

GEO6
GLOBAL ENVIRONMENT OUTLOOK

HEALTHY
PLANET
HEALTHY
PEOPLE

UN
environment
United Nations
Environment Programme



UN
environment

Findings of the sixth Global Environment Outlook

Briefing, 6th meeting of the Task Force on Access to Information under auspices of the UNECE Aarhus Convention, 4th Oct. 2019

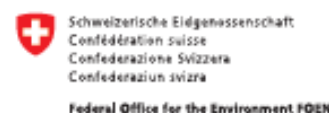
Pierre Boileau

Thanks to funders and partners

- Not possible to conduct a project of this size without significant contributions from funders and partners
- We had contributions of expertise and time from many authors.
- Their institutions also allowed them time away from their main activities to assist us.

GEO-6 Funders

Producing an assessment of this scale requires many generous contributions. The following organizations provided funding directly or indirectly to the sixth *Global Environment Outlook*: The Government of Norway, the European Union, the Governments of Italy, Singapore, China, Mexico, Switzerland, Denmark, Egypt and Thailand. Together with UN Environment's Environment Fund and Regular Budget, these contributions allowed for the production of GEO-6 and its accompanying Summary for Policymakers, as well as subsequent outreach activities.



GEO-6 Partners

GEO-6 also benefited from the generous contributions of several partners, including: GRID-Arendal, World Conservation Monitoring Centre (WCMC), The Centre for Environment and Development in the Arab Region and Europe (CEDARE), The Big Earth Data Science Engineering Program (CASEarth), the European Space Agency (ESA), the Netherlands Environmental Assessment Agency (PBL), the Freie Universität Berlin and the Massachusetts Institute of Technology (MIT).



How we got here

Main report

- 146 authors, 78 members of advisory bodies
- 41 review editors
- From more than 70 countries
- 301 UN reviewers
- More than 1,000 technical reviewers
- 364 Intergovernmental reviewers
- 5 review periods, 2 of which were intergovernmental reviews

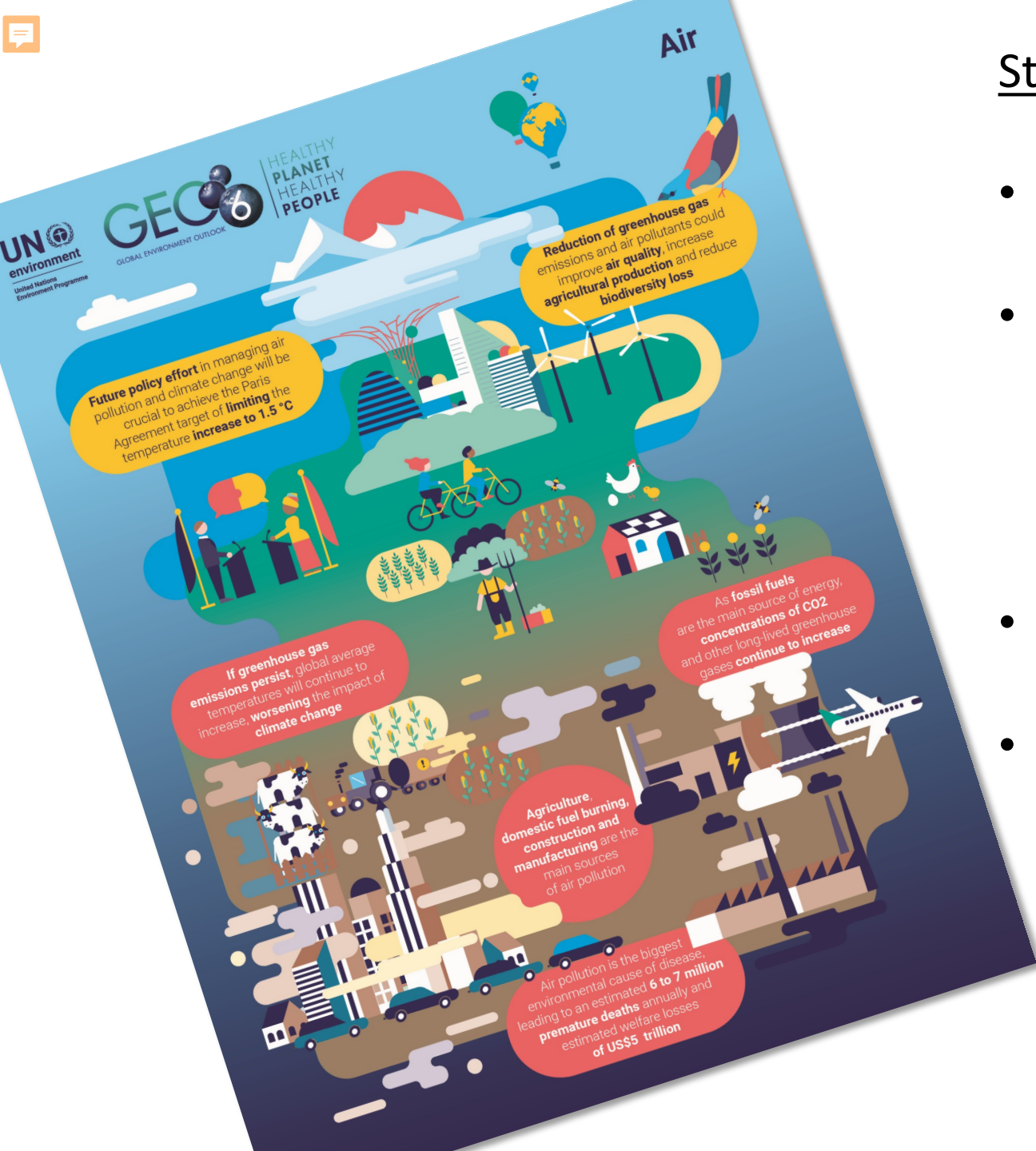
Summary for Policymakers

- Negotiated in January, 2019
- 95 countries, 250 participants, 4 days
- 37 page summary plus 'Key Messages'

Drivers of Environmental Change

- **Population** - 9-10 billion people by 2050
- **Demographics** - older in richer countries, younger in poorer countries
- **Urbanization** - 6-7 billion living in cities by 2050, 2-3 billion of those living in informal settlements
- **Economic development** – needed to eradicate poverty, end hunger, but increases consumption and extraction of resources
- **Technological change** – can improve agricultural productivity for example, but creates more waste and toxins.
- **Climate change** – already a 1 degree Celsius increase. We will have sea-level rise, more frequent droughts, more severe weather events.





State of the Environment: Air

- **Air Pollution** – 6-7 million premature deaths now, projected to be 4.5-7 million in 2050
- **Greenhouse Gases** – Policies to reduce GHG emissions can produce health benefits (reduce air pollution). Financial savings from these health benefits could be double the cost of climate policies.
- **Ozone depleting substances** – still some effort needed to repair the ozone hole.
- **Persistent and hazardous pollutants** – efforts still needed, for example, to address mercury emissions which have substantial health effects
- **Short-lived climate pollutants** – easier to control and mitigate and would have more immediate positive effects.



State of the Environment: Biodiversity

- **In crisis** - We might be observing the sixth mass extinction in the earth's history
- **Nature's contribution to people** – 70 per cent of poor people rely on natural resources for their livelihoods
- **Species decline** – a 60 per cent decline in the Living Planet Index between 1970 and 2014.
- **Ecosystem decline** – 10 out of 14 terrestrial habitats showed a decrease in vegetation productivity between 2000 and 2013.
- **Marine biodiversity** – global fish stocks overexploitation increased from 10 per cent in 1975 to 33 per cent in 2015.
- **Genetic diversity** – crop genetic diversity being conserved for enhancing productivity, nutritional content and resilience.





State of the Environment: Oceans and Coasts

- **Coral Reefs** – bleaching events are now occurring at 6-year intervals, while recovery normally takes 10 years.
- **Fisheries and aquaculture** – These support between 58-120 million livelihoods and generated US\$362 billion in revenue in 2016.
- **Nutrition** – fish provide over 3 billion people with 20 per cent of their dietary protein.
- **Sustainable fisheries** – overexploitation has depleted wild fish stocks and aquaculture also has important environmental and health impacts
- **Marine plastics** – 8 million tons of plastic enter the oceans each year through mismanagement of domestic waste on land.

State of the Environment: Land and Soil

- **Food production** – Is the primary use of land. We will need 50 percent more food to feed the 10 billion people on the planet in 2050
- **Monoculture crops** – Have helped increase productivity but lead to environmental degradation, biodiversity and nutrition loss.
- **Animal protein** – 77 percent of agricultural land is used for meat production.
- **Food waste** – About 1/3 of food is wasted each year.
- **Deforestation** – The deforestation rate has dropped to 6.5 million ha/yr with planted forests increasing to 3.2 million ha/yr.
- **Urbanization** – Urban settlements have grown by about 2.5 times since 1975, accounting for 3 per cent of land use in 2015.





State of the Environment: Freshwater

- **Public good and risk multiplier** – affecting human and ecosystem health through pollution and climate change.
- **Disease** – 1.4 million people die from pathogen-polluted drinking water and 2.3 billion do not have access to safe sanitation.
- **Antibiotic and antimicrobial resistance** – are projected to be a major cause of death in 2050.
- **Freshwater ecosystems** – 40 per cent of global wetlands were lost between 1997 and 2011. Freshwater species populations declined by 81 per cent between 1970 and 2012
- **Food** – 70% of all freshwater is used for food production. New technologies can dramatically increase water use efficiency for the agricultural, industrial and mining sectors.

Impacts from human activities: Crosscutting

- **Human health** – 9 million premature deaths due to environmental pollution in 2015. Mainly indoor and outdoor air pollution, but also water pollution and sanitation.
- **Environmental disasters** – Affected more than 3 billion people between 2005 and 2015
- **Energy** – 1.2 billion people don't have access to electricity and 2.7 billion still use traditional fuels for cooking and heating.
- **Chemicals** – More than 100,000 chemicals in use with chemical pollution now a global threat.
- **Waste and wastewater** – urban waste generation is about 7-10 billion tons/yr.
- **Education for Sustainable Development** – is essential for changing lifestyles and habits.





State of our Data and Knowledge

- **Data and knowledge has improved since GEO-5** – more environmental statistics, complemented by better monitoring and geospatial data.
- **Still data gaps** – urbanization, air and health, water consumption/wastewater, genetic diversity, land-use and ownership, ocean dynamics and environmental disasters.
- **New emerging data and knowledge systems** – big data and analytics, citizen science, traditional knowledge.
Big data combined with AI – analyze large environmental data sets in combination
- **Citizen science** – networks expanding. Authentication still a challenge.
- **Traditional knowledge** – understand complex systems. Observation-based, long-term.

Knowledge Products: measuring the SDGs



Environment-related indicators in the SDGs



SUSTAINABLE DEVELOPMENT GOALS

169 TARGETS

93 INDICATORS
ENVIRONMENT-RELATED

NATIONAL SUSTAINABLE DEVELOPMENT INDICATORS

SDG METRICS



Satellite Imagery
Water/Ocean Observations
In Situ Monitoring
Air/Pollution
Ecosystems
Forest/Agriculture
Climate
Land Use and Cover
Cadaver/Parcels



Citizen Science
Community Programs
Crowd Sourcing
Research Data
Indigenous Local Knowledge
Ground Truthing



Population
Demographics
Poverty
Trade/Business
Environment
Labour/Economics
Agriculture
Disability/Gender
CRVS



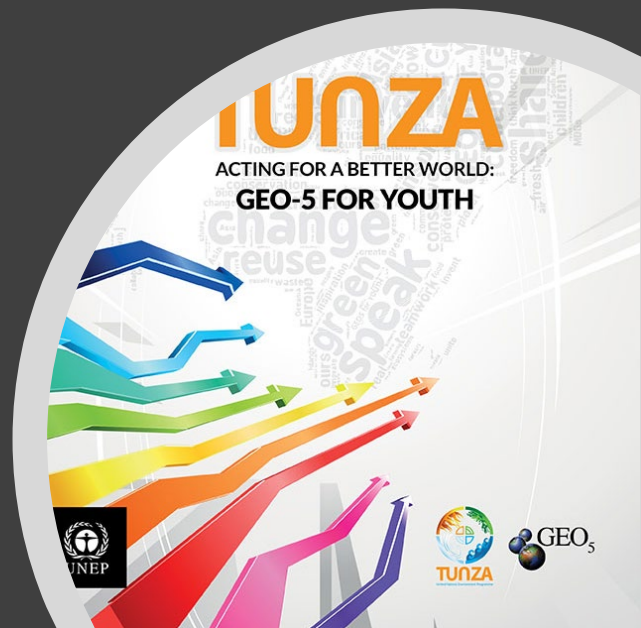
Mobile Phones
Social Media
Automated Devices
VGI
Web Analytics
Transactional Data

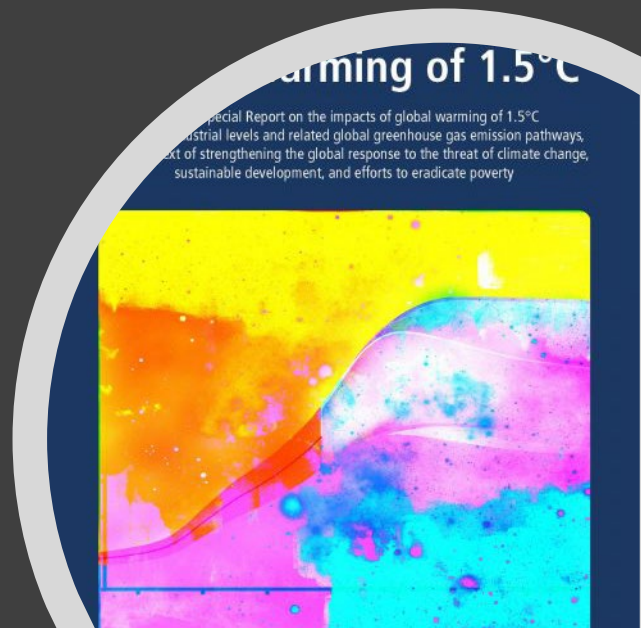
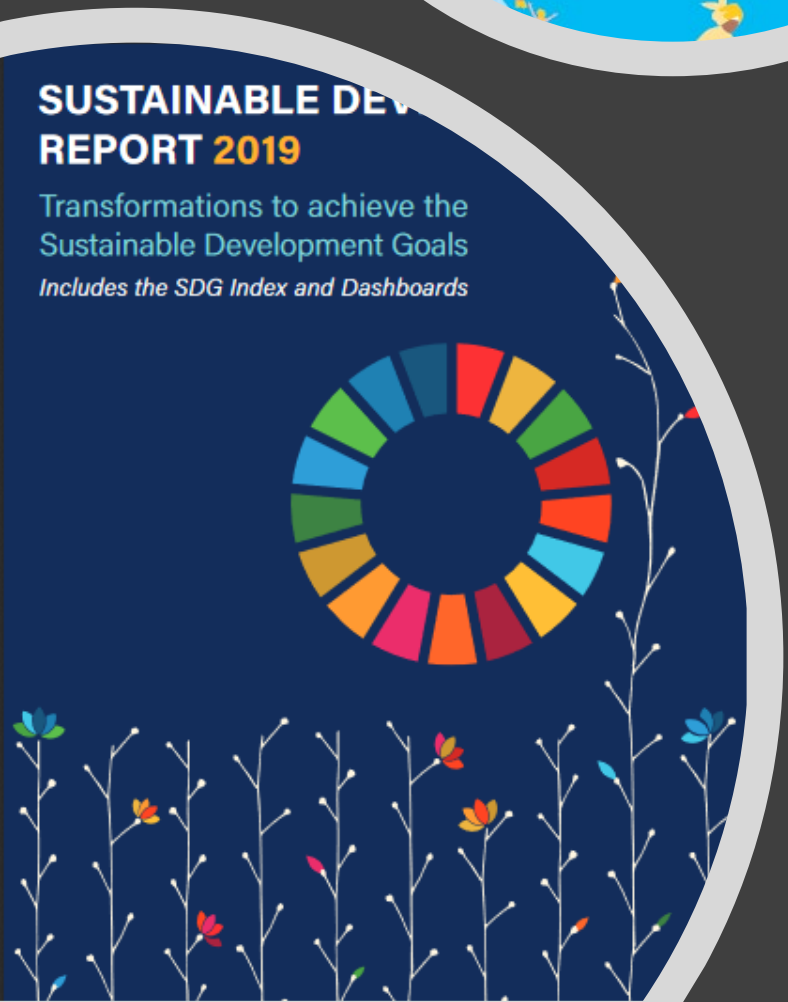
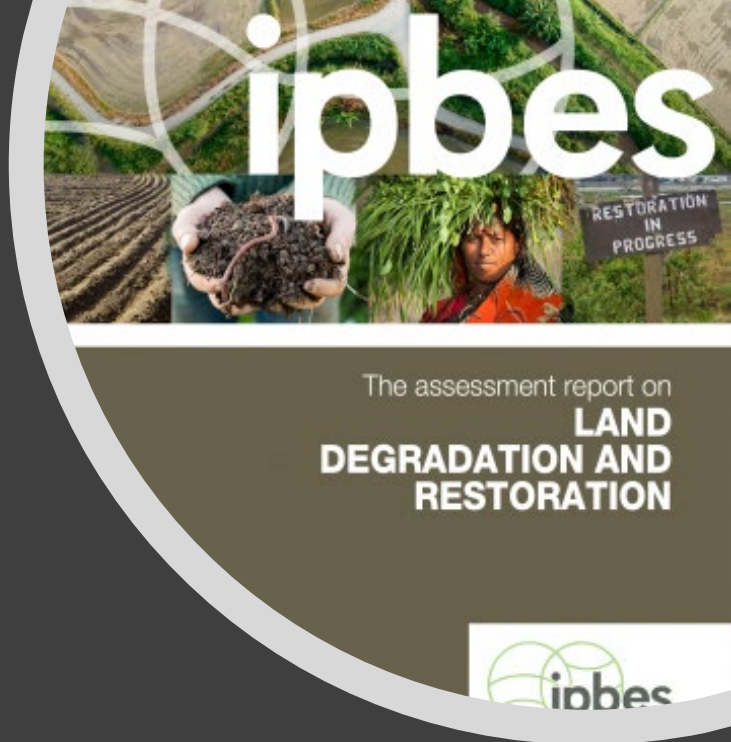
EXISTING AND EMERGING TOOLS FOR ENVIRONMENTAL ASSESSMENT

DATA AND KNOWLEDGE



GEO Derivative Products





Adhoc Global Assessment Dialogue

'Future of GEO' Steering Committee

- Resolution 23 at UNEA-4 established the Steering Committee
- Membership approved by UNEP's Committee of Permanent Representatives

Region	Female	Male	Total
Asia-Pacific Group	5	4	9
Western European and Others Group (WEOG)	4	5	9
Eastern European Group	4	2	6
African Group	4	4	8
Latin American and Caribbean Group (GRULAC)	1	4	5
	18	19	37

- 2 calls so far, preparing for Inception Meeting in Prague, Oct. 31 – Nov. 1
- Co-chairs, vice-chairs and rapporteur elected
- Discussion of options paper issues, terms of reference and work plan on-going

Data underpin good decisions

- **68% of environment-related SDG indicators do not have enough data to assess global progress.**
- **Investment in data and statistics is essential.**
- **There is even less data availability that is disaggregated by vulnerable population or geospatially.**

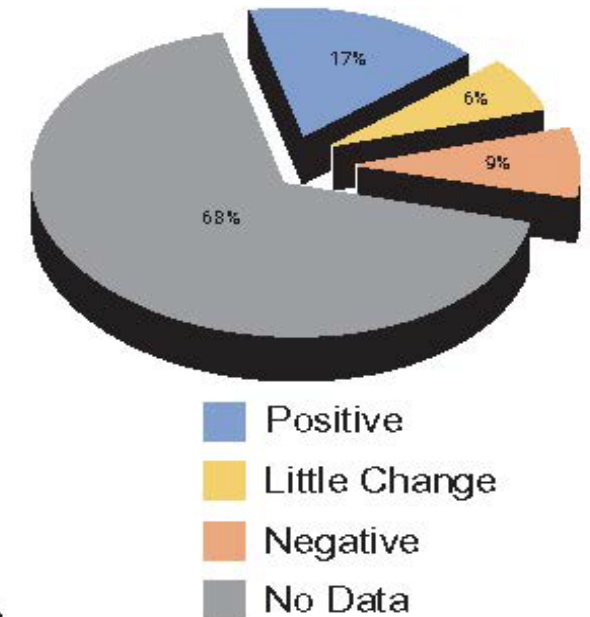
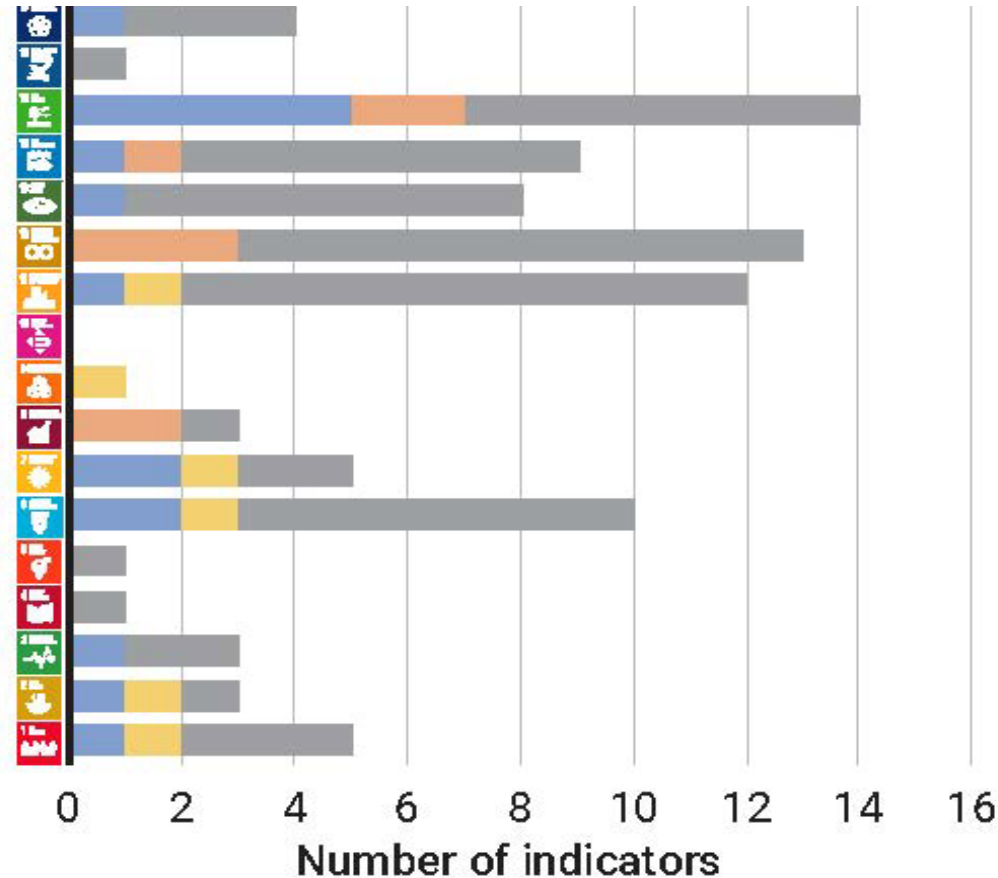


Figure 11.1: Conceptual outline of policy effectiveness analysis

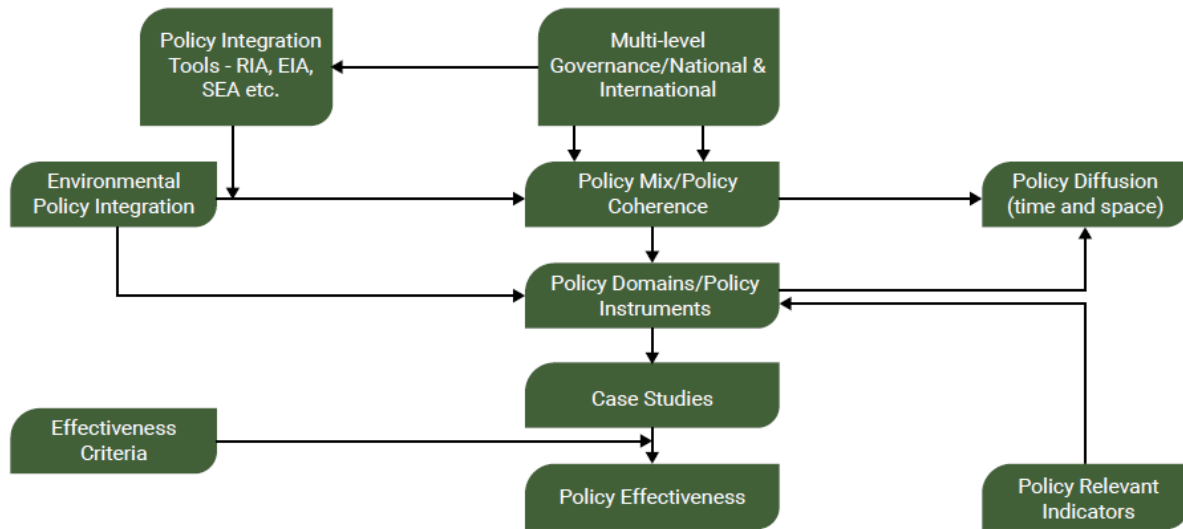
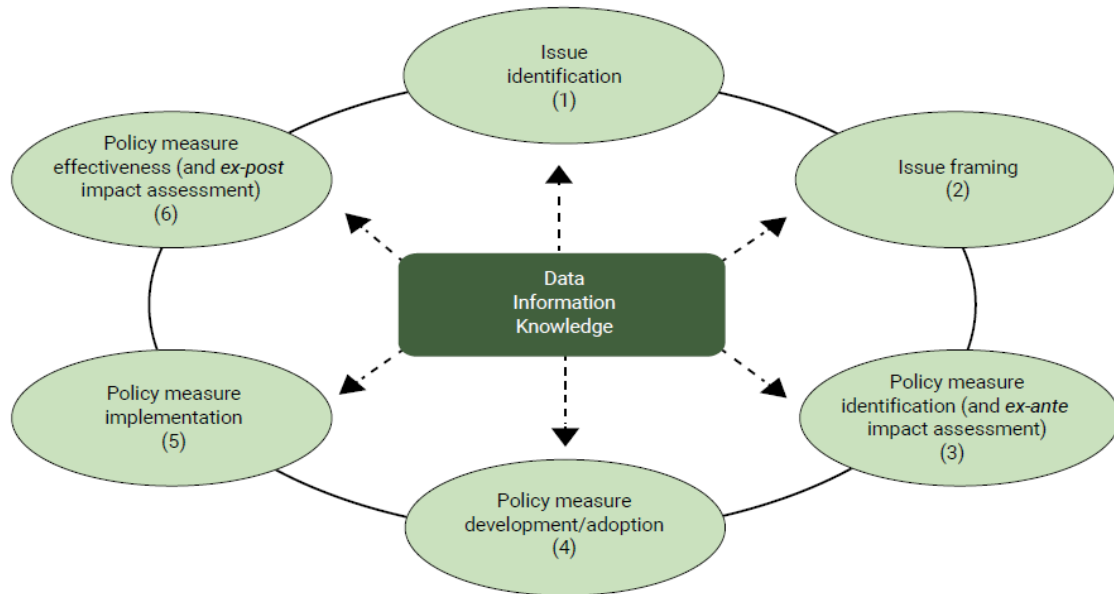


Figure 11.2: The policy cycle



Source: European Environment Agency [EEA] (2006)

Effectiveness of environmental policies

- **Policy design** – at least as important as policy choice when measuring effectiveness.
- **Effectiveness** – Not enough information is available to assess effectiveness, so policies may not reach their full potential.
- **Diffusion** – successful policies are used as role models for adoption in other countries.
- **Integration** – adding environmental concerns to other sectors of policymaking increases effectiveness.
- **Efforts are insufficient** – existing policies insufficient to address the backlog of environmental problems.
- **Systemic approaches** – transformative change by reconfiguring basic social and production systems and structures is needed.

Outlook for the future (current policies)

- **Improvements in human development, but insufficient to meet environmental dimension of SDGs and IAEGs –** environmental health risks remain prominent in 2030.
- **Further degradation in nearly all environmental areas–** from climate change to biodiversity loss to water scarcity, land degradation and ocean acidification.
- **Failure to act now will lead to ongoing and potentially irreversible impacts** on the environment and human health.

Figure SPM.8. Projected global trends in target achievement for selected Sustainable Development Goals and internationally agreed environmental goals

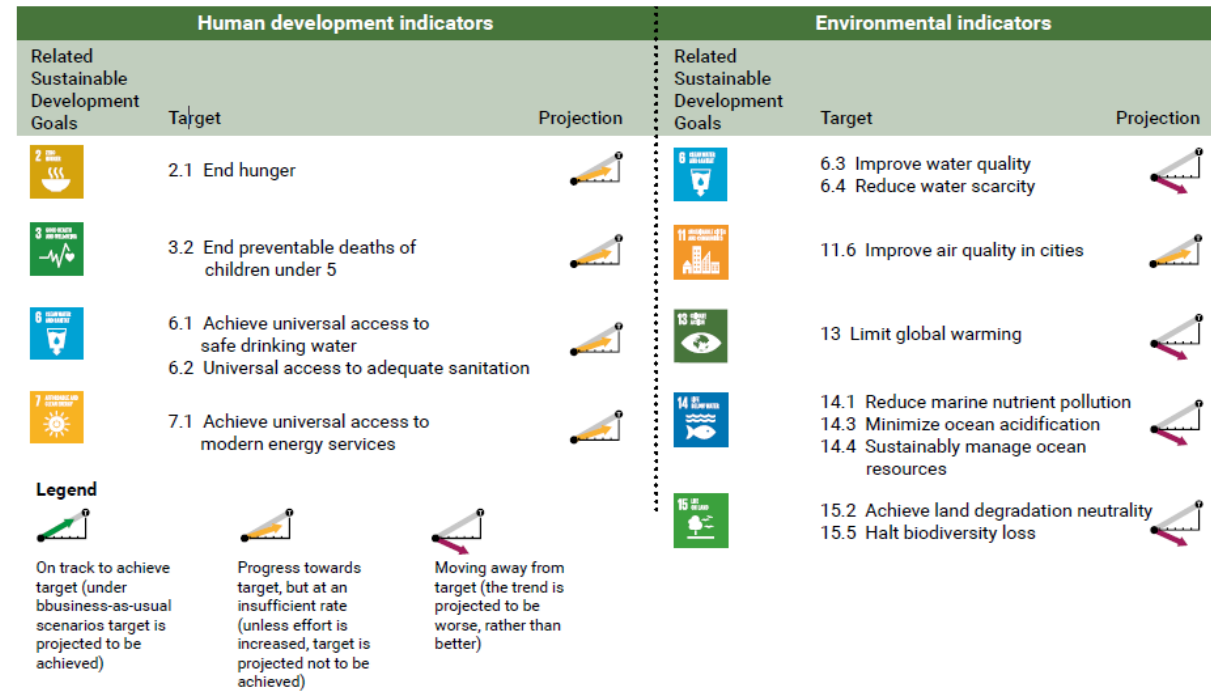
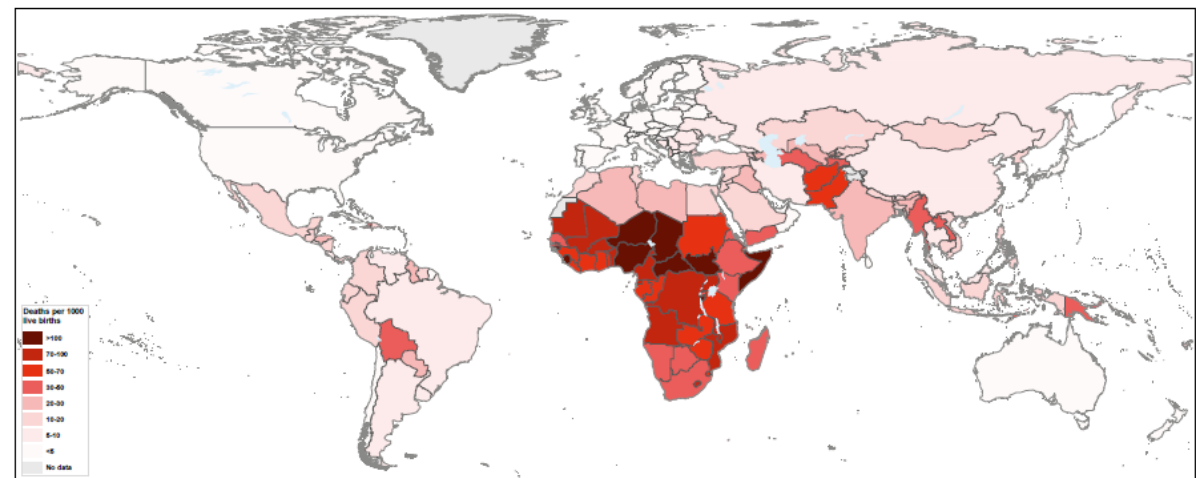


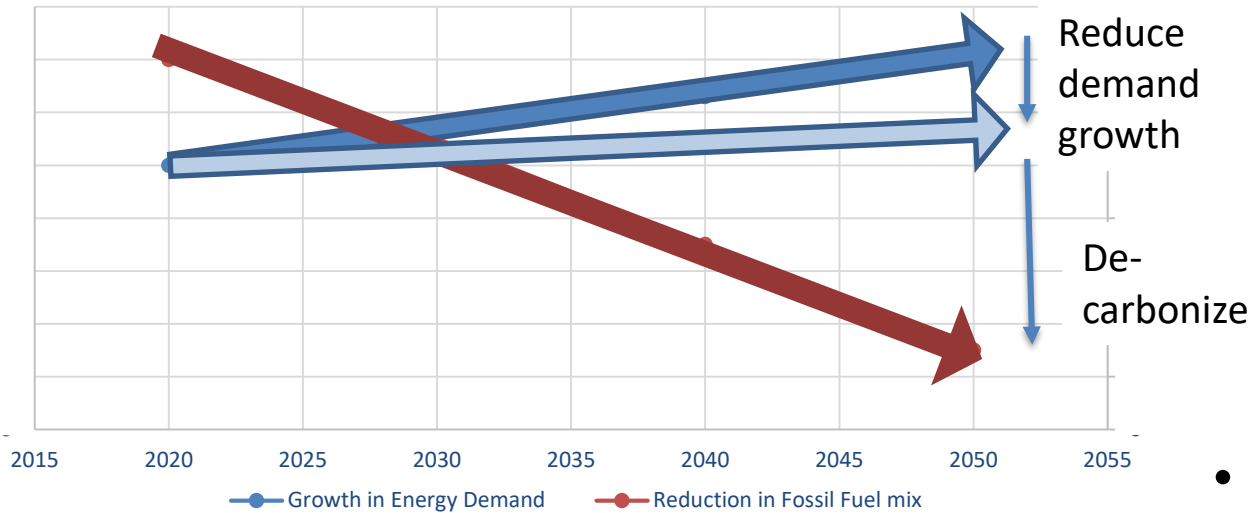
Figure 21.11: Projected under-five mortality rate in 2030



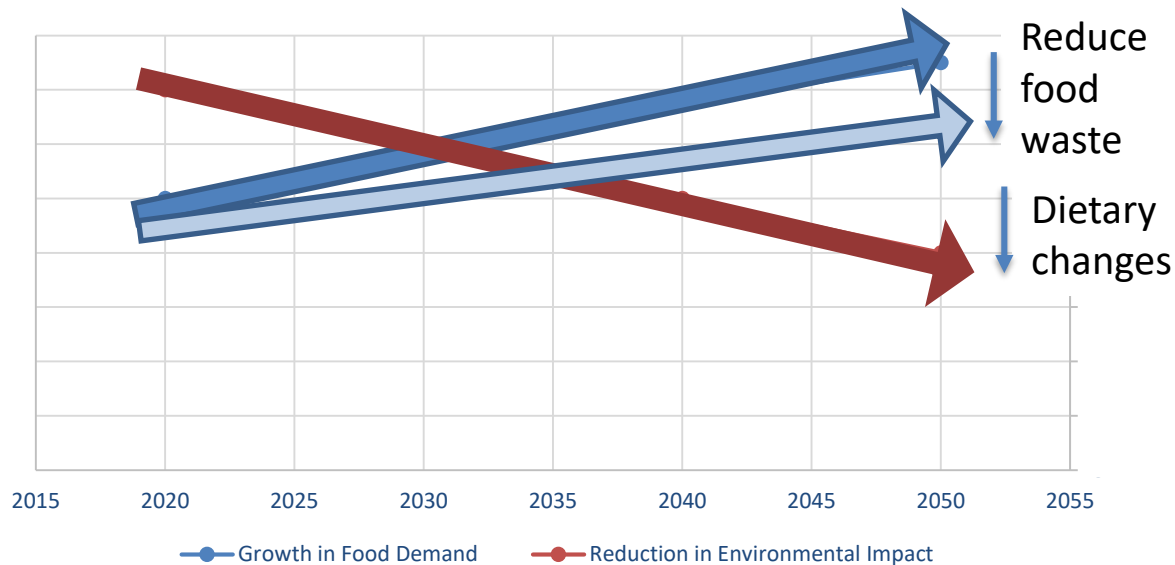
Source: Moyer and Hedden (2018).

Changing the path we are on

Opposing Trends for Energy Demand and Fossil Fuel Mix



Opposing Trends for Food Demand and Environmental Impact



- **Pathways exist to meet the environmental dimension of SDGs/MEAs** – transitions in consumption, production, access and environmental management. **Transforming food and energy systems is central** to the pathways that could achieve environmental sustainability.
- **Incremental policies will not be sufficient** – all pathways require rapid and wide-ranging innovations; many beyond historic rates of change. **Policy integration and coherence are needed** – integrate environmental concerns in all policy sectors at all levels to deal with possible trade-offs.
- **More synergies than tradeoffs exist** – e.g. phasing out fossil fuels will help achieve air pollution, climate and human health goals.

Participatory approaches

- **Ideas and small scale projects already exist** – Through workshops and crowd-sourcing, innovation can be found.
- **Participation in development of policy approaches improves their effectiveness** – Engagement is strengthened and local issues are addressed.
- **Bottom-up initiatives can help refine our understanding of the future** – Current models consider broad megatrends. These can be refined with bottom-up information.
- **Both social and technical innovations are needed** – participatory approaches can understand how to implement these systemic approaches.

Figure 23.9: Heat map of Climate CoLab proposals showing pairings of measures/interventions and SDGs

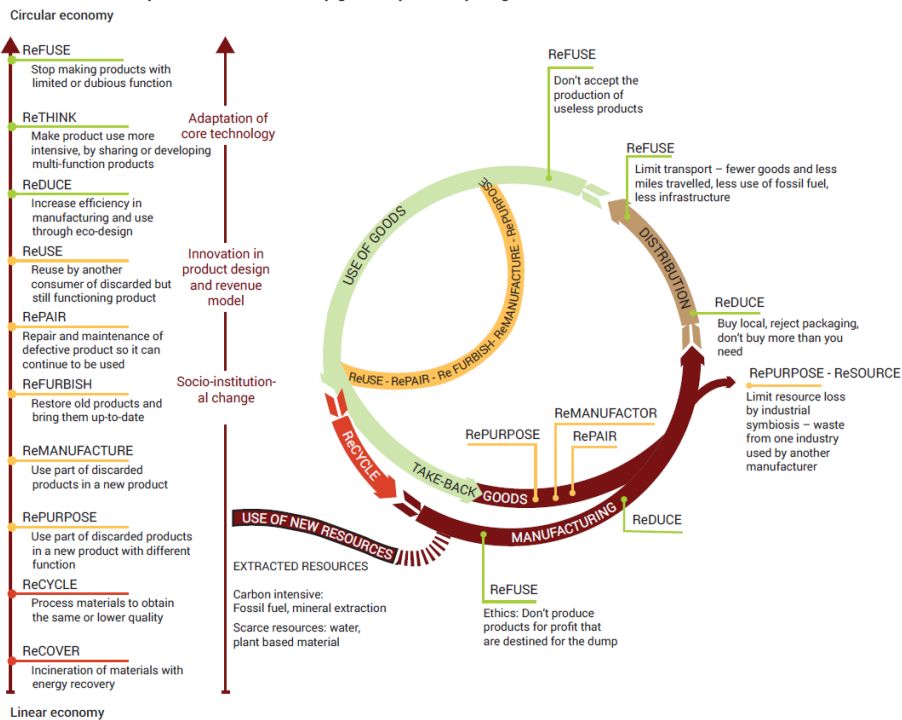
Cluster	Measure category	No poverty (1)	Zero hunger (2)	Good health and well-being (3)	Quality education (4)	Gender equality (5)	Clean water and sanitation (6)	Affordable and clean energy (7)	Decent work and economic growth (8)	Industry, innovation and infrastructure (9)	Reduced inequalities (10)	Sustainable 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)	Partnership for the goals (17)
Energy, Climate and Air	Energy access	2	2	2	1	1	2	4	2	2	1	0	1	4	1	1	0	2
	Behavioural change (transport and households)	3	3	3	1	2	2	4	3	3	2	3	3	5	3	3	2	4
	End-use electrification	1	1	1	0	0	2	2	1	0	1	0	0	1	1	1	0	0
	Low/zero emission technologies (non-biomass)	3	4	4	1	2	3	5	4	2	2	2	0	5	1	2	1	3
	Bioenergy (with and without CCS)	0	0	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0
	Improve energy efficiency	2	2	2	1	1	2	1	2	1	1	2	0	3	1	1	0	1
	Negative emission technologies	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Air pollution control Non-CO ₂ emission reduction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Agriculture, Food, Land and Biodiversity	Reduce food waste	2	2	2	1	2	1	1	1	1	1	2	1	2	1	1	1	2
	Yield improvement	3	3	2	0	2	1	0	1	1	1	1	1	3	0	1	0	2
	Nutrition management	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Food access	7	10	10	4	6	4	6	8	3	5	4	6	10	3	6	2	8
	Diet change	0	1	1	0	0	1	0	0	1	0	0	0	1	1	0	1	0
	Manage soil carbon loss	3	3	2	1	2	3	1	1	1	1	2	1	3	1	1	1	2
	Minimize land damage	5	8	8	3	6	7	6	7	5	5	4	6	10	4	7	3	6
	Land ownership	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Human Well-being	Protection of terrestrial ecosystems	3	5	5	2	3	5	4	4	3	2	3	5	6	3	5	1	3
	Land-use planning	1	2	2	1	0	1	0	0	1	0	0	1	2	0	1	0	1
	Forest management	2	3	2	1	1	4	3	2	1	0	1	3	4	2	3	0	1
	Poverty alleviation	8	9	9	3	3	5	5	7	4	4	3	5	10	3	5	1	5
Freshwater and Oceans	Child/ maternal healthcare	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Education	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Improve water-use efficiency	1	1	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0
	Blue carbon	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	WASH	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Wastewater treatment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Water quality standards	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Desalination	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Integrated water resource management	1	3	3	2	3	2	2	3	0	2	2	0	3	0	1	1	3
	Sustainable fisheries	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other	Ocean regulation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Protection of marine ecosystems	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Monitoring and reporting	1	1	2	1	0	2	1	1	2	1	1	1	2	0	1	2	2
	Circular economy	3	3	5	1	3	1	1	1	2	2	4	4	4	1	2	1	2
	Sharing economy	2	2	2	1	1	1	1	1	1	1	1	1	2	1	1	1	2
	Plastics and consumer waste reduction	2	1	3	0	2	1	0	0	1	1	4	4	4	1	3	0	2
	Awareness and skills building	7	8	8	5	7	7	7	8	5	7	0	7	13	5	7	5	6
	Gender equality	5	6	7	2	7	3	3	3	3	3	3	3	3	3	3	3	3
Smart cities for sustainability	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Ecosystem restoration	1	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	
Effective governance	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	



Numbers indicate the count of proposals coded with the specific pairing of intervention (row) and SDG (column). 'Other' is described more in Section 23.11

Figure 17.4: Building a circular economy

Ultimate circularity Circular economy goes beyond recycling

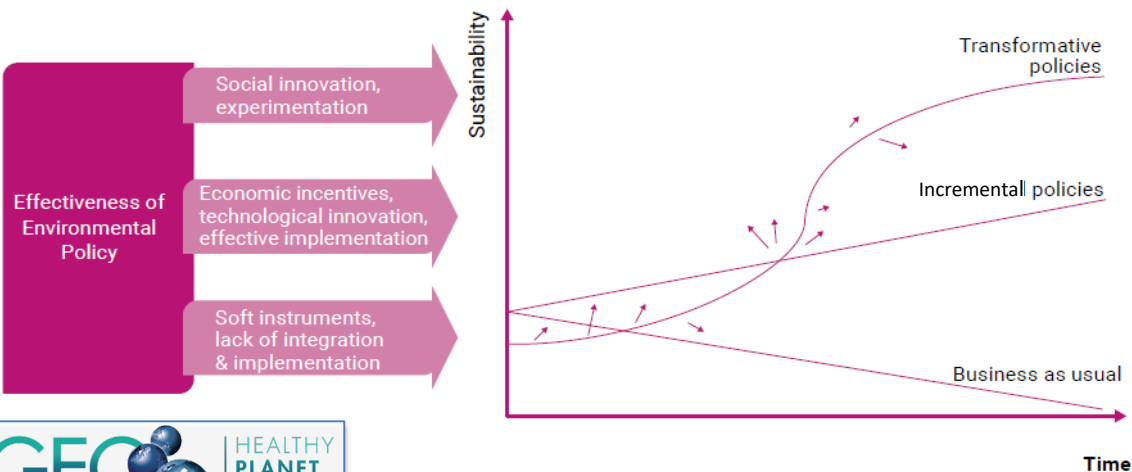


Source: Based on Stahel (2016) and Potting et al. (2017).

The way forward

- **Healthy planet is a foundation for supporting all life forms** – but, we have transformed earth’s natural systems and disrupted self-regulatory mechanisms and life-support systems.
- **Human health is now affected at a significant scale** – through exposure to harmful pollutants and reduced access to ecosystem services.
- **Policy innovation** – can help guide the transformative change that is needed.
- **Systemic innovation** – the key to socioeconomic development towards a sustainable world.
- **Transformative change** – is a disruptive process that goes beyond incremental improvement, but can be achieved.

Figure 24.1: Different policy approaches





Thank you

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www.unenvironment/global-environment-outlook

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