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UNITED NATIONS UNIVERSITY

UNU-IAS

Institute for the Advanced Study of Sustainability

Sustainability Science in a Global Landscape

Seminar co-organized by
United Nations University, Institute for the Advanced Study of Sustainability (UNU-IAS) and Elsevier

Dignity/ People/ Prosperity
Planet/ Justice/ Partnership

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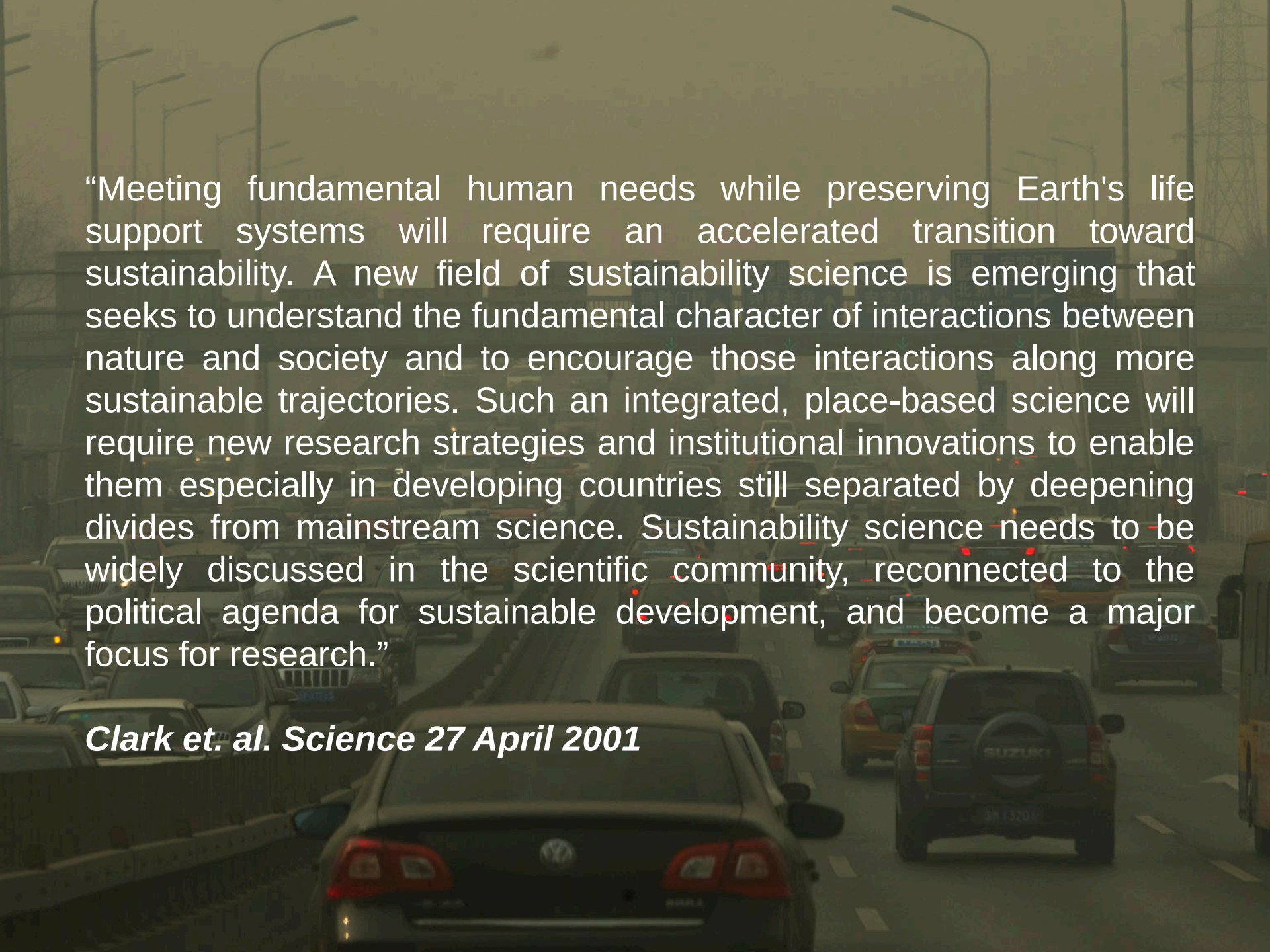
December 14, 2015, Tokyo



“Meeting fundamental human needs while preserving Earth's life support systems will require an accelerated transition toward sustainability. A new field of sustainability science is emerging that seeks to understand the fundamental character of interactions between nature and society and to encourage those interactions along more sustainable trajectories. Such an integrated, place-based science will require new research strategies and institutional innovations to enable them especially in developing countries still separated by deepening divides from mainstream science. Sustainability science needs to be widely discussed in the scientific community, reconnected to the political agenda for sustainable development, and become a major focus for research.”

Clark et. al. Science 27 April 2001

Mapping the 17 SDGs on 6 essential elements

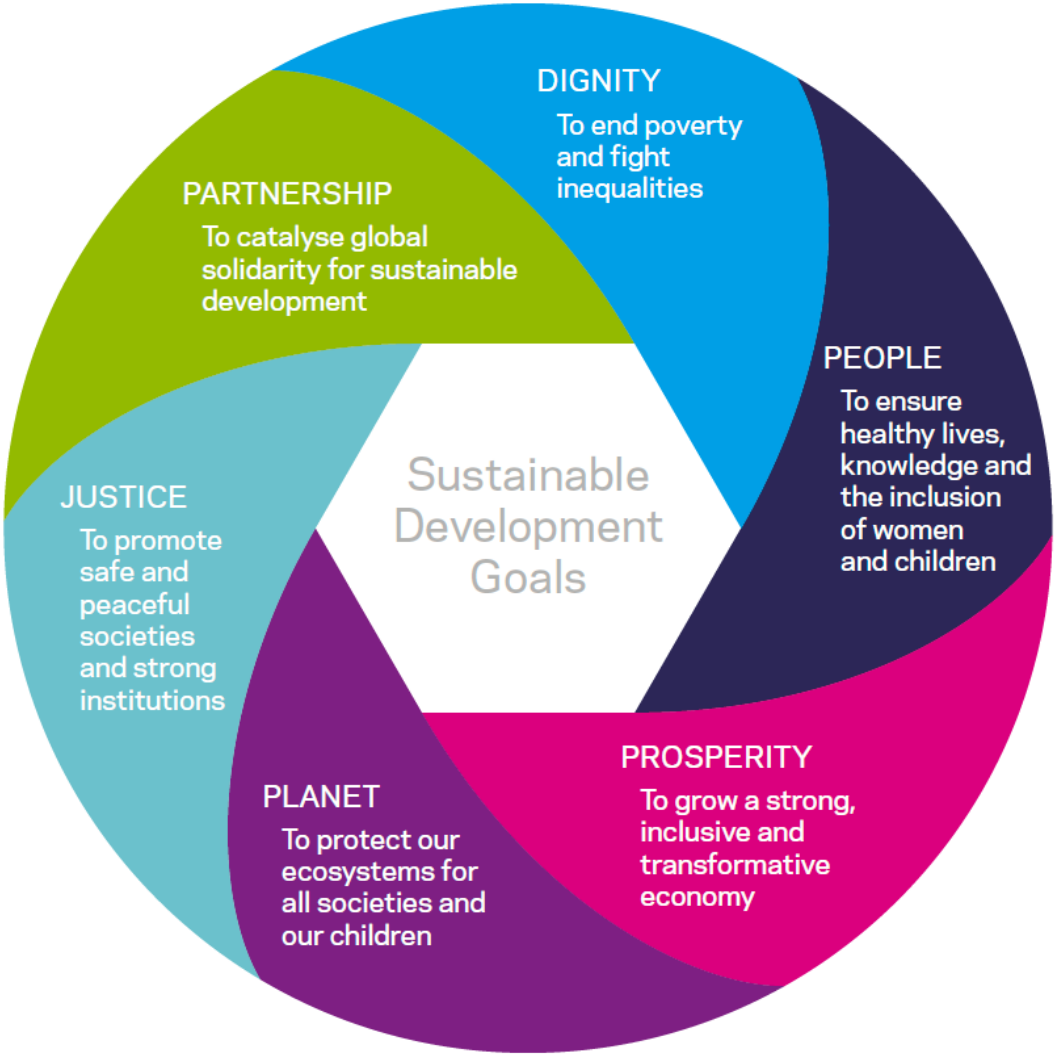


Figure I.1 — *The six Essential Elements. The figure is reproduced based on Figure 1 in the United Nations' report "The Road to Dignity by 2030: Ending Poverty, Transforming All Lives and Protecting the Planet".*

Critical Dimensions of Sustainability Science

- Research Output and Citation Impact
- Research Collaboration
- Interdisciplinary Research

Scopus –
the world's largest abstract & citation database

Over 55M records from **21,912** serial titles and **42,000** books (July 2014)
22M pre 1996 records | 33.0M post 1995 records

- Content from > 5,000 publishers
- "Articles in Press" from > 3,750 titles
- Titles from 105 different countries in all geographical regions
- 40 "local" languages covered
- More than 3,500 Gold Open Access journals Indexed

How can we "data-mine" the science publication landscape

How to define what type of publications goings into a theme?

THEME DIGNITY

The publications need to satisfy the following conditions:

1. Contain at least one of the keywords or combinations of keywords in abstract, title or keywords:

agricultural development	food price	poverty alleviation
(agricultural production AND sustainab*)	(food security AND sustainab*)	poverty determinant
child labor	(hunger AND sustainab*)	poverty line
child mortality	income growth	poverty reduction
children's health	income inequality	(reform program* AND sustainab*)
development aid	income shock	(rural development AND sustainab*)
distributional effect	land ownership	rural finance
(educational attainment AND sustainab*)	land reform	rural poverty
endowment	land right	(safety net AND sustainab*)
(food AND aid)	land tenure	small farmer
(food policy AND sustainab*)	malnutrition	smallholder

2. Belong to one of the following Scopus subject areas:
social sciences, economics, econometrics & finance, business, management & accounting, multidisciplinary, and does not belong to medicine.

THEME PEOPLE

The publications need to satisfy at least one of the following two conditions:

1. Satisfy a, b and c below:
    a. Contain at least one of the keywords or combinations of keywords in abstract, title or keywords:

AIDS	intersex	tobacco use
cancer	lesbian	traffic accident
cardiovascular disease	malaria	transgender
child mortality	maternal mortality	tropical disease
chronic respiratory disease	mental health	tuberculosis
diabetes	neonatal mortality	unplanned pregnancy
drug abuse	planned abortion	vaccine
health finance	post natal depression	(victim AND crime)
health risk	premature mortality	violence
hepatitis	reproductive health	water-borne disease
HIV Infection	sexually transmitted disease	
household accident	spontaneous abortion	

    b. Contain at least one of the following keywords in abstract, title or keywords: development, sustainab*, millennium, goal, target, indicator.
    c. Belong to at least one of the Scopus subject areas: obstetrics and gynaecology, health policy, endocrinology, diabetes & metabolism, cardiology & cardiovascular medicine, psychiatry & mental health, public health, environmental & occupational health, infectious diseases,

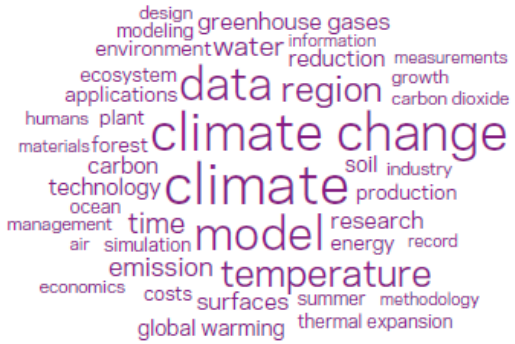
What are the common keywords for the themes?

Dignity

People

Prosperity

Planet



Justice

Partnership

RESEARCH OUTPUT AND CITATION IMPACT

SUSTAINABILITY SCIENCE IS A FIELD WITH A HIGH GROWTH RATE IN RESEARCH OUTPUT

7.6%

Double the Scopus average growth rate (2009-13)

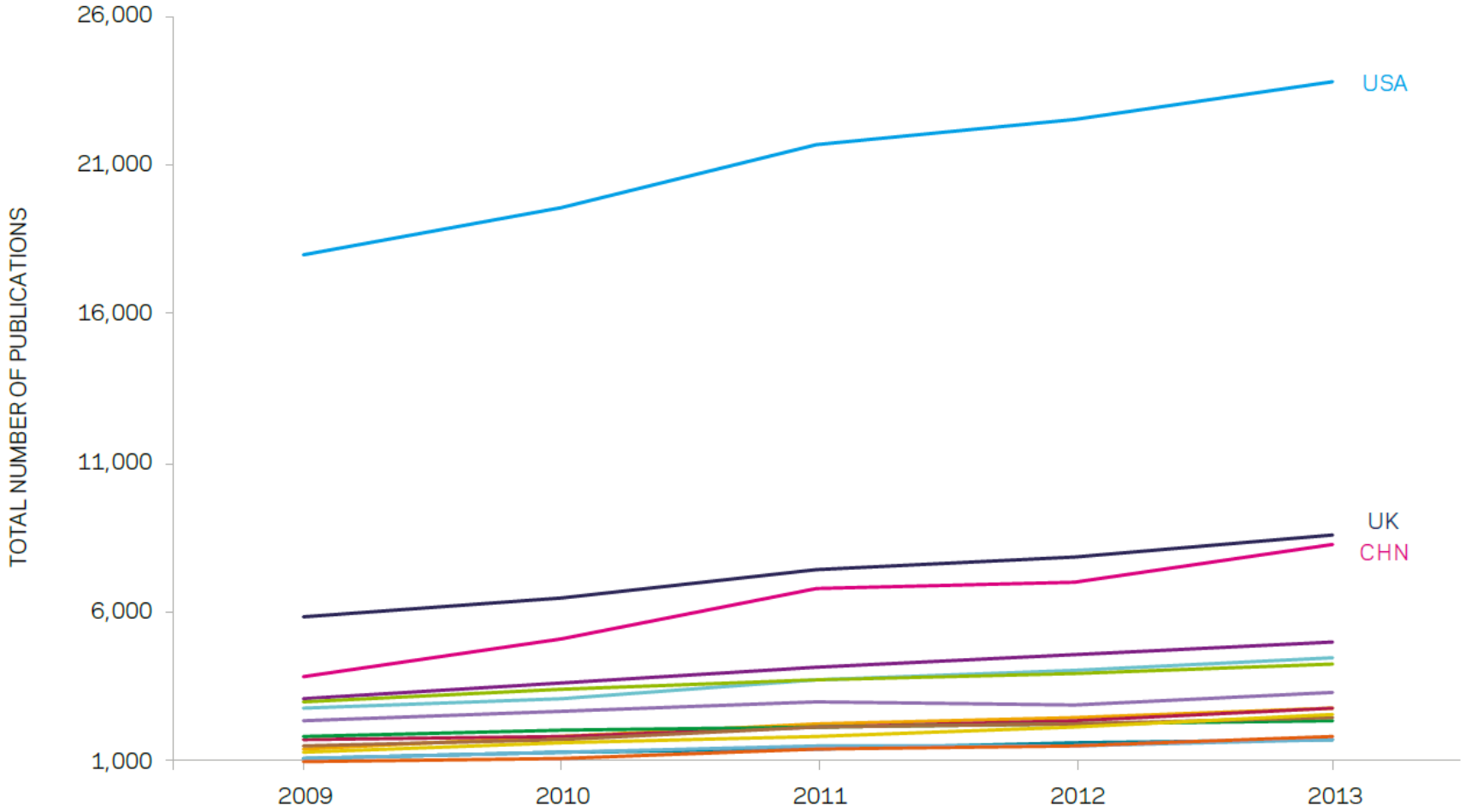


Figure 1.1 *— Total number of publications; per country for top 15 most prolific countries in sustainability science; for sustainability science; per year for the period 2009-2013.*
a*. Top 15 most prolific countries*

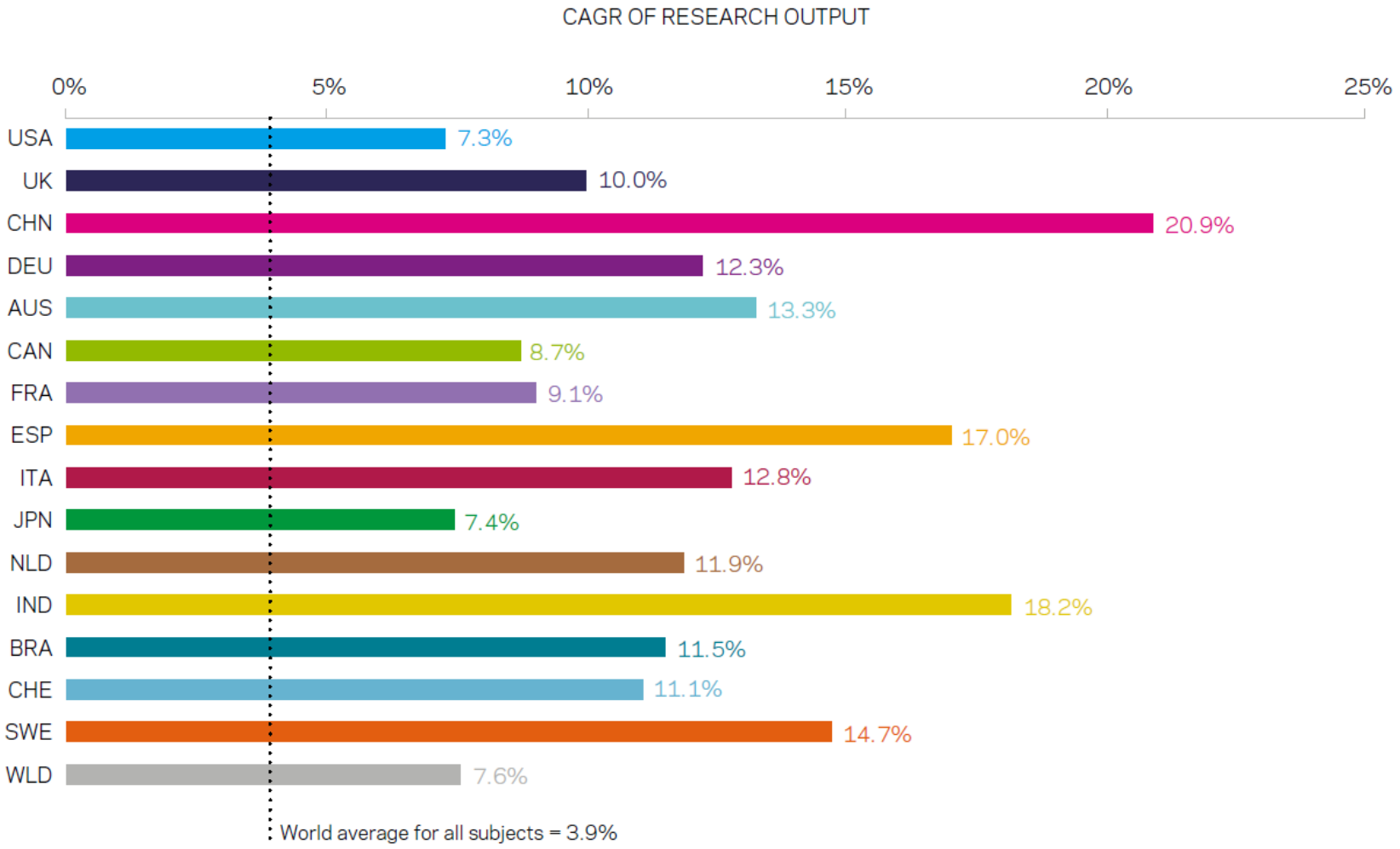


Figure 1.2 — *CAGR of publications in sustainability science; per country for the top 15 most prolific countries in sustainability science; for the period 2009-2013.*

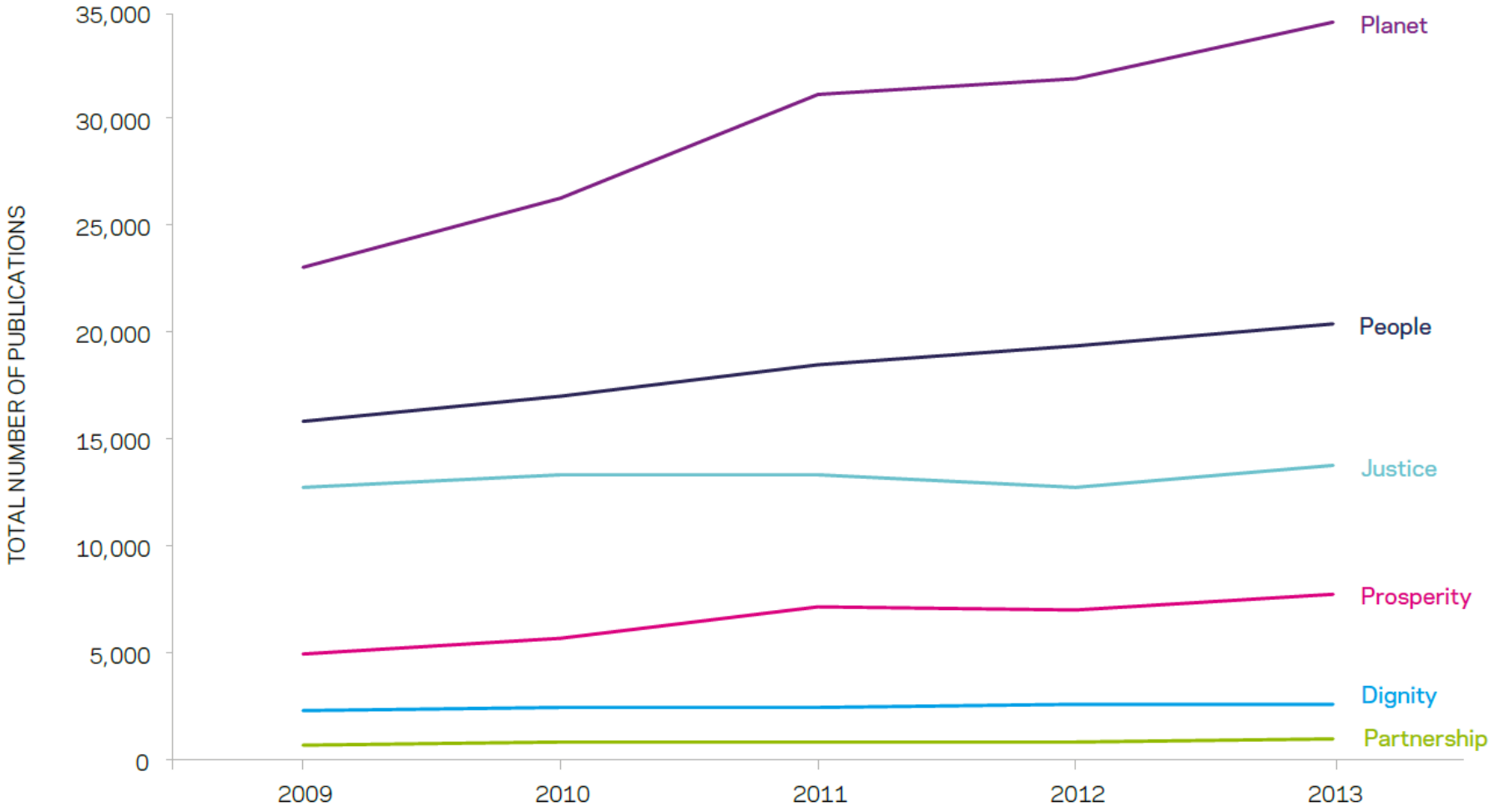


Figure 1.3 — *Total number of publications; for the world; per theme for sustainability science; per year for the period 2009-2013.*

RESEARCH OUTPUT IN SUSTAINABILITY SCIENCE ATTRACTS

30%

MORE CITATIONS THAN AN AVERAGE RESEARCH PAPER

RESEARCH COLLABORATION

RESEARCH IN SUSTAINABILITY SCIENCE IS HIGHLY COLLABORATIVE

EXAMPLE:

US proportion of international collaboration in its research output

26.5% (2009) to 32.9% (2013)

HOWEVER:

Collaboration between high-income and low-income nations remains low

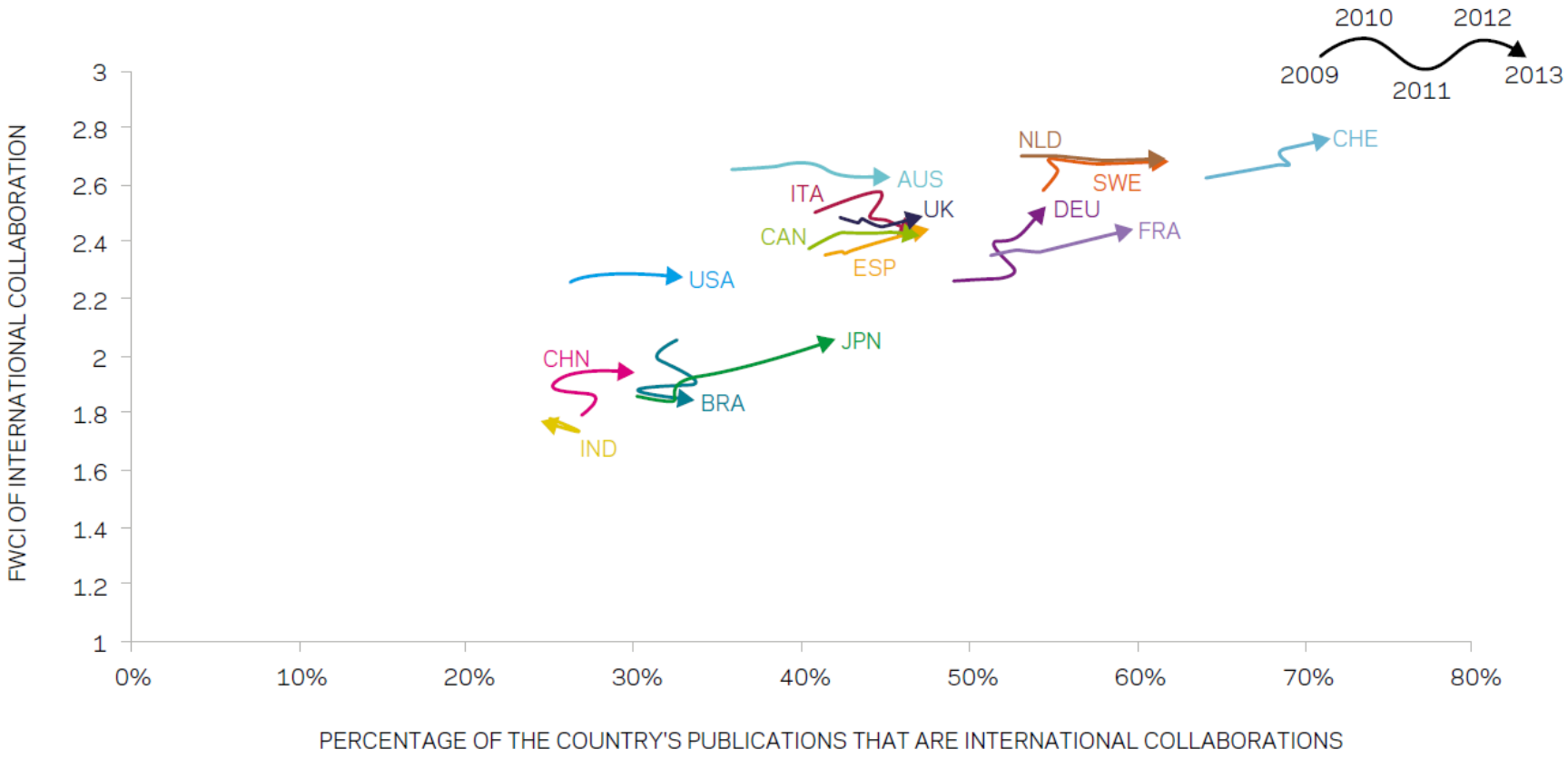


Figure 2.1 *— Share of internationally collaborative publications out of the country's total publications and FWCI of international collaboration; per country for the top 15 most prolific countries in sustainability science; for sustainability science; per year for the period 2009-2013.*

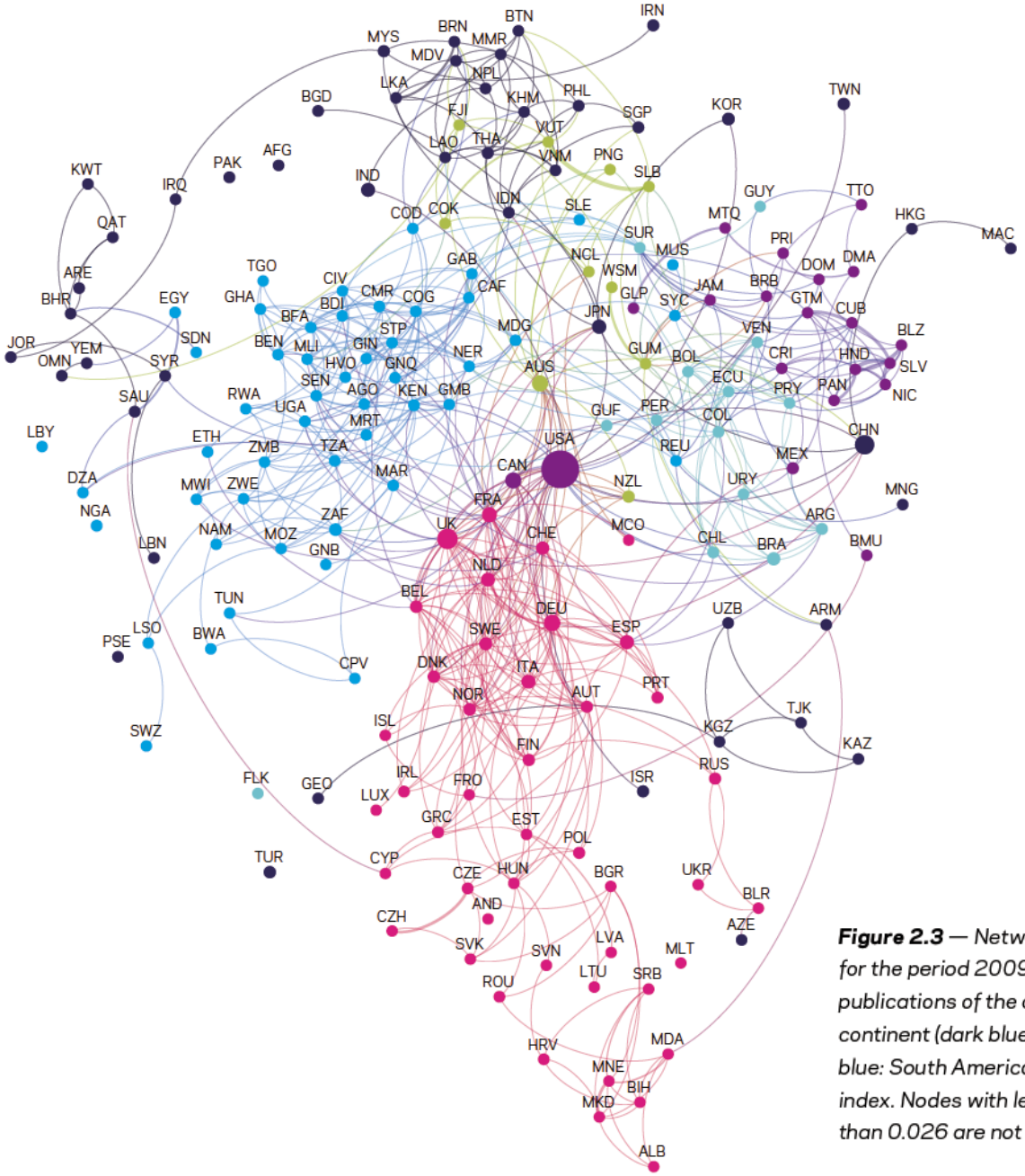


Figure 2.3 *— Network map of countries; for the world; for sustainability science; for the period 2009-2013. The size of the nodes denotes the number of the publications of the country. The color of the nodes and edges denotes the continent (dark blue: Asia, blue: Africa, pink: Europe, purple: North America, green blue: South America, green: Oceania). The length of the edges denotes Salton's index. Nodes with less than 10 connections and edges with a Salton's index less than 0.026 are not shown. Force Atlas 2 algorithm is used for the layout.*

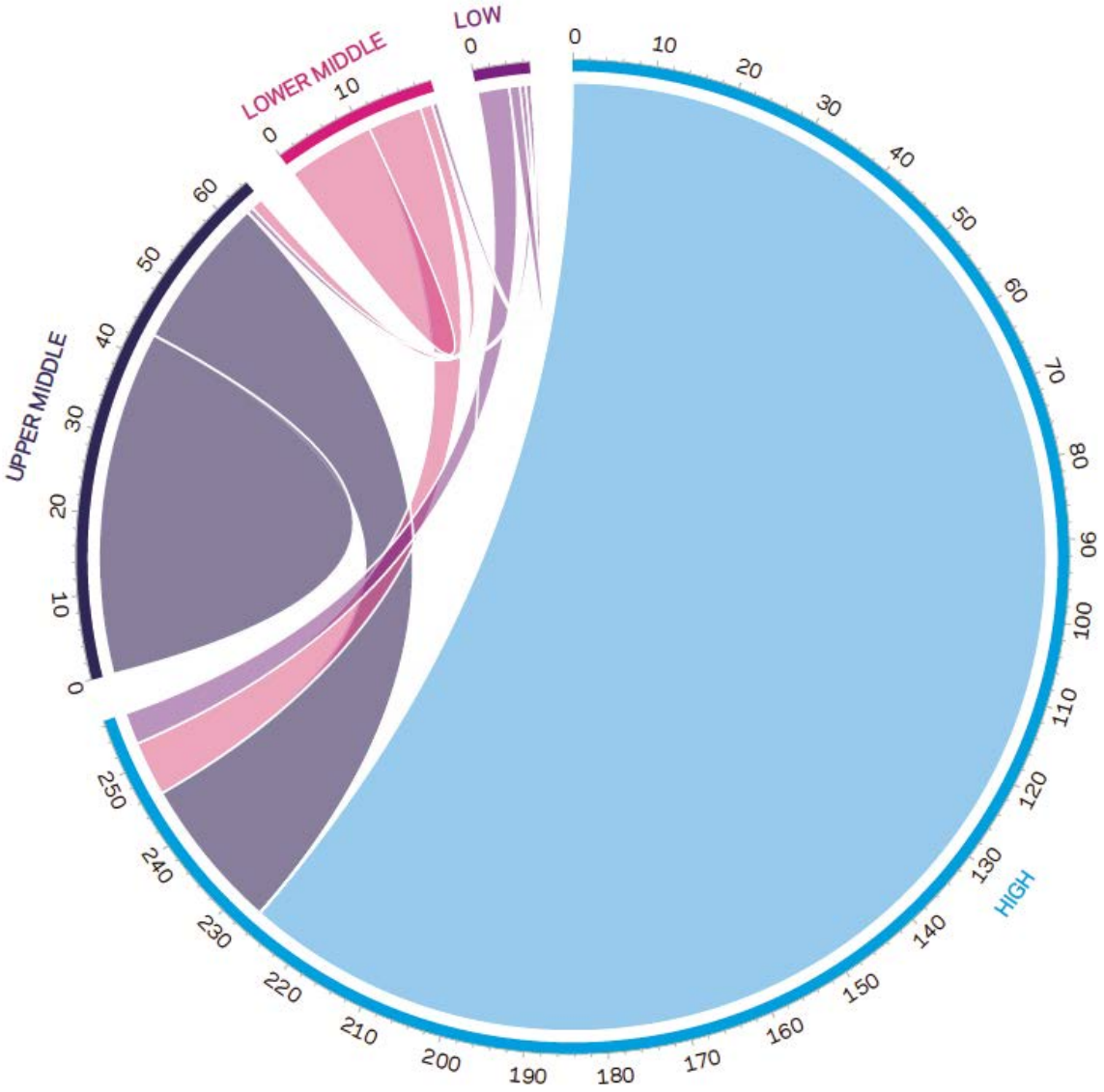
Disparities in Contributions to Sustainability Science

HIGH-INCOME COUNTRIES

76% (254 629) of all publications in sustainability science (2009-13)

LOW-INCOME COUNTRIES

2% of all publications in sustainability science (2009-13)



LOW-INCOME COUNTRIES

Publications: 5,597
2% of all publications in sustainability science

Collaborative publications
With high-income countries: 3,992 (71.3%)
With upper-middle-income countries: 752 (13.4%)
With lower-middle-income countries: 707 (12.6%)

UPPER-MIDDLE-INCOME COUNTRIES

Publications: 63,069
19% of all publications in sustainability science

Collaborative publications
With high-income countries: 19,250 (30.5%)
With lower-middle-income countries: 1,498 (2.4%)
With low-income countries: 752 (1.2%)

LOWER-MIDDLE-INCOME COUNTRIES

Publications: 18,360
6% of all publications in sustainability science

Collaborative publications
With high-income countries: 6,833 (37.2%)
With upper-middle-income countries: 1,498 (8.2%)
With low-income countries: 707 (3.9%)

HIGH-INCOME COUNTRIES

Publications: 254,629
76% of all publications in sustainability science

Collaborative publications
With upper-middle-income countries: 19,250 (7.6%)
With lower-middle-income countries: 6,833 (2.7%)
With low-income countries: 3,992 (1.6%)

Figure 2.5 *— The number of collaborative publications across income classes; for the world; for sustainability science; for the period 2009-2013. The numbers in the bracket are the share of collaborative publications out of all publications of the countries in the income class.*

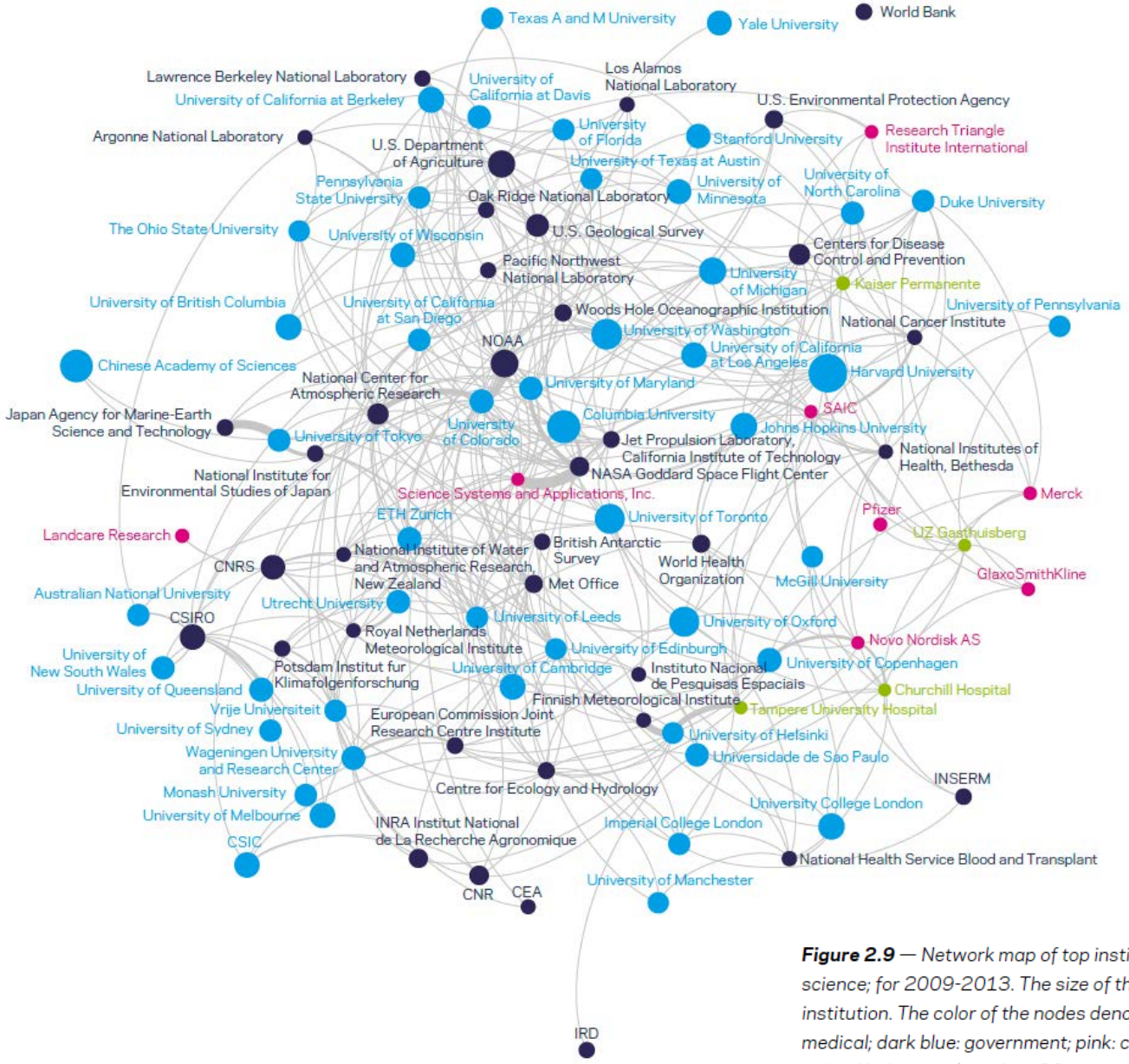


Figure 2.9 — *Network map of top institutions in each sector; for the world; for sustainability science; for 2009-2013. The size of the nodes denotes the number of the publications of the institution. The color of the nodes denotes the sector of the institution (blue: academic; green: medical; dark blue: government; pink: corporate). The length of the edges denotes Salton's index. Nodes with less than 39 connections and edges with a Salton's index less than 0.025 are not shown. Force Atlas 2 algorithm is used for the layout.*

Interdisciplinary Research

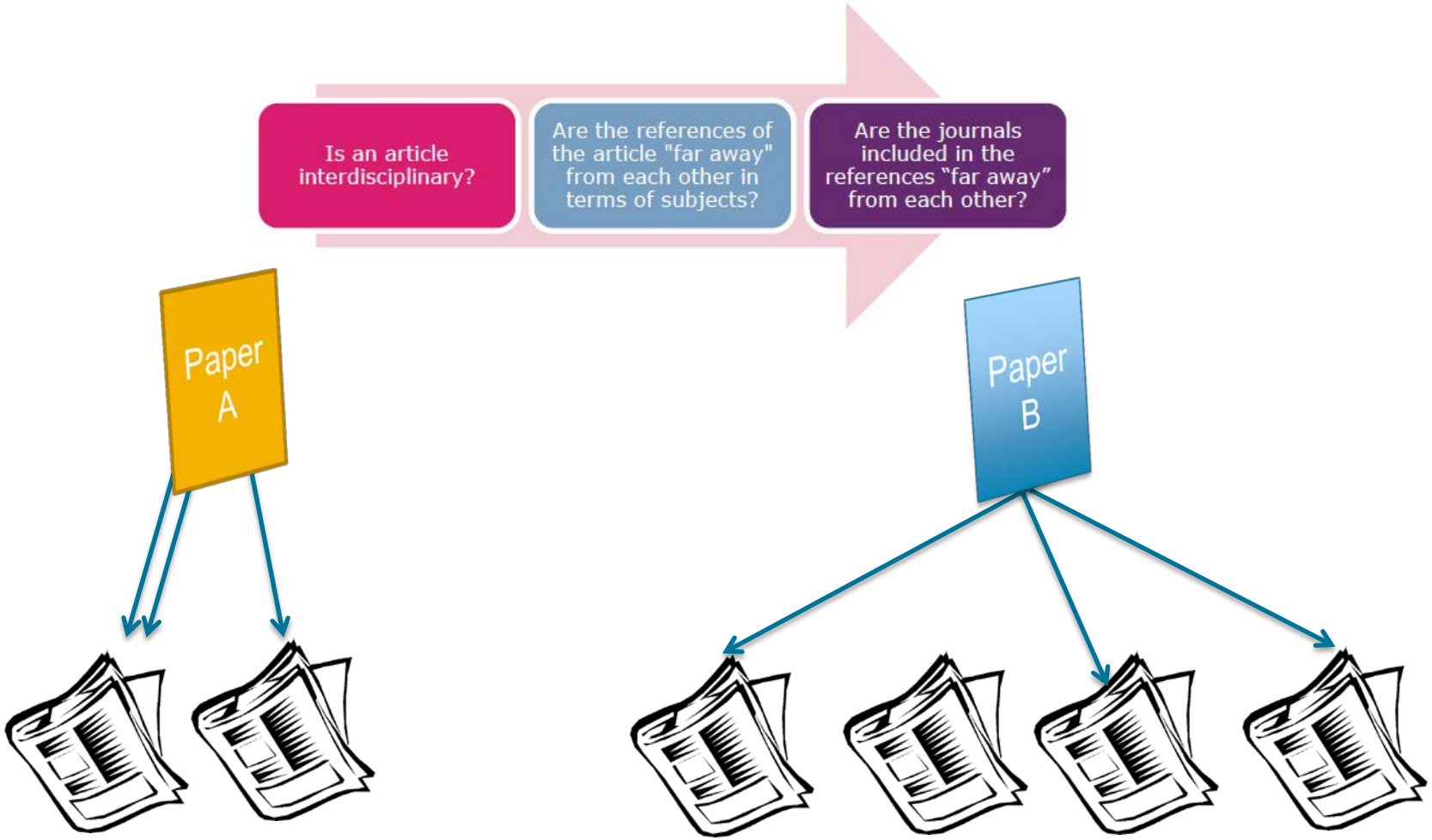
Monodisciplinary: apple

Multidisciplinary: fruit salad

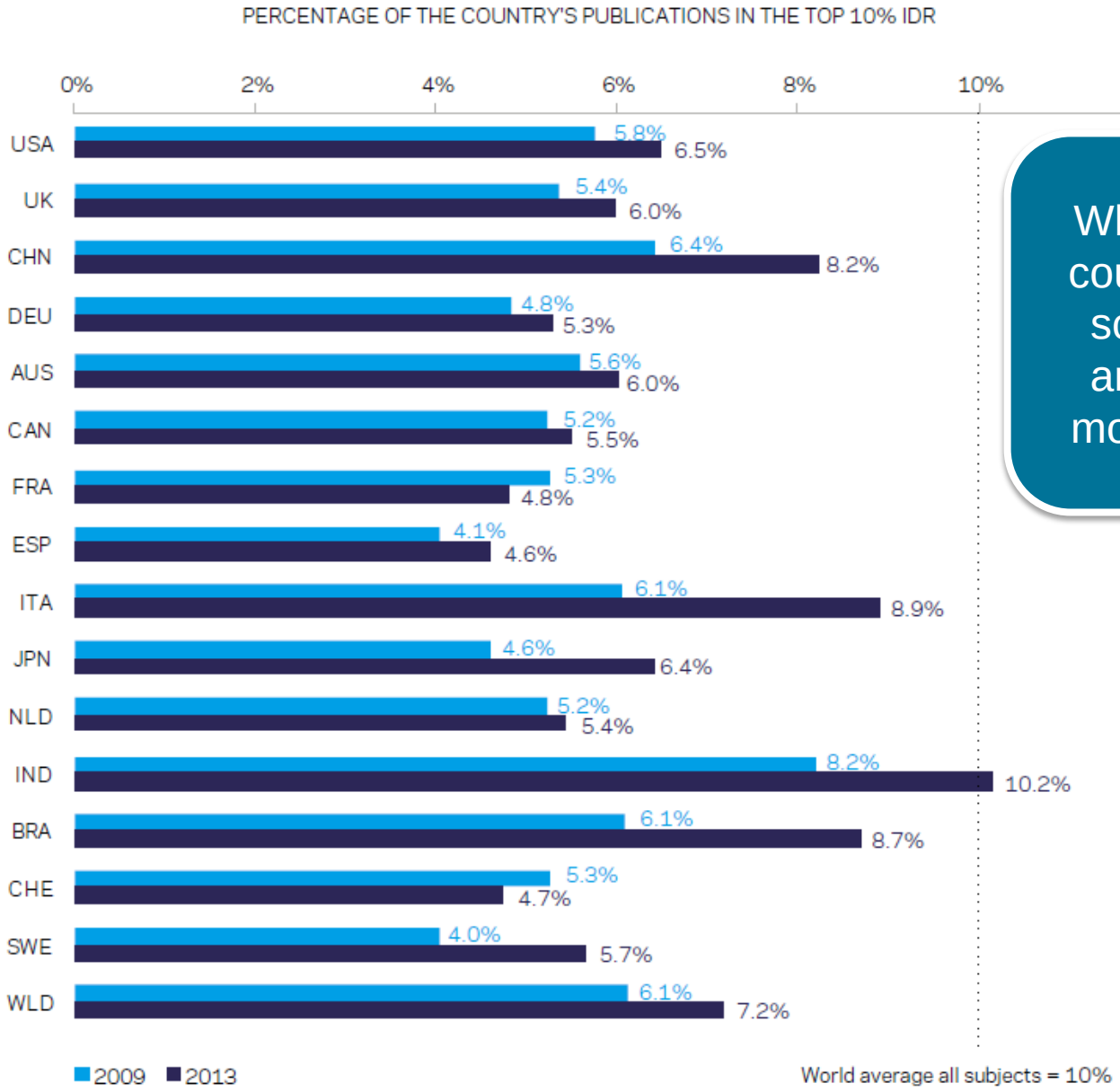
Interdisciplinary: smoothie

Transdisciplinary: multi-fruit ice cream

How can we define interdisciplinarity?



SUSTAINABILITY SCIENCE IS LESS INTERDISCIPLINARY THAN THE WORLD AVERAGE



What is the share of a country's sustainability science publications among the top 10 % most interdisciplinary?

Figure 3.1 — *Share of the top 10% most IDR; per country for the top 15 most prolific countries in sustainability science; for sustainability science; 2009 and 2013.*

Figure 3.3 *— Co-occurrence map of key phrases in the top 10% IDR publications; for the world; for sustainability science; for the period of 2009-2013. The size of the nodes denotes the number of occurrences of the key phrase. The color of the nodes denotes the clusters. The length of the edges denotes the intensity of co-occurrences of key phrases in the top 10% IDR in sustainability science. Nodes with no connection and edges with the intensity less than 0.076 are not shown. Force Atlas 2 algorithm is used for the layout.*

Conclusions

- Baseline
- Growth
- Disparities
- Strengths
- Gaps
- Dialogue

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Coralie Bos, Joe D'Angelo and Kay Tancock

How editors can contribute to sustainable development

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When the UN established the Sustainable Development Goals at its headquarters in New York last month, it set the agenda for Sustainable Development for the next 15 years.

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Short Communications

"There is a natural value chain of knowledge. I think mapping how this range of activities connect and could contribute to problem solving within the SDG framework would be extremely valuable."

Jeffrey Sachs

The Earth Institute

2015

Thank you!