International Institute for Applied Systems Analysis
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ISAP 2019

Integrating climate change and the sustainable development goals

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IIASA

- *international research institute*
- *multidisciplinary research aimed at policy making*
- *global and universal challenges*

IMPACT

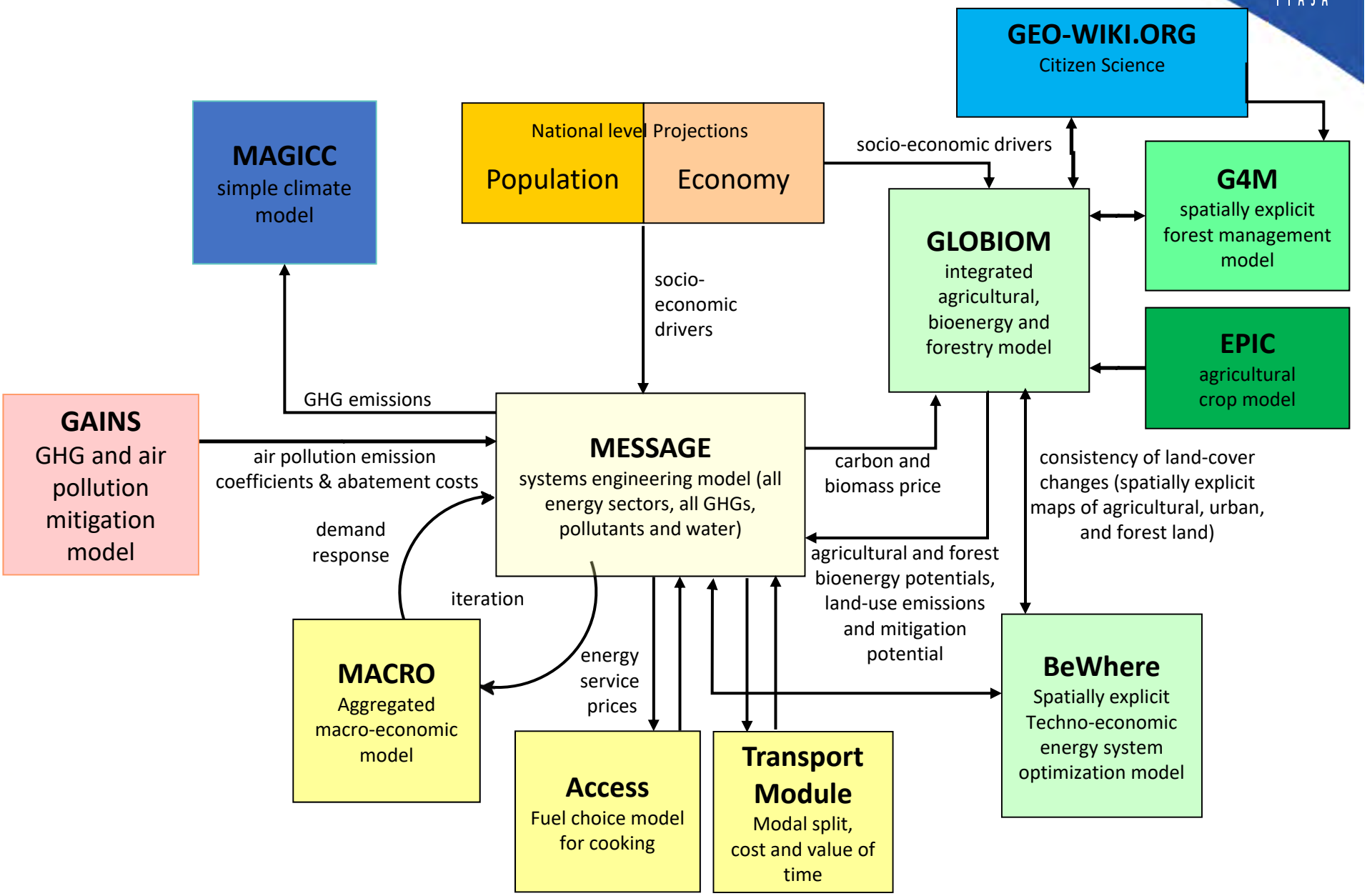
IPCC Special Report on Global Warming of 1.5°C

Approved by the IPCC at a meeting on 6 October in South Korea. More than 6,000 scientific references were cited in the report. Writing the report involved 91 authors from 40 countries and 133 contributing authors, 12 of whom are from IIASA.

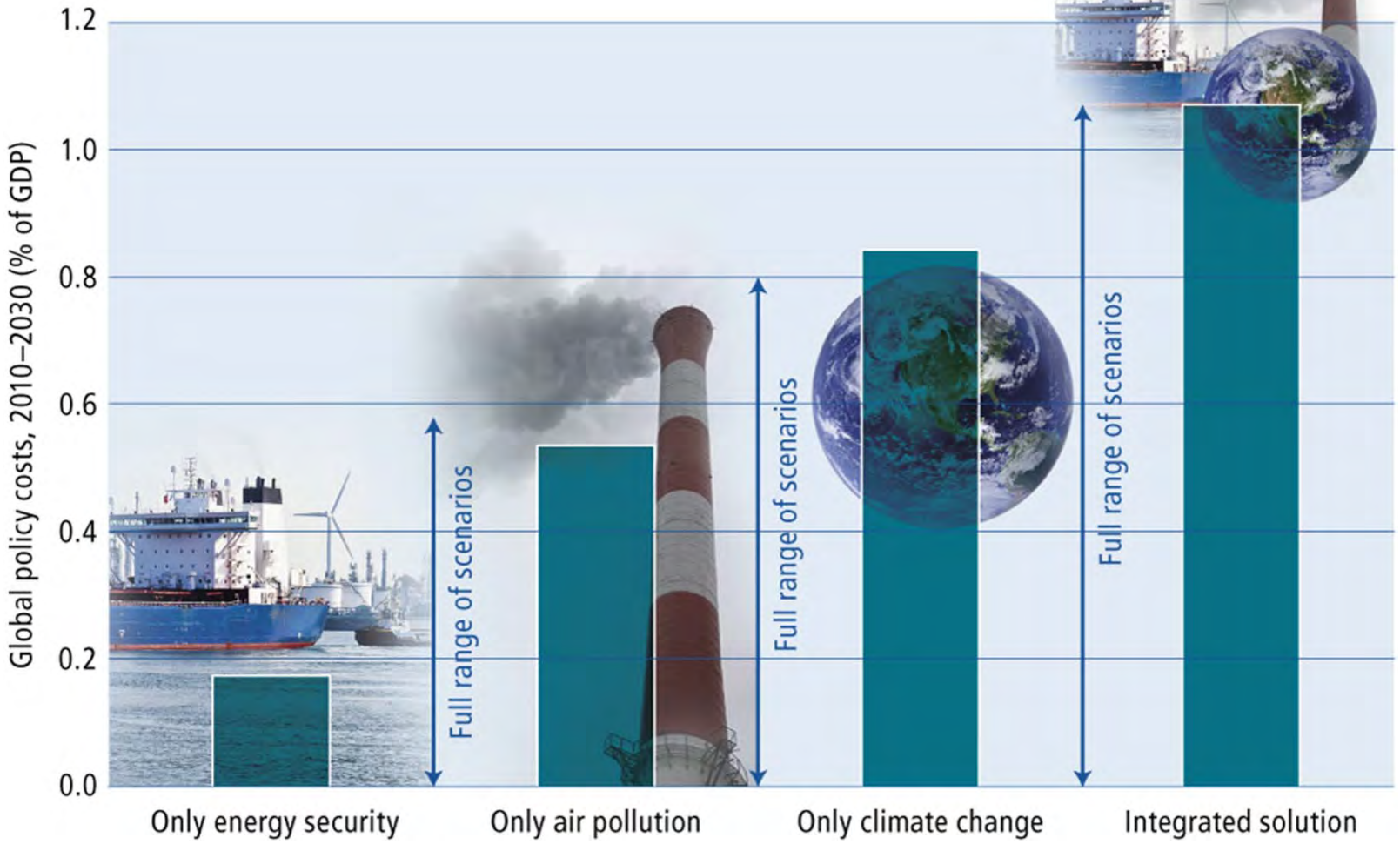
Paris climate change agreement aims for a global response to limit temperature increase to 1.5°C. At this time, December 2015, IIASA had one of the few research groups that had conducted analysis into how to achieve this target.

Systemic understanding?

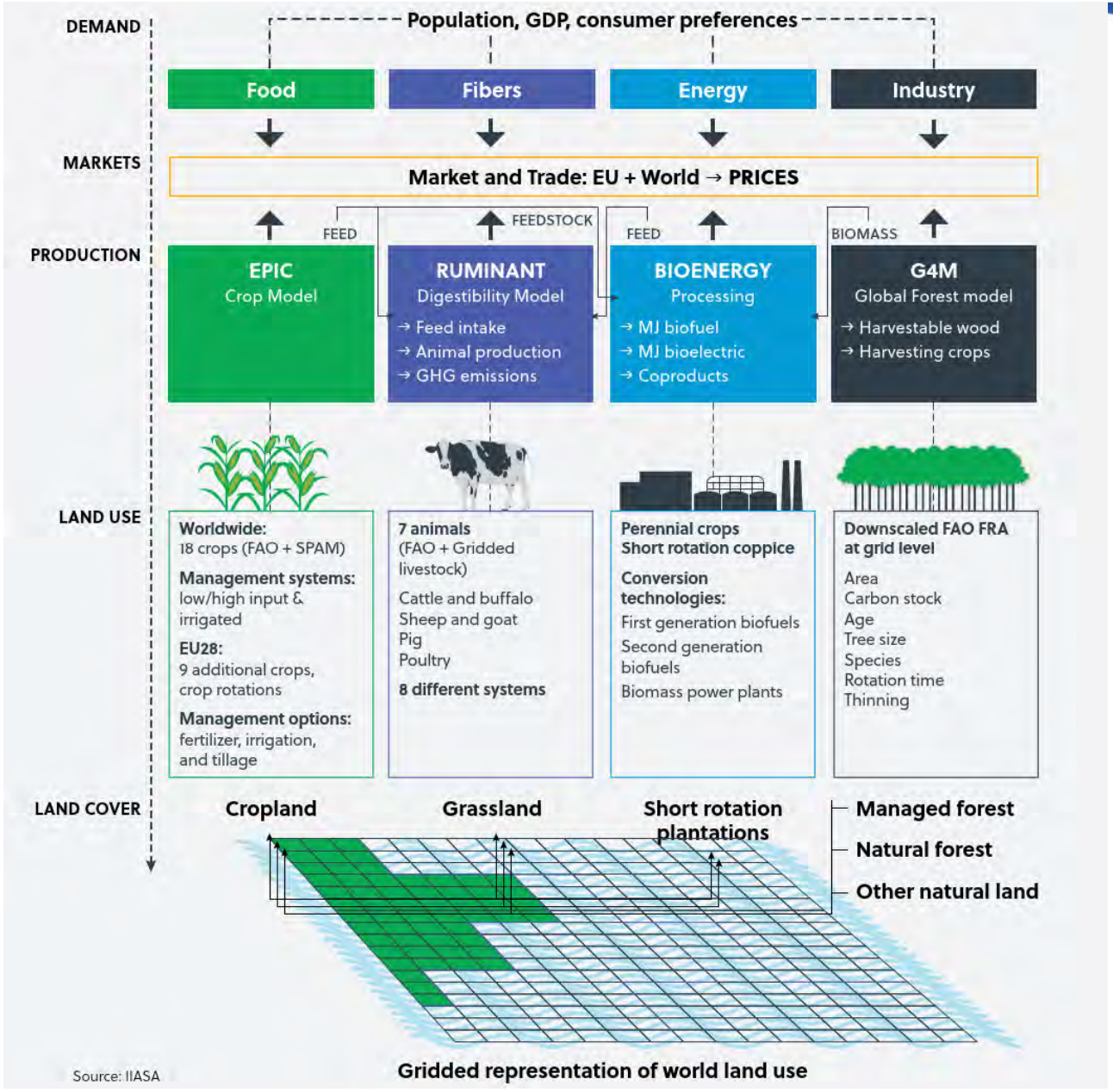
The drive for integrated understanding



Multiple benefits of integrated policies
(harnessing synergies and trade-offs)



Source: McCollum, Krey, Riahi, 2012



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Integrating disciplines

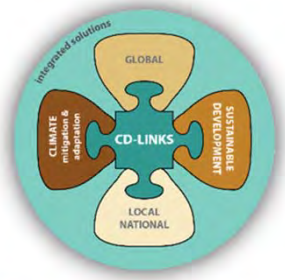
CD-LINKS: Cutting edge science, integration of global and national perspective

- low carbon development pathways, climate change and sustainable development linkages, policy, capacity

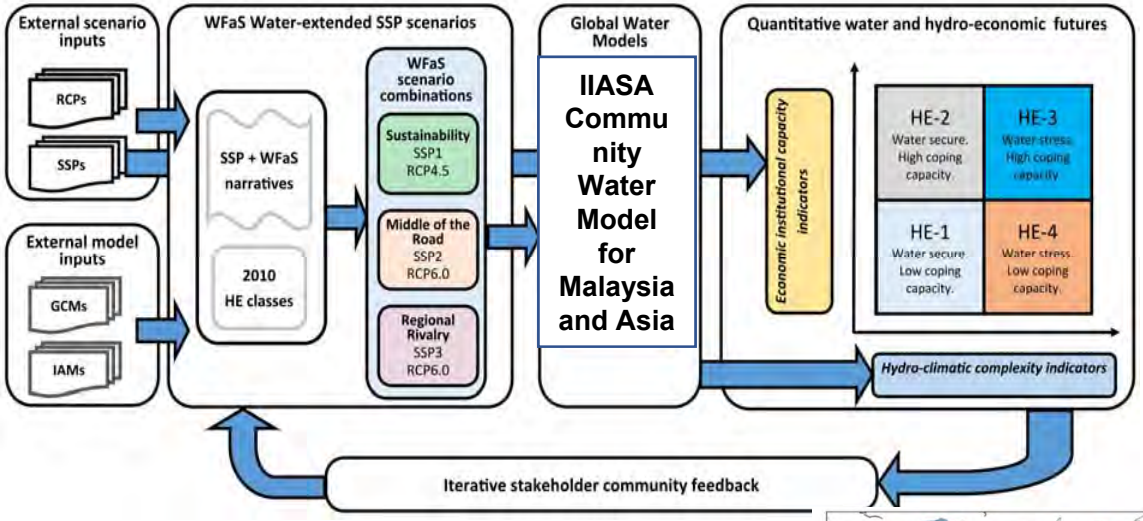
GLOBAL transformation pathways

Improved representation of national circumstances and policy priorities

NATIONAL mid-century strategies



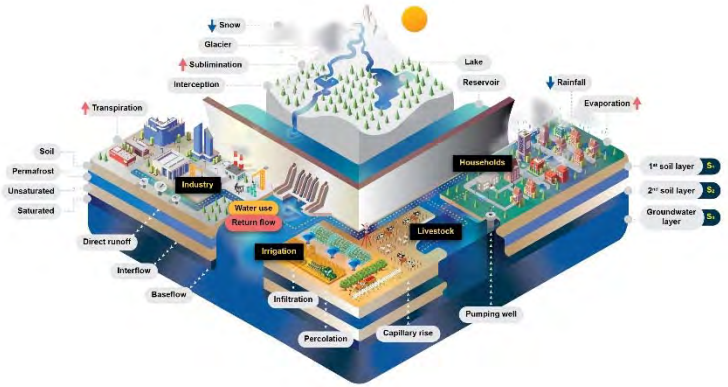
Integrating spatial scales

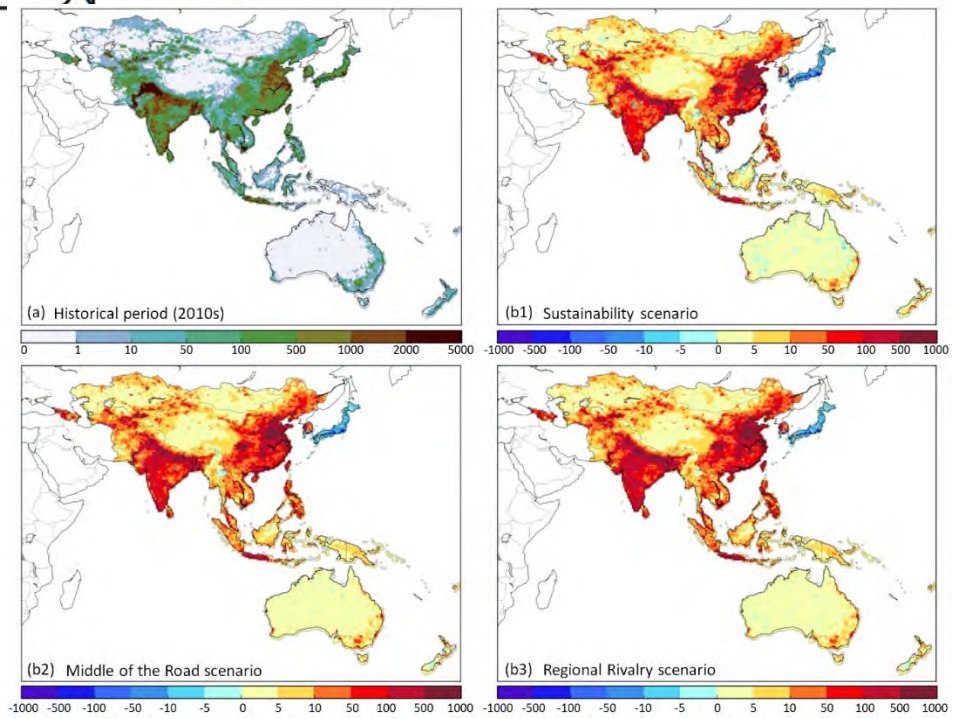


Water Futures and Solutions (WFaS) Initiative and framework

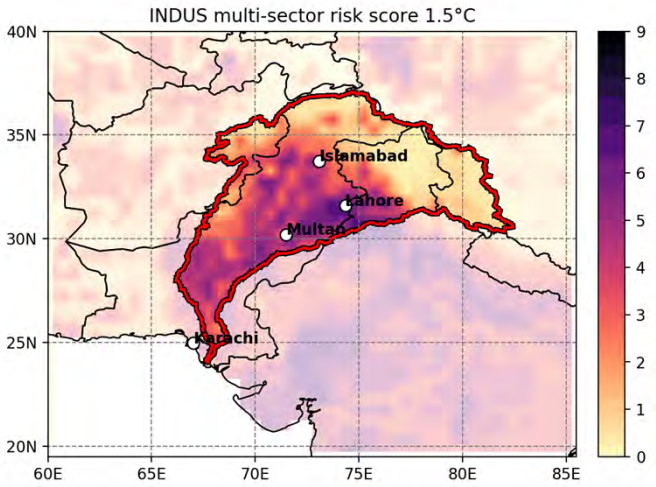
***Malaysia has seasonal water scarcity**

Malaysia/Asia
Future water demand for 3 SSP-RCP scenarios



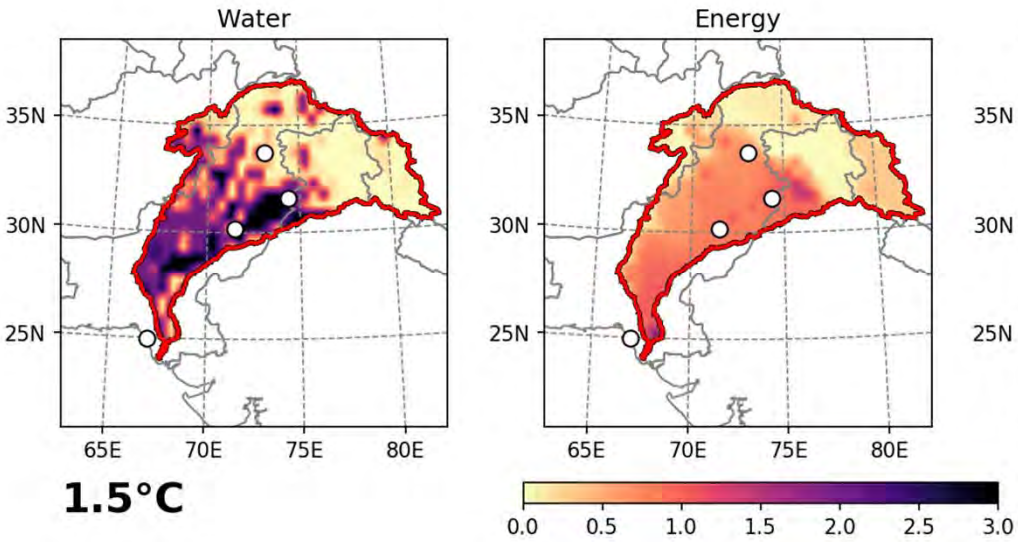


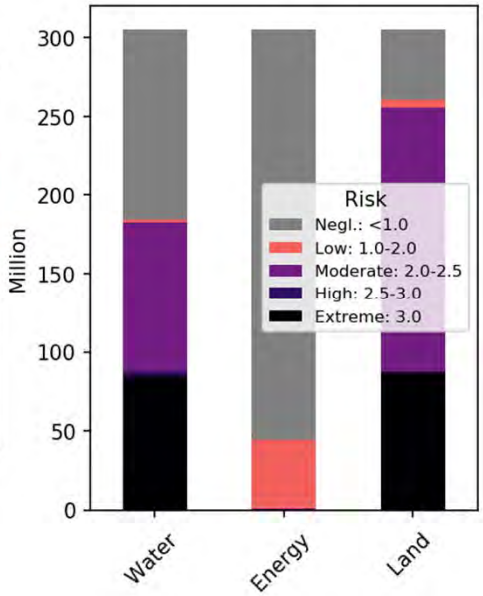
Integrating temporal scales



Hotspot basin:
Indus – ISWEL project

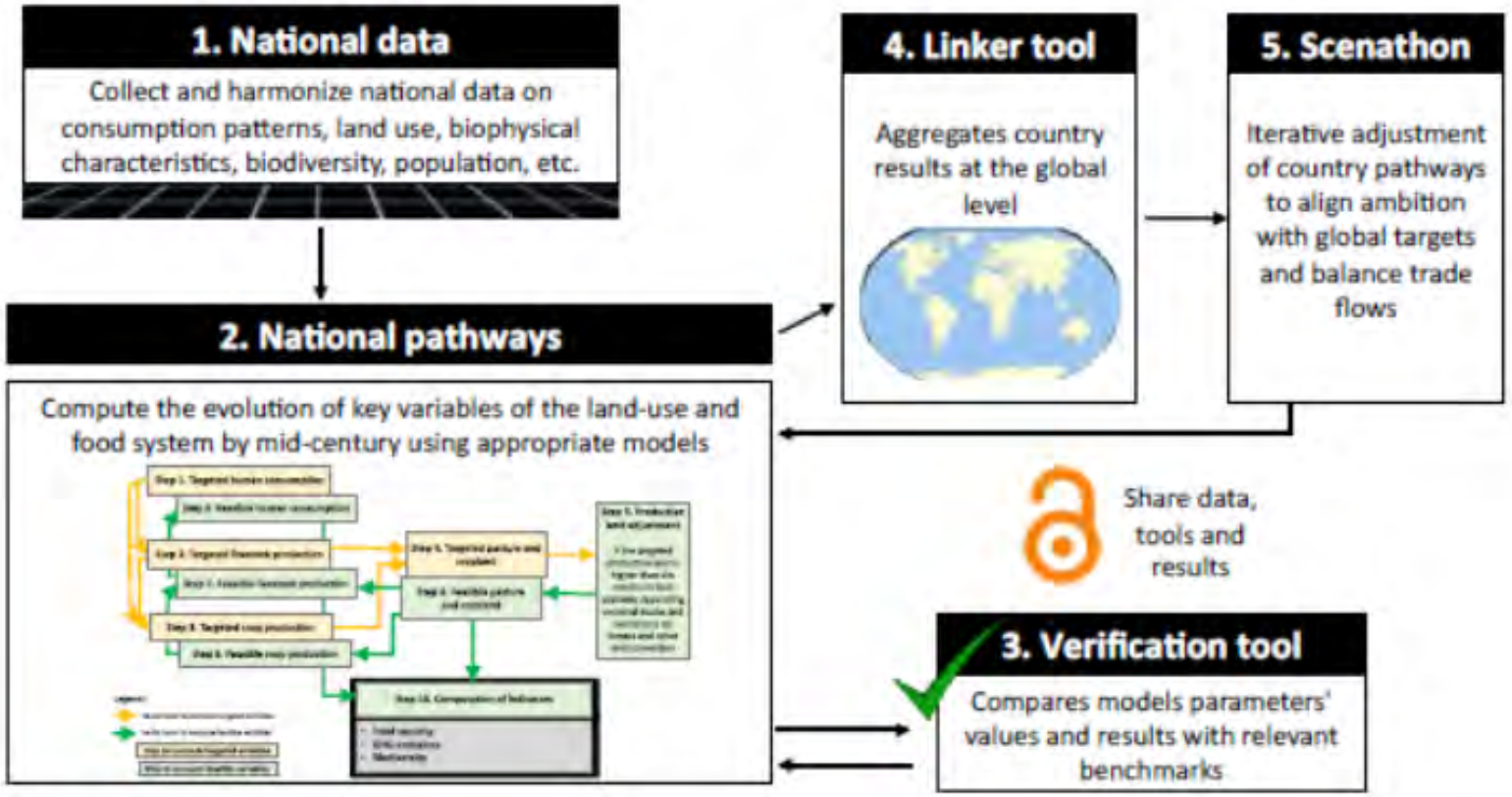
Current risks in water and land sectors
With warmer temperatures
– energy risks affect most regions





Integrating disciplines, temporal and spatial scales

Food, **A**griculture, **B**iodiversity, **L**and, **E**nergy (FABLE)



Co-design, production and implementation

No G20 country is on track to achieve SDGs

	NO POVERTY 1	ZERO HUNGER 2	GOOD HEALTH AND WELL BEING 3	QUALITY EDUCATION 4	GENDER EQUALITY 5	CLEAN WATER AND SANITATION 6	AFFORDABLE AND CLEAN ENERGY 7	DECENT WORK AND ECONOMIC GROWTH 8	INDUSTRY, INNOVATION AND INFRASTRUCTURE 9	INEQUALITIES REDUCED 10	SUSTAINABLE CITIES AND COMMUNITIES 11	RESPONSIBLE CONSUMPTION AND PRODUCTION 12	CLIMATE ACTION 13	LIFE BELOW WATER 14	LIFE ON LAND 15	PEACE, JUSTICE AND STRONG INSTITUTIONS 16	PARTNERSHIPS FOR THE GOALS 17
Argentina	→	↗	↗	↗	↗	••	↗	↗	↗	••	→	••	↓	→	→	↓	↓
Australia*	↑	↗	→	↗	↗	••	↗	↗	↗	••	↗	••	↗	↗	→	→	↗
Brazil	↑	↗	↗	→	↗	••	→	↗	↗	••	→	••	↓	→	→	↓	→
Canada*	→	↗	↑	→	↗	••	→	↗	↗	↓	••	••	→	→	→	↑	••
China	↑	↑	↗	••	↗	••	↗	↑	↑	••	→	••	↓	→	→	↓	••
European Union	→	↗	↑	↑	↑	↑	↑	→	↑	→	↗	••	↗	→	→	↗	→
France*	→	↗	↑	↗	↑	↗	↑	↗	↑	↑	↗	••	↑	→	↗	↗	→
Germany*	→	↗	↑	↗	↗	→	↑	↑	↑	→	↗	••	→	→	→	↗	↗
India	↑	↗	↗	••	→	↗	→	↑	↗	••	→	••	→	↗	→	→	→
Indonesia	↑	↗	↗	→	→	↗	↑	↑	↑	••	→	••	→	→	↓	↗	→
Italy*	→	↗	↗	↗	↑	↑	↑	→	↗	→	→	••	↑	→	→	→	↓
Japan*	••	→	↗	↑	→	→	↗	↑	↑	••	••	••	↓	→	↗	↗	↗
Korea, Rep.*	↗	→	↗	→	↗	→	↗	••	→	••	••	••	↓	→	↓	→	••
Mexico*	↑	↗	↗	→	↗	→	↗	↗	↗	↓	↗	••	↗	→	→	→	→
Russian Federation	→	↗	↗	↑	↗	••	↗	↑	↑	••	↗	••	→	↗	→	↗	••
Saudi Arabia	→	↗	↗	↑	↗	••	↗	↗	↑	••	••	••	↓	→	→	↗	••
South Africa	→	↗	↗	••	→	↗	↗	↗	↗	••	↗	••	→	→	↗	→	↑
Turkey*	↗	↗	↗	→	↗	••	↗	→	↗	→	→	••	↓	↗	→	↗	••
United Kingdom*	↗	↗	↑	↗	↗	→	↑	↑	↑	↓	↗	••	↑	→	↗	↑	↑
United States*	↗	↗	↗	→	↗	↗	↗	↗	↑	••	↗	••	→	→	→	→	↗

Source: Bertelsmann Stiftung and SDSN

SUSTAINABLE DEVELOPMENT SOLUTIONS NETWORK
A GLOBAL INITIATIVE FOR THE UNITED NATIONS

Going beyond synergies and trade-offs: a seven-point scale

- Negative interactions: cancelling (-3), counteracting (-2), constraining (-1)
- Neutral interaction: consistent
- Positive interactions: enabling (+1), reinforcing (+2) and indivisible (+3)

Nilsson, M., D. Griggs and M. Visbeck, 2016. Map the interactions between Sustainable Development Goals. Nature, 534:320-322.

COMMENT

GOAL SCORING

The influence of one Sustainable Development Goal or target on another can be summarized with this simple scale.

Interaction	Name	Explanation	Example
+3	Indivisible	Inextricably linked to the achievement of another.	Ending all forms of discrimination against women and girls is indivisible from ensuring women's full and effective participation and equal opportunities for leadership.
+2	Reinforcing	Aids the achievement of another goal.	Providing access to electricity reinforces water-pumping and irrigation systems. Strengthening the capacity to adapt to climate-related hazards reduces losses caused by disasters.
+1	Enabling	Creates conditions that further another goal.	Providing electricity access in rural homes enables education, because it makes it possible to do homework at night with electric lighting.
0	Consistent	No significant positive or negative interactions.	Ensuring education for all does not interact significantly with infrastructure development or conservation of ocean ecosystems.
–1	Constraining	Limits options on another goal.	Improved water efficiency can constrain agricultural irrigation. Reducing climate change can constrain the options for energy access.
–2	Counteracting	Clashes with another goal.	Boosting consumption for growth can counteract waste reduction and climate mitigation.
–3	Cancelling	Makes it impossible to reach another goal.	Fully ensuring public transparency and democratic accountability cannot be combined with national-security goals. Full protection of natural reserves excludes public access for recreation.

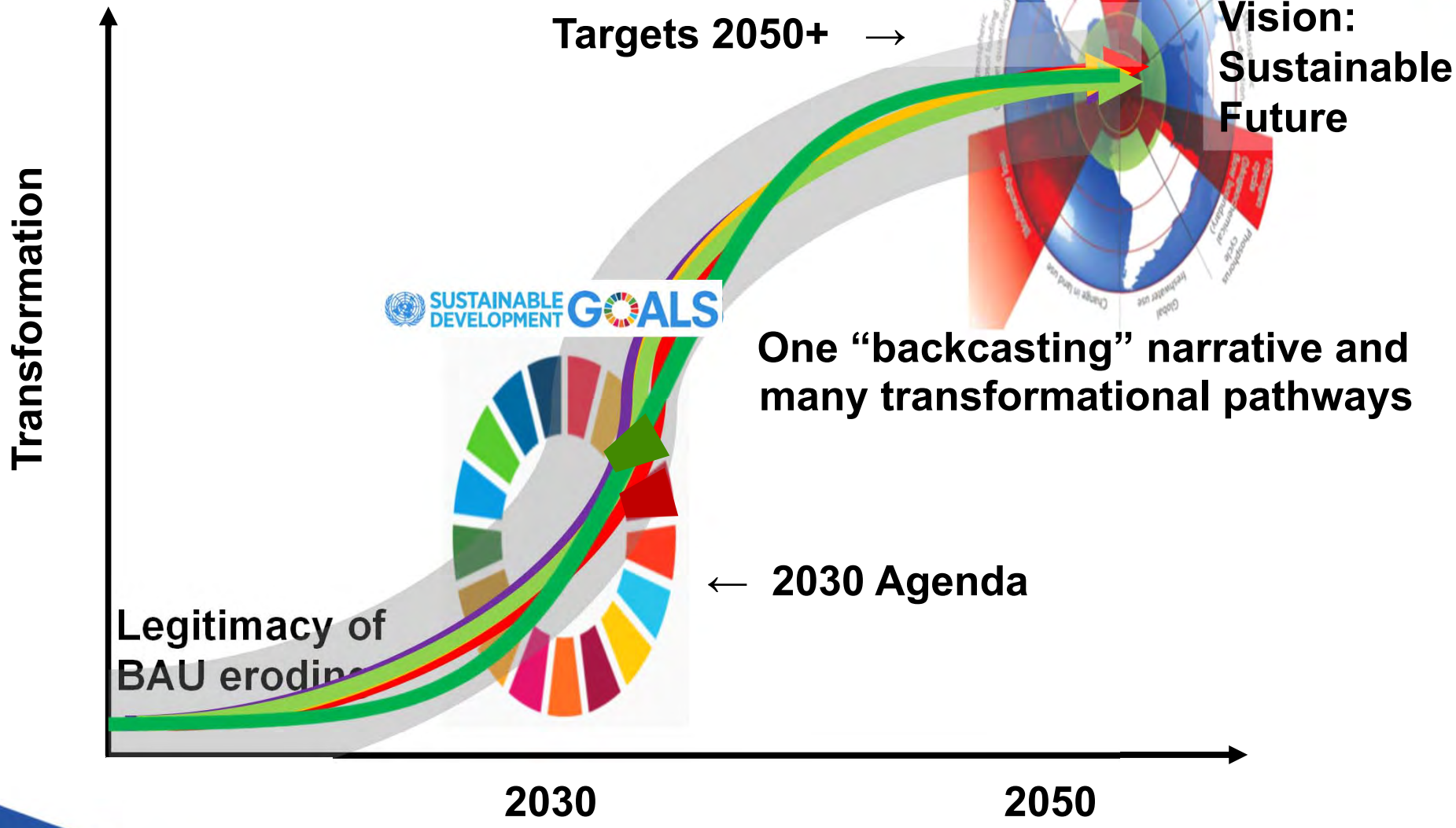
Science for Sustainability (key challenges)

1. Agenda 2030 - gift to humanity
2. More coordination and collaboration - deliver the research behind Agenda 2030
3. Degree of urgency to getting this research done
4. Transformative and high impact research – large scale mobilization for transformative societal changes
5. Post-normal research (truly transdisciplinary: co-design, co-production and co-implementation)
6. Holistic or systems approach is required
   - complexities, trade-offs and synergies
   - many of todays problems are yesterdays solutions;
   - `not just technical but intellectual integration

Science for Sustainability (key challenges)

7. No one should be left behind – no SDG should be left behind
8. The research agenda should clearly identify
   - research that needs to be done (what)
   - underlying values (why)
   - governance and institutions (how)
9. Recognize that priorities will differ and shift over time
10. Cost of not getting Agenda 2030 right (forced migrations, rising inequality tensions, exceeding planetary/ ecosystem limits – Cape Town water shortage 2017/18; Chennai 2019)

The World in 2050 (www.TWI2050.org)



Source: After WBGU, 2011

Six Major Transformations (TWI2050.org)

Digital revolution
Artificial intelligence, big data, biotech, nanotech, autonomous systems

Human capacity & demography
Education, health, ageing, labor markets, gender, inequalities

Smart cities
Decent housing, mobility, sustainable infrastructure, pollution

SDGs:
Prosperity
Social Inclusion
Sustainability

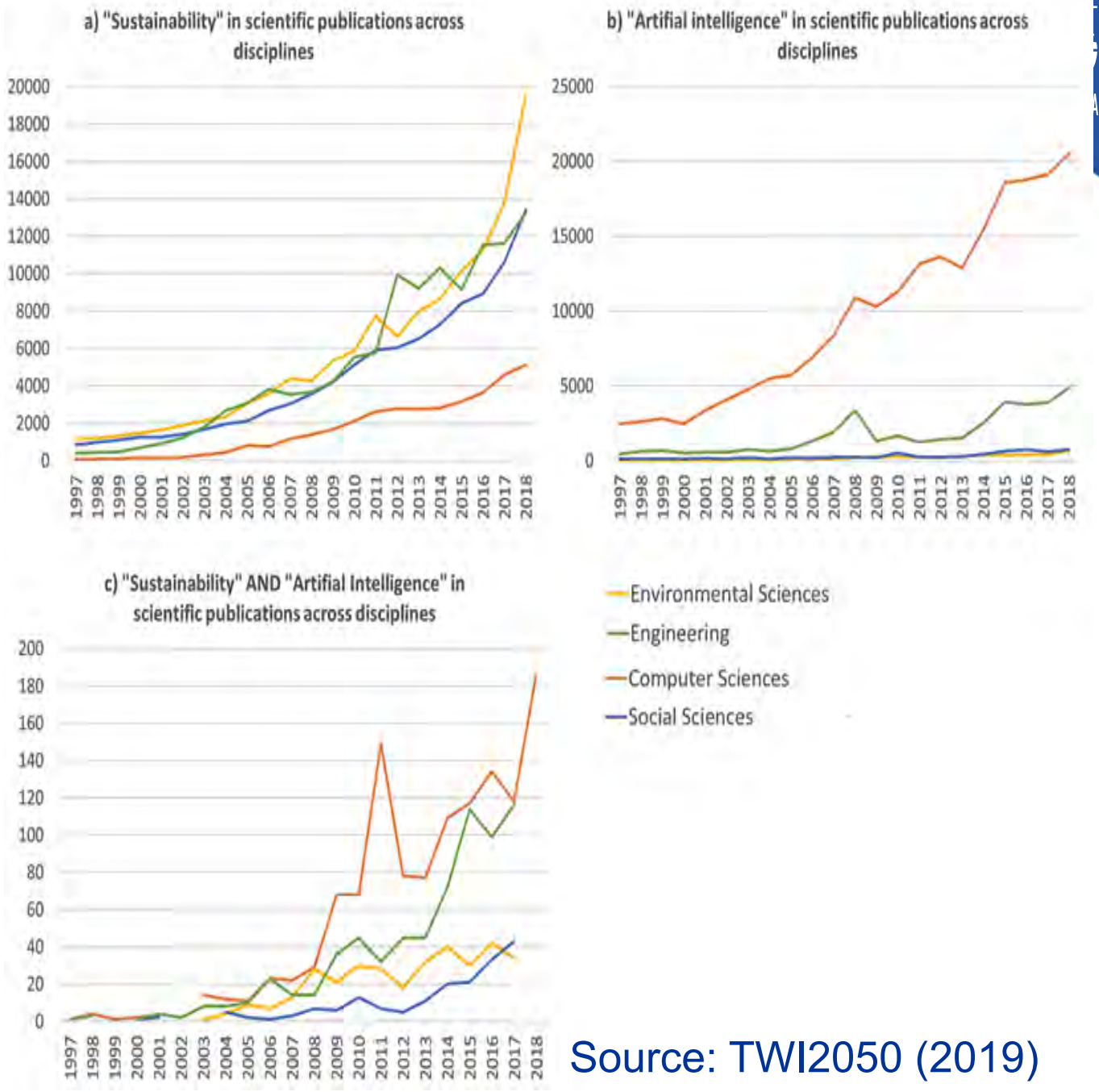
TWI2050
The World in 2050
www.twi2050.org

Consumption & production
Resource use, circular economy, sufficiency, pollution

Food, biosphere & water
Sustainable intensification, biodiversity, forests, oceans, healthy diets, nutrients

Decarbonization & energy
Energy access, efficiency, electrification, decent services

More integrative science is needed to cover advances in digital technologies and the interconnections of digital technologies with sustainability



Source: TWI2050 (2019)

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