

Global Sustainable Development Report (GSDR 2019)

Food for thought:
Sustainability science approach to global
environmental challenges

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GA EUROMARINE
PIRAN – 15 January 2020

THE FUTURE
IS NOW

SCIENCE FOR ACHIEVING
SUSTAINABLE DEVELOPMENT



GLOBAL SUSTAINABLE
DEVELOPMENT REPORT 2019

Key Messages

- It is time to sound the alarm
- Better focus on the arrows than on the boxes
- Mobilize the billions and shift the trillions
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Many recent and converging UN reports
IPCC, IPCC special report on
Oceans, IPBES, GSDR, Human
Development Report

Urgency of the environmental situation
and considering the future trends

Sustainability Goals: We are missing sustainability targets, resulting in increasing pressure from stakeholders

The international community is failing to reach its biodiversity conservation goals



2020 will be a milestone year for countries and cities worldwide



Businesses are failing to meet their sustainability commitments, with only 15% on the right track

The **Aichi Biodiversity 2020 targets**, a 2020 worldwide biodiversity conservation strategy plan, are likely to be missed.

The **GSDR Assessment and IPCC Ocean and cryosphere** reports concluded that the negative trends slow down progress towards the United Nation's **Sustainable Development Goals (SDGs)** set in **the 2030 Agenda**, including those related to climate, cities and water.

As of December 2018, no **G20 country** was meeting its 2030 climate targets, with 82% of the bloc's energy supply still coming from fossil fuels.

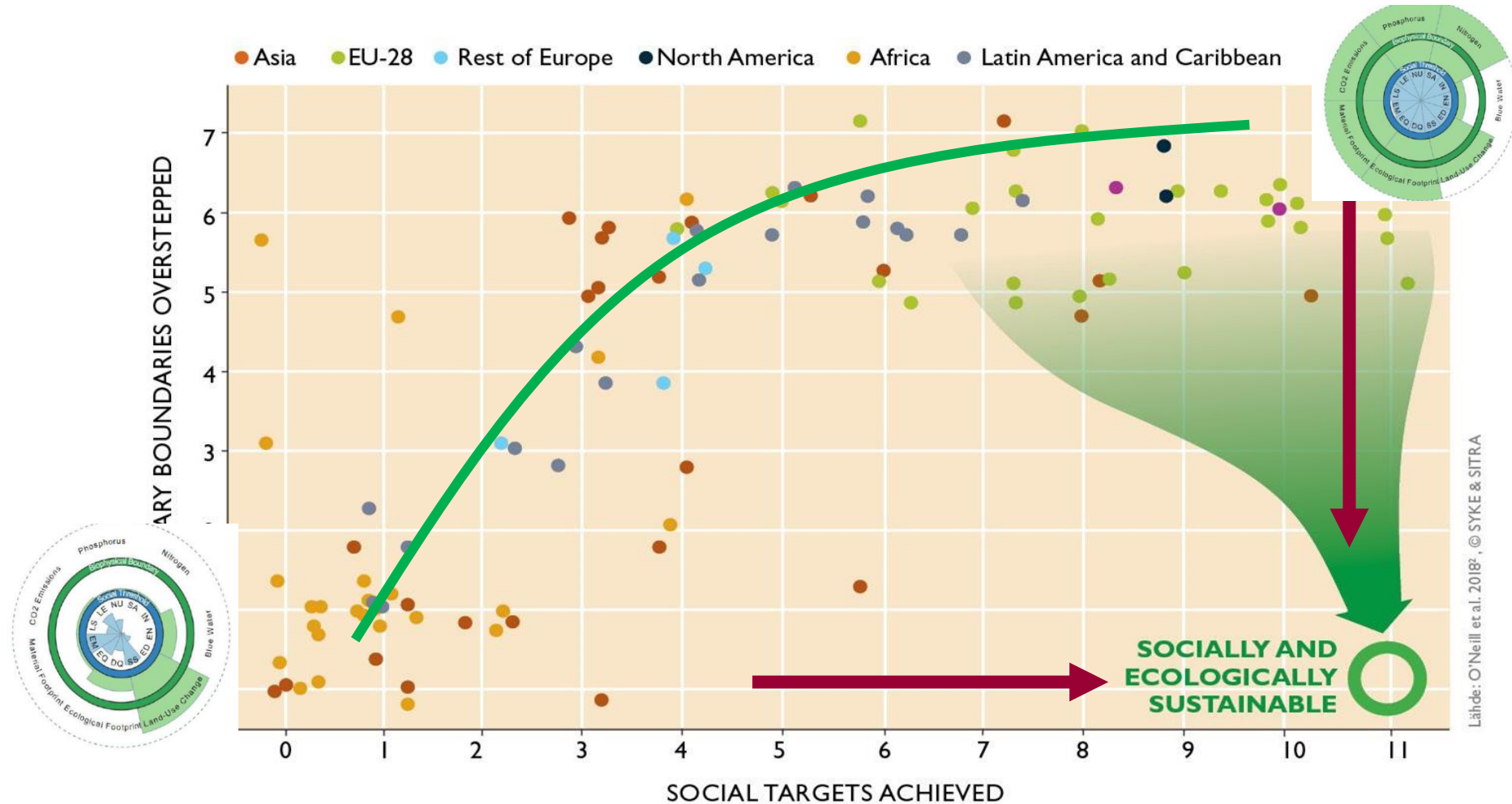
As part of the **Paris Agreement's "ratchet mechanism"** countries with 2025 GHG emissions targets will communicate in 2020 their second round of climate pledges, while countries with 2030 targets will communicate or update their pledge.

94 **C40 megacities** are committed to addressing climate change, and 144 **cities** around the world have GHG savings commitments ending by 2020. As they approach this milestone year, it will be critical for them to make new commitments, creating the opportunity to increase their ambition and encourage other cities around the world to follow suit.

Sustainability targets are table-stakes but achieving them is hard and delay will be costly: **85% of companies have defined sustainability targets, but only 15% are on track to achieve them.** The yearly investment gap globally is estimated at USD 2.5 trillion.

The **lack of incentives** tied to performance on sustainability, the pressure of short-term earnings performance and the insufficient resources dedicated to sustainability incentives are the main **barriers that prevent companies from capturing potential value from sustainability initiatives.**

Not a single country has achieved a high level of well-being in an ecologically sustainable way



Lähde: O'Neill et al. 2018², © SYKE & SITRA



A decisive decade ahead

*Sounding the alarm bell:
The need to scale-up and
accelerate implementation*

Business-as-usual approaches

| GOAL | WITHIN 5% | 5-10% | >10% | NEGATIVE LONG-TERM TREND |
|---------|---|--|---|--|
| Goal 1 | | 1.1. Eradicating extreme poverty | 1.3. Social protection for all | |
| Goal 2 | | 2.1. Ending hunger (undernourishment) | 2.2. Ending malnutrition (stunting) 2.5. Maintaining genetic diversity 2.a. Investment in agriculture* | 2.2. Ending malnutrition (overweight) |
| Goal 3 | 3.2. Under 5 mortality 3.2. Neonatal mortality | | 3.1. Maternal mortality 3.4. Premature deaths from non-communicable diseases | |
| Goal 4 | 4.1 Enrolment in primary education | 4.6 Literacy among youth and adults | 4.2. Early childhood development 4.1 Enrolment in secondary education 4.3 Enrolment in tertiary education | |
| Goal 5 | | | 5.5. Women political participation | |
| Goal 6 | | 6.2. Access to safe sanitation (open defecation practices) | 6.1. Access to safely managed drinking water 6.2. Access to safely managed sanitation services | |
| Goal 7 | | 7.1. Access to electricity | 7.2. Share of renewable energy* 7.3. Energy intensity | |
| Goal 8 | | | 8.7. Use of child labour | |
| Goal 9 | | 9.5. Enhancing scientific research (R&D expenditure) | 9.5. Enhancing scientific research (number of researchers) | |
| Goal 10 | | | 10.c. Remittance costs | Inequality in income** |
| Goal 11 | | | 11.1. Urban population living in slums* | |
| Goal 12 | | | | 12.2. Absolute material footprint, and DMC* |
| Goal 13 | | | | Global GHG emissions relative to Paris targets** |
| Goal 14 | | | | 14.1. Continued deterioration of coastal waters* 14.4. Overfishing* |
| Goal 15 | | | | 15.5. Biodiversity loss* 15.7. Wildlife poaching and trafficking* |
| Goal 16 | | | 16.9 universal birth registration * | |

* target not specified ** based on most recently available data

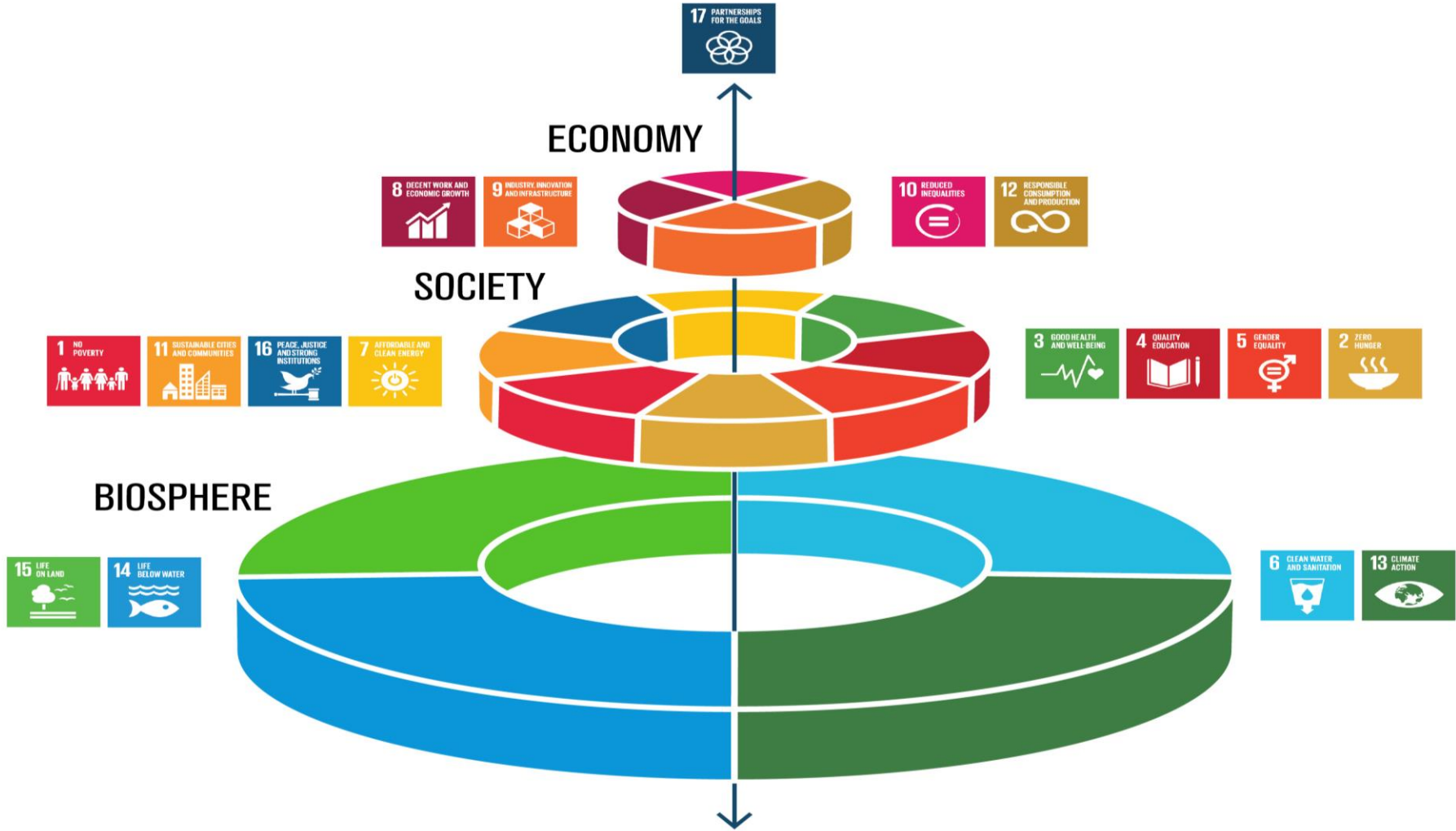
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An international agenda for our future: Agenda 2030



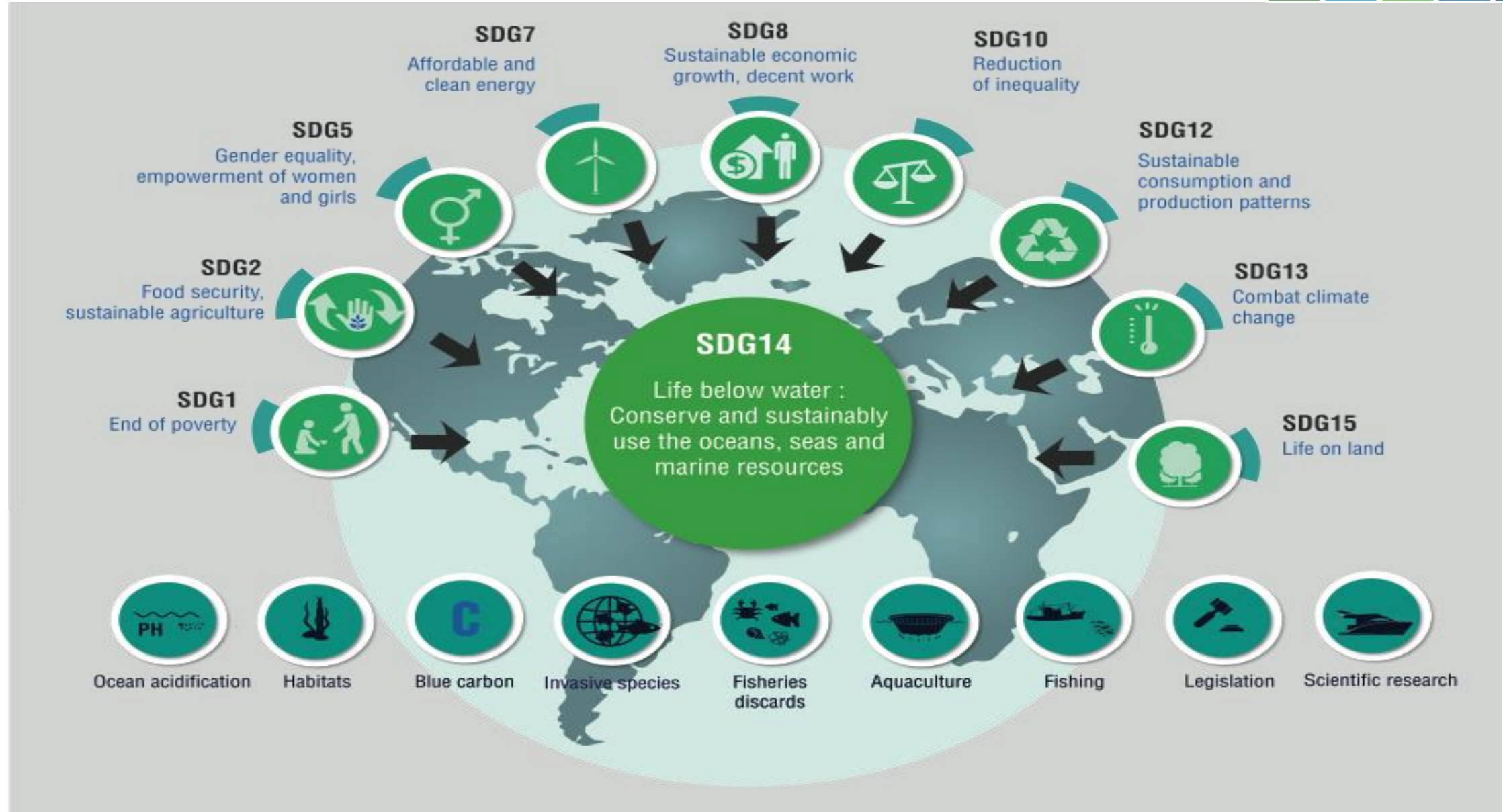
SDGs and their relationships



Graphics by Jerker Lokrantz/Azote

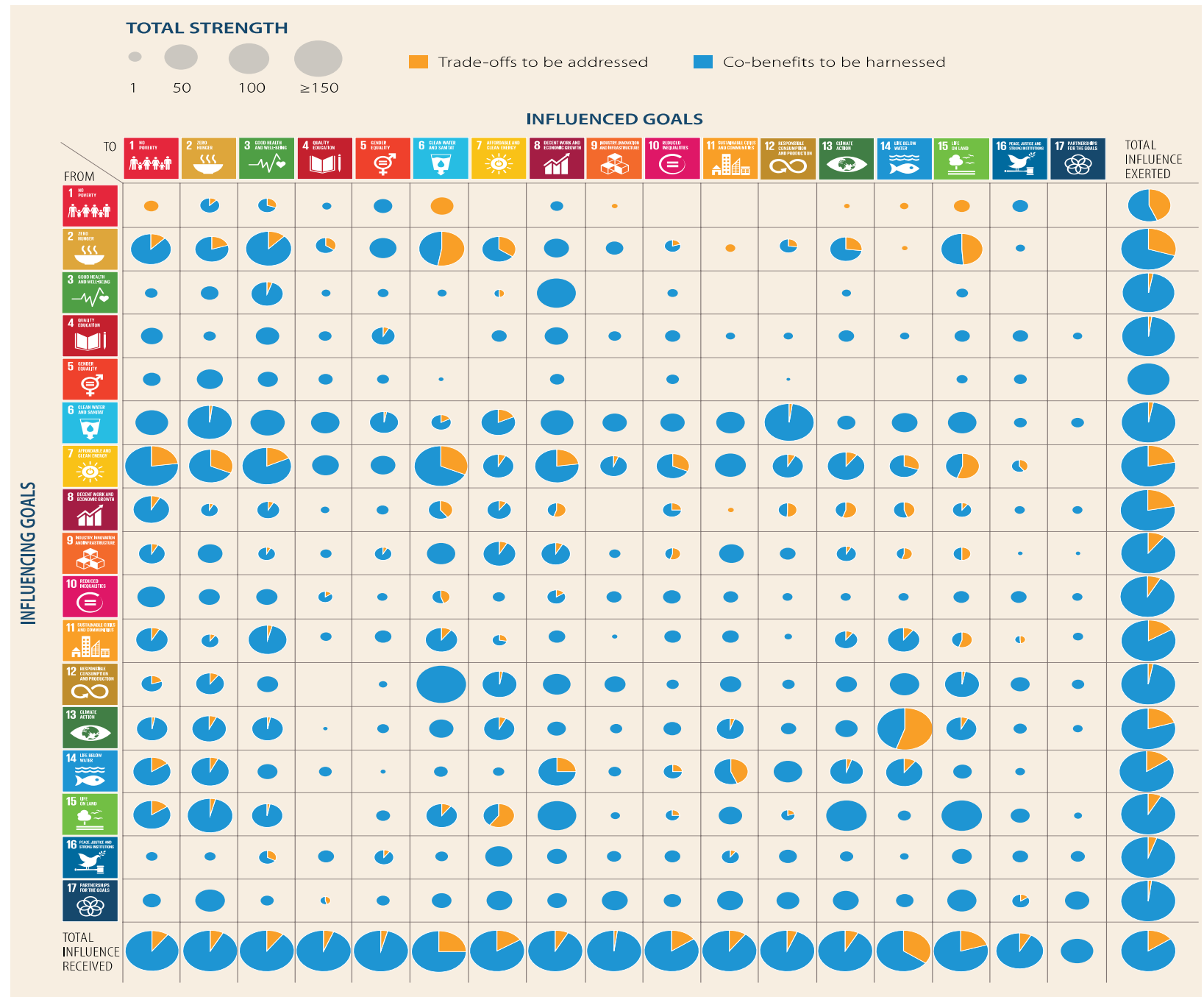
Linking SDG 14 with the other SDGs

(Moatti and Cury 2017)



Strong interactions between SDGs

(GSDR 2019)



Need to focus on interactions, synergies and trade-offs among SDGs

Coding:

- 62 Global Reports and scientific assessments
- 110 scientific papers with explicit mention of SDG interactions

General pattern:

- 2080 interactions positively or negatively assessed at target level

| To SDG | 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 |
|---|--------------|---------------|------------------------------|---------------------|-------------------|------------------------------|-------------------------------|-----------------------------------|---|-------------------------|---------------------------------------|---|-------------------|---------------------|-----------------|---|-------------------------------|
| 1 No Poverty | 2.00 | 2.40 | -2.00 | 2.00 | -2.00 | -1.00 | | 2.00 | | | | | -1.00 | -2.00 | -2.00 | | 2.00 |
| 2 Zero Hunger | -1.50 | -1.60 | -1.57 | | | -1.58 | -1.25 | | | | | | -1.80 | -1.00 | -1.64 | | |
| 3 Good Health and Well-being | 2.00 | 1.80 | 1.89 | 2.00 | 3.00 | 2.00 | -1.00 | -2.00 | | | | | | | | | |
| 4 Quality Education | -2.00 | | | | -1.00 | | | | | | | | | | | | |
| 5 Gender Equality | 1.67 | 1.50 | 2.00 | 2.00 | 2.80 | | | 2.00 | 3.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | | 2.00 | 2.00 |
| 6 Clean Water and Sanitation | 1.80 | 1.87 | 1.75 | 2.00 | 3.00 | 1.00 | | 2.00 | | | | | -1.00 | | | | 2.00 |
| 7 Affordable and Clean Energy | 1.94 | -2.00 | 2.00 | 2.00 | -1.00 | -2.00 | -1.00 | | | | | | | | | | |
| 8 Decent Work and Economic Growth | 1.94 | 1.76 | 2.00 | 2.00 | 1.94 | 1.00 | 1.58 | 1.70 | 1.00 | 1.80 | 1.00 | 1.09 | 2.33 | 2.00 | 2.00 | 1.50 | 2.00 |
| 9 Industry, Innovation and Infrastructure | -1.20 | -1.33 | -1.00 | | | | -1.20 | -1.00 | -1.00 | | | | -1.00 | -1.00 | -1.33 | | |
| 10 Reduced Inequalities | 2.00 | 1.81 | 1.68 | 1.00 | 1.17 | 1.92 | 1.89 | 1.48 | 1.71 | 1.20 | 2.11 | 1.86 | 1.88 | 1.67 | 1.78 | | 2.00 |
| 11 Sustainable Cities and Communities | -2.00 | | -1.00 | | | -2.00 | -1.00 | -1.00 | | -1.00 | | | -2.00 | -2.00 | -1.80 | | |
| 12 Responsible Consumption and Production | 2.15 | 2.00 | 2.11 | 2.00 | 3.00 | 2.86 | 1.09 | 1.75 | | | | 1.57 | | 2.00 | 1.67 | 1.25 | 1.50 |
| 13 Climate Action | -2.00 | -1.00 | -2.00 | | -1.00 | -1.00 | -1.00 | -2.00 | | -1.33 | | | -1.00 | | | -3.00 | |
| 14 Life Below Water | 1.90 | 2.00 | 1.67 | 1.50 | 1.67 | 2.89 | 2.00 | 2.00 | 3.00 | 2.00 | 2.00 | | 2.00 | | 1.00 | 1.00 | 1.00 |
| 15 Life on Land | | | -2.00 | -1.00 | -2.00 | | | | | | | | | | | | |
| 16 Peace, Justice and Strong Institutions | 2.00 | 1.38 | 1.75 | 1.25 | 2.00 | 2.33 | 2.00 | 1.80 | 2.00 | 2.00 | 1.50 | 2.00 | 2.00 | 1.50 | 2.00 | 1.50 | 2.00 |
| 17 Partnerships for the Goals | | -1.00 | | | | -1.00 | -1.00 | | | | | | -2.00 | -1.57 | -1.67 | | |
| 1 No Poverty | 1.82 | 2.00 | 1.96 | 1.00 | 1.67 | 2.67 | 2.50 | 2.00 | | | 1.67 | | 2.00 | 1.67 | 2.10 | 2.00 | 1.00 |
| 2 Zero Hunger | 2.00 | -2.00 | 2.00 | | 2.00 | 2.87 | 1.63 | 2.00 | | | 2.00 | 1.50 | | -2.00 | -1.00 | | |
| 3 Good Health and Well-being | -2.00 | 2.11 | 2.00 | | 2.00 | 2.87 | 1.63 | 2.00 | | | 2.00 | 1.50 | | -2.00 | -1.00 | | |
| 4 Quality Education | 2.00 | 2.11 | 2.00 | | 2.00 | 2.87 | 1.63 | 2.00 | | | 2.00 | 1.50 | | -2.00 | -1.00 | | |
| 5 Gender Equality | -2.00 | -1.50 | -1.50 | | | | -1.50 | | | | -1.00 | | | -2.52 | -2.00 | | |
| 6 Clean Water and Sanitation | 1.87 | 2.36 | 2.31 | 1.00 | 1.00 | 2.00 | 2.00 | 2.40 | 1.75 | 2.00 | 2.08 | 2.00 | 2.00 | 2.04 | 2.12 | 2.00 | 2.00 |
| 7 Affordable and Clean Energy | -1.11 | -1.00 | | | | | | -1.86 | | | -1.50 | | -2.00 | -2.00 | | | |
| 8 Decent Work and Economic Growth | 2.06 | 1.84 | 2.20 | 2.00 | 1.00 | | | 2.00 | 1.00 | 2.00 | 1.92 | 2.58 | 1.83 | 2.10 | 1.80 | 2.00 | |
| 9 Industry, Innovation and Infrastructure | | -2.00 | | | | -2.00 | | | | | | | | | | | |
| 10 Reduced Inequalities | 2.00 | 1.75 | 2.08 | | 1.50 | 2.22 | 1.67 | 2.10 | | 1.00 | | 1.00 | 2.18 | | 1.69 | 2.00 | 2.00 |
| 11 Sustainable Cities and Communities | | | -3.00 | | -2.00 | | | | | | | | -2.00 | | | | |
| 12 Responsible Consumption and Production | 2.50 | 2.00 | 2.50 | 2.00 | 1.50 | 2.00 | 2.00 | 2.14 | 2.00 | 1.20 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 1.60 | 1.75 |
| 13 Climate Action | | | | -1.00 | | | | | | | | | | | | -2.00 | |
| 14 Life Below Water | 2.00 | 1.88 | 1.50 | 2.00 | 1.50 | 1.88 | 1.70 | 1.56 | 1.71 | 2.00 | 2.00 | 2.00 | 2.00 | 1.50 | 2.00 | 2.00 | 1.90 |

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It's not the Kuznets' curve, It's the elephant's curve

The idea that increased inequalities are « the price to pay » for poverty eradication is misleading

Inequality reduction and poverty elimination are strongly interrelated

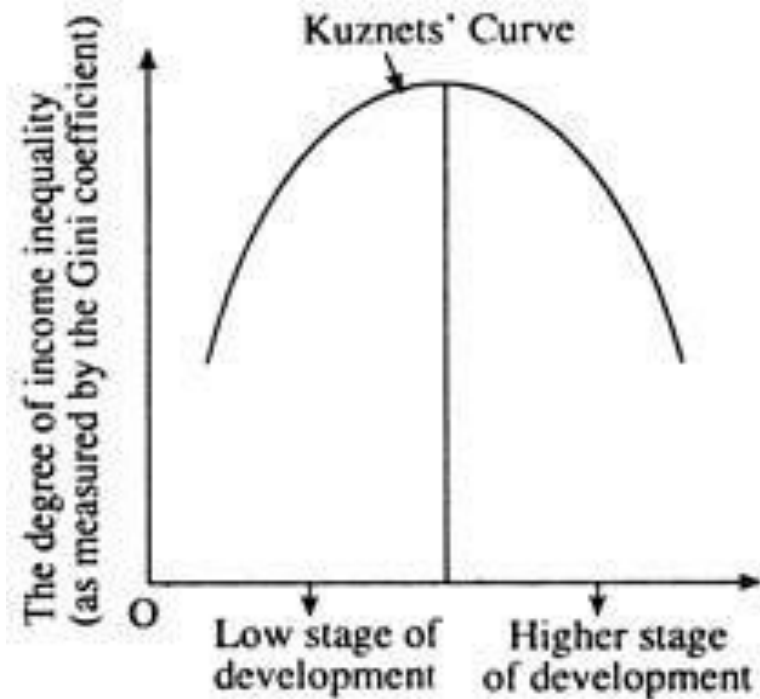
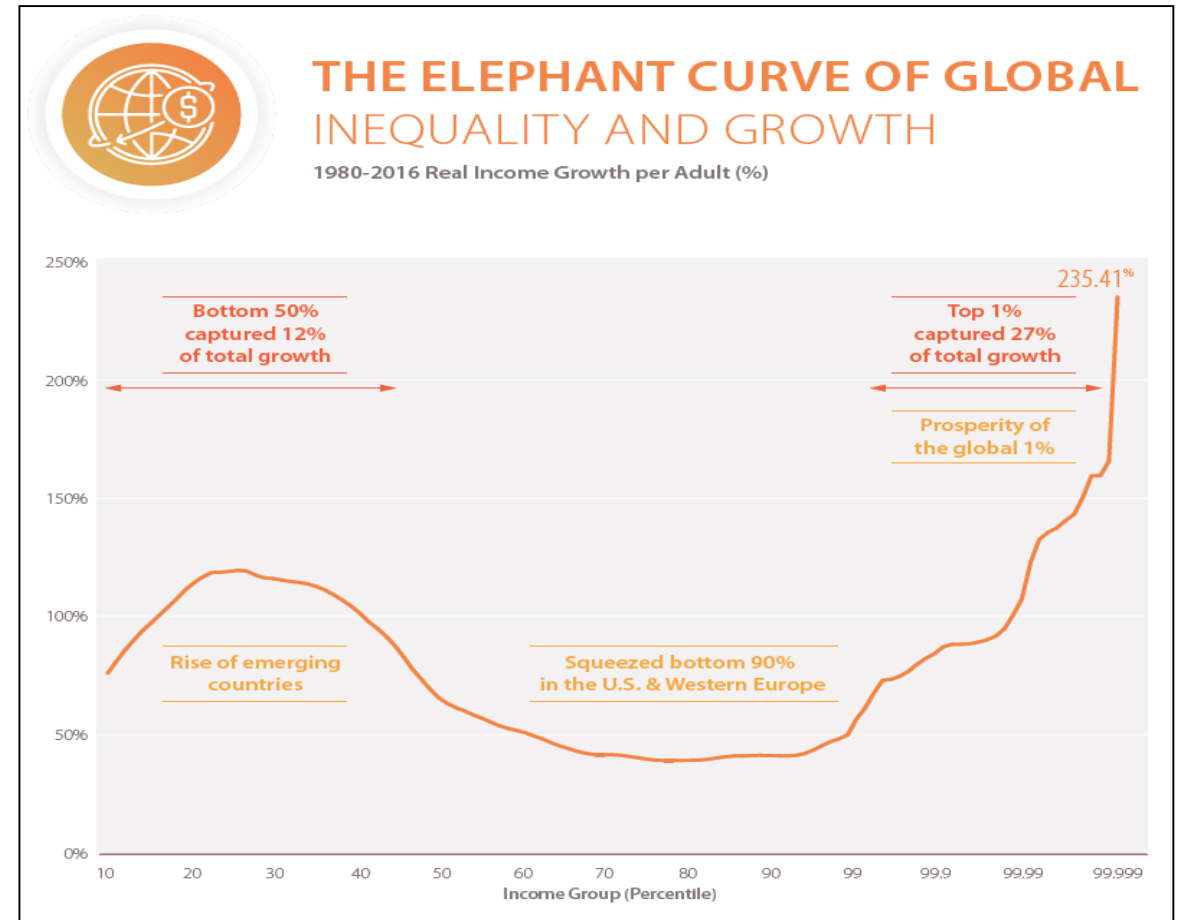
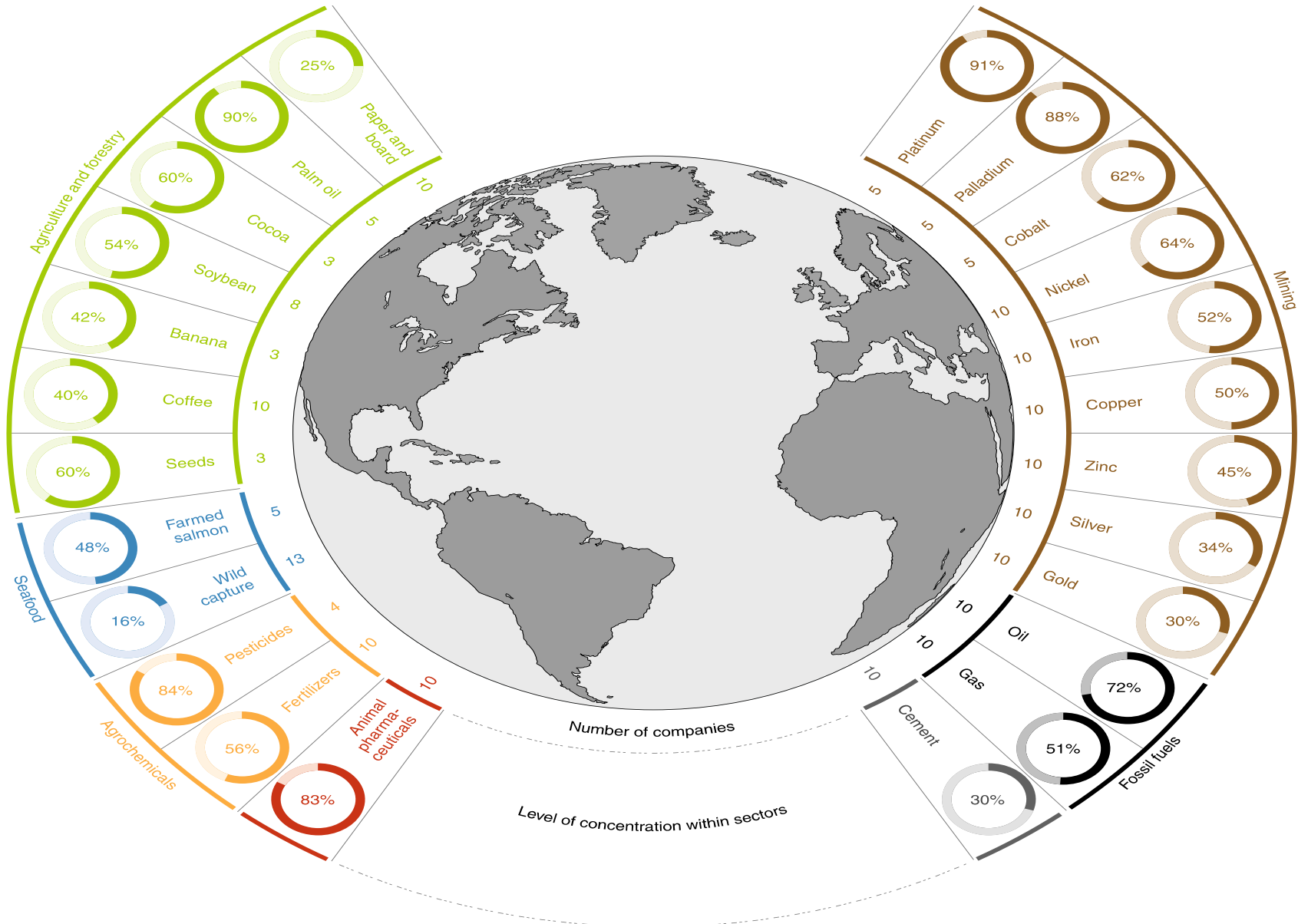


Fig. 2: Kuznets' Inverted U :Hypothesis



The biosphere in the hands of a few (Folke et al. 2019 Nature EE)



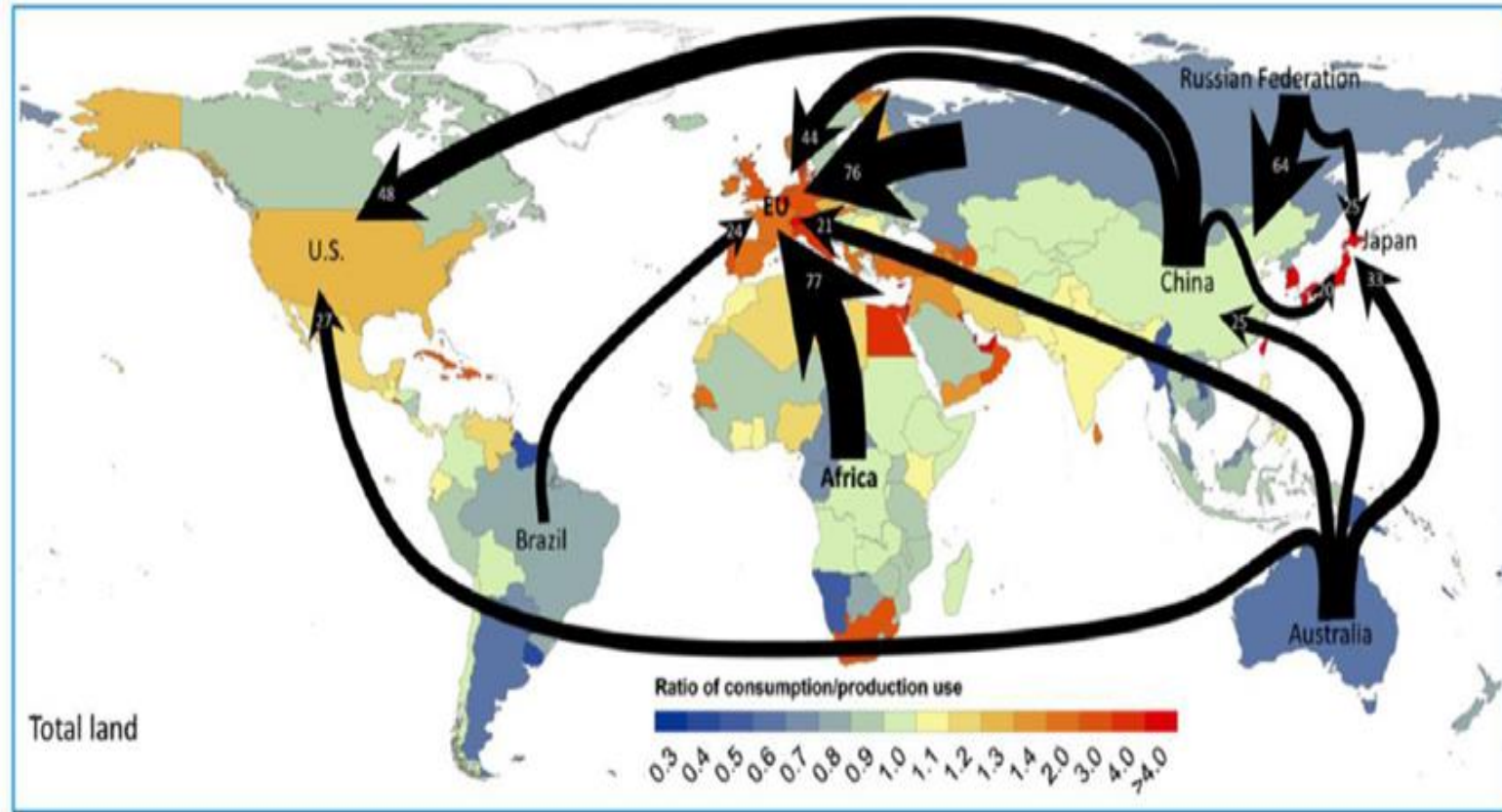
Mobilizing the billions, Shifting the trillions

- Total world investment in 2019 (IMF) = **22.8** trillion US\$
11.5 in advanced economies
11.3 in emerging and developing economies
- Foreign Direct Investment in 2018 (UNCTAD) = **1.43** trillion US\$
0.67 in developing countries
- Total ODA (OECD/DAC) in 2018 = **0.15** trillion US \$
- Public Development Finance Institutions Investment in 2018 = **1.9** trillion US\$
- Annual funding gap until 2030 for sustainable development in developing countries (UNDP) = **2.5** trillion US\$
- World total subsidies for fossil fuels in 2018 (IMF)= **400** billion (direct)/ **5.3** trillion (indirect)US \$
- 2015 annual commitments of advanced countries for climate finance toward developing countries = **0.1** trillion US\$
- Total volume of Exchange-trading funds = **3.5** trillion US\$
- Total assets of world private finance = **413** trillion US\$

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Systems thinking: SDG interactions by transnational flows (KM²)



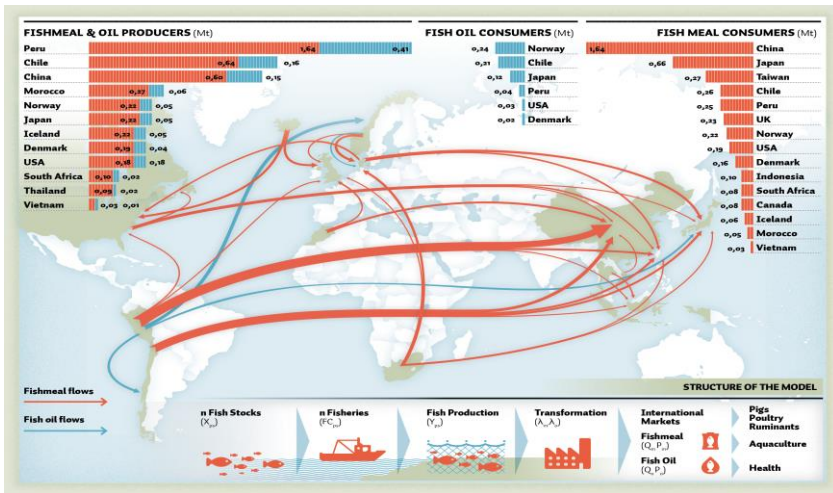
Promoting sustainability science and frugal technologies

- Identifying **complex causal chains** affecting planetary boundaries and human well-being
- Understanding positive and negative **interactions** when implementing 17 SDGs
- Promoting « **win win** » **innovations** for adaptation towards social and environmental global changes
- Co-constructing research programs with **affected communities**

« The role of science is to contribute for making social mobilization in favour of sustainable development become an evidence based mobilization » Amartya Sen

*“The attempt, by **sustainability science**, to understand the integrated “whole” of planetary and human systems requires cooperation between scientific, social and economic disciplines, public and private sectors, academia and government. In short it requires a massive global cooperative effort and one major task of sustainability science is to assist integrated cross-disciplinary coordination” PNAS, 2001*

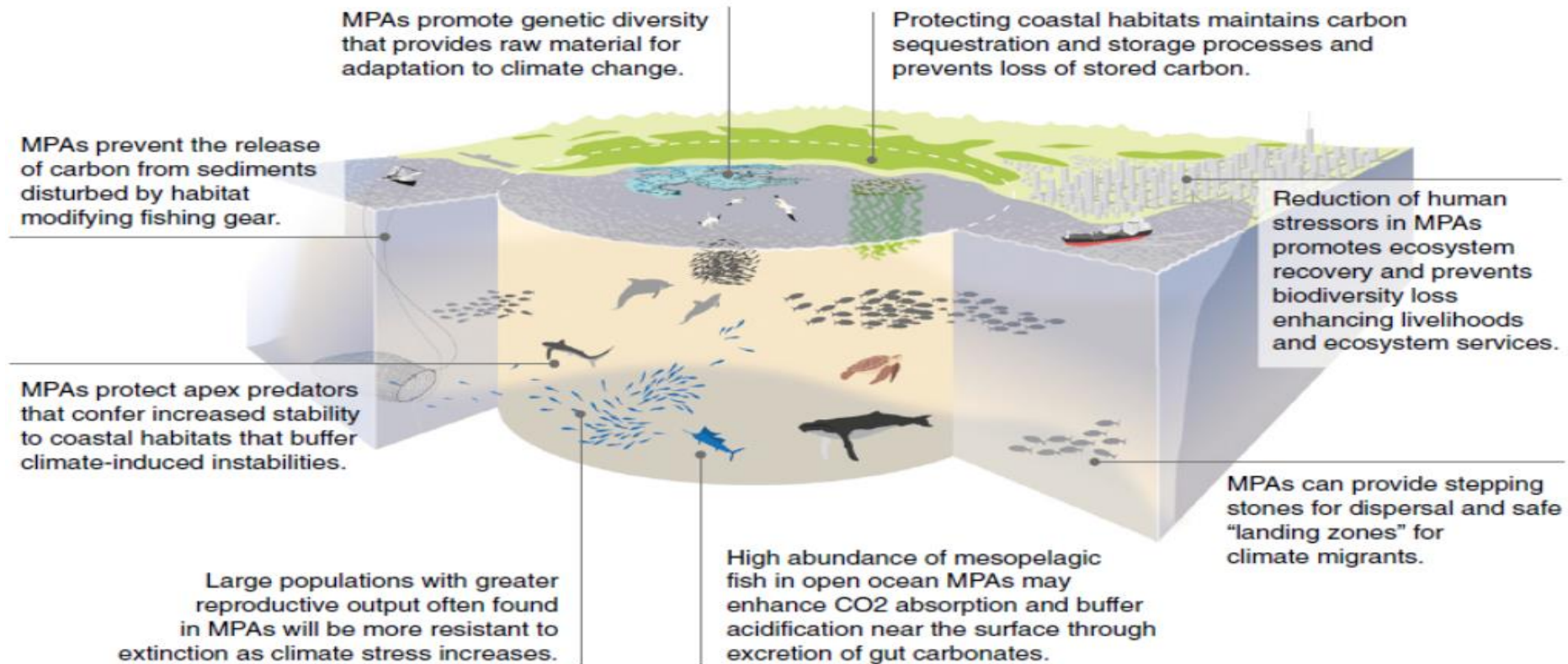
Extreme climatic events in Peru jeopardize fisheries, food security, and women employment in Senegal



Promote innovative research : Marine reserves can mitigate and promote adaptation to climate change



Marine Protected Areas | Help the oceans to mitigate and adapt to climate change by promoting intact and complex ecosystems with high diversity and abundance of species.



*Callum et al 2017
PNAS 114 (24)*

Fig. 1. Eight illustrative pathways by which MPAs can mitigate and promote adaptation to the effects of climate change in the oceans.

Key Messages for EUROMARINE

1. Biodiversity and climate are linked together
2. It is time to sound the alarm, to act and reverse adverse trends
3. Scientists must address the arrows between SDGs rather than the boxes (pluridisciplinary and global effort!)
4. Mobilize the billions and shift the trillions from the private sector to challenge global changes : towards a new Stewardship biosphere/Sustainability Entrepreneurship
5. Sustainability science to tackle global challenges with key objectives (as we lack time !)
6. Euromarine-Oyster and sustainability Science ?