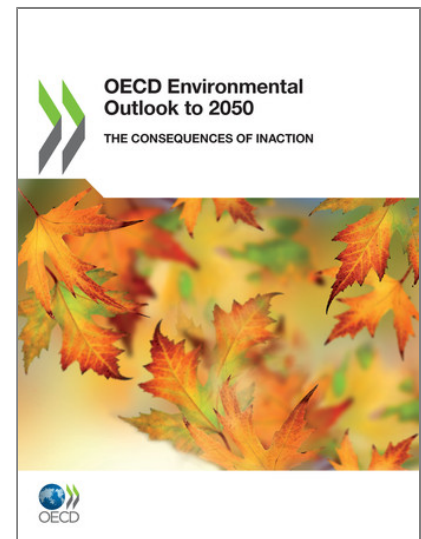


# OECD *Multilingual Summaries*

## OECD Environmental Outlook to 2050. The Consequences of Inaction

Summary in English



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[10.1787/9789264122246-en](https://doi.org/10.1787/9789264122246-en)

- Humanity has witnessed unprecedented growth and prosperity in the last four decades, with the size of the world economy more than tripling and population increasing by over 3 billion people since 1970. This growth, however, has been accompanied by environmental pollution and natural resource depletion. The current growth model and the mismanagement of natural assets could ultimately undermine human development.
- The *OECD Environmental Outlook to 2050* asks “What will the next four decades bring?” Based on joint modelling by the OECD and the Netherlands Environmental Assessment Agency, it looks forward to the year 2050 to find out what demographic and economic trends might mean for the environment if the world does not adopt more ambitious green policies. It also looks at what policies could change that picture for the better. This *Outlook* focuses on four areas: climate change, biodiversity, water and health impacts of pollution. These four key environmental challenges were identified by the previous *Environmental Outlook to 2030* (OECD, 2008) as “Red Light” issues requiring urgent attention.

Over the past decades, human endeavour has unleashed unprecedented economic growth in the pursuit of higher living standards. However, the sheer scale of economic and population growth has overwhelmed progress in curbing environmental degradation. Providing for a further 2 billion people by 2050 will challenge our ability to manage and restore the natural assets on which all life depends.

The *OECD Environmental Outlook to 2050* projects demographic and economic trends over the next four decades, using joint modelling by the OECD and the PBL Netherlands Environmental Assessment Agency. It assesses their impacts on the environment if humanity does not introduce more ambitious policies to better manage natural assets. It then examines some of the policies that could change that picture for the better. This *Outlook* focuses on four most urgent areas: climate change, biodiversity, water and the health impacts of pollution. It concludes that **urgent – and holistic – action is needed now to avoid significant costs and consequences of inaction, both in economic and human terms.**

## What could the environment look like in 2050?

By 2050, the Earth's population is expected to increase from 7 billion to over 9 billion and the **world economy is projected to nearly quadruple, with growing demand for energy and natural resources.** Average GDP growth rates are projected to slow in China and India, while Africa could see the world's highest growth rates between 2030 and 2050. OECD countries are expected to have over a quarter of their population aged over 65 years in 2050, compared to 15% today. China and India are also likely to see significant population ageing, while more youthful populations in other parts of the world, especially Africa, are expected to grow rapidly. These demographic shifts and higher living standards imply evolving lifestyles and consumption patterns, all of which will have significant consequences for the environment. Nearly 70% of the world population is projected to be urban residents by 2050, magnifying challenges such as air pollution, transport congestion, and waste management.

A world economy four times larger than today is projected to use 80% more energy in 2050. **Without more effective policies, the share of fossil energy in the global energy mix will still remain at about 85%.** The emerging economies of Brazil, Russia, India, Indonesia, China and South Africa (the “BRIICS”) are projected to become major energy users. To feed a growing population with changing dietary preferences, agricultural land is projected to expand globally in the next decade, although at a diminishing rate.

The combination of no new policies and continuing socioeconomic trends constitutes this study's “*Baseline*” scenario. Under the *Baseline*, pressures on the environment from population growth and rising living standards will outpace progress in pollution abatement and resource efficiency. **Continued degradation and erosion of natural environmental capital are expected to 2050, with the risk of irreversible changes that could endanger two centuries of rising living standards.**

Without more ambitious policies, by 2050:

- **More disruptive climate change is likely to be locked in**, with global greenhouse gas (GHG) emissions projected to increase by 50%, primarily due to a 70% growth in energy-related CO<sub>2</sub> emissions. (See Figure <http://dx.doi.org/10.1787/888932570468>.) The atmospheric concentration of GHGs could reach 685 parts per million (ppm) by 2050. As a result, the global average temperature increase is projected to be 3 oC to 6 oC higher by the end of the century, exceeding the internationally agreed goal of limiting it to 2 oC above pre-industrial levels. The GHG mitigation actions pledged by countries in the Cancún Agreements at the United Nations Climate Change Conference will not be enough to prevent the global average temperature from exceeding the 2 oC threshold, unless very rapid and costly emission reductions are realised after 2020. Surpassing the 2 oC threshold would alter precipitation patterns, increase glacier and permafrost melt, drive sea-level rise, and worsen the intensity and frequency of extreme weather events. This will hamper the ability of people and ecosystem to adapt.
- **Biodiversity loss is projected to continue**, especially in Asia, Europe and Southern Africa. Globally, terrestrial biodiversity (measured as mean species abundance – or MSA – an indicator of the intactness of a natural ecosystem) is projected to decrease a further 10% by 2050. (See Figure <http://dx.doi.org/10.1787/888932570943>.) Primary forests, which are rich in biodiversity, are projected to shrink in area by 13%. The main pressures driving biodiversity loss include land-use change (e.g. agriculture), the expansion of commercial forestry, infrastructure development, human encroachment and fragmentation of natural habitats, as well as pollution and climate change. Climate change is projected to become the fastest growing driver of biodiversity loss to 2050, followed by commercial forestry and, to a lesser extent, bioenergy croplands. About one-third of global freshwater biodiversity has already been lost, and further loss is projected to 2050. Declining biodiversity threatens human welfare, especially for the rural poor and

indigenous communities whose livelihoods often depend directly on biodiversity and ecosystems services. The aggregate loss of biodiversity and ecosystem service benefits associated with the global loss of forests, for example, is estimated to be between USD 2 and 5 trillion per year, according to the Economics of Ecosystems and Biodiversity study.

- **Freshwater availability will be further strained**, with 2.3 billion more people than today (in total over 40% of the global population) projected to be living in river basins experiencing severe water stress, especially in North and South Africa, and South and Central Asia. Global water demand is projected to increase by some 55%, due to growing demand from manufacturing (+400%), thermal electricity generation (+140%) and domestic use (+130%). (See Figure <http://dx.doi.org/10.1787/888932571171>.) In the face of these competing demands, the *Baseline* sees little scope for increasing irrigation water. Environmental flows will be contested, putting ecosystems at risks. Groundwater depletion may become the greatest threat to agriculture and urban water supplies in several regions. Nutrient pollution from urban wastewater and agriculture is projected to worsen in most regions, intensifying eutrophication and damaging aquatic biodiversity. The number of people with access to an *improved* water source (although not necessarily *safe* water for human consumption) is expected to increase, essentially in the BRIICS. However, globally more than 240 million people are expected to be without such access by 2050. Sub-Saharan Africa is unlikely to meet the Millennium Development Goal (MDG) of halving by 2015 the 1990 level of the population without access to an *improved* water source. The MDG for sanitation will not be met by 2015; by 2050 1.4 billion people are projected to be still without access to basic sanitation.
- **Air pollution is set to become the world's top environmental cause of premature mortality under this scenario.** (See Figure <http://dx.doi.org/10.1787/888932571855>.) Air pollution concentrations in some cities, particularly in Asia, already far exceed World Health Organization safe levels. By 2050, the number of premature deaths from exposure to particulate matter is projected to more than double to reach 3.6 million a year globally, with most deaths occurring in China and India. Because of their ageing and urbanised populations, OECD countries are likely to have one of the highest premature death rates from ground-level ozone, second only to India. **The burden of disease related to exposure to hazardous chemicals is significant worldwide**, but more severe in non-OECD countries where chemical safety measures are still insufficient. Yet, non-OECD countries are projected to greatly increase chemicals production, with the BRIICS overtaking the OECD in global sales by 2050 under the *Baseline*. While OECD governments are making progress in assessing human exposure to chemicals, knowledge of the health impacts is still limited.

These *Baseline* projections highlight the need for urgent action today to change the course of our future development. **Natural systems have “tipping points” beyond which damaging change becomes irreversible** (e.g. species loss, climate change, groundwater depletion, land degradation). However, these thresholds are in many cases not yet fully understood, nor are the environmental, social and economic consequences of crossing them. A key challenge is to strike a balance between giving clear policy signals to resource users and consumers, while leaving room for manoeuvre and adaptation given the uncertainties.

**Acting now is environmentally and economically rational.** For example, the *Outlook* suggests that if countries act now, there is still a chance – although it is receding – of global GHG emissions peaking before 2020 and limiting the world's average temperature increase to 2 °C. The *Outlook* suggests that a global carbon price could lower GHG emissions by nearly 70% in 2050 compared to the *Baseline* and limit GHG concentrations to 450 ppm. (See Figure <http://dx.doi.org/10.1787/888932570069>.) This would slow economic growth by 0.2 percentage points per year on average, costing roughly 5.5% of global GDP in 2050. This pales alongside the potential cost of inaction which some estimate could be as high as 14% of average world consumption per capita. The *Outlook* also suggests, for example, that the benefits of making further air pollution reductions in the BRIICS could outweigh the costs by 10 to 1 by 2050.

## What policies can change this outlook?

**Well-designed policies can reverse the trends projected in the *Outlook Baseline* scenario.** Given the complexity of the environmental challenges, a wide array of policy instruments are needed, often in combination. This *Outlook* draws on a policy framework outlined by the OECD's *Green Growth Strategy*, which countries can tailor to their level of development, resource endowments and environmental pressures. But there are common approaches:

- **Make pollution more costly than greener alternatives;** e.g. with environmental taxes and emissions trading schemes. Such market-based instruments can also generate much-needed fiscal revenues.
- **Value and price the natural assets and ecosystem services;** e.g. through water pricing which is an effective way of allocating scarce water, payments for ecosystem services, natural park entrance charges, etc.
- **Remove environmentally harmful subsidies;** an important step in pricing resources and pollution properly (e.g. to fossil fuels, electricity for pumping irrigation water).

- **Devise effective regulations and standards;** *e.g.* to safeguard human health or environmental integrity, for promoting energy efficiency.
- **Encourage green innovation;** *e.g.* by making polluting production and consumption modes more expensive, and investing in public support for basic R&D

**A mix of policies is needed because the different environmental issues are closely linked.** For example, climate change can affect hydrological cycles and exacerbate pressures on biodiversity and human health. Biodiversity and ecosystem services are intimately linked to water, climate and human health: marshlands purify water, mangroves protect against coastal flooding, forests contribute to climate regulation and genetic diversity provides for pharmaceutical discoveries. Policies must be carefully designed to account for these cross-cutting environmental functions and their wider economic and social implications.

## Making reform happen and mainstreaming green growth

Making reform happen will depend on political leadership and widespread public acceptance that changes are both necessary and affordable. Not all of the solutions will be cheap, which is why seeking out the most cost-effective among them is so important. A key task is to improve understanding of the challenges and trade-offs that need to be made.

**Integrating environmental objectives in economic and sectoral policies (*e.g.* energy, agriculture, transport) is vital,** as the latter have greater impacts than environmental policies alone. Environmental challenges should be assessed in the context of other global challenges such as food and energy security and poverty alleviation.

**Well-designed policies can maximise synergies and co-benefits** on several fronts. Tackling local air pollution, for example, can cut GHG emissions while reducing the economic burden of health problems. Climate policy also helps protect biodiversity if emissions are reduced from avoiding deforestation. Meanwhile **contradictory policies need to be carefully monitored and addressed.** For example, water infrastructure such as dams – intended to improve water and energy security – can disrupt wildlife habitats and ecosystems. Increasing the use of biofuels to meet climate goals could potentially have negative impacts on biodiversity by requiring more land for bioenergy crops.

As many of the environmental problems are global in nature (*e.g.* biodiversity loss, climate change) or linked to the trans-boundary effects of globalisation (*e.g.* trade, international investment), **international co-operation is indispensable to ensure an equitable sharing of the cost of action.** For example, while the world's mega-biodiverse areas are mainly located in developing countries, the burden of biodiversity conservation measures needs to be shared broadly as their benefits accrue globally. This calls for international financing to support such efforts. Similarly, international financing for low-carbon climate-resilient growth will need to be scaled up significantly. The *Outlook* suggests that it is possible to raise considerable revenues from market-based measures: if the emission reduction pledges that industrialised countries indicated in the Cancún Agreements were to be implemented through carbon taxes or cap-and-trade schemes with fully auctioned permits, the fiscal revenues could amount to about 0.6% of their GDP in 2020, *i.e.* over USD 250 billion. Just a small part of such revenues could help finance climate action. International co-operation is also needed to channel financing for providing universal access to *safe* water and adequate sanitation.

**Better information supports better policies, so our knowledge base needs to be improved.** There are many areas where economic valuation should be improved, including for understanding the full benefits of biodiversity and ecosystem services, and health costs associated with exposure to chemicals. This will help to measure those elements of improved human welfare and progress that cannot be captured by GDP alone. Better information on costs and benefits will help to improve our understanding of the costs of inaction, and make a strong case for green growth policy reforms.

This *Outlook* provides policy makers actionable policy options for today that can help to put the world on a more sustainable path.

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