

Moving from Environmental Crisis to Sustainable Solutions

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WMO WCRP Discussion Series

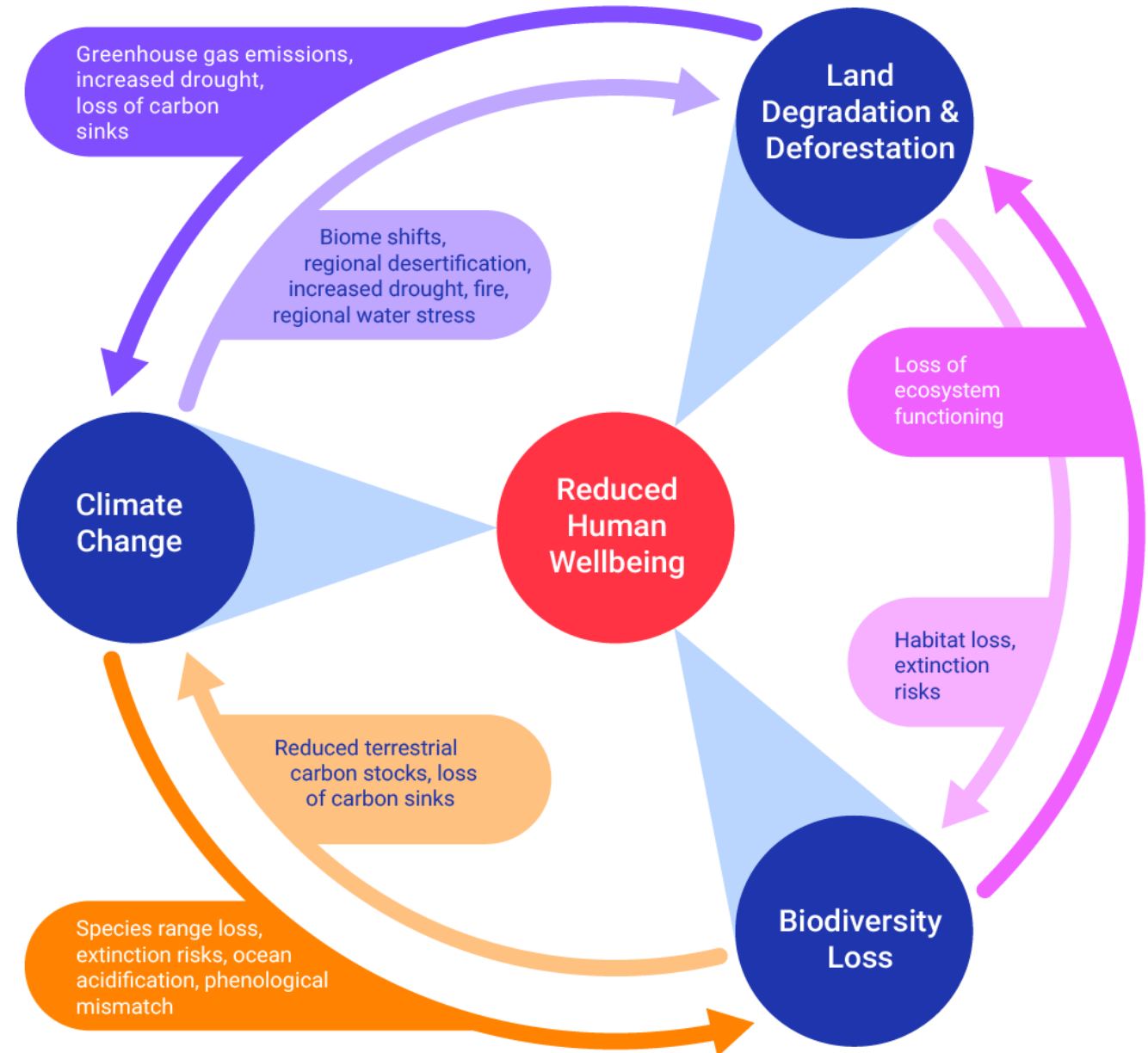
September 18th, 2023

3.9. The interactions between climate change, land use and biodiversity

Four major inter-connected global environmental issues threaten human well-being of current and future generations:

- Climate change
- Loss of biodiversity
- Land degradation, and
- Air, water and land pollution

These environmental issues must be addressed together along with key development challenges



Human Well-Being is Being Threatened

Climate change, along with the loss of biodiversity, pollution and land degradation, adversely affect the human well-being of current and future generations.

Therefore, these issues are not only environmental issues but also:

- economic issues
- development issues
- security issues
- social, moral and ethical issues

If we want to eliminate poverty and hunger, have access to clean water and energy, a healthy, equitable and secure good quality of life for everybody, then we must address the issues of climate change and the other environmental crises

Environmental degradation threatens the achievement of the SDGs

Impeding poverty elimination, inequality reduction, economic development and peace

- ▶ Exacerbated multi-dimensional poverty
- ▶ Accentuated inequality, including gender inequality
- ▶ Lost income opportunities
- ▶ Increased risk of conflict over resources
- ▶ Increased risk of displacement and outmigration

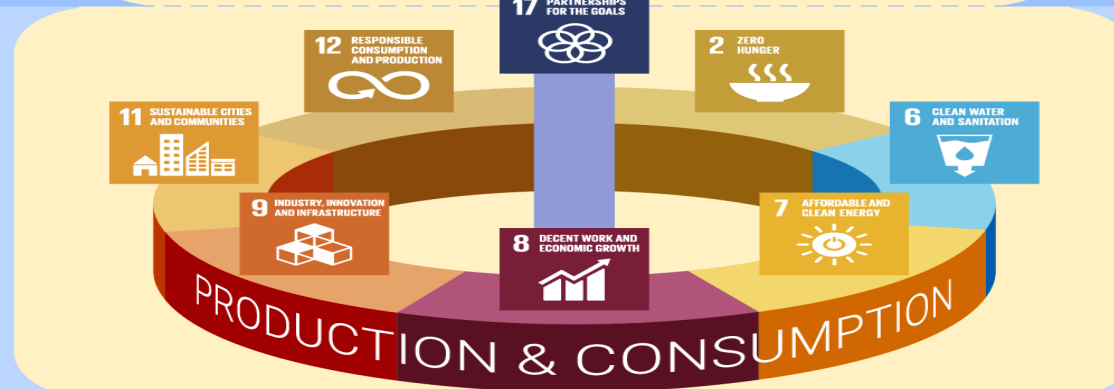


Threatening human health

- ▶ Increased undernutrition, heat stress and air pollution-related diseases
- ▶ Exacerbated food- and water-borne infections and zoonotic diseases
- ▶ Reduced ability of nature to provide medicines and support physical and mental well-being

Hampering efforts to make cities and communities sustainable

- ▶ Increased vulnerability to natural disasters
- ▶ Stresses on urban infrastructure
- ▶ Rising air and water pollution
- ▶ Rising waste disposal problems



Weakening food and water security

- ▶ Increased food-system vulnerability
- ▶ Reduced agricultural productivity
- ▶ Reduced nutritional value of crops
- ▶ Lower catch in fisheries
- ▶ Increased water scarcity

Changing climate

- ▶ Higher temperatures
- ▶ More extreme weather events, e.g. flooding, droughts, storm surges and heatwaves
- ▶ Rising sea level
- ▶ Changing precipitation patterns
- ▶ Ocean acidification



Biodiversity loss and ecosystem degradation

- ▶ Loss of species richness and accelerated species extinction
- ▶ Loss of genetic resources in domestic and wild species
- ▶ Loss of ecosystem functions, such as pollination, seed dispersal, soil formation and biological productivity

Goals for a more sustainable environment

Six inter-connected broad environmental goals, which need to be quantified consistent with internationally agreed targets:

- Mitigation of climate change (e.g., 50% reduction in current emissions by 2030, net-zero emissions by 2050)
- Adaptation to climate change (e.g., climate resilient agriculture, water systems, ecosystems, infrastructure and human health)
- Conservation of terrestrial, freshwater and marine ecosystems
- Restoration of degraded ecosystems
- Reduced air, land and water pollution
- Land degradation neutrality

Social goals to be achieved simultaneously – based on SDGs, including:

- Human health and well-being
- Food and water security
- Equitable societies

Key drivers of the quadruple environmental crisis

Climate change, along with the loss of biodiversity, pollution and land degradation, is primarily driven by.

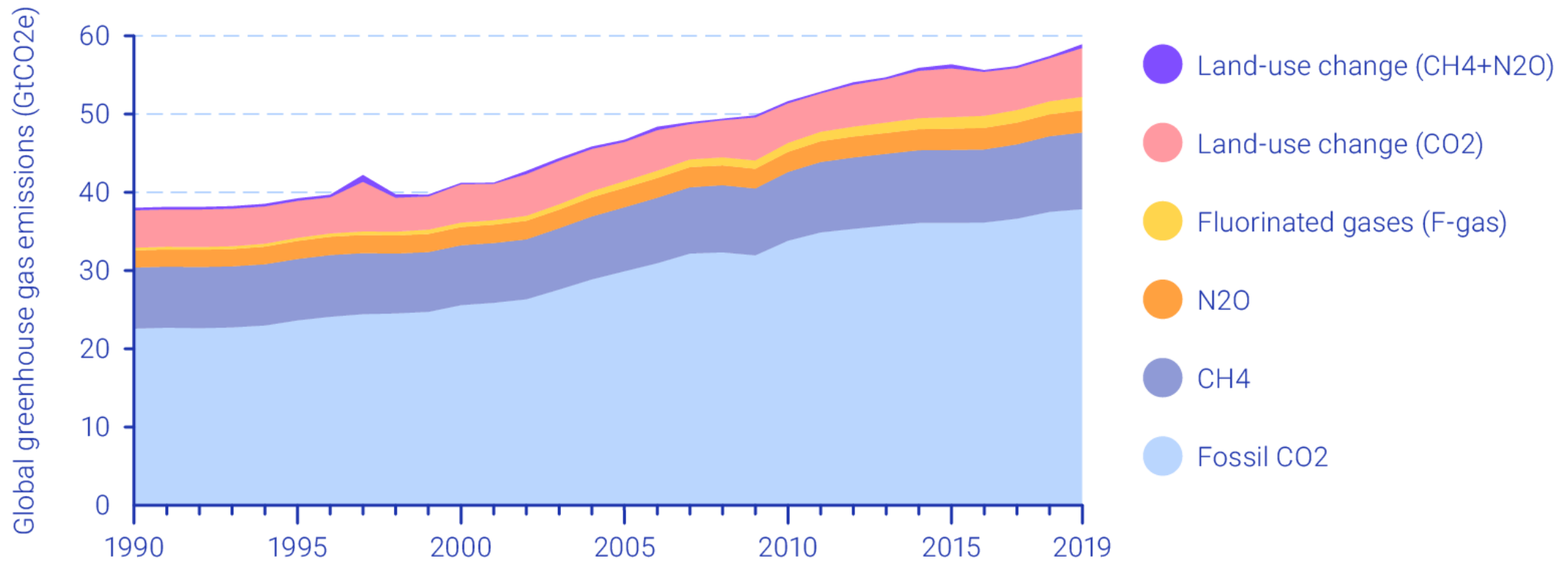
- The production and use of energy – about 70% of GHG emissions
- The production and consumption of food – about 30% of GHG emissions
 - Livestock systems, including supply chain, account for 60% of food emissions

Therefore, addressing climate change and the other environmental crises requires a complete transformation of the energy, food, economic and financing systems

Human Emissions of Greenhouse Gases Continue to Increase

The world is already more than 1°C warmer than a century ago, accelerating sea level rise, with more frequent and intense extreme events, threatening people and nature

2.8. Global greenhouse gas emissions from all sources

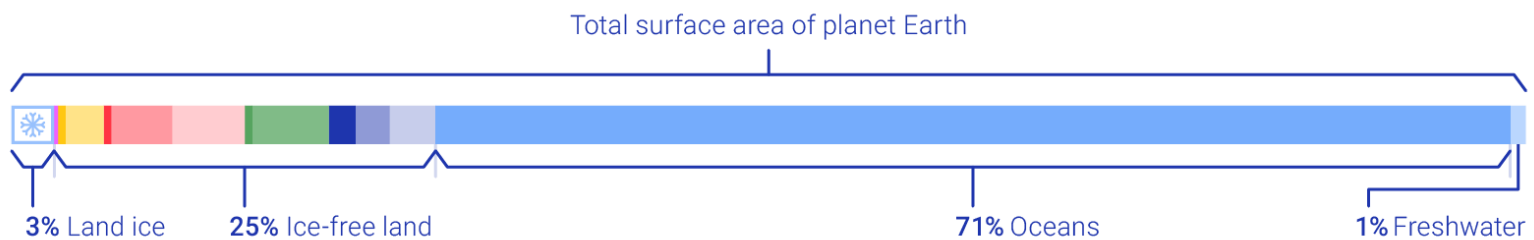
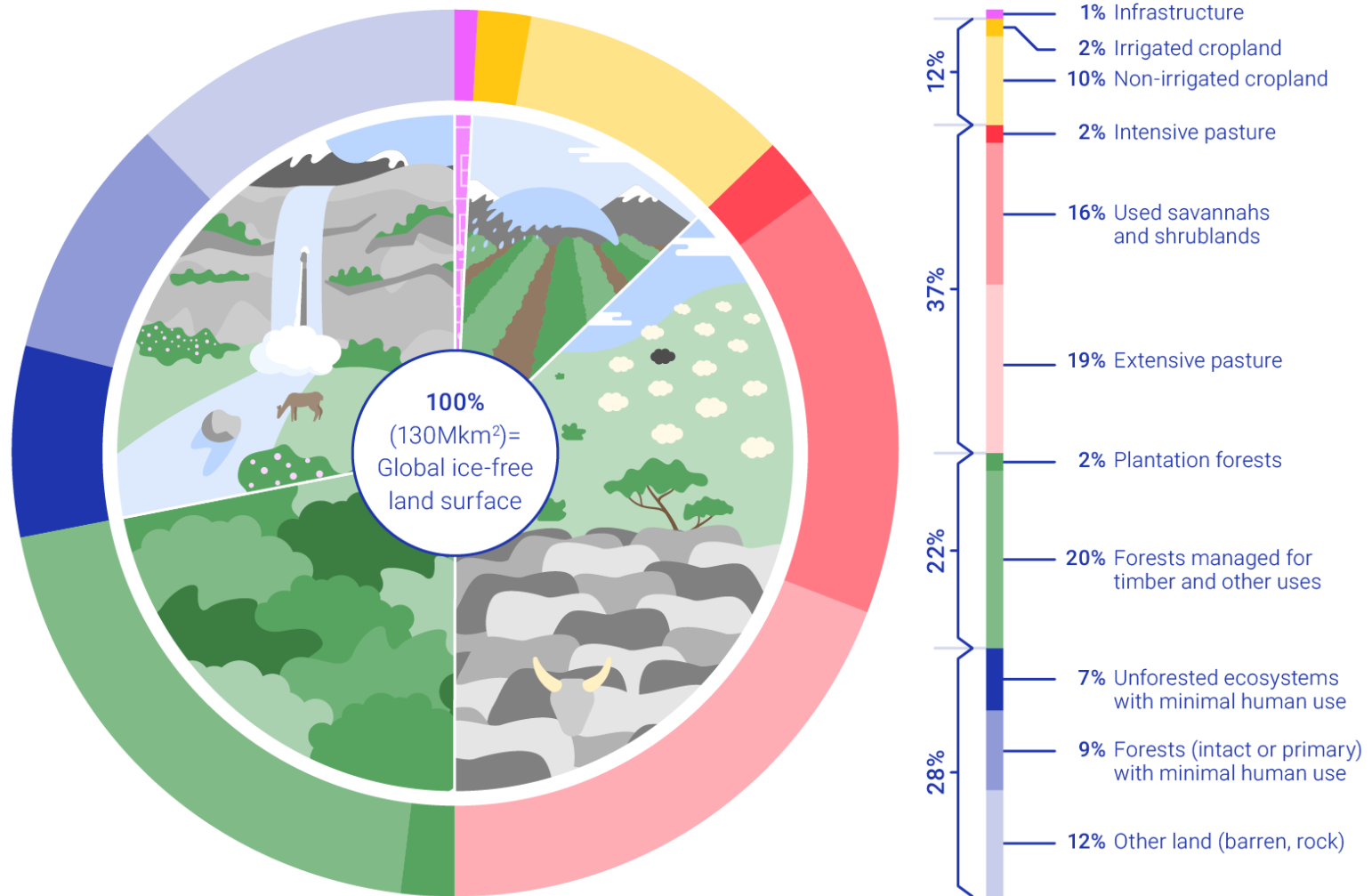


Humanity has a major impact on 3/4 of land and on 2/3 of oceans

1/4 of global warming results from activities related to land-use

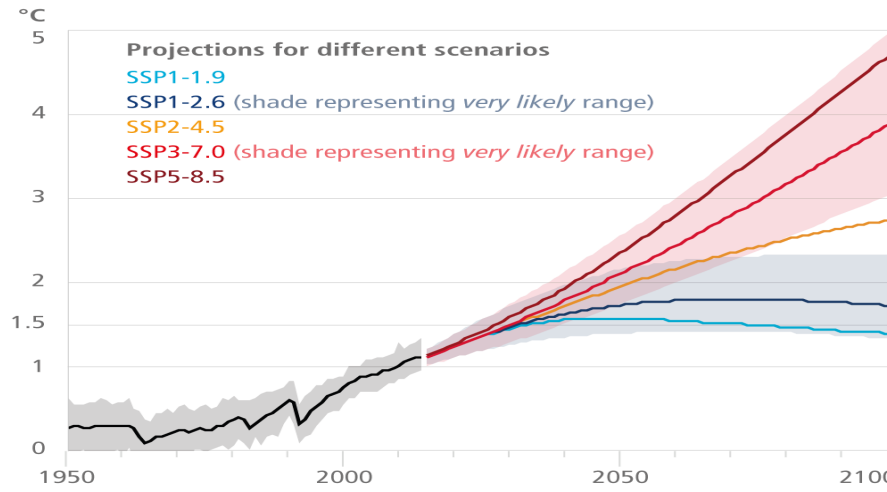
1/4 land has been radically transformed

Remaining near-natural land is projected to be only 10 per cent by 2050

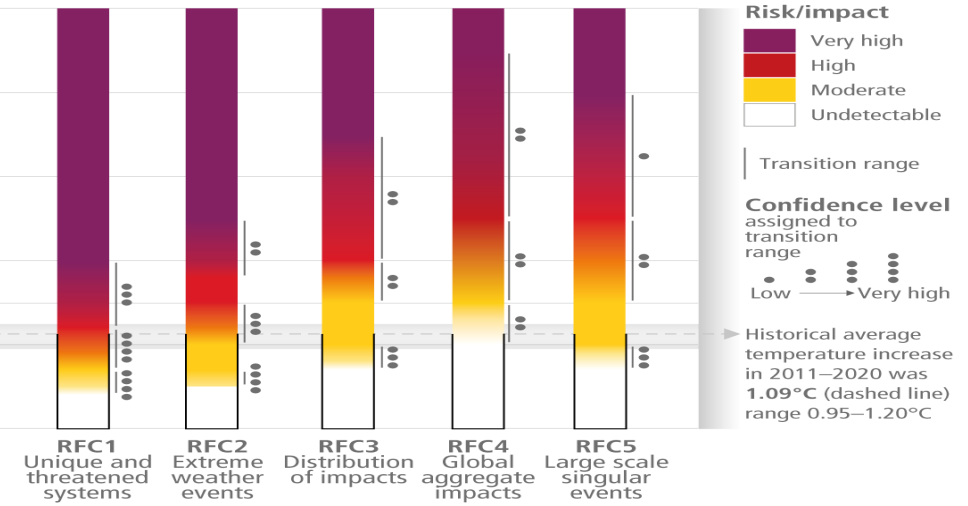


Global and regional risks for increasing levels of global warming

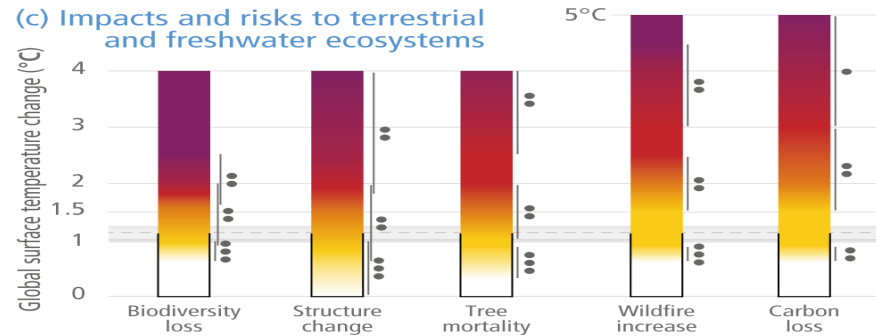
(a) Global surface temperature change
Increase relative to the period 1850–1900



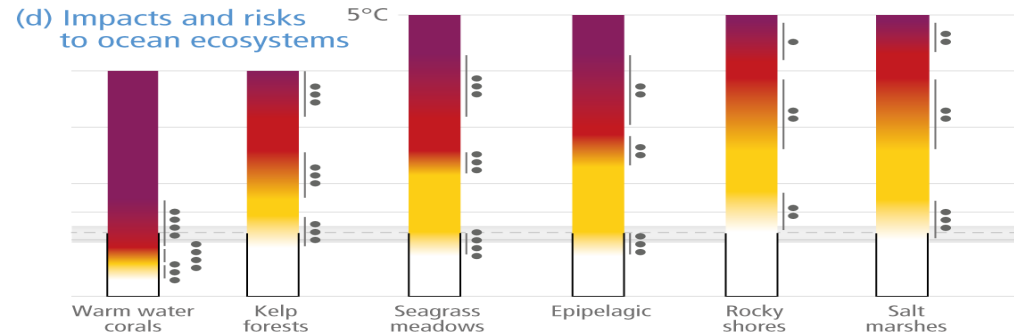
(b) Reasons for Concern (RFC)
Impact and risk assessments assuming low to no adaptation



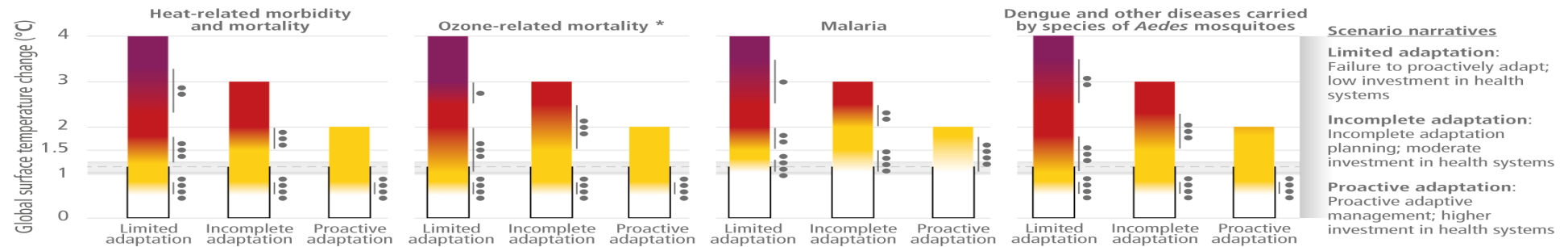
(c) Impacts and risks to terrestrial and freshwater ecosystems



(d) Impacts and risks to ocean ecosystems



(e) Climate sensitive health outcomes under three adaptation scenarios



* Mortality projections include demographic trends but do not include future efforts to improve air quality that reduce ozone concentrations.

“Burning embers” diagram from AR6 WGII SPM

Closing the Greenhouse Gas Emissions Gap

CO₂ emissions need to be:

- reduced by 45% by 2030
- net zero by 2050

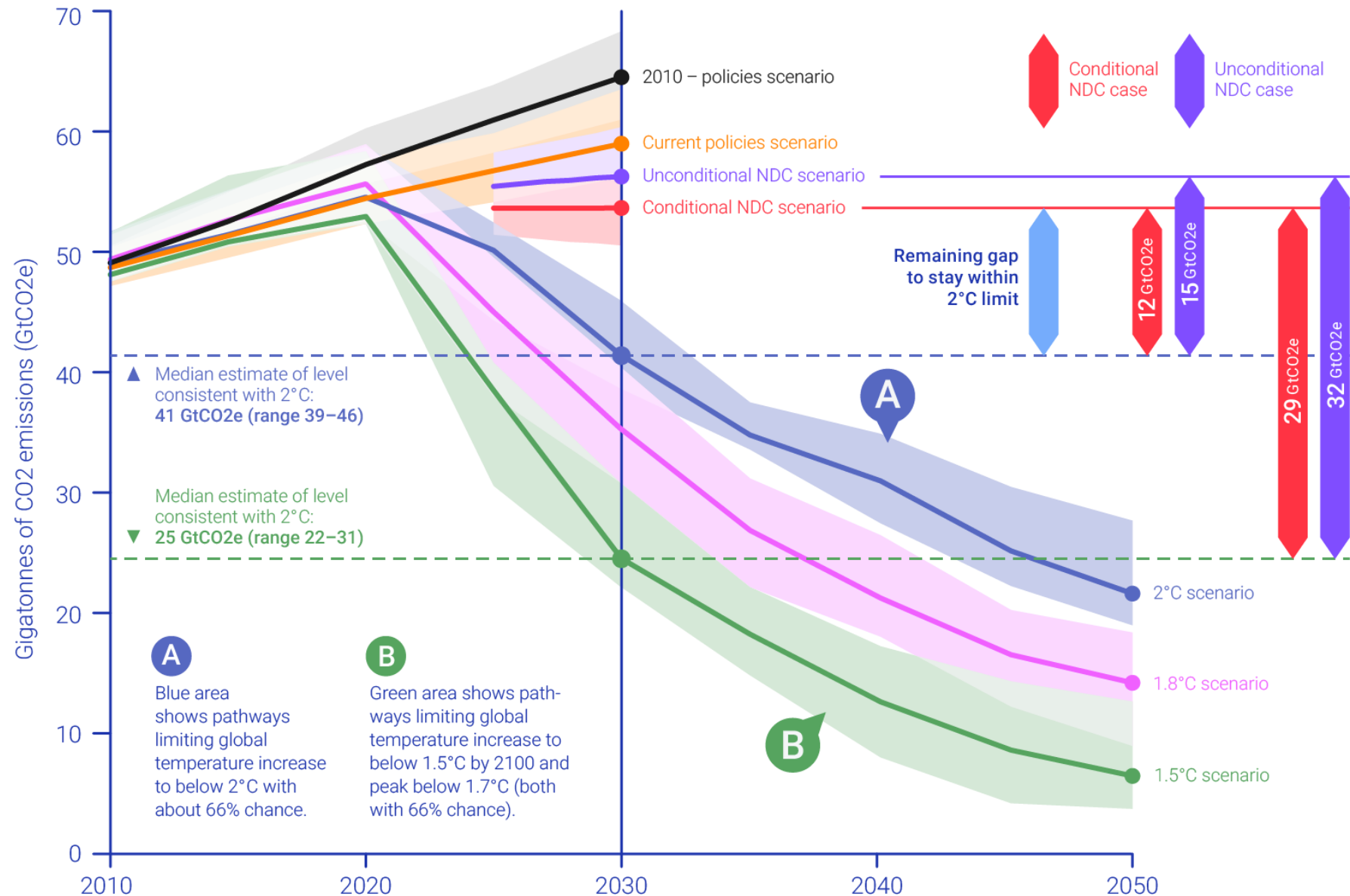
to limit global warming to 1.5°C

- reduced by 25% by 2030
- reach net zero by around 2070

to limit warming to 2°C

Current projected emissions in 2030 are comparable or even higher (about 16%) than in 1990 – recent UNFCCC report

We are currently on a pathway to 3-4°C



The Truth about the Paris Agreement

While the Paris Agreement is an important step to limit human-induced climate change, the current ensemble of national pledges are totally inadequate to achieve the 2°C target, let alone the aspirational goal of 1.5°C

Without additional significant actions to reduce GHG emissions we are on pathway to 2.5-3°C

Global Temperatures could reach 2°C by 2050-2060 and the 1.5°C target by the early-mid 2030s

Unless cost-effective negative carbon emissions technologies are developed and implemented soon, the Paris targets are unachievable

While net-zero emission by 2050 are needed – the focus of governments on net zero is dangerous – it takes our focus off the much more important goal of significant reductions between now and 2030

Transforming humankind's relation with nature is the key to a sustainable future

Human knowledge, ingenuity, technology and cooperation can transform societies and economies and secure a sustainable future

This transformation will involve a fundamental change in the technological, economic and social organization of society, including world-views, norms, values and governance

Major shifts in investment and regulation are key to just and informed transformations that overcome inertia and opposition from vested interests

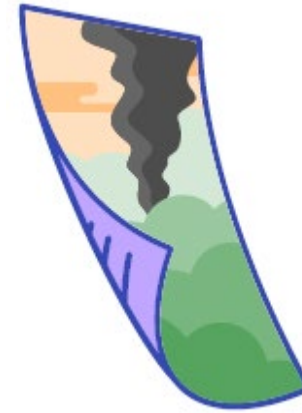
The challenge is to both mitigate adverse outcomes and to adapt to a changing environment

Transformation of our economic, financial and productive systems can lead and power the shift to sustainability

Society needs to eliminate/repurpose environmentally harmful subsidies, embrace a circular economy, internalize externalities, include the value of natural capital in decision-making and invest in the transition to a sustainable future – the question is how we do these in a politically and socially acceptable manner

Climate, biodiversity and other environmental finance could be ramped up by redirecting some of the environmentally harmful subsidies to a low-carbon economy, sustainable agriculture, forestry and fisheries and the conservation and restoration of biodiversity

The food, water and energy systems can and should be transformed together given their inter-connections to meet growing human needs in an equitable, resilient and environmentally and socially friendly manner

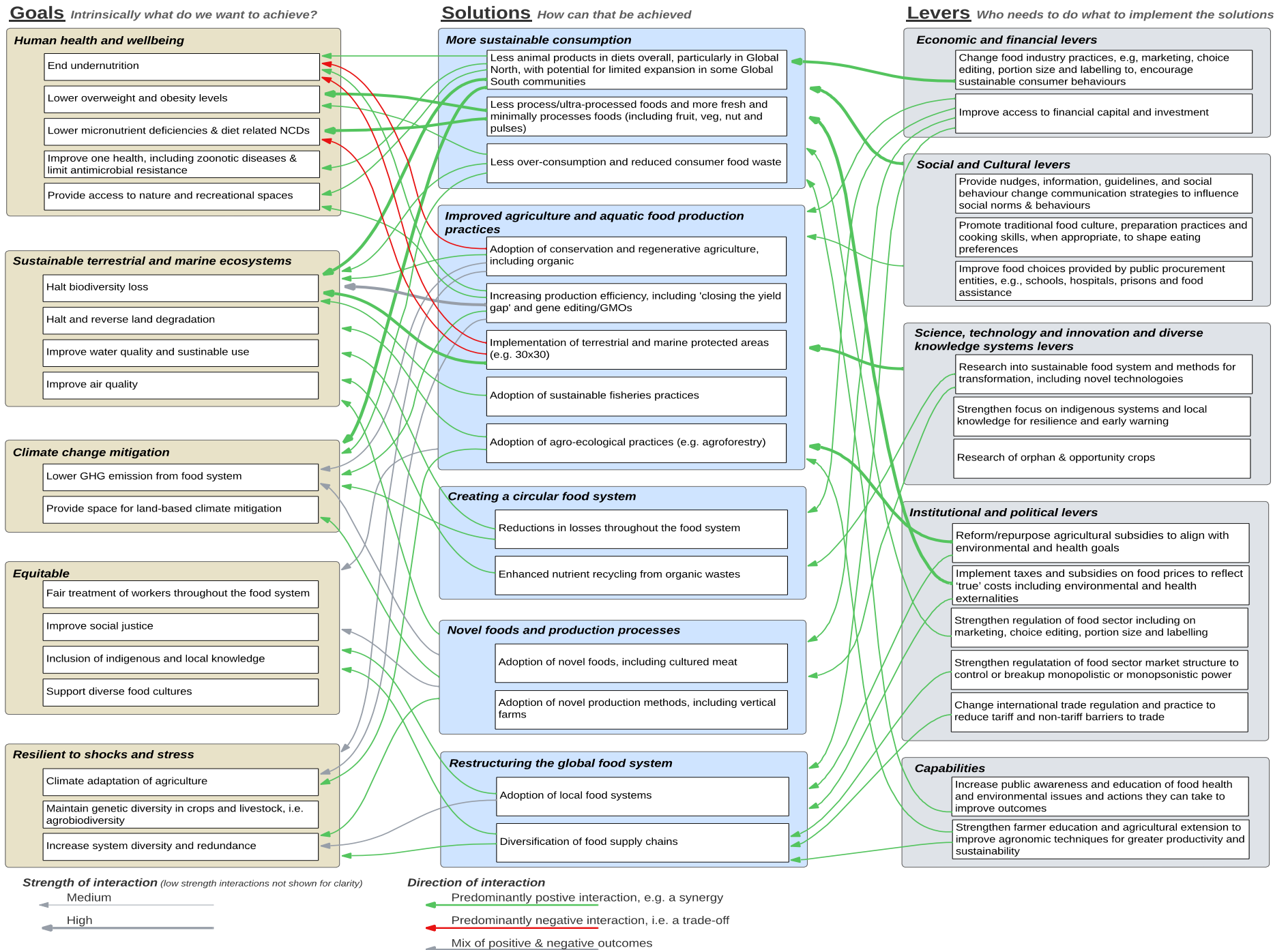


Transforming the economics/financing, energy, food/agriculture and environmental sectors

Five levers to stimulate transformation, i.e., levers to stimulate action:

- Economic and financing (e.g., repurpose subsidies; internalize externalities; use of inclusive wealth in decision-making; payment for ecosystem services; access to capital; and de-risk finance for sustainable energy, agriculture and circular business models)
- Institutional and political (e.g., strengthen regulations of energy and food sector market structure to control or breakup monopolistic power; change international trade regulation and practice to reduce tariff and non-tariff barriers to trade; shift taxation from labor to non-renewable resources; employ polycentric governance decision-making)
- Social and cultural (e.g., influence social norms through providing information, guidelines, etc)
- Science, technology, innovation and knowledge (e.g., development of technologies for sustainable and climate resilient energy-related and food systems)
- Capabilities (e.g., increase public awareness and education of energy, food, health and environmental issues and actions they can take to improve outcomes; retrain workers for sustainable technologies)

Goal– Solution– Levers for transforming the food system



Role of actors in the public and private sphere

A: Governments at all levels hold a leading role

B: Intergovernmental Organizations facilitate joint efforts

G: Scientific and Educational Organization develops knowledge and understanding

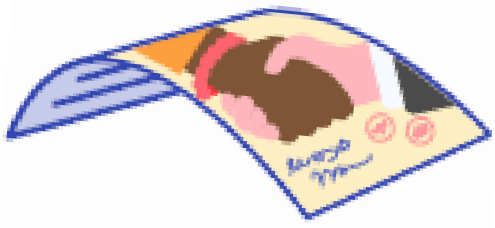
1. Economy and Finance
2. Environment (Climate Change, Air Quality, Conservation/ Landscape)
3. Food/ Agriculture/ Fisheries/ Forests
4. Energy
5. Water (quantity and quality)
6. Health
7. Chemicals and Waste
8. Cities

C: Financial Organizations direct investments

F: Public, Community and Youth Groups, and Indigenous Peoples and Local Communities (IPLC) put theory into practice

D: Non-Governmental Organizations (NGOs) conceive ideas and raise awareness

E: Private sector innovates and implements



Selected key messages for Governments

Lead the change through cross-sectoral policies, legislation, enforcement, monitoring and financing for:

- Scaling up and accelerating action to address the climate, biodiversity, pollution, and land degradation emergencies together

Transform the economic and financial systems so they power the shift to sustainability and circularity by:

- Establishing carbon taxes, carbon pricing, markets for carbon trading, and schemes for offsetting of nature and payments for ecosystem services
- Shifting environmentally harmful subsidies and investments in economic activities, research and development towards low-carbon and nature-friendly solutions
- Accounting for natural capital and environmental costs in measures of economic performance and in decision-making

Transform food, energy and production systems to provide access to sustainable, affordable and nutritious food, clean energy and safe water for all by

- Establish policies and implement technologies to contribute to cost-effectively reduce GHGs emissions globally by 50% by 2030 and net-zero by mid-century, including through developing energy efficiency regulations and infrastructure for electric vehicles
- Establish policies for a sustainable agricultural and water system, that is climate resilient, and addresses healthy diets and reductions in food and water waste