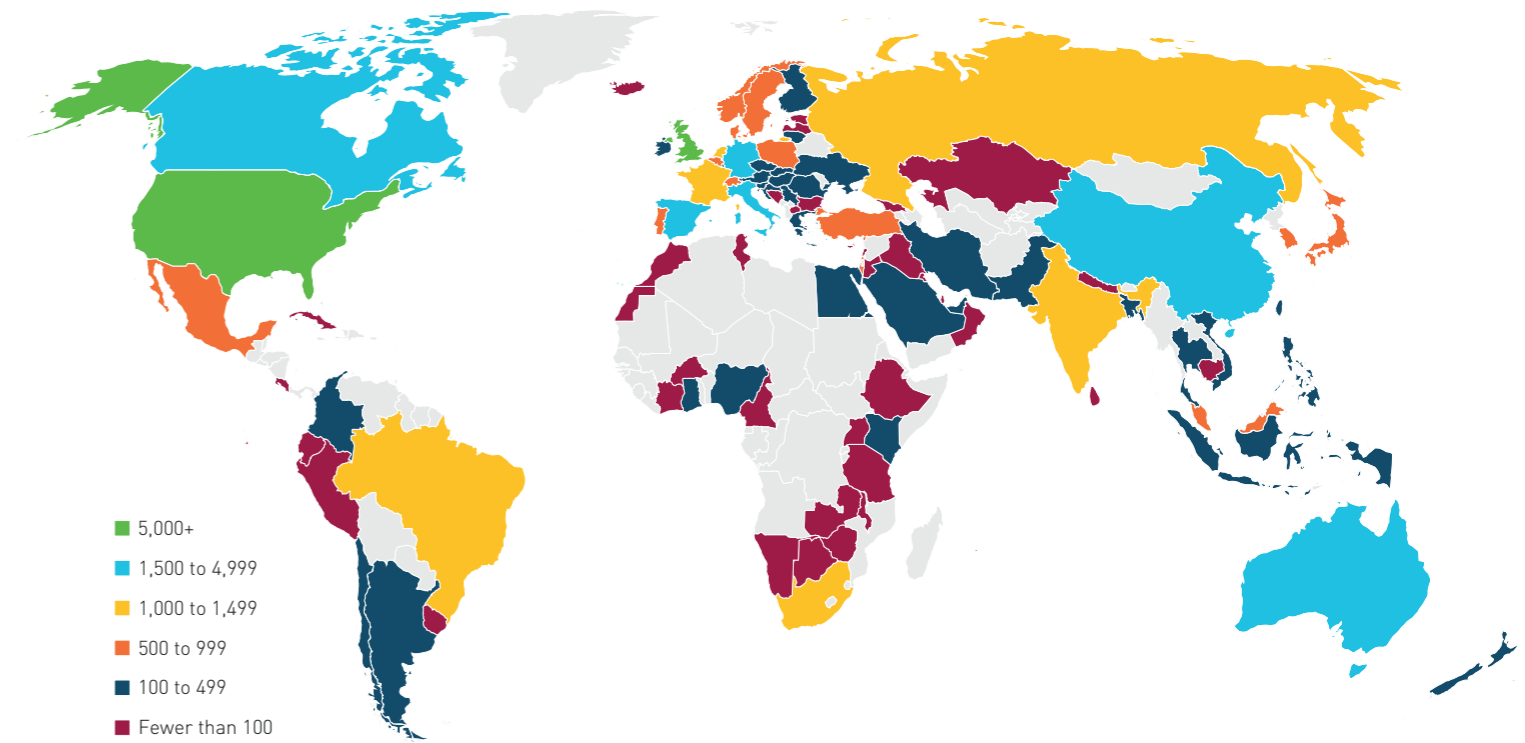
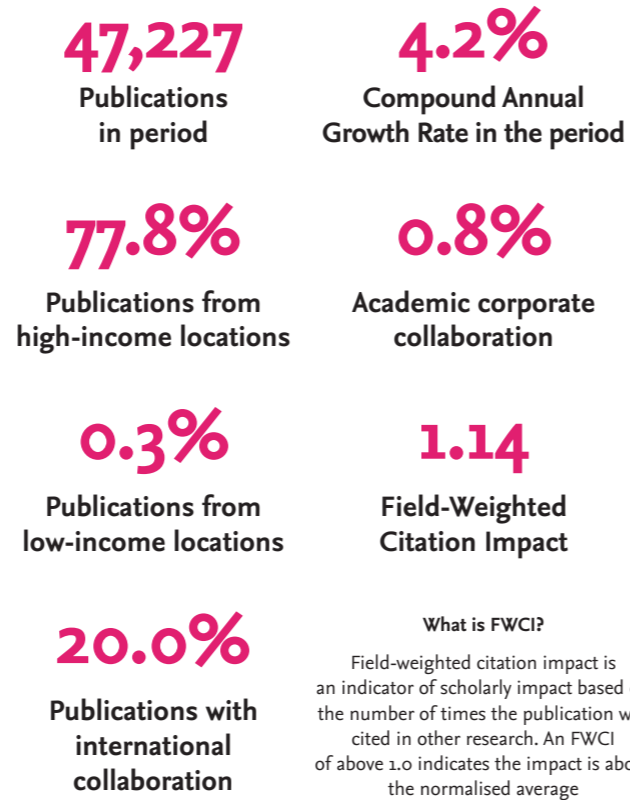
The top five locations for which research on SDG10 represents the largest share of their research portfolio are Ghana, Luxembourg, South Africa, Lithuania and Kenya.

International collaboration yielded 20% of research on SDG10. High income locations collaborated with low income locations on 2% of their total SDG10 research, while nearly 65% of the related output from low income locations came from collaboration with high income locations.

As a measure of academic impact measured by citation, the field weighted citation impact (FWCI) for SDG10 research was above average every year, with an average of 1.14 over the period.

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[See the methodology and definitions](#)

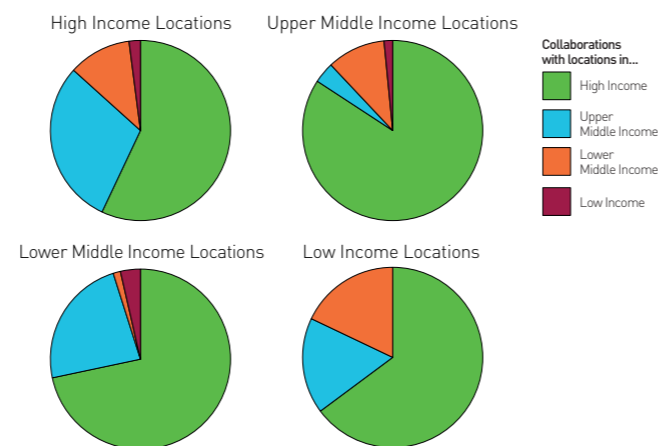
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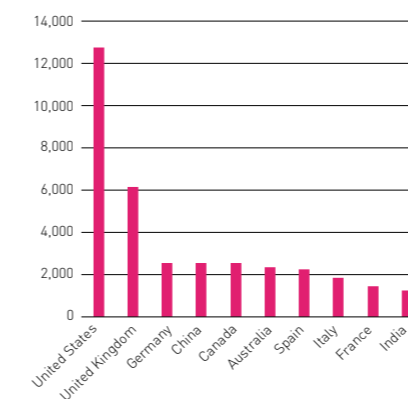
Key themes in SDG10 Research



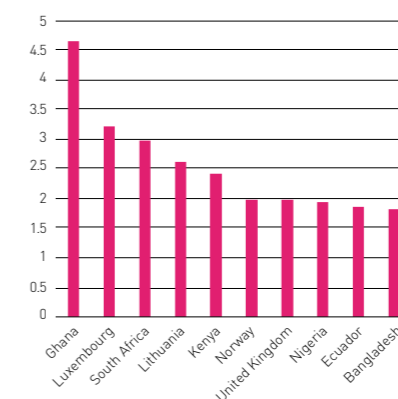
International collaboration between income groups by location



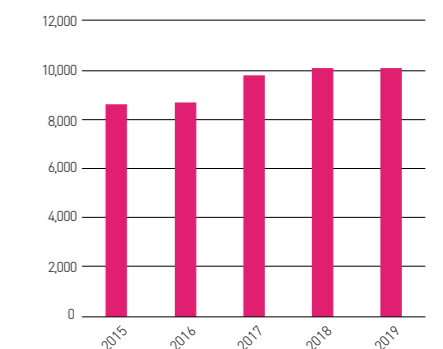
Top 10 locations by publication



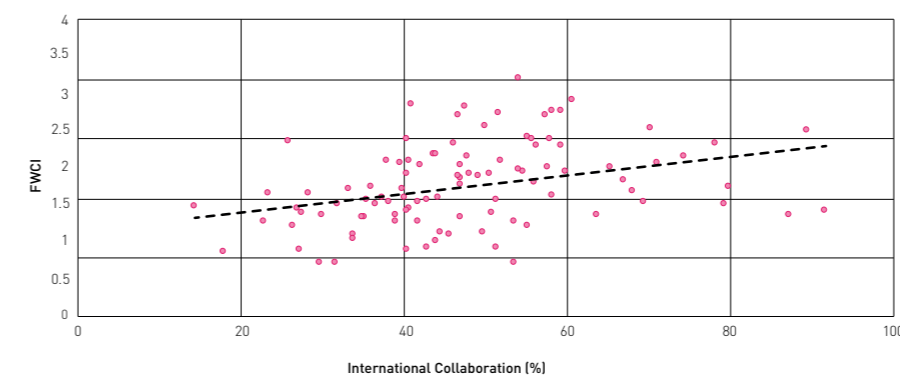
Top 10 locations by RAI *(Relative Activity Index)



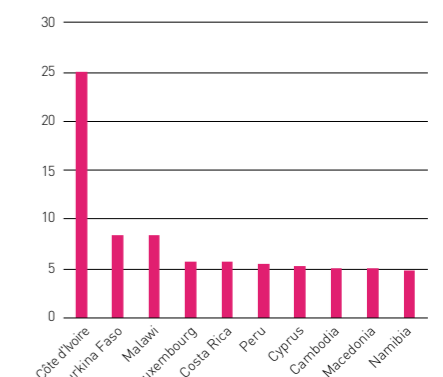
Volume of publications supporting SDG10



International collaboration and research impact



Top 10 locations for corporate-academic collaboration



SDG11 Sustainable Cities and Communities



Achieving the SDGs: Evaluating indicators to be used to benchmark and monitor progress towards creating healthy and sustainable cities

Billie Giles-Corti³⁷, Melanie Lowe³⁸
& Jonathan Arundel³⁹

DOI: [10.1016/j.healthpol.2019.03.001](https://doi.org/10.1016/j.healthpol.2019.03.001)

In 2016, the World Health Organization declared that ‘Health is one of the most effective markers of any city’s successful sustainable development’ (World Health Organisation, 2016). With estimates that around 6.7 billion people will live in cities by 2050, 21st century city planning decisions will play a critical role in achieving the United Nations (UN) Sustainable Development Goals (SDGs). They will determine the city structure and access to health-enhancing (or health-damaging) urban environments, and ultimately lifestyle choices that impact both individual and planetary health. Benchmarking, monitoring and evaluating city planning policies and interventions is therefore critical to optimise urban outcomes. This paper examined the extent to which the UN indicators will help cities evaluate their efforts to deliver sustainability and health outcomes. It identified inconsistencies between the two UN indicator frameworks (i.e. the Global SDG framework and the UN Habitat indicator action framework for cities). A more comprehensive approach to benchmarking, monitoring and evaluating policies designed to achieve healthy and sustainable cities and assessing spatial inequities is proposed.

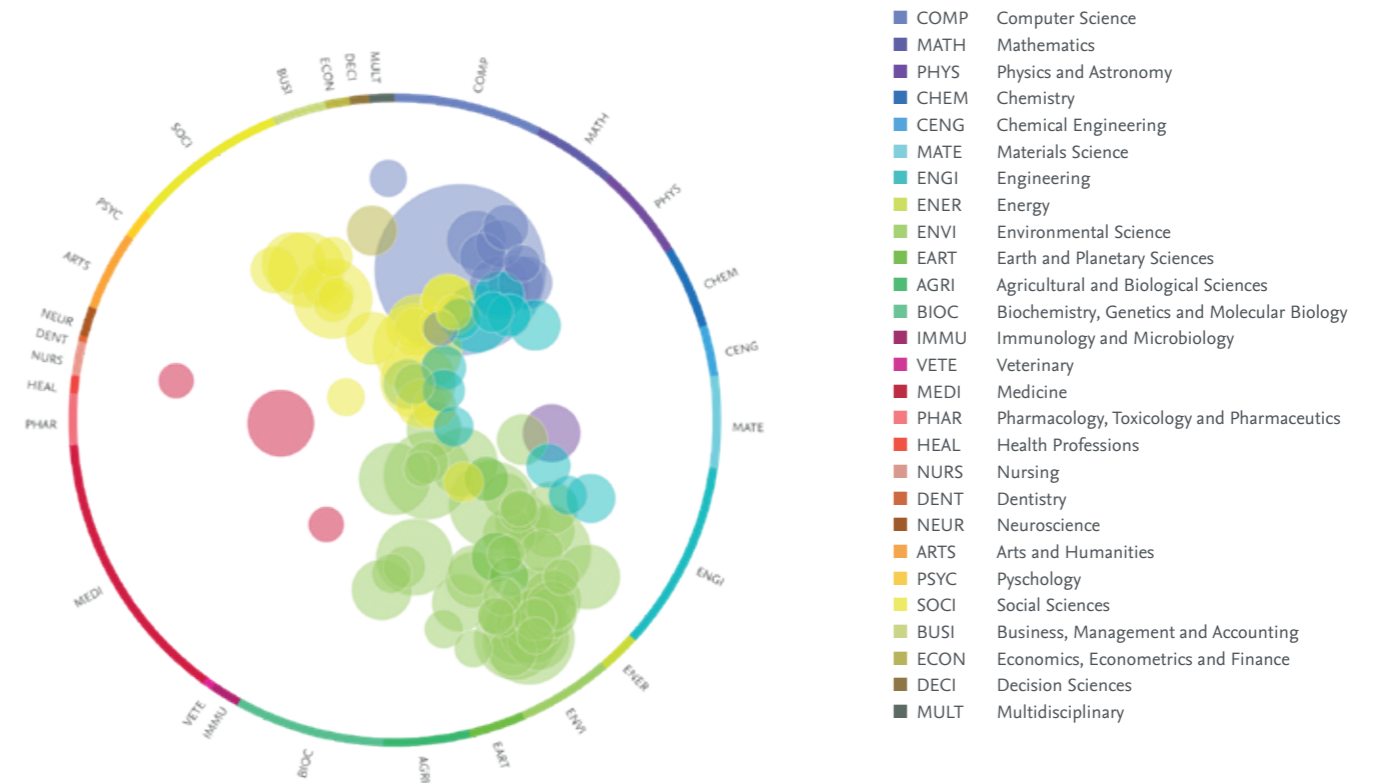
“Ideally, indicators allow cities to benchmark and monitor the implementation and outcomes of policies and interventions, and when spatially disaggregated and mapped, identify spatial inequities within and between cities.”

- 37 NHMRC Centre of Research Excellence in Healthy Liveable Communities, Melbourne, Australia
- 38 Australian Catholic University, Melbourne, Australia NHMRC Centre of Research Excellence in Healthy Liveable Communities, Melbourne, Australia
- 39 Global Development Institute, University of Manchester, Oxford Road, Manchester, M13 9PL, United Kingdom
- 40 Global Development Institute, University of Manchester, Oxford Road, Manchester, M13 9PL, United Kingdom
- 41 The Urban Institute, University of Sheffield, 219 Portobello Street, Sheffield, S1 4DP, United Kingdom

Highlights

- Given rapid urbanization, city planning is key to achieving the SDGs.
- UN indicator frameworks do not include many determinants of city outcomes.
- A more comprehensive set of indicators for cities is required.
- This will better facilitate monitoring of progress toward attaining the SDGs.

With urbanization on the rise and more than 50% of the world population living in cities, “rapid urbanization is exerting pressure on fresh water supplies, sewage, the living environment, and public health”, state the [United Nations](#) – putting at risk the 2030 target of ensuring access for all to adequate, safe and affordable housing and basic services, such as transportation. Explore research output, impact and collaboration on SDG11 and see which research trends are shaping the global conversation.



Investigate, understand and analyse SDG research globally with SciVal Research Areas for the UN Sustainable Development Goals (SDGs). institutions track and demonstrate progress towards the targets of the SDGs. The Topic Wheel presented here clusters publications 2010-2019 into global, unique research topics based on citation patterns.

Research linked to [SDG11](#) is most prominent within Environmental and Computer Sciences. The 17 Perspective Abstract in the page before offer a complementary view, focusing on the impact urban environments have on health outcomes, as well as arguing for a closer connection with Decision Sciences.

Expert Insights

The Tsinghua-Lancet Commission on Healthy Cities in China: unlocking the power of cities for a healthy China

Increasingly, people leave the countryside to pursue better opportunities in cities. Nowhere has urbanisation been more rapid and pronounced than in China. This [Lancet Commission](#), led by Tsinghua University in Beijing, examines the particular challenges and opportunities for health in China’s cities, with regard to health

risks, health promotion, environmental health, and health-care delivery. For cities to be active participants in China’s aspiration as an ecocivilisation, there needs to be increased participation in health-related activities by stakeholders, with fuller integration of health into all civic policies. From this dialogue should come shared goals that are assessed regularly, and research on interventions to improve health for people who live in cities.

Many of the SDGs are inextricably linked: progress towards one Goal depends on and affects other Goals. The implications of this are clear: the science supporting the SDGs must be multidisciplinary, international and have considered the relevance of sex and gender factors. The 19 papers commissioned for the [Elsevier SDG Perspectives Project](#) look at the SDGs from environmental, social sciences and health perspectives, and offer nuanced insights into the ambitions, achievements and limitations of the 2030 Agenda. These articles have been published in Special Issues of [Current Opinion in Environmental Sustainability](#), [World Development](#) and [Health Policy](#) and provide complementary insights to each SDG infographic.

SDG11 Sustainable Cities and Communities

2015-2019

Output, Impact, Collaboration

Research supporting SDG11 has grown since 2015, with a compound annual growth rate of 13.1% compared to nearly 3.5% for research in all fields.

China produces the most research supporting SDG11, followed by the US, United Kingdom, India and Italy. Seven of the 10 most prolific locations are high income locations (accounting for more than 62,500 publications); two are upper-middle income locations (China and Brazil) and one is a lower-middle income location (India). No low income locations featured in the top 50.

The top five locations for which research on SDG11 represents the largest share of their research portfolio are Ghana, Sri Lanka, Philippines, Ecuador and Nepal.

International collaboration yielded 23% of research on SDG11. High income locations collaborated with low income locations on 1% of their total SDG11 research, while 65% of the related output from low income locations came from collaboration with high income locations.

As a measure of academic impact measured by citation, the field weighted citation impact (FWCI) for SDG11 research was above average every year, with an average of 1.22 over the period.

This analysis builds on Elsevier's *Sustainability Science in a Global Landscape* report, which was released in 2015 to coincide with the launch of the SDGs. See a [2017 update on key findings on the RELX SDG Resource Centre](#). Help us to provide insight into SDG research. [Click here to review the research](#)

[See the methodology and definitions](#)

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141,331
Publications
in period

13.1%
Compound Annual
Growth Rate in the period

60.4%
Publications from
high-income locations

1.8%
Academic corporate
collaboration

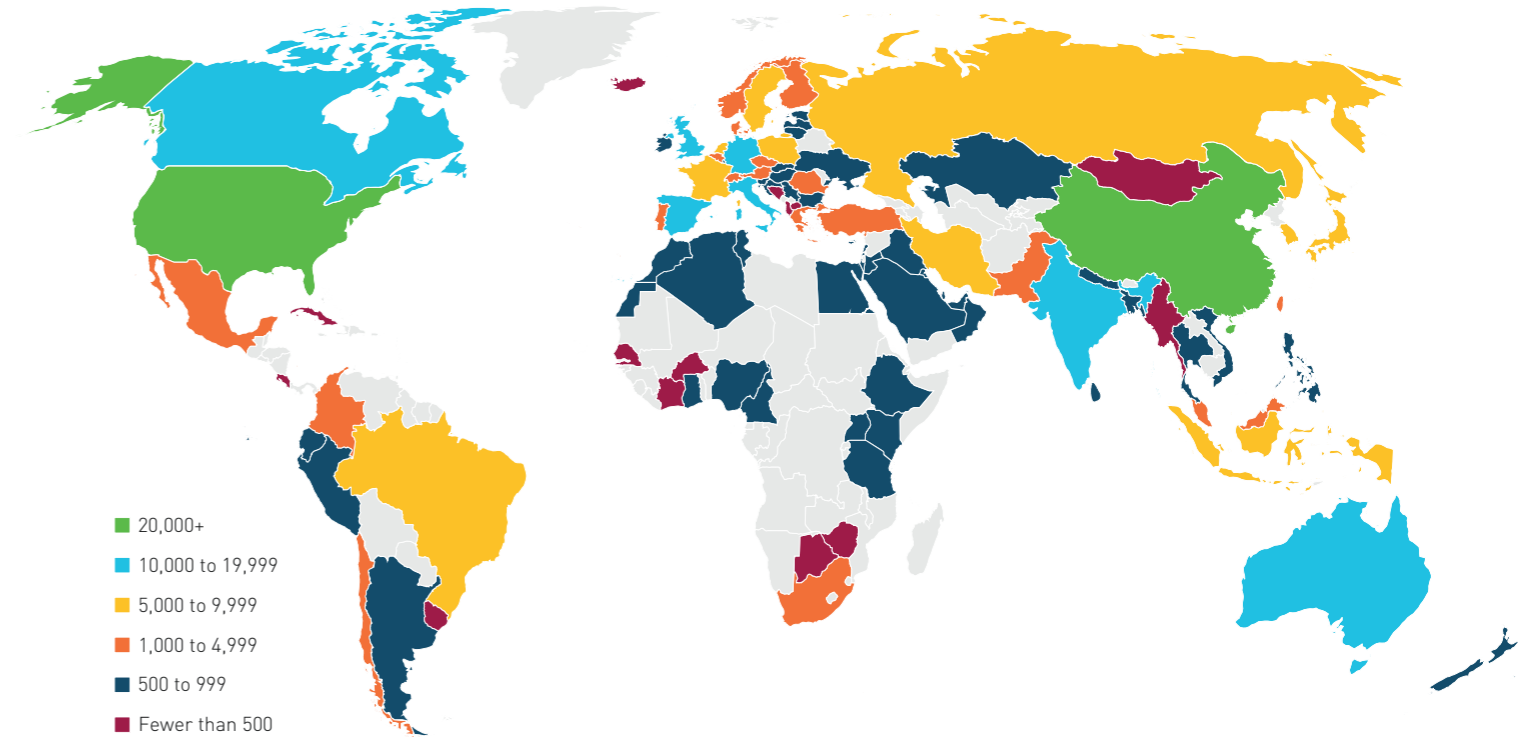
0.3%
Publications from
low-income locations

1.22
Field-Weighted
Citation Impact

22.6%
Publications with
international
collaboration

What is FWCI?

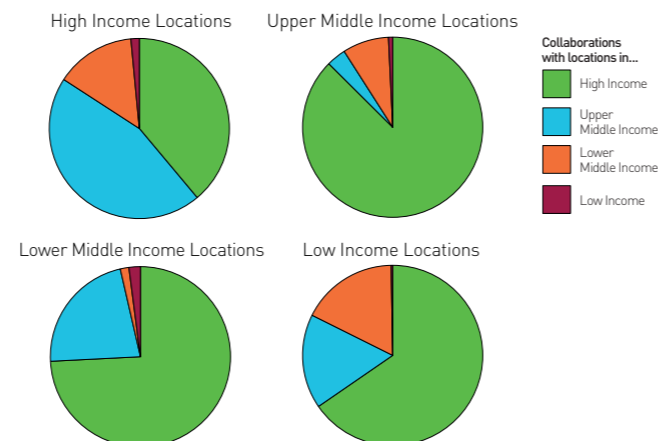
Field-weighted citation impact is an indicator of scholarly impact based on the number of times the publication was cited in other research. An FWCI of above 1.0 indicates the impact is above the normalised average



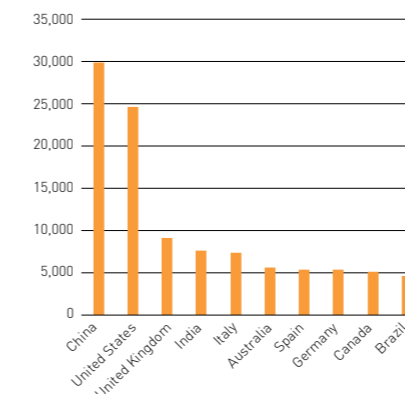
Key themes in SDG11 Research



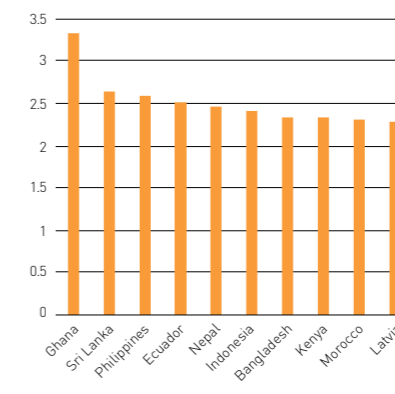
International collaboration between income groups by location



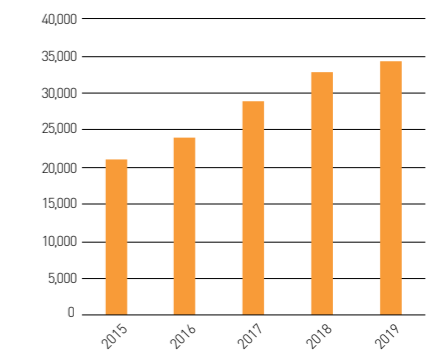
Top 10 locations by publication



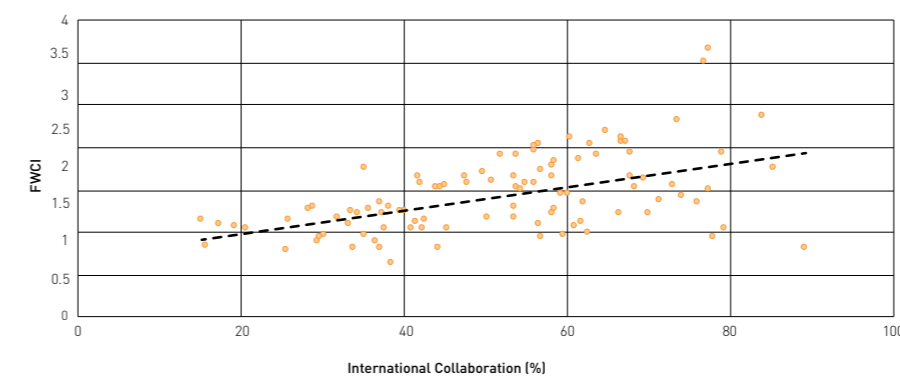
Top 10 locations by RAI *(Relative Activity Index)



Volume of publications supporting SDG11

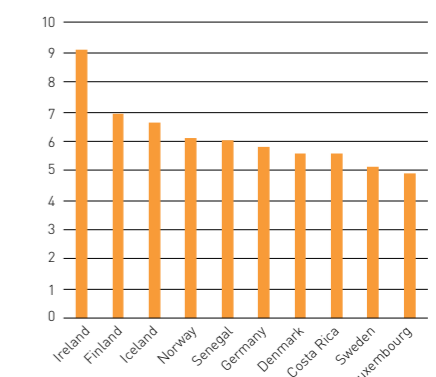


International collaboration and research impact



*Relative Activity Index is a measure of the proportion of the country's research output in the subject, relative to the proportion seen globally

Top 10 locations for corporate-academic collaboration



SDG12 Responsible Consumption and Production



Circular economy strategies for adaptive reuse of cultural heritage buildings to reduce environmental impacts

Gillian Foster⁴³

DOI: [10.1016/j.resconrec.2019.104507](https://doi.org/10.1016/j.resconrec.2019.104507)

Circular economy strategies seek to reduce the total resources extracted from the environment and reduce the wastes that human activities generate in pursuit of human wellbeing. Circular Economy concepts are well suited to the building and construction sector in cities. Cultural heritage buildings hold a unique niche in the urban landscape. In addition to shelter, they embody the local cultural and historic characteristics that define communities. Therefore, extending their useful lifespan has multiple benefits that extend beyond the project itself to the surrounding area, contributing to economic and social development. To explore this complex issue, the research applies systematic literature review and synthesis methods. Decision makers lack knowledge of the environmental benefits of adaptive reuse of cultural heritage buildings and lack tools to implement these projects. A new comprehensive circular economy framework for the adaptive reuse of cultural heritage buildings to reduce environmental impacts intends to meet these needs.

The framework integrates methods and techniques from the building and construction literature that aim to reduce lifecycle environmental impact of buildings with a circular product supply chain approach.

“The goal of circular economy is macro-level transformation to a sustainable economy. This goal cannot be reached without the micro level transformations supported by this research. It is not enough to focus on closing material loops to create new products from today’s waste streams without care for the overall scale of resources used.”

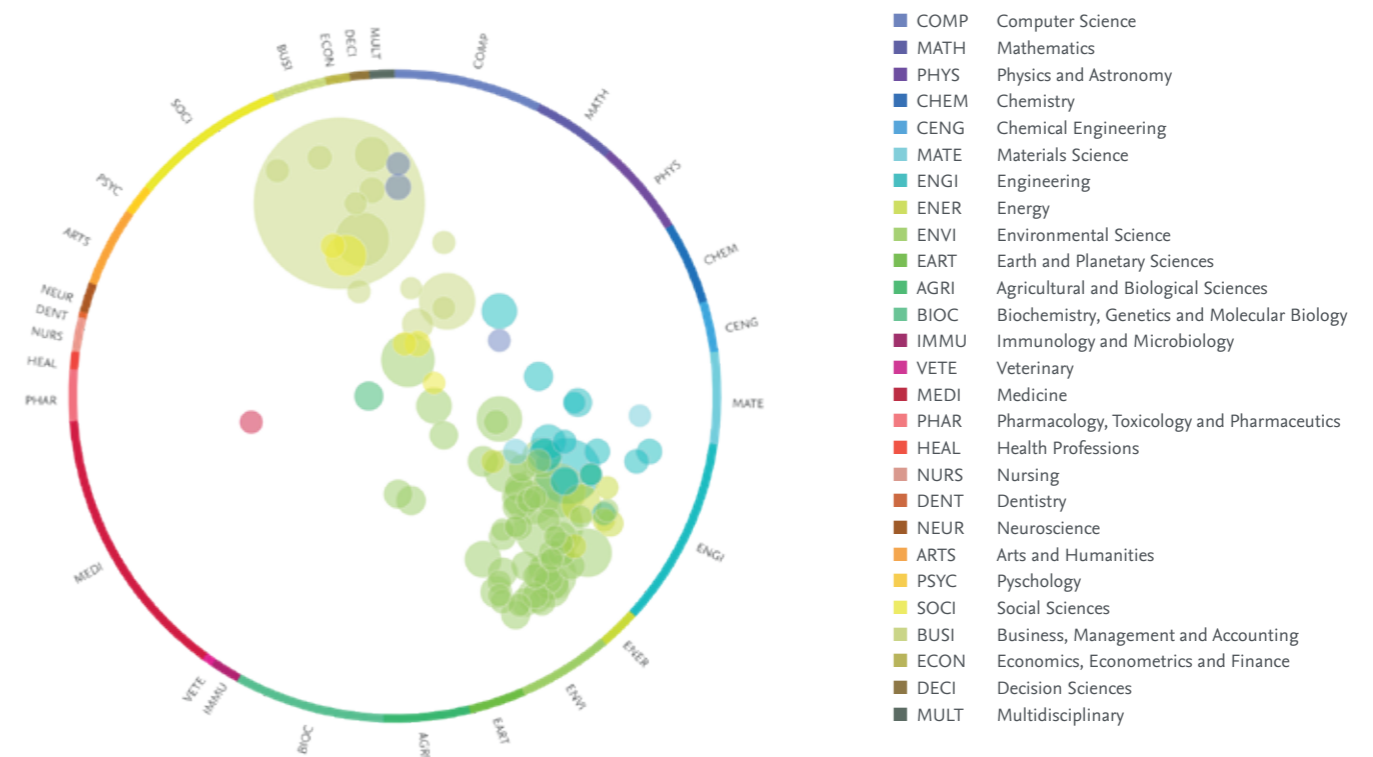
⁴³ Institute for Ecological Economics, Department of Socioeconomics, Vienna University of Economics and Business, Welthandelsplatz 1/D5, 1020 Wien, Austria

Highlights

- Lack of knowledge and tools hampers Circular Economy in the building sector.
- Urban cultural heritage buildings are drivers of environmental sustainability.
- Adaptive reuse of urban cultural heritage buildings is a nexus issue.
- A circular product supply chain approach transforms a linear building lifecycle.
- A new framework proposes 46 circularity strategies for adaptive reuse of buildings.

By 2050, the equivalent of almost three planets could be required to provide the natural resources needed to sustain current lifestyles. However, the [United Nations](#) mention that “the COVID-19 pandemic offers countries an opportunity to build recovery plans that will reverse current trends and change our consumption and production patterns towards a more sustainable future.”

Explore research output, impact and collaboration on SDG12, and see which research trends are shaping the global conversation.



Investigate, understand and analyse SDG research globally with SciVal Research Areas for the UN Sustainable Development Goals (SDGs). Research Areas queries can help researchers and institutions track and demonstrate progress towards the targets of the SDGs. The Topic Wheel presented here clusters publications 2010-2019 into global, unique research topics based on citation patterns.

Research linked to [SDG12](#) is most prominent within Business and Environmental Sciences, followed by Engineering. The Elsevier Atlas Award paper in the page before offers a complementary view, explicitly outlining how the construction sector in cities is closely linked to Economics and the Environment.

Expert Insights

User perspectives in the design of interactive everyday objects for sustainable behaviour
Elsevier Atlas Award winning paper - February 2020

Addressing efficient management of energy has become a central objective due to the scarcity of traditional energy sources and global warming. To cope with this overarching issue, some technological solutions such as Smart Grids, Internet of Things or Demand response are proposed. However, the majority of them overlooks the role of human beings in the equation. This [Atlas-winning paper](#) provides a set of design-hypotheses to devise augmented objects

that ally with their users to reduce energy consumption. “We always assume technology will help improve energy efficiency. But while we want to create comfort for the users, forgetting human factors could actually decrease efficiency. We think that human pains, perspectives, needs and beliefs should be put at the center of the design of the pieces of technology that we create.” - Dr. Diego Casado-Mansilla, co-author of the study.

Many of the SDGs are inextricably linked: progress towards one Goal depends on and affects other Goals. The implications of this are clear: the science supporting the SDGs must be multidisciplinary, international and have considered the relevance of sex and gender factors. The 19 papers commissioned for the [Elsevier SDG Perspectives Project](#) look at the SDGs from environmental, social sciences and health perspectives, and offer nuanced insights into the ambitions, achievements and limitations of the 2030 Agenda. These articles have been published in Special Issues of [Current Opinion in Environmental Sustainability](#), [World Development](#) and [Health Policy](#) and provide complementary insights to each SDG infographic.

SDG12 Responsible Consumption and Production

2015-2019
Output, Impact, Collaboration

Research supporting SDG12 has grown since 2015, with a compound annual growth rate of 11.6% compared to nearly 3.5% for research in all fields.

China produces the most research supporting SDG12, followed by the US, United Kingdom, India and Italy. Seven of the 10 most prolific locations are high income locations (accounting for more than 37,400 publications); two are upper-middle income locations (China and Brazil) and one is a lower-middle income location (India). No low income locations featured in the top 50.

The top five locations for which research on SDG12 represents the largest share of their research portfolio are Ghana, Nigeria, Sri Lanka, Latvia and Malaysia.

International collaboration yielded 24% of research on SDG12. High income locations collaborated with low income locations on 1% of their total SDG12 research, while nearly 58% of the related output from low income locations came from collaboration with high income locations.

As a measure of academic impact measured by citation, the field weighted citation impact (FWCI) for SDG12 research was above average every year, with an average of 1.36 over the period.

This analysis builds on Elsevier's [Sustainability Science in a Global Landscape](#) report, which was released in 2015 to coincide with the launch of the SDGs. See a [2017 update](#) on key findings on the RELX SDG Resource Centre. Help us to provide insight into SDG research. [Click here to review the research](#)
[See the methodology and definitions](#)

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84,127
Publications in period

11.6%
Compound Annual Growth Rate in the period

61.7%
Publications from high-income locations

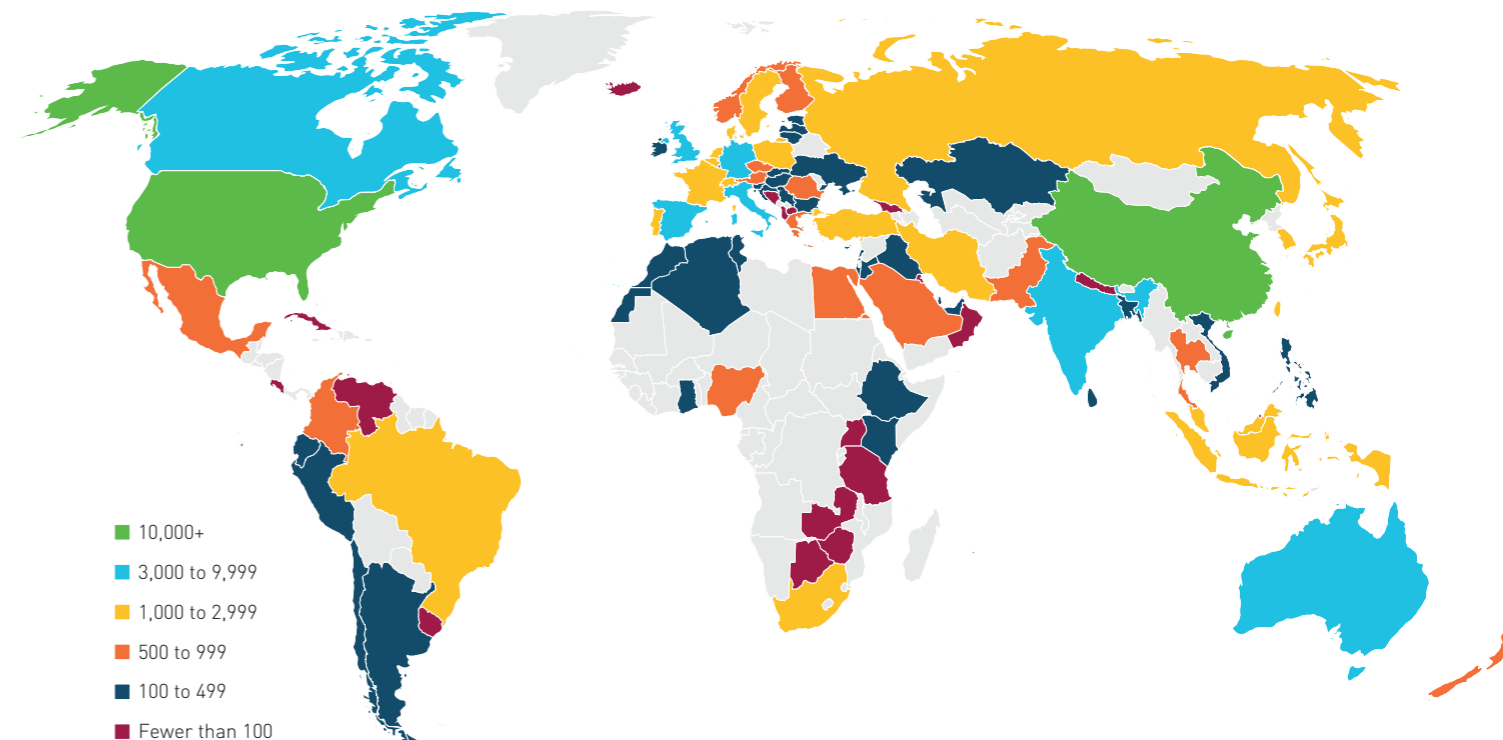
2.0%
Academic corporate collaboration

0.2%
Publications from low-income locations

1.36
Field-Weighted Citation Impact

24.2%
Publications with international collaboration

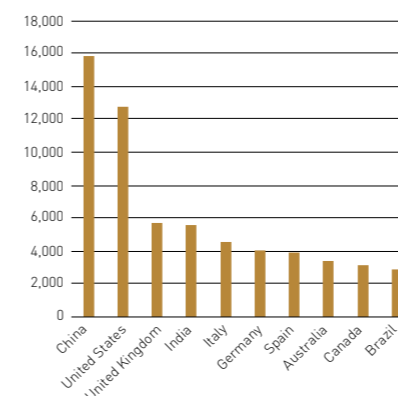
What is FWCI?
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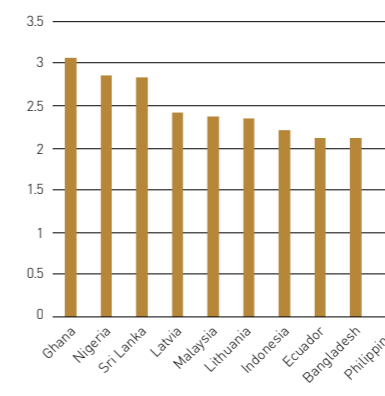
Key themes in SDG12 Research



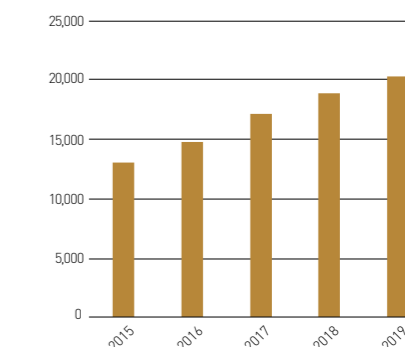
Top 10 locations by publication



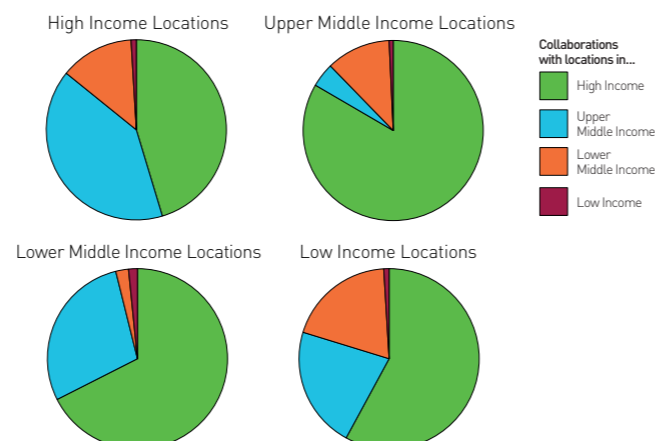
Top 10 locations by RAI *(Relative Activity Index)



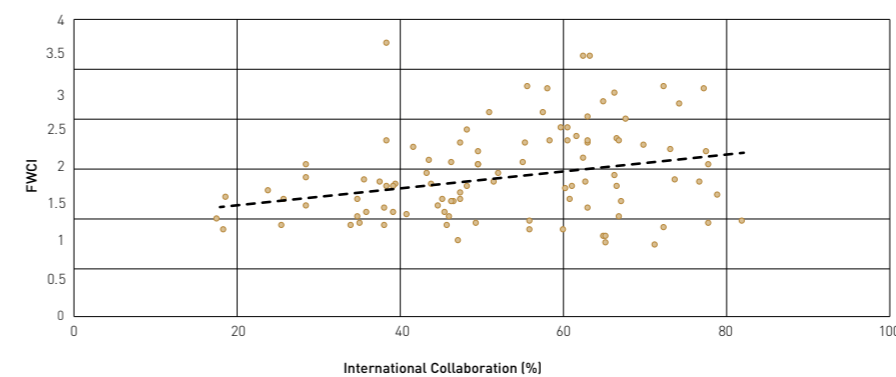
Volume of publications supporting SDG12



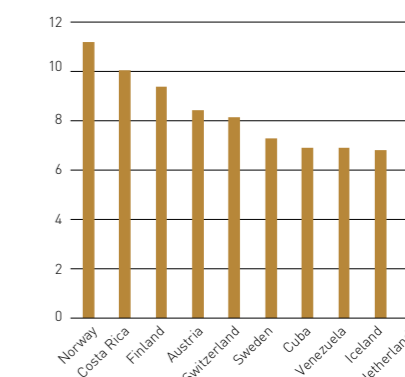
International collaboration between income groups by location



International collaboration and research impact



Top 10 locations for corporate-academic collaboration



SDG13 Climate Action



Urgent action to combat climate change and its impacts (SDG13): transforming agriculture and food systems

Bruce M Campbell^{43,45}, James Hansen⁴⁶,
Janie Rioux⁴⁷, Clare M Stirling⁴⁸,
Stephen Twomlow⁴⁹ & Eva(Lini) Wollenberg⁵⁰

DOI: [10.1016/j.cosust.2018.06.005](https://doi.org/10.1016/j.cosust.2018.06.005)

Actions on climate change (SDG13), including in the food system, are crucial. SDG13 needs to align with the Paris Agreement, given that UNFCCC negotiations set the framework for climate change actions. Food system actions can have synergies and trade-offs, as illustrated by the case for nitrogen fertiliser. SDG13 actions that reduce emissions can have positive impacts on other SDGs (e.g. 3, 6, 12, 14, 15); but such actions should not undermine the adaptation goals of SDG13 and SDGs 1, 2, 5 and 10. Balancing trade-offs is thus crucial, with SDG12 central: responsible consumption and production. Transformative actions in food systems are needed to achieve SDG13 (and other SDGs), involving technical, policy, capacity enhancement and finance elements. But transformative actions come with risks, for farmers, investors, development agencies and politicians. Likely short- and long-term impacts need to be understood.

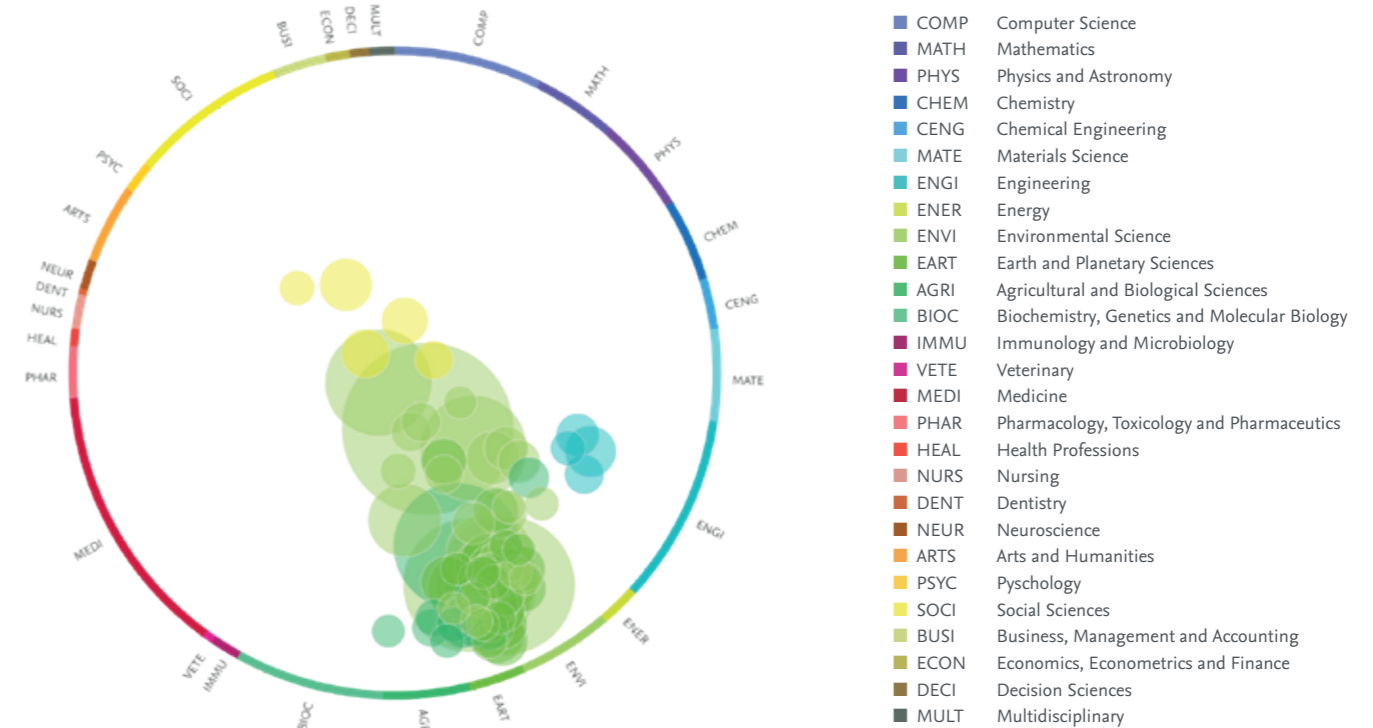
“Transformative actions in the food system to achieve SDG13 and UNFCCC agreements are crucial, but actions need to be carefully considered given the possibility of trade-offs between adaptation and mitigation, and amongst other SDGs.”

- 44 CGIAR Research Program on Climate Change, Agriculture, and Food Security (CCAFS), International Center for Tropical Agriculture (CIAT), c/o University of Copenhagen, Rolighedsvej 21, Frederiksberg C DK-1958, Denmark
- 45 International Research Institute for Climate and Society, Columbia University, Lamont Campus, PO Box 1000, Palisades, NY 10964-8000, USA
- 46 International Research Institute for Climate and Society, Columbia University, Lamont Campus, PO Box 1000, Palisades, NY 10964-8000, USA
- 47 Green Climate Fund, 175 Art Center-daero, Yeonsu-gu, Incheon 22004, Republic of Korea
- 48 International Maize and Wheat Improvement Center (CIMMYT), Apdo. Postal 6-641, 06600 México, D.F., Mexico
- 49 International Fund for Agricultural Development, Via Paolo di Dono, 44 00142 Rome, Italy
- 50 University of Vermont (UVM), Burlington, VT, USA

Highlights

- Transformative food system actions will be crucial to meet many SDGs.
- SDG13 needs to align with the Paris Agreement.
- Actions to reduce food system emissions can have a synergistic effect on several SDGs.
- Emission reduction actions can have trade-offs with adaptation and several SDGs.
- Transformation in food systems will need technical, policy, capacity enhancement and finance actions.

2019 was the second warmest year on record. Oceans have warmed, the amounts of snow and ice have diminished and sea level has risen. But according to the [United Nations](#) “it is still possible, using a wide array of technological measures and changes in behavior, to limit the increase in global mean temperature to two degrees Celsius above pre-industrial levels.” Explore research output, impact and collaboration on SDG13, and see which research trends are shaping the global conversation.



Investigate, understand and analyse SDG research globally with SciVal Research Areas for the UN Sustainable Development Goals (SDGs). Research Areas queries can help researchers and institutions track and demonstrate progress towards the targets of the SDGs. The Topic Wheel presented here clusters publications 2010-2019 into global, unique research topics based on citation patterns.

Research linked to SDG13 is most prominent within Environmental, Health and Agricultural Sciences. The 17 Perspective Abstract in the page before offers a complementary view of how combined action on Climate Change and Food Systems are vital for the achievement of the Goals.

Expert Insights

The Lancet Countdown: Tracking Progress on Health and Climate Change

Climate change underpins all the social and environmental determinants of health but also has positive implications. [The Lancet Countdown: Tracking Progress on Health and Climate Change](#) is an international, multi-disciplinary research collaboration between academic institutions following on from the 2015 Lancet Commission on Health and Climate Change, which emphasised that the response

to climate change could be “the greatest global health opportunity of the 21st century”. The Lancet Countdown is dedicated to monitoring the evolving health profile of climate change, and providing an independent assessment of the delivery of commitments made by governments worldwide under the Paris Agreement.

Many of the SDGs are inextricably linked: progress towards one Goal depends on and affects other Goals. The implications of this are clear: the science supporting the SDGs must be multidisciplinary, international and have considered the relevance of sex and gender factors. The 19 papers commissioned for the [Elsevier SDG Perspectives Project](#) look at the SDGs from environmental, social sciences and health perspectives, and offer nuanced insights into the ambitions, achievements and limitations of the 2030 Agenda. These articles have been published in Special Issues of [Current Opinion in Environmental Sustainability](#), [World Development](#) and [Health Policy](#) and provide complementary insights to each SDG infographic.

SDG13 Climate Action

2015-2019

Output, Impact, Collaboration

Research supporting SDG13 has grown since 2015, with a compound annual growth rate of 6.3% compared to nearly 3.5% for research in all fields.

The US produces the most research supporting SDG13, followed by China the United Kingdom, Germany and Australia. Eight of the 10 most prolific locations are high income locations (accounting for more than 139,000 publications); one is an upper-middle income location (China) and one is a lower-middle income location (India). No low income locations featured in the top 50.

The top five locations for which research on SDG13 represents the largest share of their research portfolio are Greenland, New Caledonia, Fiji, Panama and Bolivia.

International collaboration yielded 34.5% of research on SDG13. High income locations collaborated with low income locations on 2% of their total SDG13 research, while nearly 56% of the related output from low income locations came from collaboration with high income locations.

As a measure of academic impact measured by citation, the field weighted citation impact (FWCI) for SDG13 research was above average every year, with an average of 1.37 over the period.

This analysis builds on Elsevier's [Sustainability Science in a Global Landscape](#) report, which was released in 2015 to coincide with the launch of the SDGs. See a [2017 update](#) on key findings on the RELX SDG Resource Centre. Help us to provide insight into SDG research. [Click here to review the research](#)
[See the methodology and definitions](#)

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180,102

Publications in period

6.3%

Compound Annual Growth Rate in the period

73.5%

Publications from high-income locations

2.1%

Academic corporate collaboration

0.4%

Publications from low-income locations

1.37

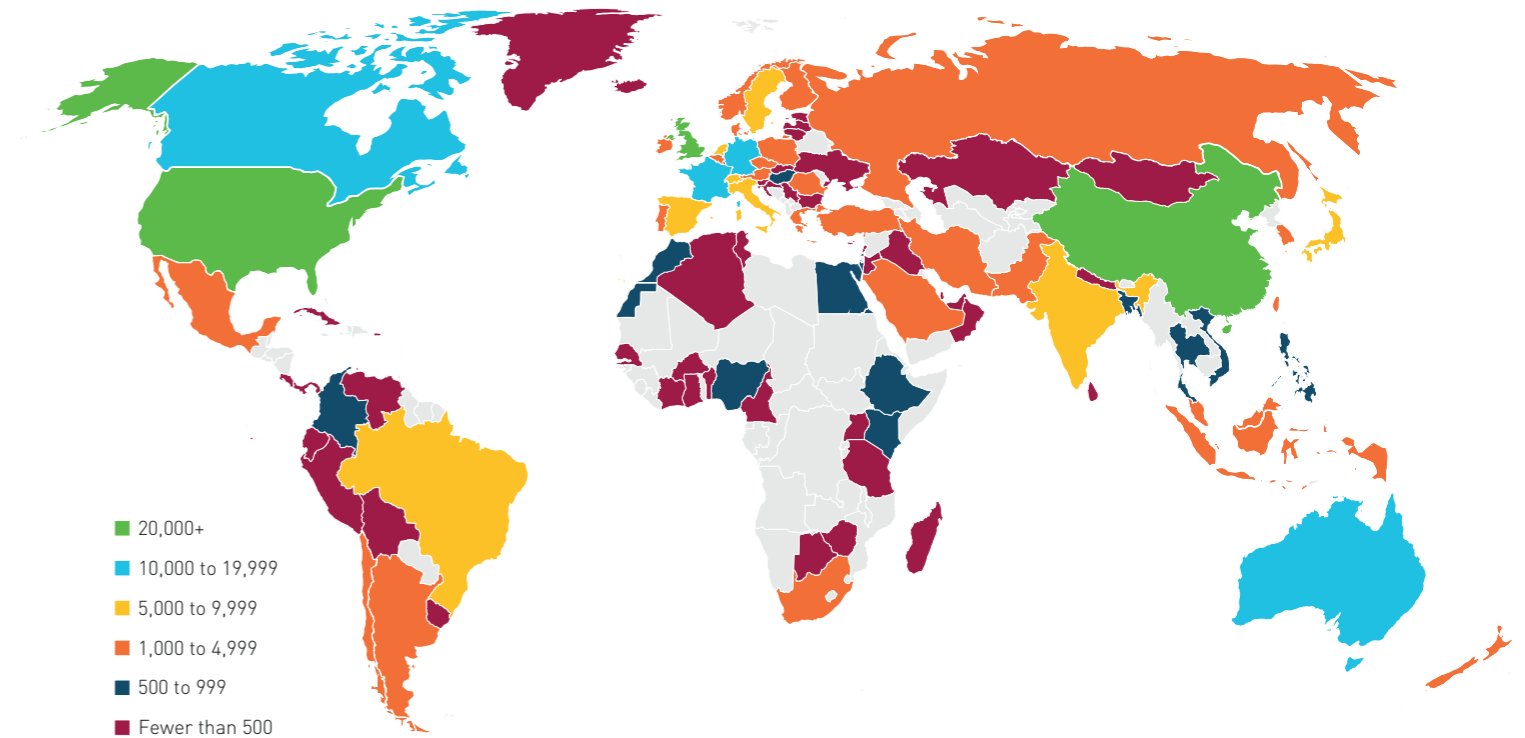
Field-Weighted Citation Impact

34.5%

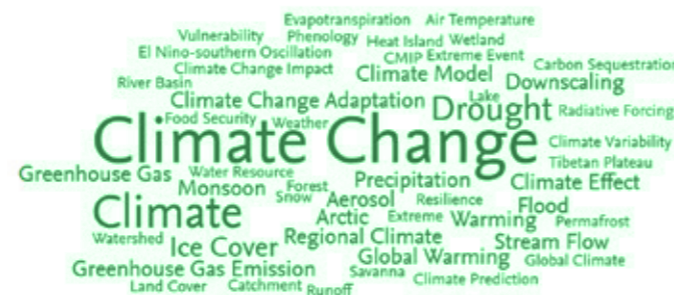
Publications with international collaboration

What is FWCI?

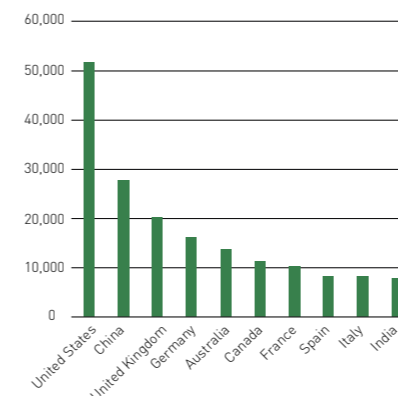
Field-weighted citation impact is an indicator of scholarly impact based on the number of times the publication was cited in other research. An FWCI of above 1.0 indicates the impact is above the normalised average



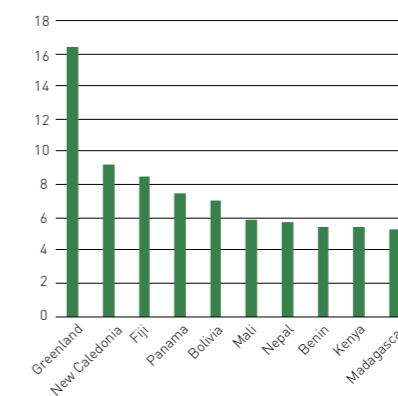
Key themes in SDG13 Research



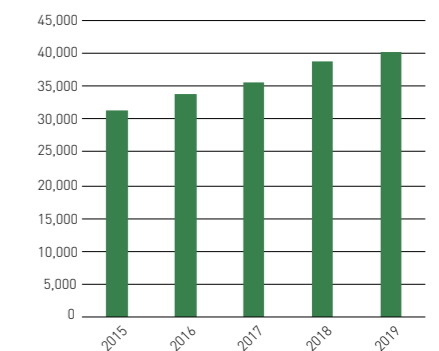
Top 10 locations by publication



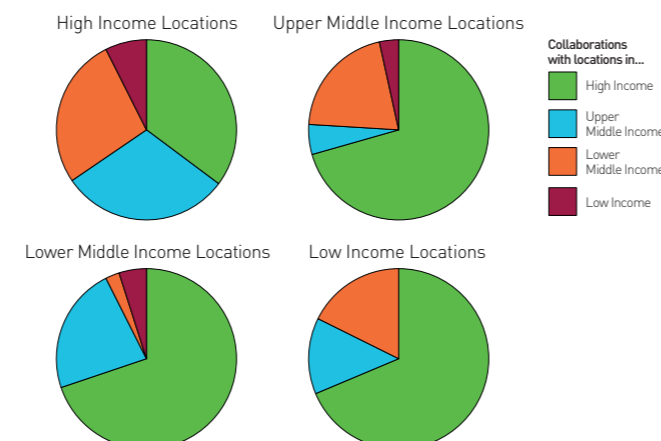
Top 10 locations by RAI *(Relative Activity Index)



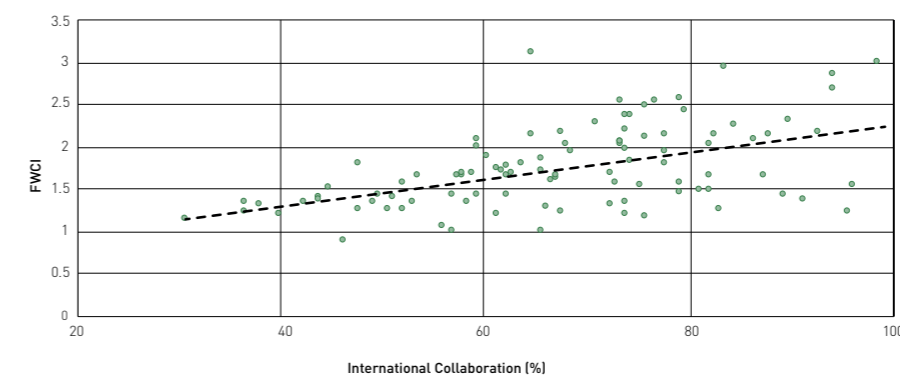
Volume of publications supporting SDG13



International collaboration between income groups by location

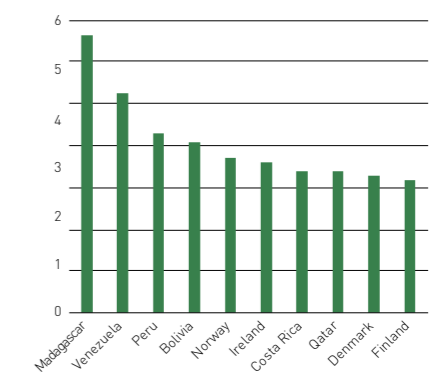


International collaboration and research impact



*Relative Activity Index is a measure of the proportion of the country's research output in the subject, relative to the proportion seen globally

Top 10 locations for corporate-academic collaboration



SDG14 Life Below Water



Rethinking marine resource governance for the United Nations Sustainable Development Goals

Selina Marguerite Stead¹

DOI: [10.1016/j.cosust.2018.12.001](https://doi.org/10.1016/j.cosust.2018.12.001)

Governments are facing mounting pressure to ‘do something on the United Nations Sustainable Development Goal (SDG) 14’. The SDG14 comprises targets and indicators for countries to show progress in achieving conservation and sustainable use of oceans, seas and marine resources for sustainable development. One novel approach experiencing traction in improving growth performance of marine resource sectors — particularly marine biotechnology and fisheries — is open innovation. This review assesses the potential impacts of using open innovation approaches more widely with good governance principles to promote sustainable management of marine resource use. This review highlights a need to broaden the measures used to determine marine management effectiveness especially in the context of achieving the SDGs. Governments are urged to pay more attention to new governance tools including open innovation when formulating new policy aimed at building future scenarios of economic resilience involving marine resource use.

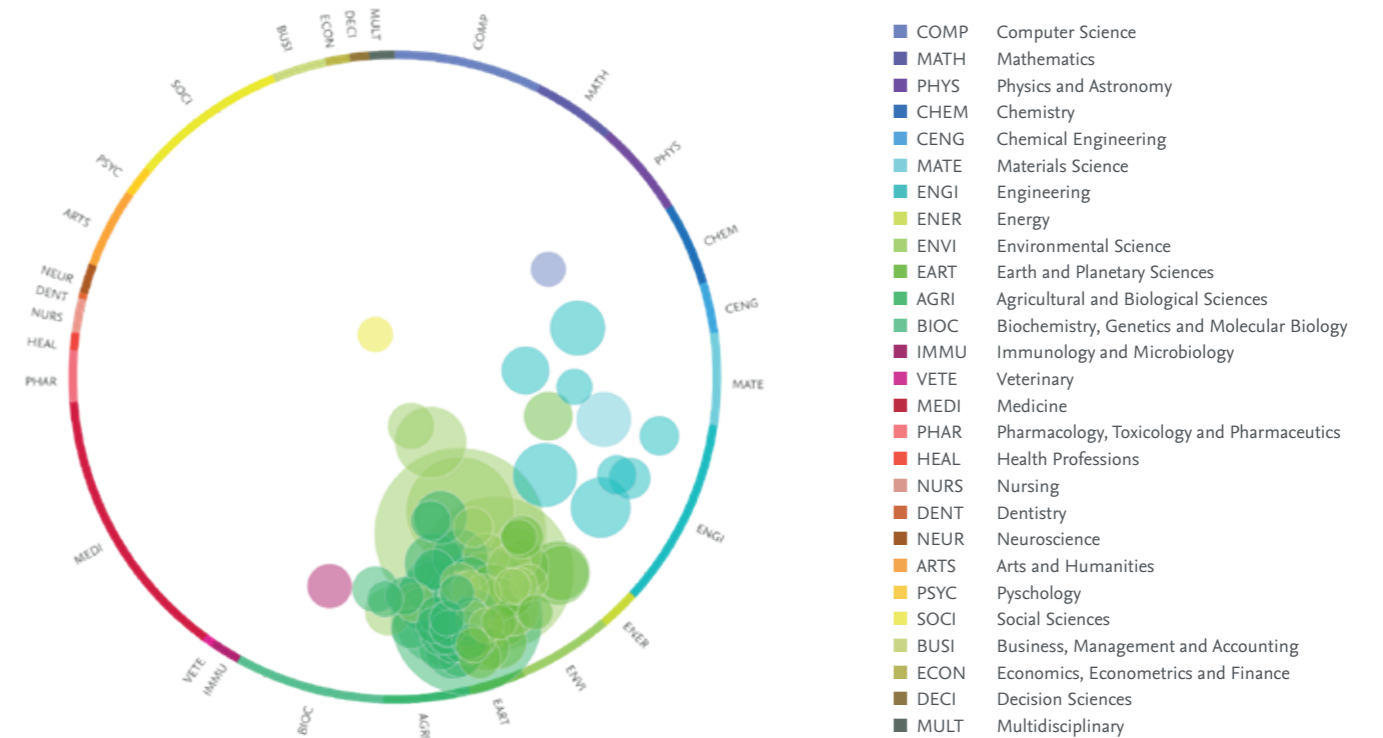
“Rethinking marine resource governance approaches including the wider use of open innovation to tackle the SDGs, especially number 14, will require an interdisciplinary licence to be bold and creative. This could be the decade scientists work more closely with governments and industry to co-implement marine sustainable management with those impacted being at the heart of decision-making so there are enough marine resources for all, forever.”

¹ School of Natural and Environmental Sciences, Newcastle University, Newcastle upon Tyne, NE1 7RU, UK

Highlights

- A new marine open innovation measure offers nations a governance tool for comparing performance of marine resource sectors.
- Open innovation can help governments improve marine resource management effectiveness to meet SDG14 targets.
- Social and economic indicators should go beyond proximate drivers to align actions with local contexts.
- Open innovation and effective engagement between civic society, governments, industry and universities can shape policy better to accelerate national economic prosperity.

With over three billion people depending on marine and coastal resources for their livelihoods, biodiversity is critical to the health of people and our planet. The [United Nations](#) note that “marine protected areas need to be effectively managed and well-resourced [...] and sustainable and climate-resilient transport is key to sustainable development.” Explore research output, impact and collaboration on SDG14, and see which research trends are shaping the global conversation.



Investigate, understand and analyse SDG research globally with SciVal Research Areas for the UN Sustainable Development Goals (SDGs). Research Areas queries can help researchers and institutions track and demonstrate progress towards the targets of the SDGs. The Topic Wheel presented here clusters publications 2010-2019 into global, unique research topics based on citation patterns.

Research linked to SDG14 is most prominent within Environmental, Health and Agricultural Sciences, followed by Engineering. The 17 Perspective Abstract in the page before offers a complementary view, arguing that SDG14 research should be closely linked to Decision Sciences, to foster open innovation in marine resource governance approaches.

Expert Insights

The Elsevier Foundation-ISC₃ Green and Sustainable Chemistry Challenge

Dr. Chioma Chikere won the \$25,000 second prize in 2017 for her project “Crude oil-polluted site eco-restoration of the Niger Delta”. The research demonstrated how organic nutrients such as garden fertilizers and animal excreta can be used to degrade hydrocarbons, cleaning up the soils heavily contaminated by decades of oil spills. “This prize is important not only for me and my team, but for Nigeria

as well,” she said. “The recognition makes me feel that we’re not left out as a developing country. Through science, we’ll be able to change lives and solve real life problems beyond the African continent. This award will give me access to better research facilities and help empower local Nigerian women through eco-restoration and biodiversity recovery.”

Many of the SDGs are inextricably linked: progress towards one Goal depends on and affects other Goals. The implications of this are clear: the science supporting the SDGs must be multidisciplinary, international and have considered the relevance of sex and gender factors. The 19 papers commissioned for the Elsevier SDG Perspectives Project look at the SDGs from environmental, social sciences and health perspectives, and offer nuanced insights into the ambitions, achievements and limitations of the 2030 Agenda. These articles have been published in Special Issues of *Current Opinion in Environmental Sustainability*, *World Development* and *Health Policy* and provide complementary insights to each SDG infographic.

SDG14 Life Below Water

2015-2019
Output, Impact, Collaboration

Research supporting SDG14 has grown since 2015, with a compound annual growth rate of 5.1% compared to nearly 3.5% for research in all fields.

The US produces the most research supporting SDG14, followed by China the United Kingdom, Australia and Germany. Eight of the 10 most prolific locations are high income locations (accounting for more than 71,600 publications); one is an upper-middle income location (China) and one is a lower-middle income location (India). No low income locations featured in the top 50.

The top five locations for which research on SDG14 represents the largest share of their research portfolio are New Caledonia, Norway, Iceland, Philippines and New Zealand.

International collaboration yielded 32% of research on SDG14. High income locations collaborated with low income locations on 1% of their total SDG14 research, while nearly 53% of the related output from low income locations came from collaboration with high income locations.

As a measure of academic impact measured by citation, the field weighted citation impact (FWCI) for SDG14 research was above average every year, with an average of 1.1 over the period.

This analysis builds on Elsevier's [Sustainability Science in a Global Landscape](#) report, which was released in 2015 to coincide with the launch of the SDGs. See a [2017 update](#) on key findings on the RELX SDG Resource Centre. Help us to provide insight into SDG research. [Click here to review the research](#)
[See the methodology and definitions](#)

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104,532
Publications
in period

5.1%
Compound Annual
Growth Rate in the period

71.3%
Publications from
high-income locations

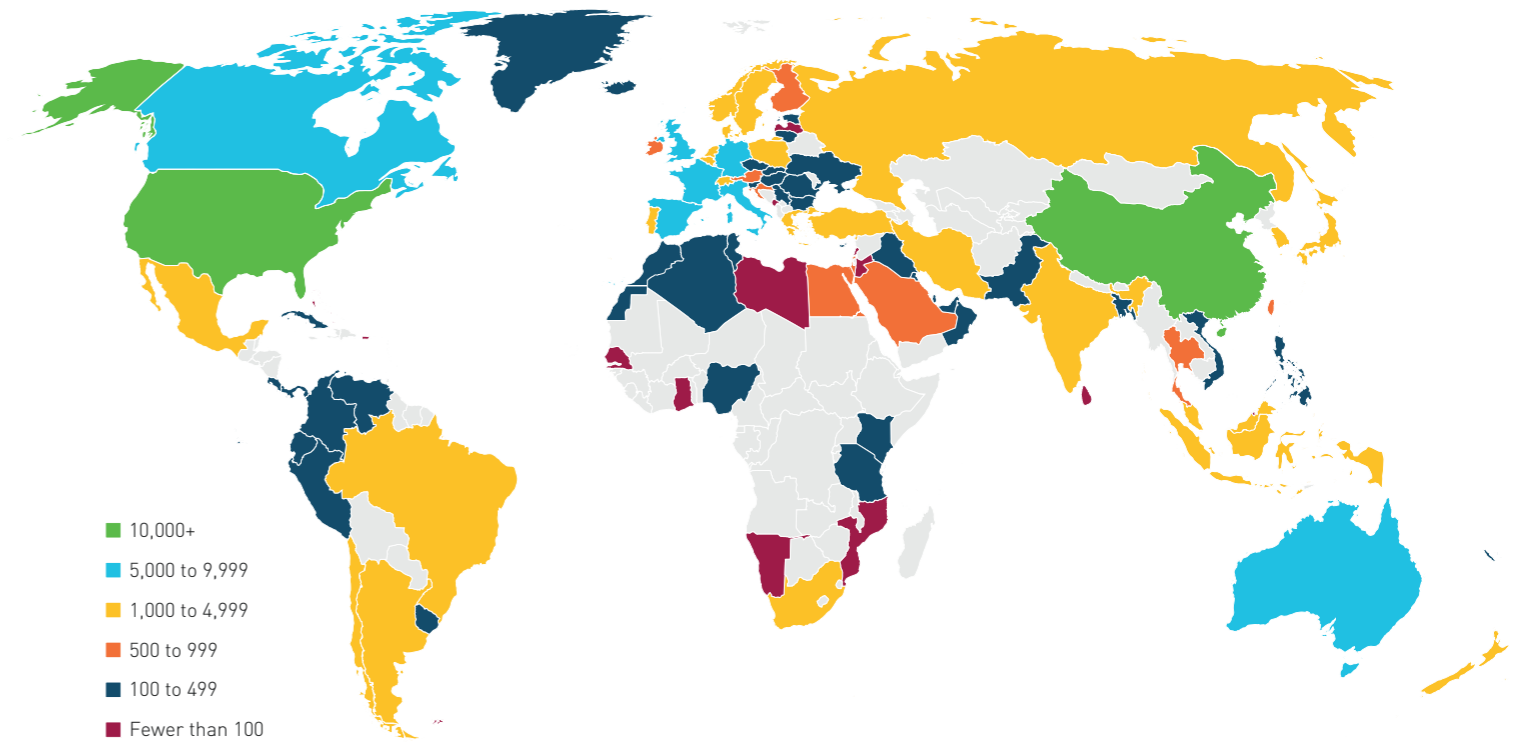
3.5%
Academic corporate
collaboration

0.04%
Publications from
low-income locations

1.1
Field-Weighted
Citation Impact

31.7%
Publications with
international
collaboration

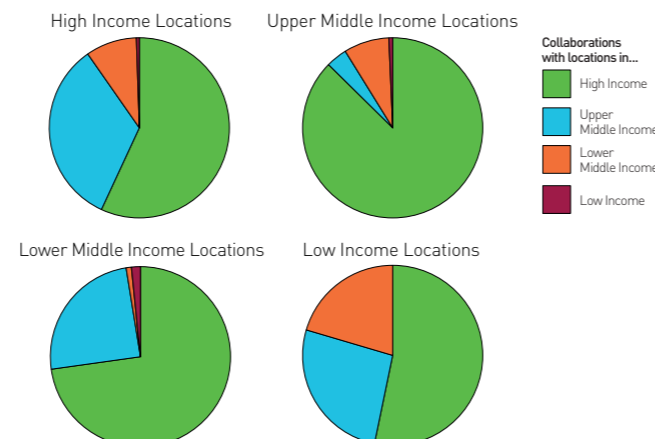
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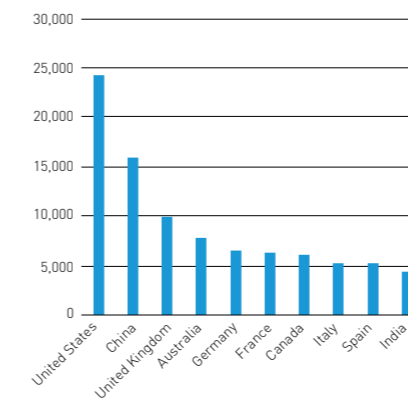
Key themes in SDG14 Research



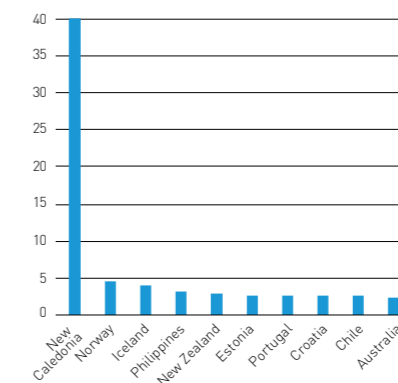
International collaboration between income groups by location



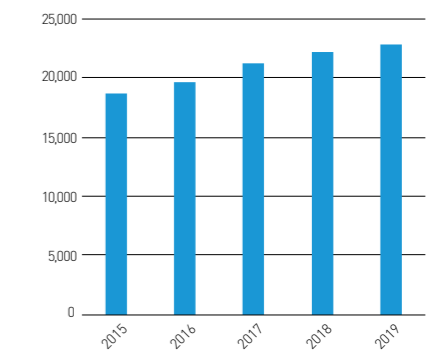
Top 10 locations by publication



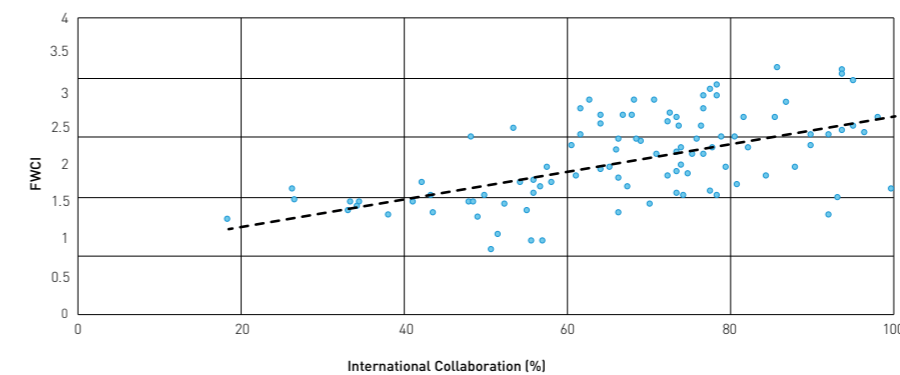
Top 10 locations by RAI *(Relative Activity Index)



Volume of publications supporting SDG14

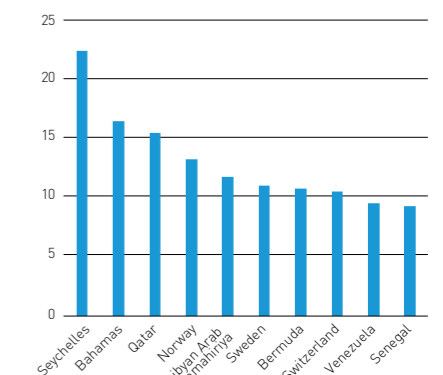


International collaboration and research impact



*Relative Activity Index is a measure of the proportion of the country's research output in the subject, relative to the proportion seen globally

Top 10 locations for corporate-academic collaboration



SDG15 Life On Land



SDG synergy between agriculture and forestry in the food, energy, water and income nexus: reinventing agroforestry?

Meinevan Noordwijk^{52,53}, Lalisa A Duguma⁵⁴,
Sonya Dewi⁵⁵, Beria Leimona⁵⁶, Delia C Catacutan⁵⁷,
Betha Lusiana⁵⁸, Ingrid Öborn⁵⁹,
Kurniatun Hairiah⁶⁰ & Peter A Minang⁶¹

DOI: [10.1016/j.cosust.2018.09.003](https://doi.org/10.1016/j.cosust.2018.09.003)

Among the Sustainable Development Goals (SDGs) three broad groups coexist: first, articulating demand for further human resource appropriation, second, sustaining the resource base, and third, redistributing power and benefits. Agriculture and forestry jointly interact with all three. The SDG portfolio calls for integrated land use management. Technological alternatives shift the value of various types of land use (forests, trees and agricultural practices) as source of 'ecosystem services'. At the interface of agriculture and forestry the 40-year old term agroforestry has described technologies (AF1) and an approach to multifunctional landscape management (AF2). A broadened Land Equivalence Ratio (LER) as performance metric indicates efficiency. Agroforestry also is an opportunity to transcend barriers between agriculture and forestry as separate policy domains (AF3). Synergy between policy domains can progress from recognized tradeoffs and accepted coexistence, via common implementation frames, to space for shared innovation. Further institutional space for integral 'all-land-uses' approaches is needed.

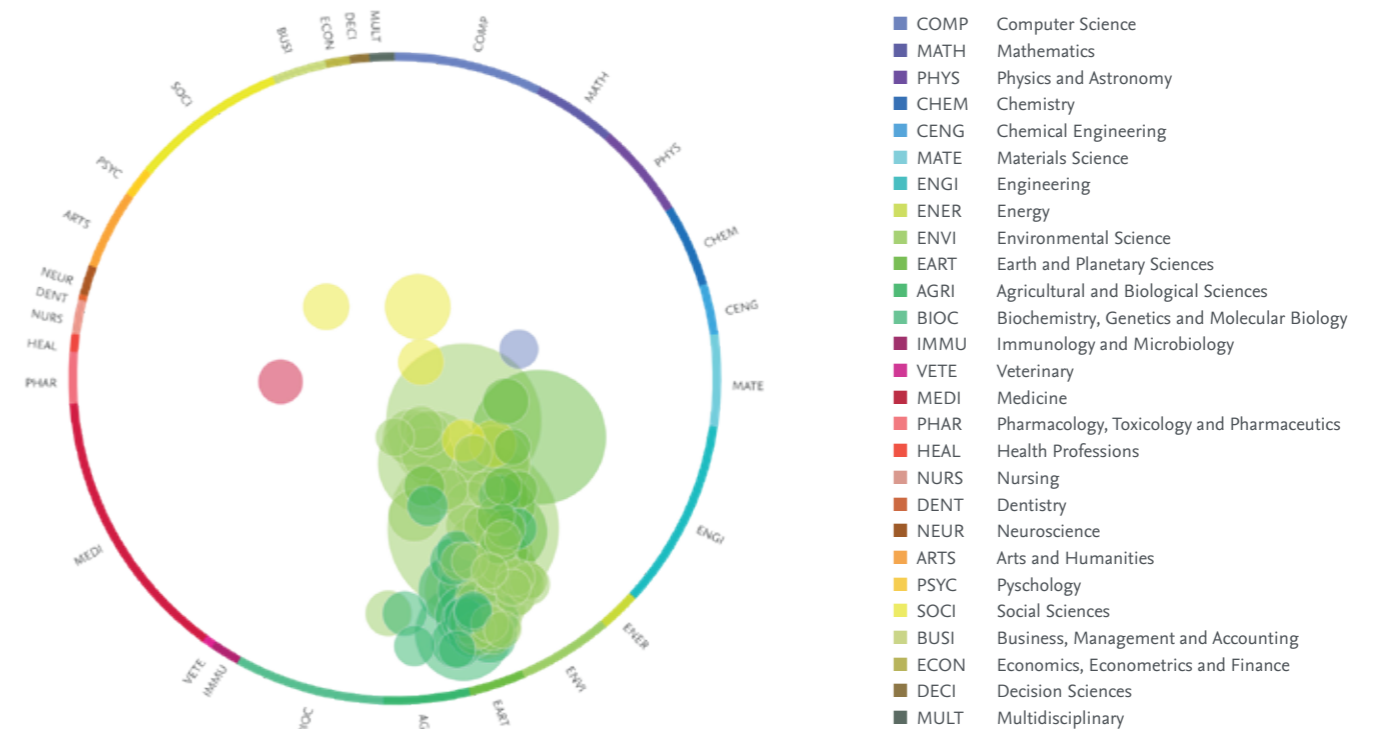
"The SDG portfolio can indeed trigger a major step towards more holistic land use perspectives at the agriculture-forestry interface and can, if used well, trigger institutional change to enhance dynamic sustainability."

- 52 World Agroforestry Centre (ICRAF), Kenya
- 53 Plant Production Systems, Wageningen University and Research, Netherlands
- 54 World Agroforestry Centre (ICRAF), Kenya
- 55 World Agroforestry Centre (ICRAF), Kenya
- 56 World Agroforestry Centre (ICRAF), Kenya
- 57 World Agroforestry Centre (ICRAF), Kenya
- 58 World Agroforestry Centre (ICRAF), Kenya
- 59 World Agroforestry Centre (ICRAF), Kenya
- 60 Brawijaya University, Malang, Indonesia
- 61 World Agroforestry Centre (ICRAF), Kenya

Highlights

- Agroforestry describes a set of technologies, a landscape approach and a drive to greater policy synergy.
- Synergy can evolve from coexistence and agreed boundaries towards joint programs and innovation.
- The FEW (food, energy, water) agenda needs to include rural income as proximate driver of change.
- The LER (land equivalence ratio) concept can be expanded to analyse landscape multifunctionality.
- Coherent agro+forestry policies are relevant for rural-urban transitions and landscape transformations.

The [United Nations](#) state that "human activity has altered almost 75 per cent of the earth's surface, squeezing wildlife and nature into an ever-smaller corner of the planet and increasing risks of zoonotic diseases like COVID-19." And while protected areas now cover 15% of terrestrial and freshwater, better management and ecological representation is needed to achieve the 2030 targets. Explore research output, impact and collaboration on SDG15, and see which research trends are shaping the global conversation.



Investigate, understand and analyse SDG research globally with SciVal Research Areas for the UN Sustainable Development Goals (SDGs). Research Areas queries can help researchers and institutions track and demonstrate progress towards the targets of the SDGs. The Topic Wheel presented here clusters publications 2010-2019 into global, unique research topics based on citation patterns.

Research linked to [SDG15](#) is most prominent within Environmental, Health and Agricultural Sciences. The 17 Perspective Abstract in the page before offer a complementary view, highlighting the connections between Agriculture and Forestry, as well as arguing for creating tighter synergies with Decision Sciences.

Expert Insights

The Elsevier Foundation-ISC3 Green and Sustainable Chemistry Challenge

Near-shore marine fisheries provide a crucial source of micronutrients necessary for early-childhood development, with positive effects on public health of low-income food-deficit countries. But what happens when these areas become deeply affected by climate change? Dr. Alessio Adamiano won the \$25,000 second prize in 2018 with the project "[phos-FATE: Empowering fishing](#)

[communities for climate change](#)". His team worked on improving resilience and empowering small-scale fishing communities in Senegal, proposing simple way of converting phosphate-rich fishery byproducts such as shells, bones and skin into valuable fertilizers for agricultural use – sustainable alternative to the common phosphate mining, a process that is highly polluting.

Many of the SDGs are inextricably linked: progress towards one Goal depends on and affects other Goals. The implications of this are clear: the science supporting the SDGs must be multidisciplinary, international and have considered the relevance of sex and gender factors. The 19 papers commissioned for the [Elsevier SDG Perspectives Project](#) look at the SDGs from environmental, social sciences and health perspectives, and offer nuanced insights into the ambitions, achievements and limitations of the 2030 Agenda. These articles have been published in Special Issues of [Current Opinion in Environmental Sustainability](#), [World Development](#) and [Health Policy](#) and provide complementary insights to each SDG infographic.

SDG15 Life On Land

2015-2019
Output, Impact, Collaboration

Research supporting SDG15 has grown since 2015, with a compound annual growth rate of 6.7% compared to nearly 3.5% for research in all fields.

The US produces the most research supporting SDG15, followed by China, the United Kingdom, Germany and Australia. Seven of the 10 most prolific locations are high income locations (accounting for more than 69,300 publications); two are upper-middle income locations (China and Brazil) and one is a lower-middle income location (India). One low income location featured in the top 50: Ethiopia (780 publications).

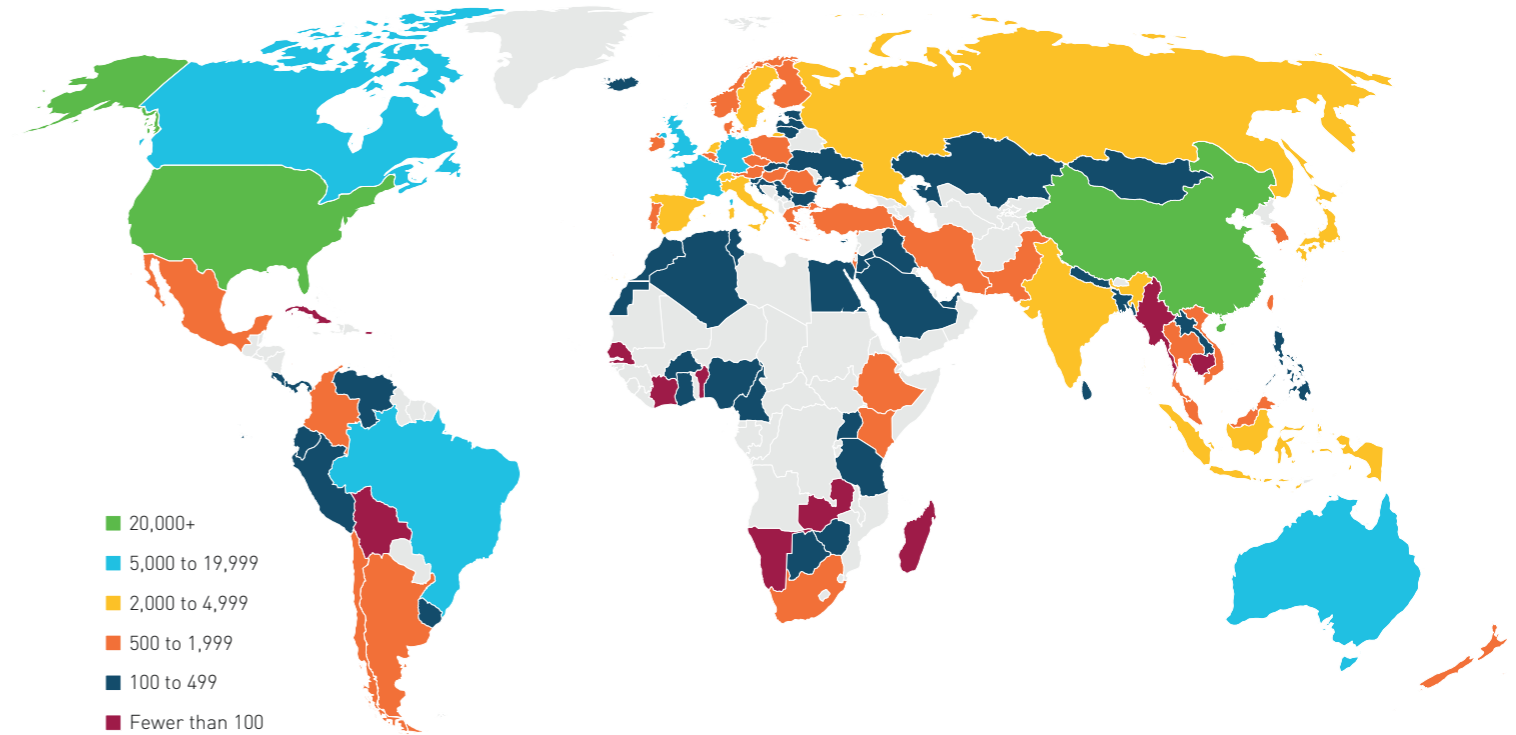
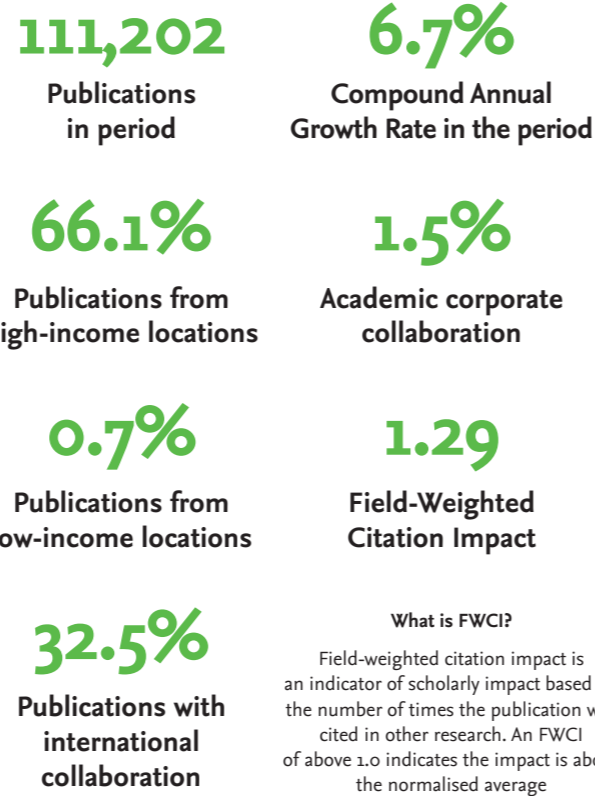
The top five locations for which research on SDG15 represents the largest share of their research portfolio are Laos, Panama, Mongolia, Ethiopia and Costa Rica.

International collaboration yielded 33% of research on SDG15. High income locations collaborated with low income locations on 3% of their total SDG15 research, while nearly 62% of the related output from low income locations came from collaboration with high income locations.

As a measure of academic impact measured by citation, the field weighted citation impact (FWCI) for SDG15 research was above average every year, with an average of 1.29 over the period.

This analysis builds on Elsevier's [Sustainability Science in a Global Landscape](#) report, which was released in 2015 to coincide with the launch of the SDGs. See a [2017 update](#) on key findings on the RELX SDG Resource Centre. Help us to provide insight into SDG research. [Click here to review the research](#)
[See the methodology and definitions](#)

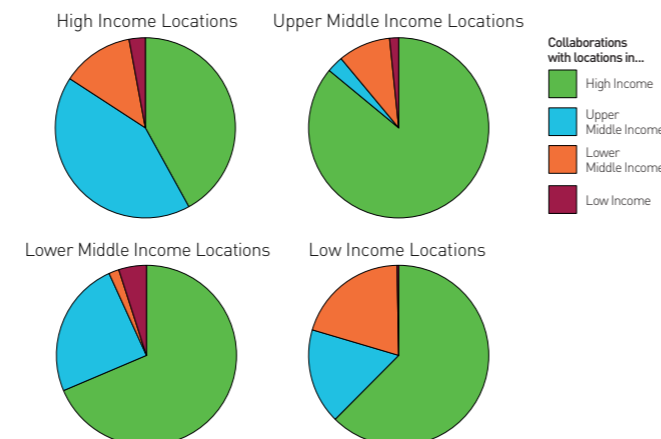
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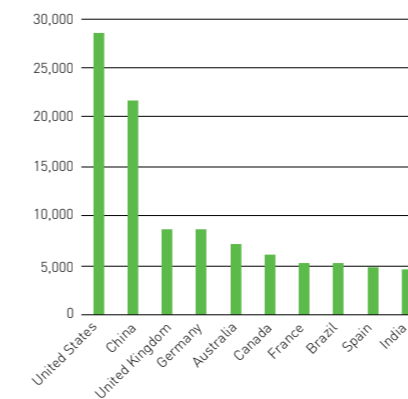
Key themes in SDG15 Research



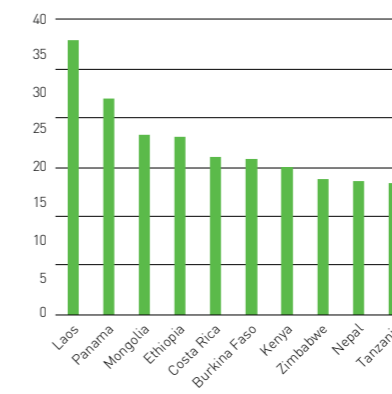
International collaboration between income groups by location



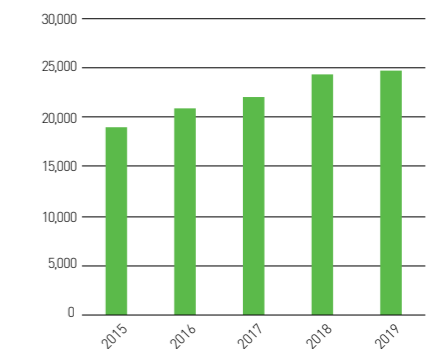
Top 10 locations by publication



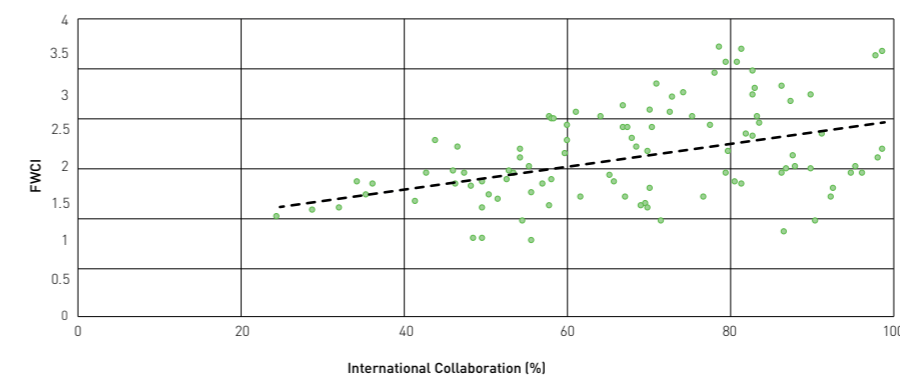
Top 10 locations by RAI *(Relative Activity Index)



Volume of publications supporting SDG15

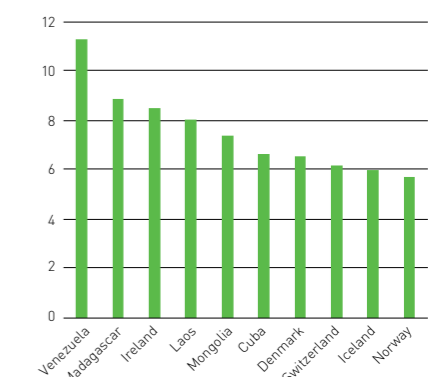


International collaboration and research impact



*Relative Activity Index is a measure of the proportion of the country's research output in the subject, relative to the proportion seen globally

Top 10 locations for corporate-academic collaboration



SDG16 Peace, justice and strong institutions



The 'New' national development planning and global development goals: Processes and partnerships

Admos O.Chimhowu⁷⁰, David Hulme⁷¹ & Lauchlan T. Munro⁷²

DOI: [10.1016/j.worlddev.2019.03.013](https://doi.org/10.1016/j.worlddev.2019.03.013)

The number of countries with a national development plan has more than doubled, from about 62 in 2006 to 134 in 2018. More than 80 per cent of the global population now lives in a country with a national development plan of one form or another. This is a stunning recovery of a practice that had been discredited in the 1980s and 1990s as a relic of directed economies and state-led development. Several factors have fostered this re-emergence but from about 2015 the momentum for producing plans has accelerated, driven in part by a need to plan for the Sustainable Development Goals (SDGs). Based on an analysis of 107 national development plans, and drawing insights from 10 case study countries, this paper analyses 'new' national development planning and identifies the types and content of the plans, and their implications for the sustainable development agenda. The paper generates a typology of the new national plans, analyses their characteristics and explores the ways in which the new national development planning and the SDGs may interact. In contrast to 20th-century national development plans the new-generation plans are often underpinned by theories of collaborative rationality rather than by linear rationality.

This new generation of national plans has been neglected by academic researchers and merits much greater examination, especially to understand the ways in which their implementation can enhance the achievement of the SDGs.

"Making progress with the SDGs in many countries will depend to a large extent on the existence of credible plans, of the capacity to implement agreed plans and of a commitment to follow through with the plans."

⁷⁰ The Global Development Institute, School of Environment Education and Development, University of Manchester, Arthur Lewis Building, Oxford Road, Manchester M13 9PL, United Kingdom

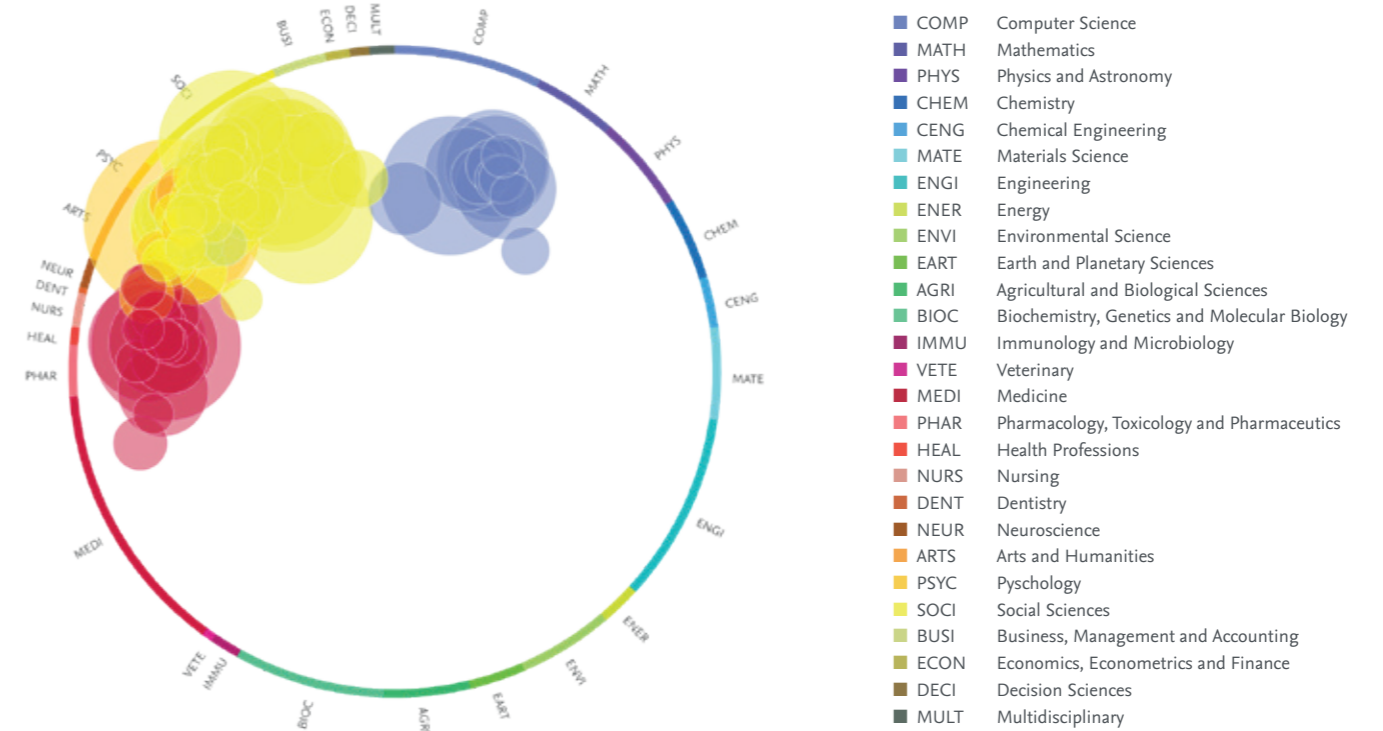
⁷¹ School of Environment Education and Development, University of Manchester, Arthur Lewis Building, Oxford Road, Manchester M13 9PL, United Kingdom

⁷² School of International Development and Global Studies/École de développement international et mondialisation, Social Sciences Building/Pavillon des sciences sociales, F5S8006, University of Ottawa/Université d'Ottawa, Ottawa, ON K1N 6N5, Canada

Highlights

- Over 130 countries have produced national development plans to show their priorities for achieving SDGs.
- Many of the plans are a product of national consensus processes although some are produced mainly technocratic elites.
- The five year (medium term) plan is the most popular although some countries have longer term visions documents.
- National Planning Commissions are back and play a lead role although Economic Ministries still dominate the process.
- A majority of national plans lack financing strategies a factor that can affect implementation and achievement of SDGs.

"The number of people fleeing war, persecution and conflict exceeded 70 million in 2018, the highest level recorded by the UN refugee agency in almost 70 years" mention the [United Nations](#) "The rule of law and development have a significant interrelation and are mutually reinforcing, making it essential for sustainable development." Explore research output, impact and collaboration on SDG16, and see which research trends are shaping the global conversation.



Investigate, understand and analyse SDG research globally with SciVal Research Areas for the UN Sustainable Development Goals (SDGs). Research Areas queries can help researchers and institutions track and demonstrate progress towards the targets of the SDGs. The Topic Wheel presented here clusters publications 2010-2019 into global, unique research topics based on citation patterns.

Research linked to SDG16 is most prominent within Social Sciences, Psychology, Medicine and Computer Sciences. The 17 Perspective Abstract in the page before offers a complementary view, arguing that even more attention to a new generation of national development plans is necessary for their successfully implementation.

Expert Insights

The legal determinants of health: harnessing the power of law for global health and sustainable development

Health risks in the 21st century are beyond the control of any government in any country. In an era of globalization, promoting public health and equity requires cooperation and coordination both within and among states. Law can be a powerful tool for advancing global health, yet it remains substantially underutilized and poorly understood. Working in partnership, public health lawyers and health

professionals can become champions for evidence-based laws to ensure the public's health and safety. This [Lancet-O'Neill Institute Commission](#) articulates the crucial role of law in achieving global health with justice, through legal instruments, legal capacities, and institutional reforms, as well as a firm commitment to the rule of law. The Commission's aim is to enhance the global health community's understanding of law, regulation, and the rule of law as effective tools to advance population health and equity.

Many of the SDGs are inextricably linked: progress towards one Goal depends on and affects other Goals. The implications of this are clear: the science supporting the SDGs must be multidisciplinary, international and have considered the relevance of sex and gender factors. The 19 papers commissioned for the [Elsevier SDG Perspectives Project](#) look at the SDGs from environmental, social sciences and health perspectives, and offer nuanced insights into the ambitions, achievements and limitations of the 2030 Agenda. These articles have been published in Special Issues of [Current Opinion in Environmental Sustainability](#), [World Development](#) and [Health Policy](#) and provide complementary insights to each SDG infographic.

SDG16

Peace, justice and strong institutions

2015-2019

Output, Impact, Collaboration

Research supporting SDG16 has grown since 2015, with a compound annual growth rate of 2.7% compared to nearly 3.5% for research in all fields.

The US produces the most research supporting SDG16, followed by China, the United Kingdom, Germany and Australia. Eight of the 10 most prolific locations are high income locations (accounting for more than 111,300 publications); one is an upper-middle income location (China) and one is a lower-middle income location (India). Six low income locations feature in the top 50: Uganda (284 publications), Ethiopia (194 publications), Tanzania (163 publications), Nepal (128 publications), Rwanda (103 publications) and Malawi (58 publications).

The top five locations for which research on SDG16 represents the largest share of their research portfolio are Rwanda, Uganda, Palestine, Zimbabwe and South Africa.

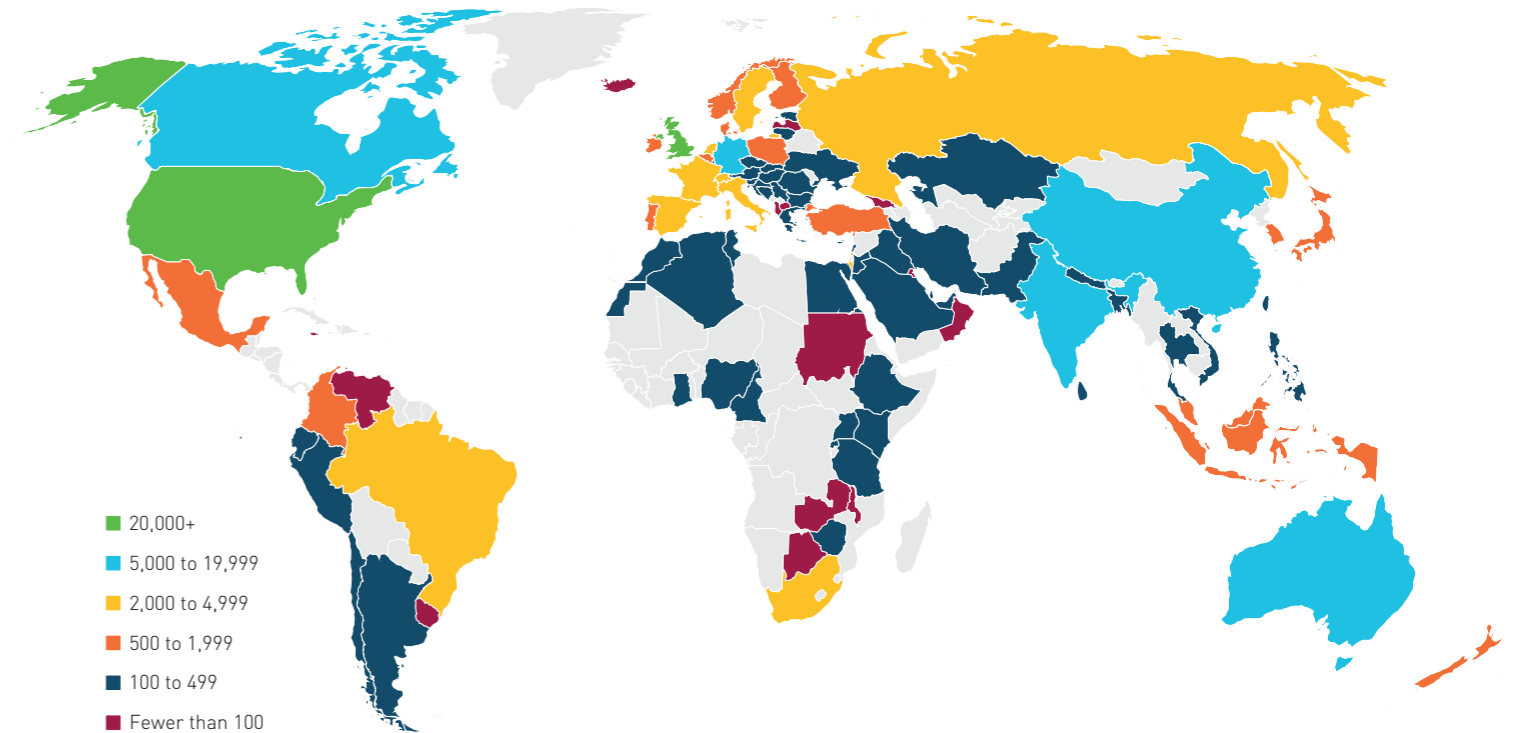
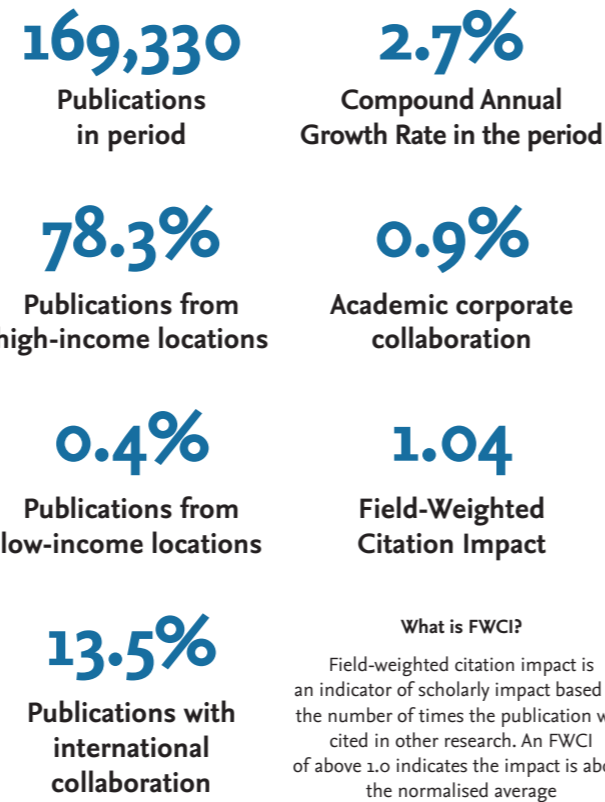
International collaboration yielded 14% of research on SDG16. High income locations collaborated with low income locations on 37% of their total SDG16 research, while nearly 73% of the related output from low income locations came from collaboration with high income locations.

As a measure of academic impact measured by citation, the field weighted citation impact (FWCI) for SDG16 research was above average every year, with an average of 1.04 over the period.

This analysis builds on Elsevier's [Sustainability Science in a Global Landscape](#) report, which was released in 2015 to coincide with the launch of the SDGs. See a [2017 update](#) on key findings on the RELX SDG Resource Centre. Help us to provide insight into SDG research. [Click here to review the research](#)

[See the methodology and definitions](#)

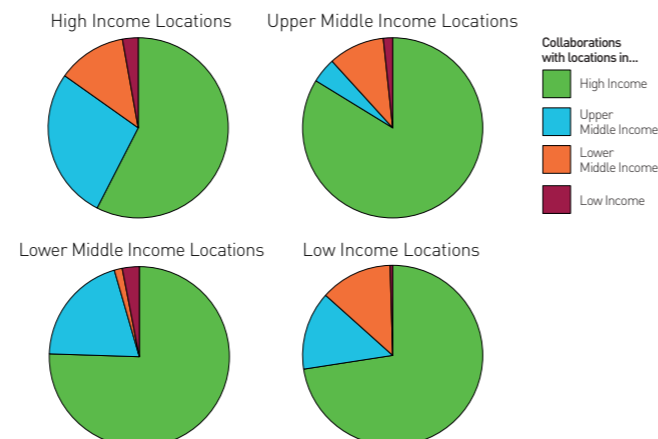
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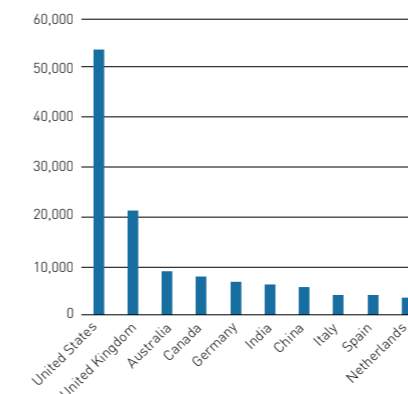
Key themes in SDG16 Research



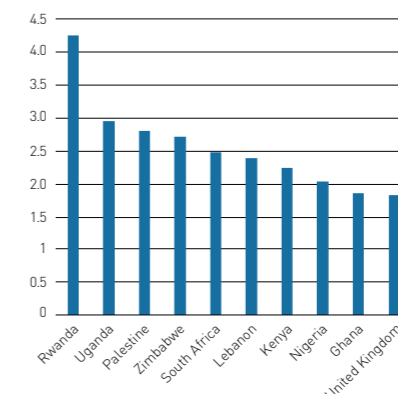
International collaboration between income groups by location



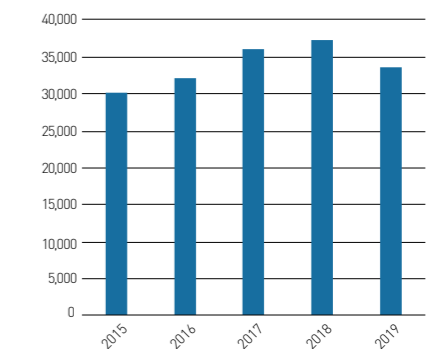
Top 10 locations by publication



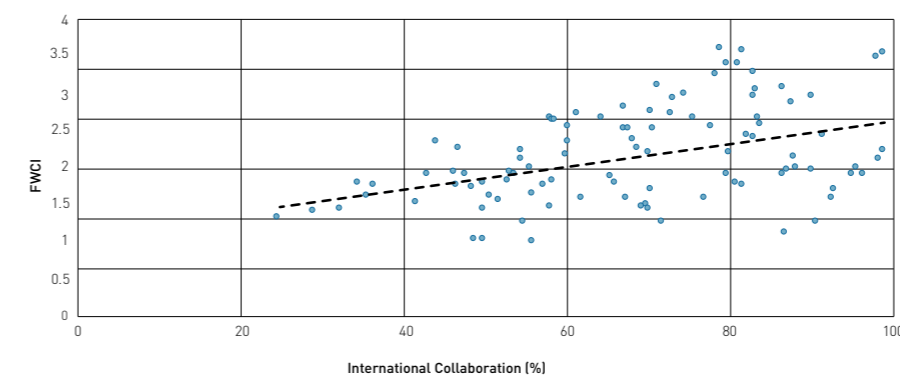
Top 10 locations by RAI *(Relative Activity Index)



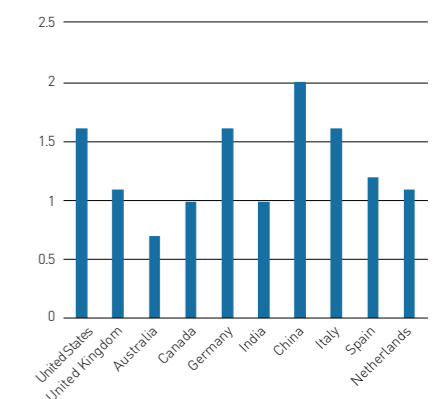
Volume of publications supporting SDG16



International collaboration and research impact



Top 10 locations for corporate-academic collaboration



17 PARTNERSHIPS FOR THE GOALS



What “SDG17: Partnerships for the Goals” means to us?

A few years ago, we moved the Elsevier Foundation to a partnership-driven approach. The UN SDG’s had just launched

and, together with our Board, we decided that it was a way to make a much more targeted impact on the SDGs. For the past decade we had been using RFPs, or Call for Grants, which offered a high volume, one-direction and, at times, scattershot approach to building a community in a specific area. Then, as now, we were working to boost inclusive health and research, but over the past 5 years as we aligned with the SDGs and took on a partnership approach, we have seen a real difference the impact of our programs. Like any relationship, longer term partnerships require time, resources, and an ongoing dialogue to grow. With this investment, we’ve also been able to serve as much more effective liaisons to Elsevier, our core funder, ensuring that we bring in relevant content, data, analytics, channels and expertise as needed to help boost the impact of each partnership. Above all, we’ve learned that it’s never just about the funding, it’s about listening and the ongoing conversation.

The SDGs can only be met if we work together. International investments and support are needed to ensure innovative technological development, fair trade and market access, especially for developing countries. To build a better world, we need to be supportive, empathetic, inventive, passionate, and above all, cooperative. —SDG17 the UN Global Goals.

SDG17: Partnership for the Goals



The 2020 EF OWSD award winners celebrating their accomplishments with the OWSD and Elsevier Foundation teams at the AAAS.

Our partnership with the Organization for Women in Science for the Developing World is a case in point. First awarded in 2013, our joint early career awards are given jointly by OWSD and the Elsevier Foundation. On the face of it, the partnership is straightforward: OWSD receives an annual grant of \$86,500 for the awards and alumni support. They chair a panel of distinguished scientists to select 5 award winners from different regions and alternating discipline areas: Biological Sciences, Engineering Sciences and Physical Sciences. We support a prize for each winner of USD \$5,000 and an all-expenses-paid trip to attend the annual conference of the American Association for the Advancement of Science (AAAS), where they are celebrated for their achievements. But the partnership is much richer than that. Working closely with OWSD and the AAAS, we are also able to tap Elsevier’s extensive academic network and communications channels to amplify the winners’ achievements and provide rich networking, media training, pitching and storytelling during their award week. As a result of this, OWSD-EF Award winners have often been received by their country’s presidents and been celebrated by local, national and international media and the award has often paved the way for other fellowships and prestigious awards including the L’OREAL-UNESCO For Women in Science Fellowships.

“The value of these awards is far more than a mere prize. The exposure that the winners receive, not only at the award ceremony and during the AAAS conference, but long after due to the contacts they are able to make, is life changing.” - Dr. Jennifer Thomson, OWSD President and Professor Emeritus University of Cape Town.

Finally, I believe that beyond prioritizing common SDGs, a partnership can only truly thrive if all of the partners commit to the hard work of ongoing dialogue.



Ylann Schemm
Director, The Elsevier Foundation

SDG17: Partnerships for the Goals



Partnerships for the SDGs are also central to Elsevier's mission to support inclusion and diversity, research capacity building, climate action and global health. One of the most compelling examples of how Elsevier has worked with partners to contribute content, data, analytics, expertise and funding to build a strong partnership, is [Research4Life](#).

Elsevier's support of this public-private partnership spans nearly 20 years and includes collaboration with UN agencies, publishers, key universities and nonprofits. Together, we have sought to help bridge the digital research divide for developing country researchers and healthcare workers. For Elsevier, it began with the WHO and serving as one of 6 founding publisher partners. The commitment has quickly grown to contributing a quarter of the 126,000 peer reviewed resources - encompassing databases such as Science Direct, Scopus, ClinicalKey and most recently Embase -, and offering strategic, communications and technical expertise.

By "ensuring inclusive and equitable quality education and promote lifelong learning opportunities for all" Research4Life actively supports SDG4, Quality Education – as well as SDG17, Partnerships for the Goals. Whether through face-to-face training, webinars or online courses, Research4Life supports researchers, librarians, lecturers, policymakers and clinicians around the world and stimulates international collaboration and better decision-making in science and health.

Unique Contributions

Since 2008, the Elsevier Foundation has additionally provided \$500,000 in grants to support Research4Life training:

- Online through the FAO-led [MOOC for virtual training](#), which offers modules on different information literacy topics and training on how to effectively use the different Research4Life programs. The first MOOC, in November 2019, saw 2,207 participants enroll from 95 countries.
- A decade of support for the Medical Library Association's [Librarians without Borders®](#) program providing face to face training to support a growing number of librarian trainers. To date, the partnership between the Elsevier Foundation and the MLA has awarded 20 training grants and conducted 90 workshops in 42 countries.

Research4Life in Numbers

Registered institutions: 10,000+

- Journals: 28,400+
- Books: 98,200+
- Other information resources: 135+
- Total resources: 126,000+
- 160 publisher partners
- Countries: 125+

"Research4Life is an example of what can be achieved, despite a modest budget, with good will, hard work, trust and commitment between many different types of organizations. Incredibly, the partnership has managed to ensure that over the past two decades, over 10,000 institutions, researchers and doctors in developing countries can access peer reviewed resources to deliver better care, relevant research and evidence-based policies in their countries. In July 2020, I was honored to take on the role of Research4Life's Executive Council Chair and consider this a sign of trust and robust collaboration."

Dr Márcia Balisciano Global Head of Corporate Responsibility, RELX

Márcia, where do you think that RELX can make the biggest difference for the SDG Goals? And how does SDG17 figure into this?
We can have the biggest impact on the SDGs by scaling our content, data, analytics and events across RELX to advance the unique contributions we make to society through our knowledge and resources. These include universal, sustainable access to information, advancing science and health, protection of society, the promotion of the rule of law and access to justice; and fostering communities.



At Elsevier, in addition to the SDG Graphics in this report, a good example is the indexing of all Scopus content to the SDGs – over 1 billion cited references from 5000+ publishers, including Elsevier, that can help researchers and their institutions see where they are contributing to the SDGs and drive better actions and outcomes. At [Risk and Business Analytics](#), [Proagrica](#) helps farmers and others in agriculture use smart data connectivity and digital tools to drive sustainability and improve biodiversity. At [LexisNexis Legal & Professional](#), the [Rule of Law Impact Tracker](#) visualises how corruption decreases and life expectancy increases when the rule of law grows. And each iteration of [Reed Exhibition's World Future Energy Summit](#) fosters some \$10 billion in sustainable energy projects.

In every one of these examples it takes partnerships – SDG17 – to make them happen. Experts helped us develop the search queries in Scopus; farmers share their data through Proagrica; partners behind the Rule of Law Impact Tracker include the [World Justice Project](#); and more than 30,000 exhibitors and attendees make the World Future Energy Summit a vibrant sustainable energy marketplace.

Can you give some examples of effective RELX partnerships for the SDGs?

We are proud to be a LEAD company of the [United Nations Global Compact](#) (UNGC) and support several of their SDG Action Platforms which bring UNGC signatories together with civil society partners to plan projects and develop tools and guidance that can help all companies increase their SDG performance. For example, we support the UNGC SDG8 Action Platform – Decent Work and Economic Growth – which helps business address important SDG8 targets such as 8.7, "Take immediate and effective measures to eradicate forced labour, end modern slavery and human trafficking and secure the prohibition and elimination of the worst forms of child labour."

The UNGC is a partner, along with [Global Citizen](#), the [Ban Ki-Moon Centre for Global Citizens](#), and the [Responsible Media Forum on RELX SDG Inspiration Days](#), which convene business, government, investors, academia, youth and NGOs – stakeholders needed to accelerate the SDGs – to explore positive, collaborative action.

What is the RELX SDG Resource Centre and how does it figure into your SDG partnership strategy?

In 2017, we launched the free [RELX SDG Resource Centre](#) to illuminate the SDGs for everyone. The site features leading-edge articles, reports, tools, events, videos and legal practical guidance from across RELX and key United Nations (UN) agencies including the UNGC, the [UN Development Programme](#) and the [UN Environment Programme](#), as well as other partners including the [Global Partnership for Sustainable Development Data](#), to advance awareness, understanding and implementation of the SDGs. The SDG News Tracker on the homepage provides up-to-the minute news about the SDGs from around the world, searching millions of articles published daily across more than 75,000 news sources in the six UN languages (Arabic, Chinese, English, French, Spanish and Russian), as well as German. We produce original research for the site, including the RELX SDG Graphics, as well as tools and podcasts such as [The SDG Impact of COVID-19](#) to hear from a range of thought leaders across industries and disciplines.

The RELX SDG Resource Centre, used by thousands each month, is a tool for the women entrepreneurs competing in the [We Empower UN SDG Challenge](#), which recognises the multiplier impact women business owners have on their staff, customers and broader communities. The RELX SDG Resource Centre has also been at the centre of a partnership with JCI to accelerate projects in the Philippines, Mongolia, Lebanon, Côte d'Ivoire and the Democratic Republic of the Congo.

Do you have advice for other organizations grappling with how best to contribute to the SDGs through partnerships?

In order to advance the SDGs, we all have to raise our aspirations. We need to go beyond what we would have done any way – this is the idea of additionality. The best partnerships can help scale your ambition. They should complement your strengths and provide new perspectives on challenges. Prospective partners may have specialist sector knowledge, on the ground expertise, and provide access to key stakeholders that you might not have otherwise. Be clear about expectations and speak regularly and informally. Knowing what you and your partner can best contribute lays the groundwork for success.

Resources & Contributors

Resources

Atlas

Science impacts everyone's world. With over 4,000 journals publishing articles from across science, technology and health, our mission is to share some of the stories that matter. Each month [Atlas](#) showcases research that could significantly impact people's lives around the world or has already done so. We hope that bringing wider attention to this research will go some way to ensuring its successful implementation.

International Center for the Study of Research (ICSR)

The mission of the [ICSR](#) is to encourage the examination of research using arrays of metrics and qualitative and quantitative methods, rather than favoring one-size-fits-all approaches. Through its work the Center seeks to further the understanding of the sociological and technological factors that underpin the conduct of modern research, providing a forum for debating research evaluation alongside testing new hypotheses and fresh ideas.

Novel Coronavirus Information Center

The [Novel Coronavirus Information Center](#) provides expert, curated information for the research and health community. All resources are free to access and include guidelines for clinicians and patients

Researcher Academy

[Researcher Academy](#) provides free access to countless e-learning resources designed to support researchers on every step of their research journey. Browse our extensive module catalogue to uncover a world of knowledge, and earn certificates and rewards as you progress.

RELX SDG Resource Centre

The [SDG Resource Centre](#) showcases the latest in science, law, business, events and more that can help drive forward the SDGs, drawing on content from across the whole of our company and from key partners as well. The aim is to support the UN in implementing the SDGs and to broaden awareness and understanding of the SDGs for our customers, governments, researchers, companies, NGOs and individuals.

SSRN's Race & Social Inequality Hub

The [SSRN Race & Social Inequality Hub](#) is just one of the steps we are taking in partnership with the research community. Here, you will find research and commentary related to racial and social equality with an emphasis on the Black experience in America. Content is curated by a team of our journal editors and publishers and members of our African Ancestry Network, and it will be continually updated. All resources are free to access.

Sustainability Hub

With an estimated 4.1 million scholarly papers related to the SDGs published in 2015-19, researchers and institutions are presented with massive amount of data that is growing exponentially. To help them navigate this sea of information, we have [produced analytics](#) to better understand sustainability science, tracked the extent to which gender factors into SDG research, examined scholarly [impact and collaboration](#) — and made [data sets](#) available for everyone to use.

Accessibility

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