

Innocenti Report Card 17

# Places and Spaces

Environments  
and children's well-being

The *Innocenti Report Card* series is designed to monitor and compare the performance of economically advanced countries in securing the rights of their children.

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Innocenti Report Card 17

# Places and Spaces

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# FOREWORD

Home. In a good childhood, home is a safe and stable place, with healthy food to eat, clean water to drink and a loving family.

Yet, many children – even in the world’s richer countries – lack these necessities of life. They are surrounded by toxic air, lead pollution, loud noise or mouldy walls. Others live in homes that are too dark, too cold or too crowded.

Unhealthy living conditions irretrievably harm children’s mental and physical well-being, their cognitive development, and their prospects for a happy and healthy life. For a child living with high levels of road traffic or without enough green space in which to play, the options to escape or offset these dangers are few.

Environmental risks are also unequally distributed. Children from poorer families and marginalized groups face greater exposure to severe housing deprivation, which deepens disadvantage and perpetuates cycles of poverty.

Beyond the doorstep of children’s homes, schools and communities, our collective home – the planet – is also in jeopardy. Rising temperatures, loss of biodiversity and extreme weather events threaten both livelihoods and lives themselves. The pressure that our natural resources are coming under and the mounting waste are harmful to both our

children and our planet. The level of consumption in most rich countries would require at least three planet earths if replicated in all countries. E-waste – the fastest-growing type of domestic waste – contains hazardous substances that damage bodies and brains, and it takes its highest toll on children.

Through global efforts to achieve sustainable development and a more equitable world, the international community has for decades been calling on governments, the private sector, civil society and individuals to protect our planet. Children and young people have also sounded the alarm, with millions globally participating in climate strikes and demanding transformative action to save their own future on the planet. The United Nations Secretary-General’s report *Our Common Agenda* presents “a stark and urgent choice: a breakdown or a breakthrough”. The first option is characterized by “a perpetual crisis”, while the second offers the “prospect of a greener, safer, better future”.<sup>1</sup>

The good news is that, by tackling one challenge, we improve the chances of solving another. Put differently, what provides a child with a safe and healthy home also protects the environment. Reducing motorized traffic, for example, can have a positive impact on road safety –

making children’s journeys to school safer – and can reduce carbon dioxide (CO<sub>2</sub>) emissions. Or transitioning towards sustainable agriculture can improve children’s diets and reduce the environmental damage of current food production. These synergies are well recognized in the Sustainable Development Goals, where meeting one goal is essential to meeting another.

Conversely, if we, as a global community, do not improve the environments in which children live and develop, what hope is there for a better future? We can do better, and we must. How? By listening to children and young people; by making discerning choices about how we consume and how we dispose of what we discard; by designing our neighbourhoods and homes with children in mind; by supporting children’s involvement in environmental debates and decisions; by ensuring that the distinct needs of children are built into environmental policies; and by pursuing policies and practices that safeguard the natural environment, on which children and young people depend.



**Gunilla Olsson**

**Director  
UNICEF Office of Research –  
Innocenti**



**SECTION 1**  
**INTRODUCTION**



# SECTION 1

## INTRODUCTION

Environmental changes taking place around the world find their way into the bodies and minds of children. Through polluted air, water and food, we each inadvertently consume a quarter of a kilogram of plastic per year – equivalent to eating a credit card every week. In nine of the world’s richest countries, more than 1 child in 20 have elevated levels of lead in their blood. The environmental ‘problem’ is not an abstract concept about a distant future: it is affecting children – right here, right now.

The results of climate change are already clear and present. Rising temperatures, higher sea levels, air and soil pollution and extraordinary-turned-ordinary weather events affect not only the world we leave for future generations, but also the brains, lungs and hearts of us all today.

Globally, one death in four among children aged under 5 years could be averted by improving environmental factors, such as air pollution, water, sanitation,

hygiene or chemicals.<sup>2</sup> Children are especially vulnerable – partly because their bodies and immune systems are still developing, but also because of their behaviour (for example, they are more likely to put their fingers in their mouths than adults). The consequences of climate change will persist throughout the lives of today’s children, requiring them to adapt to, and mitigate, the risks associated with a warming planet.

Yet, the environment influences not only whether today’s children grow up to be healthy and happy adults, but also their current mental well-being. A survey covering six high-income countries<sup>3</sup> reported that nearly half of all young people feel distressed about the environment to an extent that is affecting their daily functioning.<sup>4</sup> Some 6 in 10 believe that their governments have failed them, as regards the environment. Two in five have doubts about becoming a parent in the future, due to the climate crisis.

Rich countries, and rich people, can often try to buy their way out of a crisis; but an environmental crisis is different. Buying an air purifier does not obviate the need to breathe public air. Even if countries reduce their own carbon footprint, they still face the problems created by those that do not.

In October 2021, the United Nations Human Rights Council recognized the right to a clean, healthy and sustainable environment,<sup>5</sup> while the United Nations Committee on the Rights of the Child decided that a country can be held responsible for the impact of its emissions on children both within and beyond its territory.<sup>6</sup> Yet, more effort is needed to avert the most dire consequences of environmental neglect. The importance of having all countries work towards the goals set out in the 2030 Agenda for Sustainable Development is becoming ever more apparent.



### Definitions and scope

In English, the word ‘environment’ can be linked to many concepts – e.g., the ‘economic environment’ or the ‘digital environment’. For the purposes of this report, we adopt a narrower focus on ‘the environment’ and use the term to cover the physical aspects of natural and built environments that children experience and that affect their well-being.

This definition, and the conceptual framework that is presented below, were developed on the basis of a literature review; consultations with research and policy professionals both within

and outside UNICEF; and focus group discussions with young people aged 10–17 years from Canada, Chile, Mexico, Spain and Sweden. When asked to define the environment, young people tended to list both natural and man-made elements; and to agree that nature, the landscape and all living things are part of the environment. Children highlighted the connections between all living things – flora, fauna and humans – and the need for a balance between humans and nature. Other definitions of the environment included “everything that surrounds us”, from the home that we live in

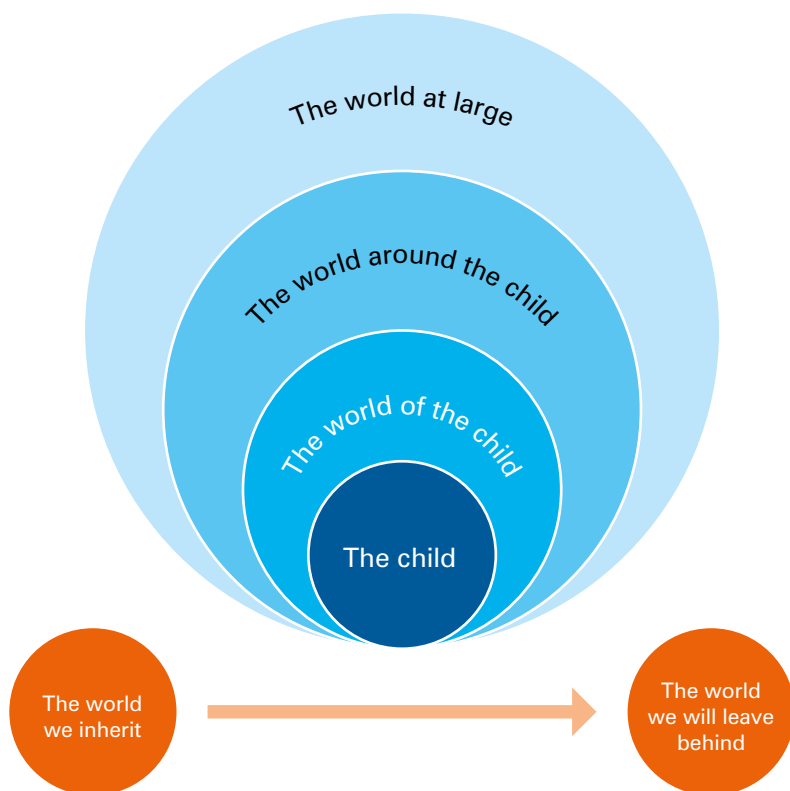
to the planet as a whole. Some participants also mentioned that culture and religion shape what the environment is and how we see it.

This report covers the 43 countries that are members of the Organisation for Economic Co-operation and Development (OECD) and/or the European Union (EU), because their harmonized data infrastructures allow for a comparative analysis of children’s environmental well-being. There are some data limitations relating to countries that have recently joined the OECD, particularly Colombia and Costa Rica.

### AIMS

The report focuses on the following questions:

1. How do environmental factors affect children’s well-being?
2. How are many of the world’s richest countries faring in terms of providing a healthy environment in which children can live, develop and thrive?
3. What actions can these countries take to improve the environments in which children live?

**Figure 1: Broad conceptual framework****Our framework**

Over the past two decades, *UNICEF Innocenti Report Cards* have led the way in comparing children's well-being across rich countries. *Innocenti Report Card 16* introduced a multi-level framework that put the child at the centre. Child outcomes – physical health, mental well-being and skills – are affected by the world of the child, the world around the child and the world at large. *Innocenti Report Card 17* takes this approach a step further (see *Figure 1*). As the current state of the environment is shaped by past actions, and is already shaping what lies ahead, we add a time perspective to the model: the world we inherit and the world we leave behind. And because the environmental actions of one country can affect children in others, we also consider the impact that countries have beyond their own borders.

Three crosscutting themes run through our framework: interlinkages, inequalities and children's influence. Interlinkages mean that many factors that cause climate change in the long run are also harming children now. For example, cars emit CO<sub>2</sub>, but also cause noise and air pollution, take up space, create risks and limit children's activities, such as playing outside.

Inequalities mean that environmental factors affect people in different ways, depending on their resources – as we have seen during the COVID-19 pandemic. Some countries and individuals are better able to protect themselves than are others. Environmental risks are also spread both geographically – from rich countries to poor countries – and temporally, with today’s choices causing tomorrow’s disasters.

Children, often the worst affected by environmental problems, will not only inherit them in the future, but are also the least able to influence the course of events. Choices that affect their lives are taken by parents, governments and businesses. Many of the national climate plans submitted ahead of the 26th United Nations Climate Change Conference of the Parties (COP26) were neither child sensitive nor created with children’s participation.<sup>7</sup>

Yet, young people are aware and are calling for action. In 2019, at the World Economic Forum in Davos, Greta Thunberg told delegates: “I want you to act as you would in a crisis. I want you to act as if our house is on fire. Because it is.”<sup>8</sup>

#### THE CONCEPTUAL FRAMEWORK IS APPLIED IN THIS REPORT AS FOLLOWS:

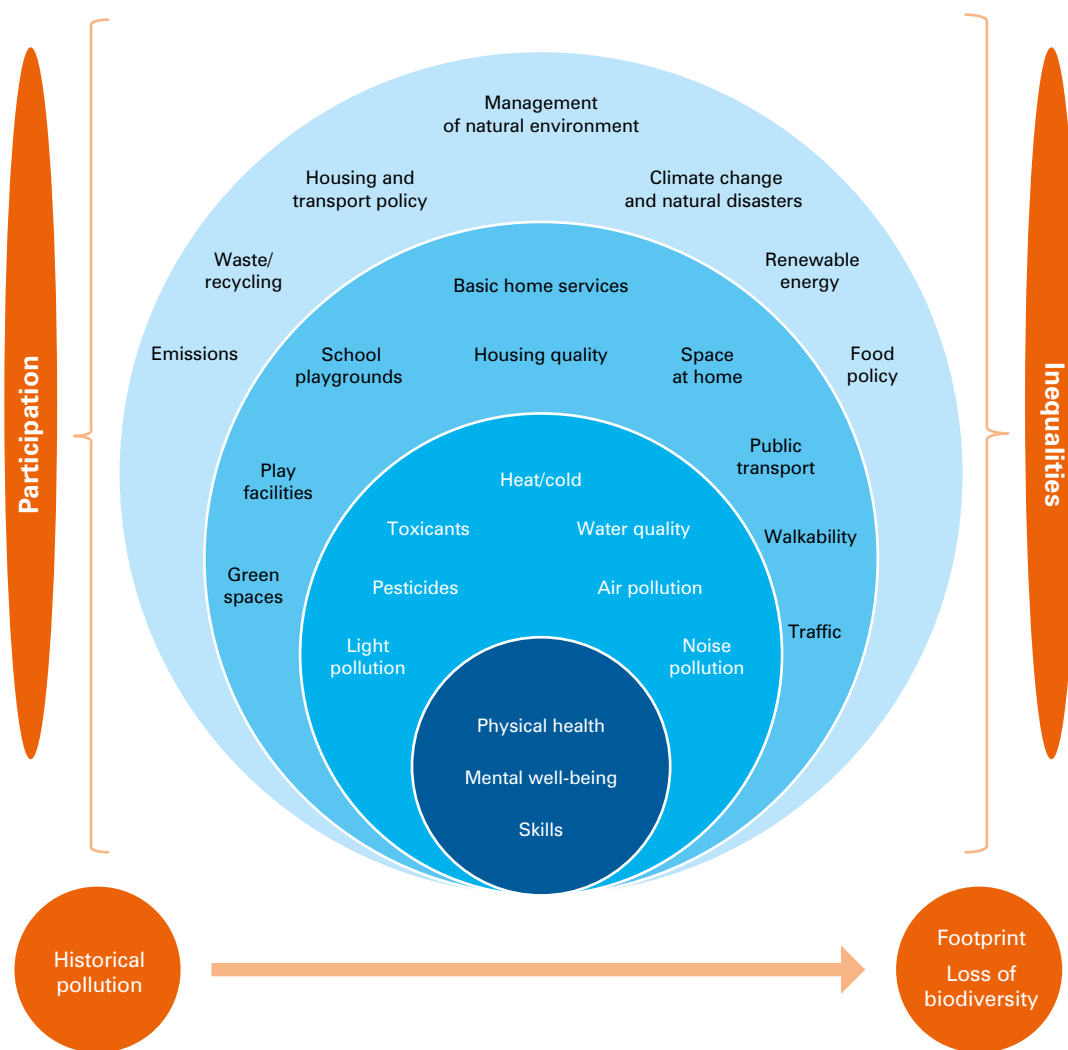
1. Child outcomes are grouped into three broad categories – physical health, mental well-being and skills – as in *Innocenti Report Card 16*.
2. The world of the child focuses on children’s direct experiences of the environment, in terms of their consumption of air, water and food, and their exposure to light, noise, heat, cold and hazardous substances.
3. The world around the child covers the physical aspects of the environments that the child encounters directly, such as housing, green space, schools, traffic and environmental hazards.
4. The world at large refers to the broader context within which these physical environments are created and maintained. This can include the impact of government policy and expenditure. Here, we include the impact of a country’s actions not only within its borders, but also externally.
5. The world we inherit refers to a country’s historical environmental record and actions, the cumulative results of which are still being felt today.
6. The world we leave behind refers to a country’s current actions and progress, which will influence the environment in the future.

Figure 2 depicts key topics that are covered in this report within each of these parts of the framework.

The design of the framework lends itself to exploring interlinkages within and between levels, as will be shown through an example later in the report. Two other cross-cutting themes – children’s influence and inequalities – are relevant in each of the nested circles.

Finally, underpinning this analysis, it is important to consider the potential role of the United Nations Convention on the Rights of the Child and of the 2030 Agenda for Sustainable Development in providing opportunities for strong advocacy on environmental issues (see also *Spotlight 1*).

**Figure 2: Topics covered in this Report Card**



## SECTION 2

# A LEAGUE TABLE OF ENVIRONMENTAL CONDITIONS

## SECTION 2

# A LEAGUE TABLE OF ENVIRONMENTAL CONDITIONS

Figure 3 presents a league table based on the best available indicators to represent the aspects of environmental conditions set out in Figures 1 and 2. It contains three indicators in each of three groupings – the world of the child, the world around the child and the world at large. Box 1 describes the criteria we used in selecting the indicators for the league table. Table 1 provides details of the definition and source of each indicator, and also refers to the figure in the report that shows country statistics for the indicator.

Spain is at the top of the league table – despite not being at the top position in any of the individual dimensions (it is ranked 8th for the ‘world of the child’, and 13th for both the ‘world around the child’ and the ‘world at large’). This is illustrative of the pattern that no country does consistently well or consistently badly across all dimensions. Spain is followed by Ireland, a country with good performance in the indicators closest to the child but an average record at the macro-level. Romania lies at the bottom of the table, where it is preceded by Costa Rica and the United States of America.

The picture in Romania and Costa Rica is remarkably different from that in the United States. In the first two, children’s immediate environments are lacking (visible from their low scores in the ‘world of the child’ and ‘world around the child’), but the countries are among the least responsible for harming the environment at large. The United States, in contrast, performs poorly in the ‘world at large’, while there is also room for improvement in the ‘world of the child’ and the ‘world around the child’.

### BOX 1: HOW INDICATORS WERE SELECTED FOR THE LEAGUE TABLE

League table indicators were chosen to reflect different aspects of the framework presented in Figure 1. The following criteria were used to select indicators.

**Quality:** Data had to meet high standards of quality, drawn either from national and internationally recognized data sources, or from peer-reviewed publications.

**Coverage:** Data should be available for all, or the great majority, of the Innocenti Report Card 17 countries.

**Recency:** Data should be available for 2018 or later.

**Relevance:** Data should be relevant to cross-national comparisons.

**Variability:** There should be enough cross-national variability to be informative.

**Comparability:** The indicators should have comparable meanings across cultures.

**Figure 3: A league table of environmental conditions that affect children's well-being**

Overall ranking	Country	World of the child	World around the child	World at large
1	Spain	8	13	13
2	Ireland	6	4	20
3	Portugal	25	9	9
4	Cyprus	15	17	10
5	Finland	1	2	30
6	Italy	7	16	14
7	Iceland	3	1	32
8	Slovenia	19	14	16
9	Germany	13	6	22
10	Sweden	4	10	26
11	United Kingdom	11	12	23
12	Netherlands	12	8	27
13	Japan	2	21	25
14	Norway	5	5	35
15	New Zealand	24	15	17
16	France	14	27	18
17	Switzerland	21	3	33
18	Hungary	34	22	6
19	Austria	9	19	29
20	Czechia	26	23	21
21	Estonia	27	11	28
22	Lithuania	32	24	15
23	Croatia	29	33	5
24	Denmark	18	26	34
25	Slovakia	31	29	11
26	Greece	22	35	8
27	Poland	30	31	7
28	Canada	17	7	38
29	Malta	33	18	24
30	Australia	10	20	37
31	Latvia	36	30	12
32	Republic of Korea	16	32	31
33	Chile	35	37	3
34	Israel	23	36	19
35	Bulgaria	37	34	4
36	Belgium	28	25	36
37	United States	20	28	39
38	Costa Rica	38	38	1
39	Romania	39	39	2

**Note:** The ranking is calculated as follows: (1) a z-score for each indicator was calculated (reversed where necessary so that a higher score represents a more positive condition); (2) the mean of the z-scores within each dimension was calculated; (3) the z-score for each mean was calculated and served as a basis for ranking a given dimension; (4) the mean of the three ranks was calculated and served as a basis for the final ranking. If two countries had the same average of three ranks, the average of z-scores was used to determine their position. Countries are ranked on a dimension if they have data for at least two of the three indicators. Four OECD/EU countries are not included in the ranking: Colombia is excluded due to missing data on the 'world around the child' dimension, while Turkey, Mexico and Luxembourg are excluded as they are extreme outliers on at least one indicator (z-scores below -4.0).

Many countries perform quite differently across the three dimensions, and not one nation shows consistently high or low scores across them. The presence of wealthy countries in some of the bottom positions (such as the United States and Belgium) indicates that national

prosperity is no guarantee that children will grow up in a healthy environment. In Canada and Australia, present-day environments appear relatively child friendly, but the countries' unsustainable consumption patterns threaten the future.

The league table therefore presents a complex and multi-faceted picture, which will be explored more fully in the following sections. Overall, no country does well across the board. There is substantial room for improvement, even among those at the top of the table.

**Table 1: Details of indicators included in the league table**

Dimension	Figure	Indicator	Indicator definition	Source
World of the child	6	Air pollution	Disability-adjusted life years (DALYs) lost to unsafe air per 1,000 children (<15), 2019	Global Burden of Disease Collaborative Network (2021). The Global Burden of Disease Study 2019. Seattle, Institute for Health Metrics and Evaluation (IHME)
	7	Water pollution	DALYs lost to unsafe water per 1,000 children (<15), 2019	Global Burden of Disease Collaborative Network (2021). The Global Burden of Disease Study 2019. Seattle, IHME.
	11	Lead poisoning	Percentage of children with elevated blood lead levels (>5 micrograms per decilitre), 2019	Rees, N. and Fuller, R. (2020). The Toxic Truth: Children's exposure to lead pollution undermines a generation of future potential. New York, UNICEF.
World around the child	15	Overcrowding	Share of overcrowded households, 2019 or latest year available	OECD (2020). Affordable Housing Database 2019. Paris: OECD.
	18	Urban green space	Logarithmic Normalized Difference Vegetation Index (NDVI) per capita, 2019	Kwon, O.-H., Hong, I., Yang, J., Wohn, D. Y., Jung, W.-S. and Cha, M. (2021). Urban green space and happiness in developed countries. <i>EPJ Data Science</i> , 10(1).
	22	Road safety	Disability-adjusted life years (DALYs) lost to road injuries per 1,000 children (<15), 3-year average of 2017–2019	Global Burden of Disease Collaborative Network (2021). The Global Burden of Disease Study 2019. Seattle: IHME.
World at large	25	Number of earths required	The ratio of a country's ecological footprint to its biocapacity, 2018	Global Footprint Network (GFN) (2022). National Footprint and Biocapacity Accounts 2022 Public Data Package. Geneva: GFN.
	27	Electronic waste generation	Total e-waste generated, kg per capita, 2019	Forti, V., Balde, C. P., Kuehr, R. and Bel, G. (2020). <i>The Global E-waste Monitor 2020: Quantities, flows and the circular economy potential</i> . Bonn, Geneva and Rotterdam: United Nations University et al.
	30	Consumption-based CO <sub>2</sub> emissions	Consumption-based CO <sub>2</sub> emissions, metric tonnes per capita, 2019	Global Carbon Network (GCN) (2021). The Global Carbon Budget Dataset. Stanford: GCN. For Iceland: Clarke, J., Heinonen, J., and Ottelin, J. (2017). Emissions in a decarbonised economy? Global lessons from a carbon footprint analysis of Iceland. <i>Journal of Cleaner Production</i> Vol. 166.



## Spotlight 1 Children's environments, children's rights and sustainable development

### The United Nations Convention on the Rights of the Child

There is a strong connection between the question of how the natural and the built environments affect children and the promotion of children's rights under the United Nations Convention on the Rights of the Child (CRC).

1. First, there are clear direct links with article 6 of the CRC (right to life, survival and development) and article 24 (health), which references a clean environment.
2. In a broader sense, article 3 of the Convention requires all actions "concerning children" to consider the best interests of the child. Many *Report Card* countries have implemented this broadly, in requiring child rights impact assessments for legislation, while others have incorporated the CRC into law. These are important measures that can be used to ensure that the impact of environment on children is fully considered in decision making and policy.
3. Another link with the CRC is the non-discrimination principle embedded in article 2. This report has highlighted how environmental risks are distributed unequally and weigh most heavily on children living in poverty and other already disadvantaged groups.
4. This report has also highlighted the need and potential to involve children in environmental debates and decisions. Article 12 requires that a child "who is capable of forming his or her own views" has the right to express them, and for these views to be given due weight "in all matters affecting the child". Children have amply demonstrated their ability to form and express their views on environmental issues, and these are certainly matters that affect them.

A very important development in terms of the environment and children's rights is the decision by the United Nations Committee on the Rights of the Child to draft a general comment (No. 26) on children's rights and the environment, with a special focus on climate change. The general comment has the objective of providing "authoritative guidance on how children's rights are impacted by the environmental crisis and what governments must do to uphold these rights". This is a "major step to hold governments accountable for ensuring children live in a clean, green, healthy and sustainable world".<sup>9</sup> At the time of writing (January 2022), the consultation on this general comment is under way.

### The 2030 Agenda for Sustainable Development

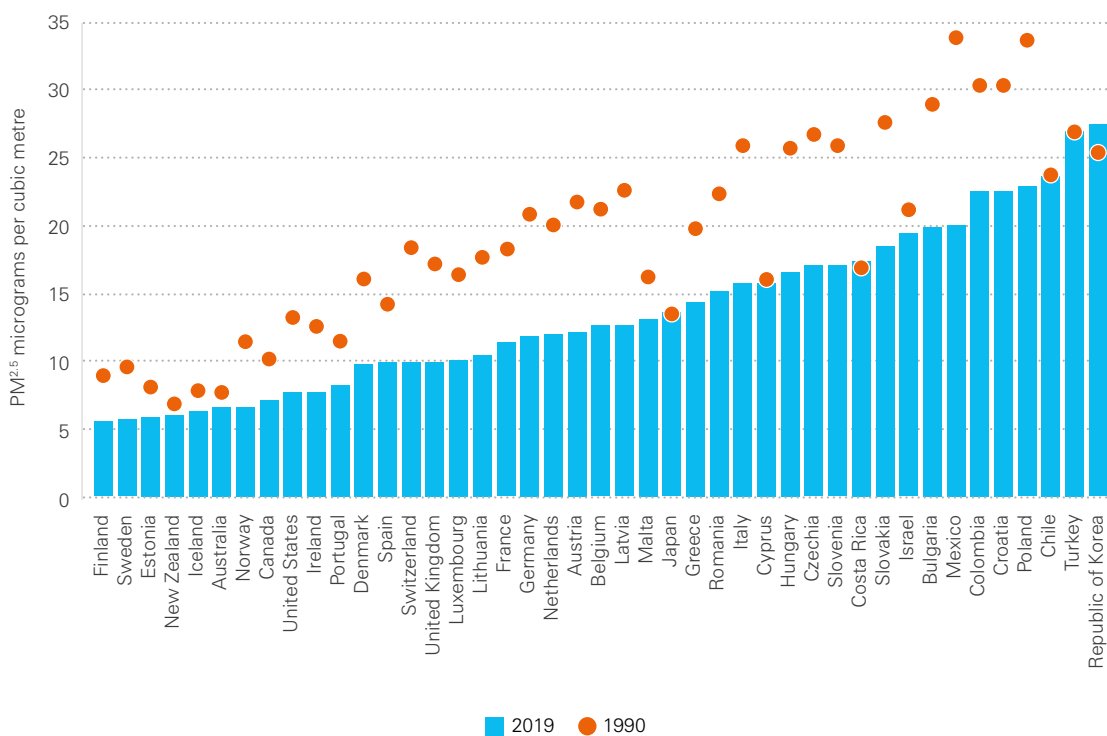
A second global instrument that is highly relevant to the content of this report is the 2030 Agenda for Sustainable Development. A majority of the 17 Sustainable Development Goals (SDGs) have an environmental focus. While many aspects on the agenda that focus on environment relate to all age groups, sustainable development will naturally benefit children, and it provides a framework by which progress on reducing the adverse effects of environmental risks on children can be monitored. A relevant example from the list of SDG indicators is the level of air pollution. As discussed in Section 3, children are more vulnerable than adults to the negative impacts of air pollution.

**Spotlight 1 Children’s environments, children’s rights and sustainable development**

Figure 4 shows how much improvement there has been in air quality over the past three decades in *Report Card* countries. Countries are ordered according to their most recent level of air pollution. While many countries have made substantial progress, the chart shows that there is still much to do. Compared to 1990, air quality has remained broadly the same or worsened in Chile, Costa

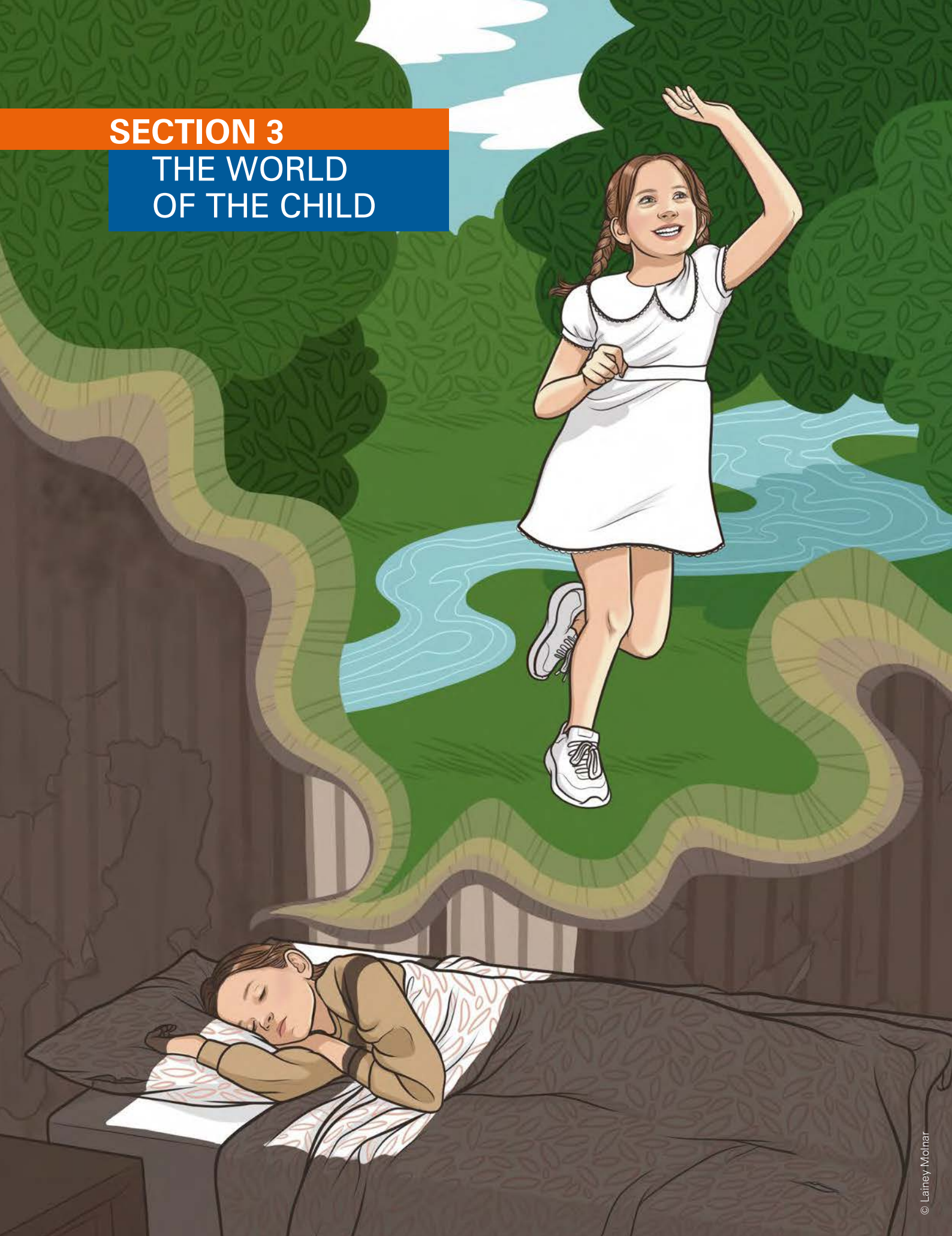
Rica, Japan, the Republic of Korea and Turkey. While Australia, New Zealand and Iceland have comparatively low levels of air pollution, they have made only small improvements in recent decades. The chart illustrates how much has still to be done to ensure healthy air for all children (and adults) to breathe.

**Figure 4: Over the last decades, air quality has improved in 38 out of 43 OECD/EU countries**  
 Mean population exposure to fine particulate matter PM<sup>2.5</sup> (1990–2019)



Source: OECD, <[https://stats.oecd.org/viewhtml.aspx?datasetcode=EXP\\_PM2\\_5&lang=en](https://stats.oecd.org/viewhtml.aspx?datasetcode=EXP_PM2_5&lang=en)>, accessed 16 February 2022.

**SECTION 3**  
**THE WORLD**  
**OF THE CHILD**



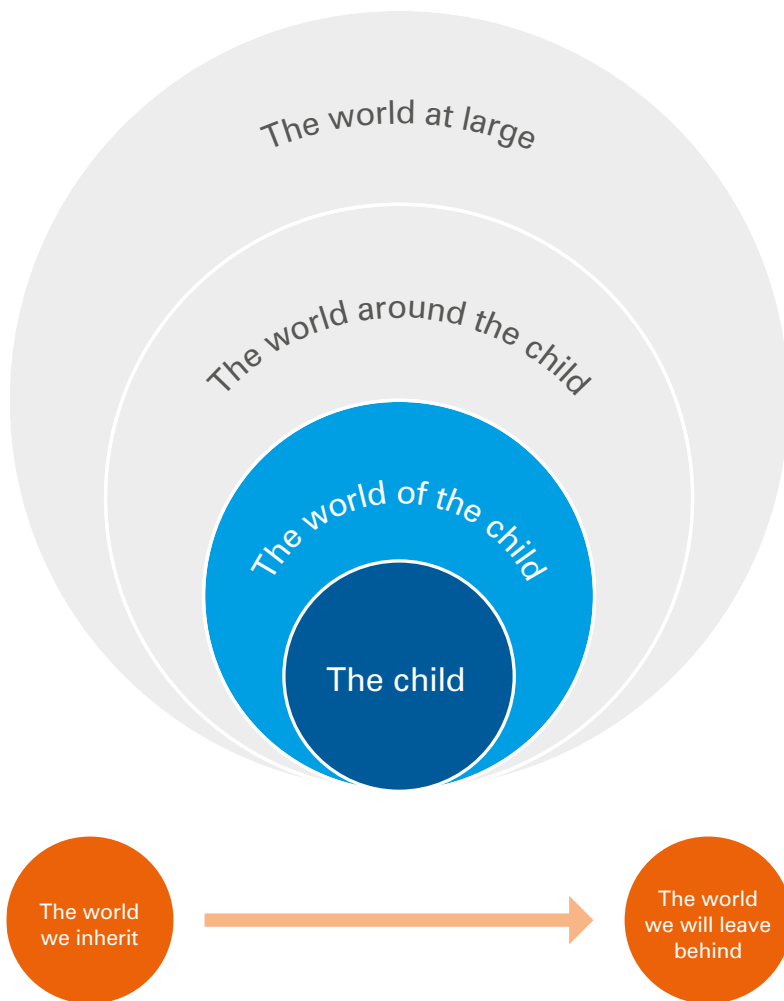
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# SECTION 3

## THE WORLD OF THE CHILD

Children’s well-being and development are directly and tangibly affected by their interface with the environments around them. This section presents evidence on those pathways –

considering children’s consumption of air, water and food, and their exposure to heat/cold, light, noise and hazardous substances.



## Air

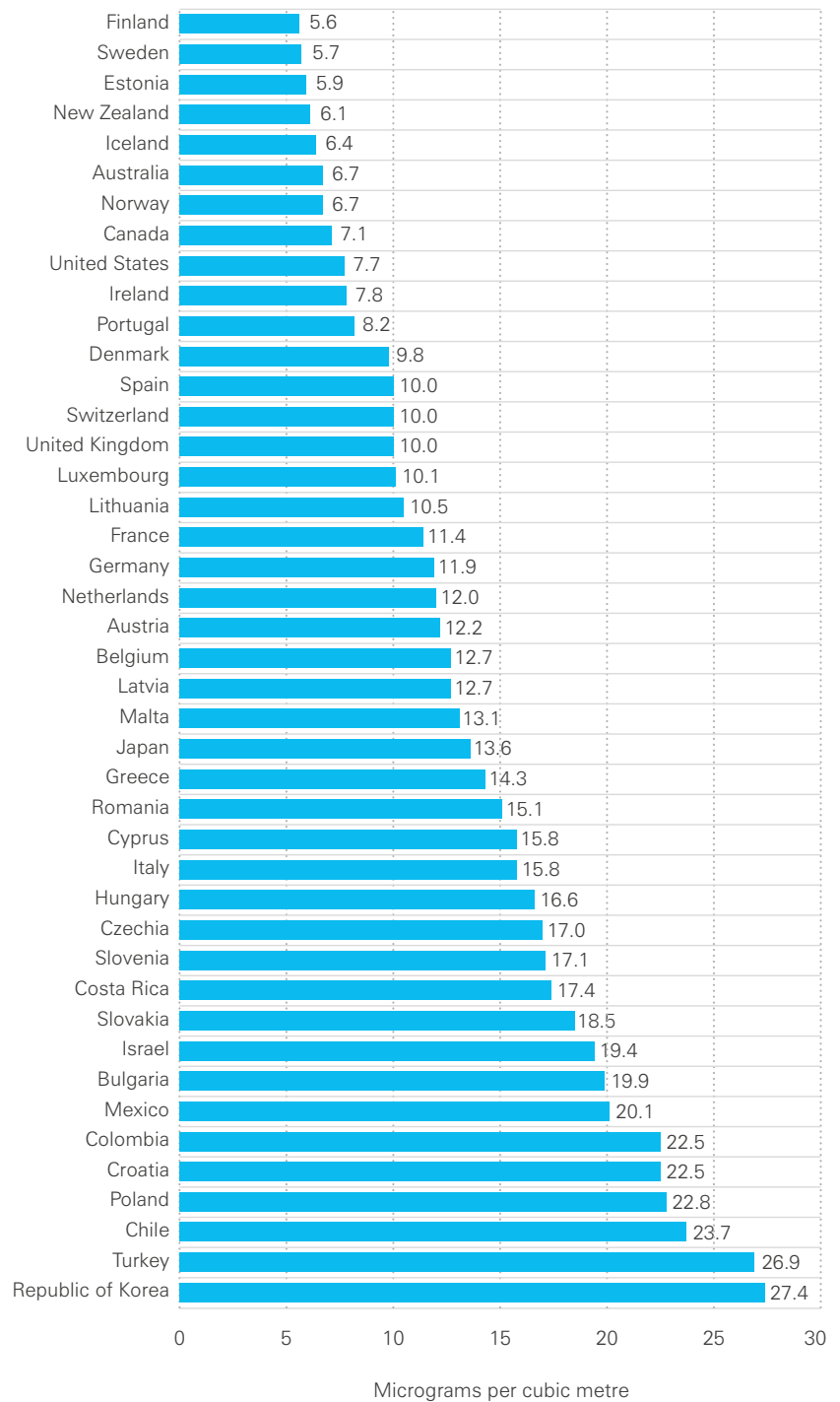
Air pollution from chemicals and gases released through energy use and production directly affects our health. In Europe, polluted air contributes to more deaths than tobacco.<sup>10</sup>

Children are more vulnerable to air pollution than are adults, because they have a smaller lung capacity and a less-developed immune system. Being shorter than adults, they are also closer to ground level, where pollution typically accumulates. Air pollution starts to harm children even before they are born – toxic air inhaled by a pregnant woman can lead to faster cell ageing of the foetus.<sup>11</sup>

Fine particulate matter in outdoor air is a common indicator of air quality: the small diameter of such matter allows it to penetrate deep into the respiratory tract.

**Figure 5: Many children in OECD/EU countries live with high levels of air pollution**

Mean population exposure to PM<sup>2.5</sup> (2019)



Source: OECD, <[https://stats.oecd.org/viewhtml.aspx?datasetcode=EXP\\_PM2\\_5&lang=en](https://stats.oecd.org/viewhtml.aspx?datasetcode=EXP_PM2_5&lang=en)>, accessed 16 February 2022.

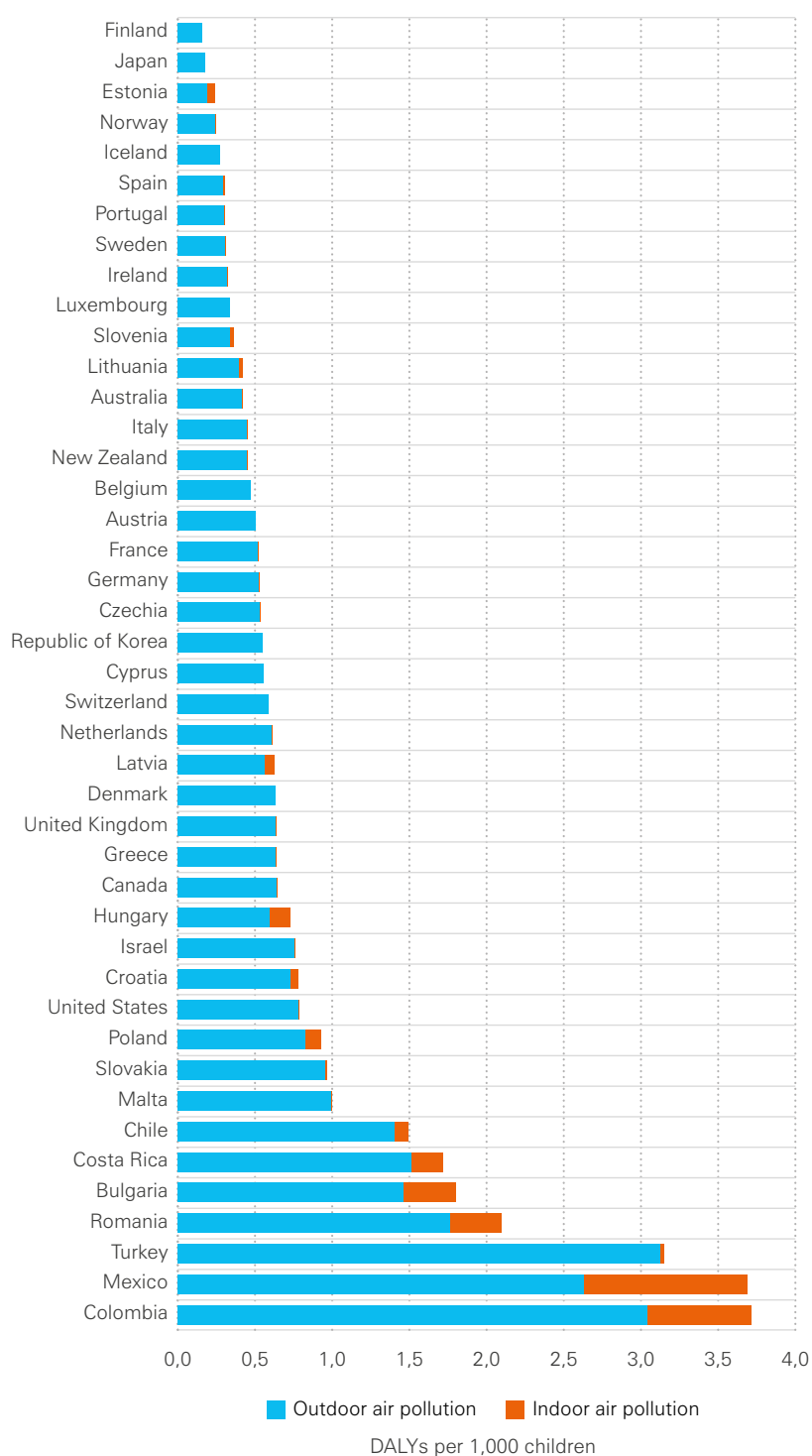
Outdoor air quality is not the only issue. The quality of indoor air is affected by factors such as cooking and smoking. This presents fundamental risks to children's health and survival. Child morbidity attributable to air pollution shows substantial variation across *Report Card* countries (see *Figure 6*). We use disability adjusted life years (DALYs) to account for the number of years of 'healthy' life lost due to pollution. Ambient particulate matter and household air pollution from solid fuels (used for heating or cooking) are jointly responsible for a substantial loss of years of healthy life among children under the age of 15. Overall, Colombia (3.7) and Mexico (3.7) had the highest number of years of 'healthy life' lost due to air pollution, while Japan (0.2) and Finland (0.2) have the lowest values.

### Water

Water is one of the essential building blocks of human life, but universal access to safe and clean water is not yet a reality in all *Report Card* countries. This is reflected in years of healthy life lost per per 1,000 children (aged 0-14) attributable to an unsafe water source, unsafe sanitation, or no handwashing facilities in the home (see *Figure 7*). Safe water, sanitation and handwashing facilities are far from being fully implemented in 13 countries. Most years of healthy life lost are in Mexico (3.8 years lost per 1,000 children), Colombia (3.7) and Turkey (2.7). The quality of essential services in these countries remains an important threat to children's health and survival.

**Figure 6: In the average country, a child is 10 times more likely to suffer from outdoor than indoor air pollution**

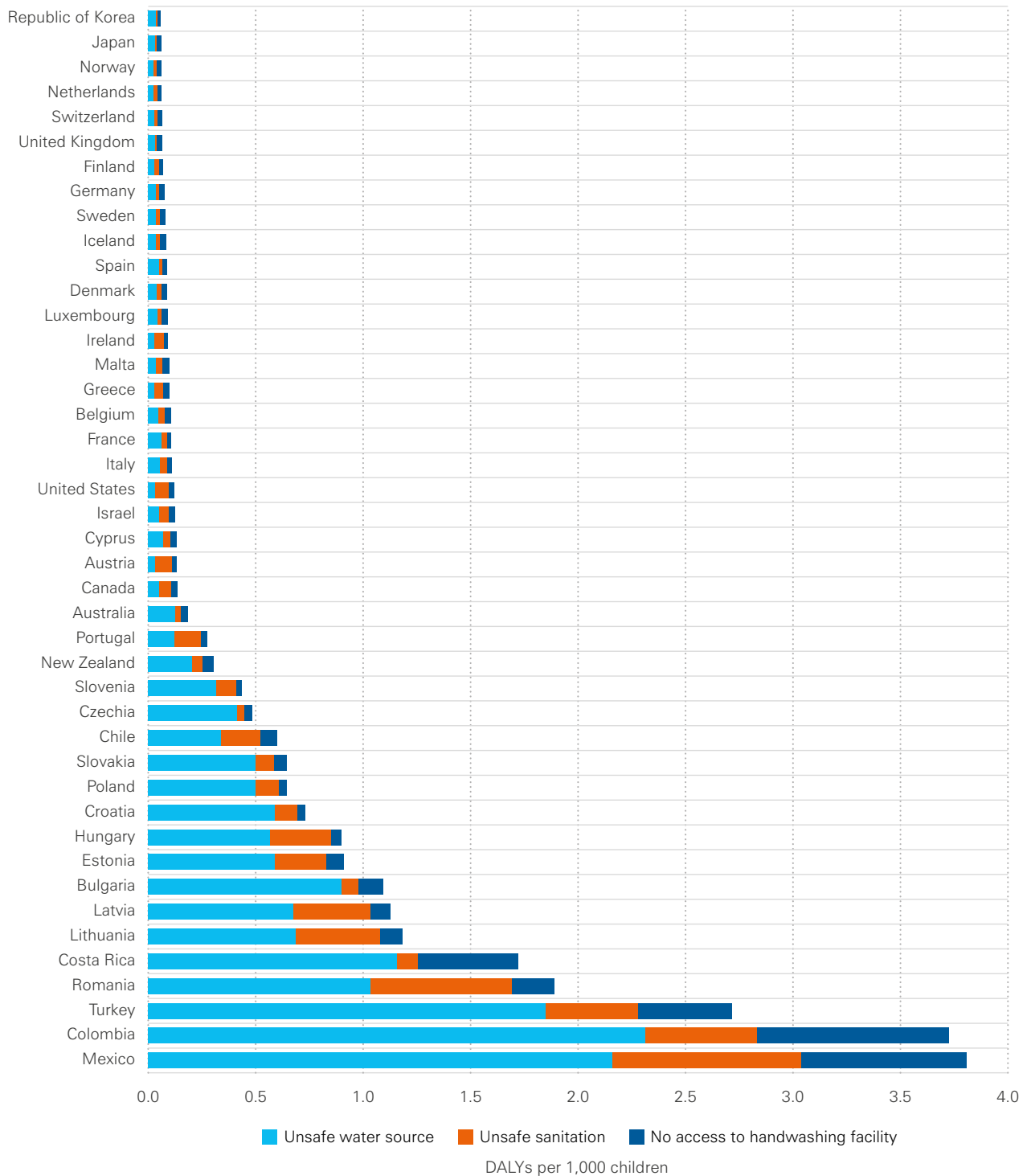
Air-related morbidity of children under the age of 15 (2019)



Source: OECD Environment Database, 'Mortality, morbidity and welfare cost from exposure to environment-related risks' <[https://stats.oecd.org/Index.aspx?DataSetCode=EXP\\_MORSC](https://stats.oecd.org/Index.aspx?DataSetCode=EXP_MORSC)> accessed on 20 March 2022

**Figure 7: Children lose more years of life from unsafe water than from inadequate sanitation and handwashing facilities put together**

Water-related morbidity of children under the age of 15 (2019)



Source: OECD Environment Database, 'Mortality, morbidity and welfare cost from exposure to environment-related risks' <[https://stats.oecd.org/Index.aspx?DataSetCode=EXP\\_MORSC](https://stats.oecd.org/Index.aspx?DataSetCode=EXP_MORSC)> accessed on 20 March 2022

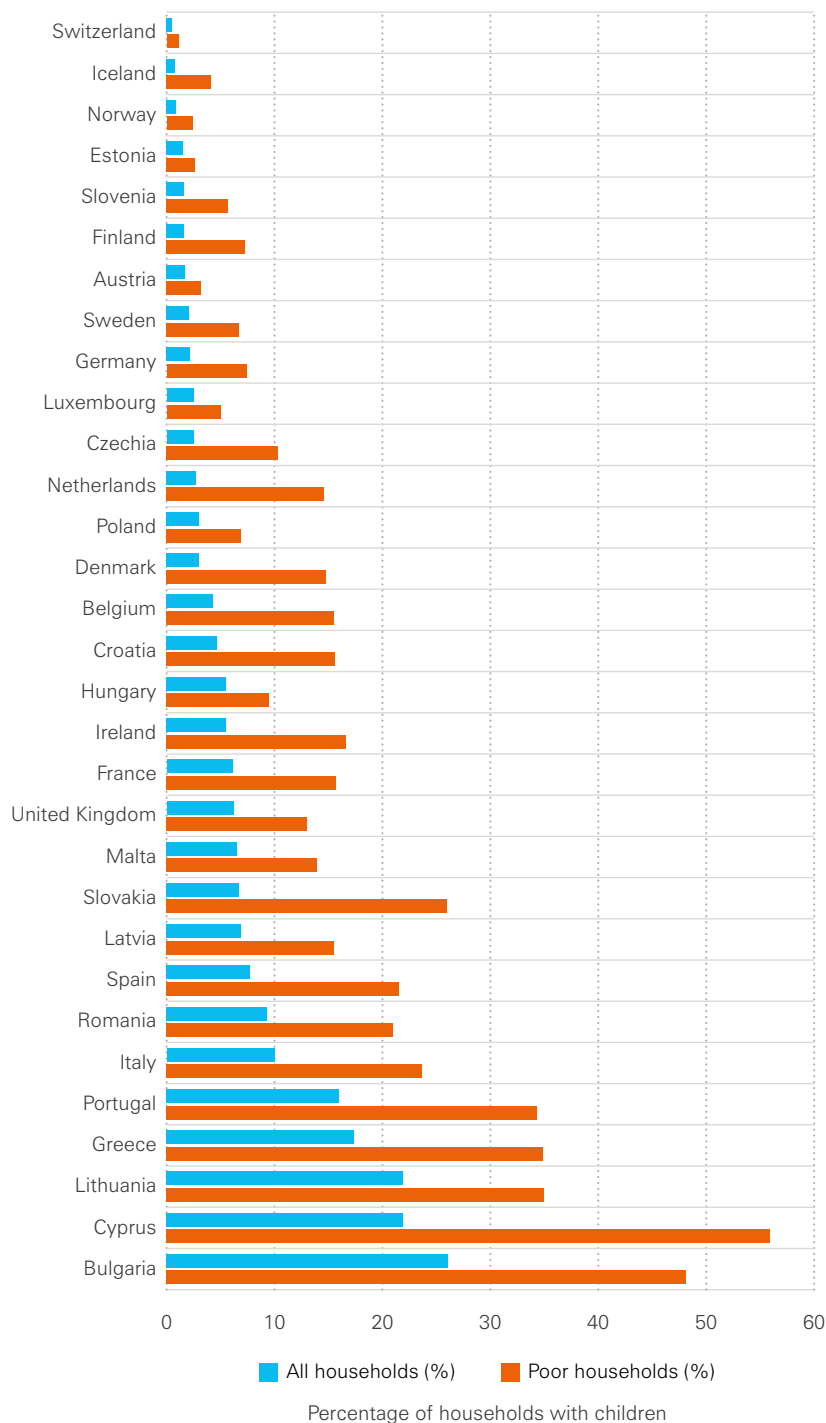
### Heat and cold

The ability to control the indoor temperature is important in maintaining safe temperatures in locations with cold winters and/or hot summers. There are also safety issues: burning solid fuels like wood may generate adequate warmth but can also pollute the air indoors.

Many households in high-income countries struggle to keep the house warm in winter, and this issue is strongly linked to socio-economic inequalities. Among 31 European countries, poor households with children were more than twice as likely to have difficulties keeping their home warm as non-poor households with children (see Figure 8).

**Figure 8: In six countries, at least 1 family in 10 with children finds it difficult to heat their home**

Percentage of households with children that have difficulty heating their homes (2019)



Note: Chart refers to 2019, except Iceland and United Kingdom (2018). Poor households defined as below 60 per cent of median equivalized income.

Source: European Union Statistics on Income and Living Conditions (EU-SILC) (indicator ilc\_mdcs01).



## Light

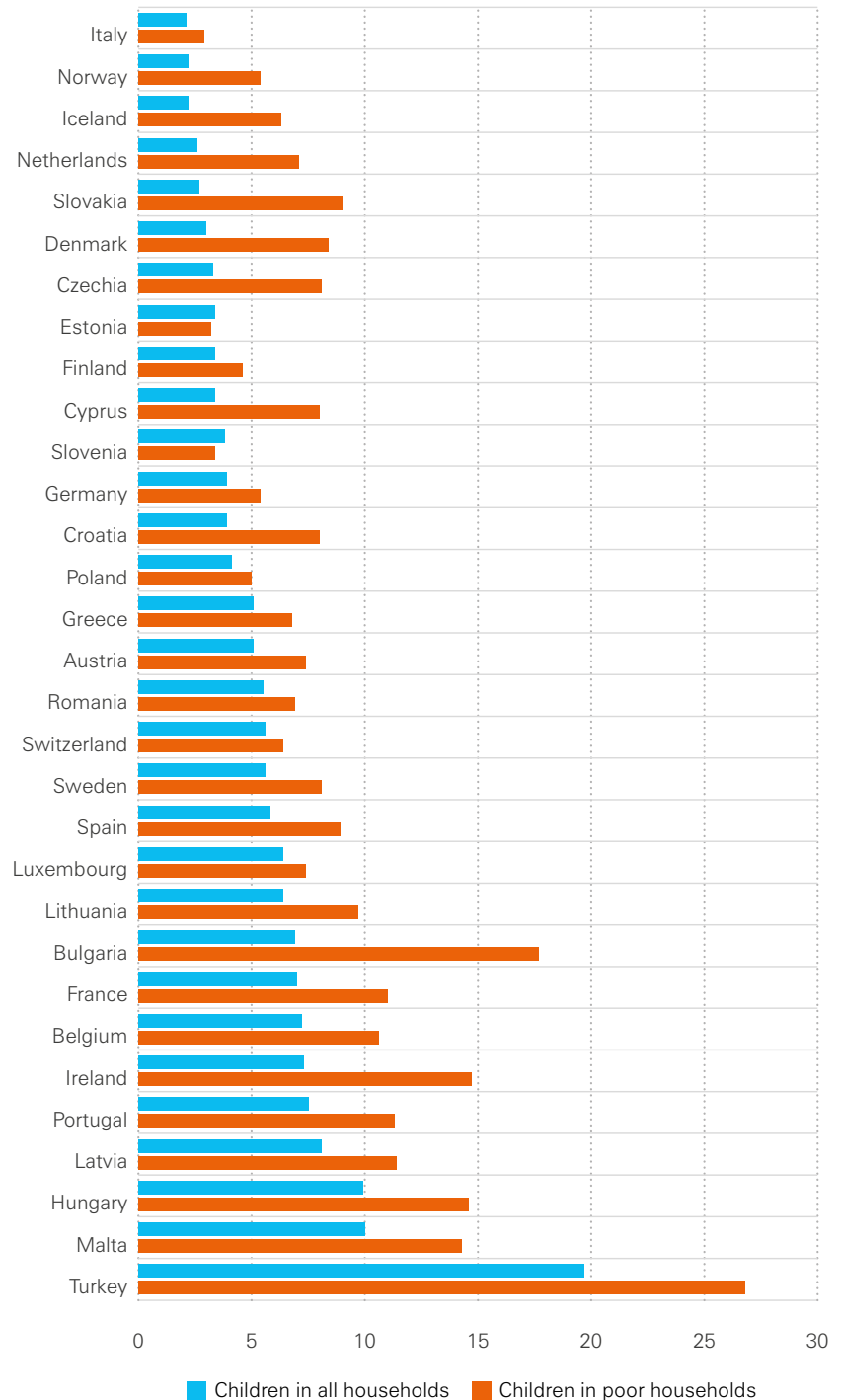
A bright home, with plenty of daylight, can support the mood of children.<sup>12</sup> Outdoor spaces at home, such as gardens or balconies, make it easier for children to enjoy direct sunlight, which improves their immune systems (via the production of vitamin D) and reduces the likelihood of chronic conditions, such as multiple sclerosis, in adulthood.<sup>13</sup>

However, nocturnal light pollution (exposure to artificial light at night) has adverse effects on children's sleep.<sup>14</sup> Sleep quality and duration are key predictors of the three child outcomes at the heart of our model: well-being, health and skills. Therefore, sleep disruption should not be taken lightly. The combination of nocturnal light pollution and underexposure to daylight is associated with higher risks of cancer and other diseases.<sup>15</sup>

In European countries, many homes do not have adequate lighting (see Figure 9). The proportion of children living in such conditions ranges from less than 3 per cent in Italy, Norway, Iceland, the Netherlands and Slovakia, to almost 20 per cent in Turkey. In almost all countries, children living in relative household income poverty are noticeably more likely to be living in homes that are too dark.

**Figure 9: In nine countries, over a tenth of poor children live without sufficient light**

Percentage of children living in homes that are too dark, by poverty status (2019)



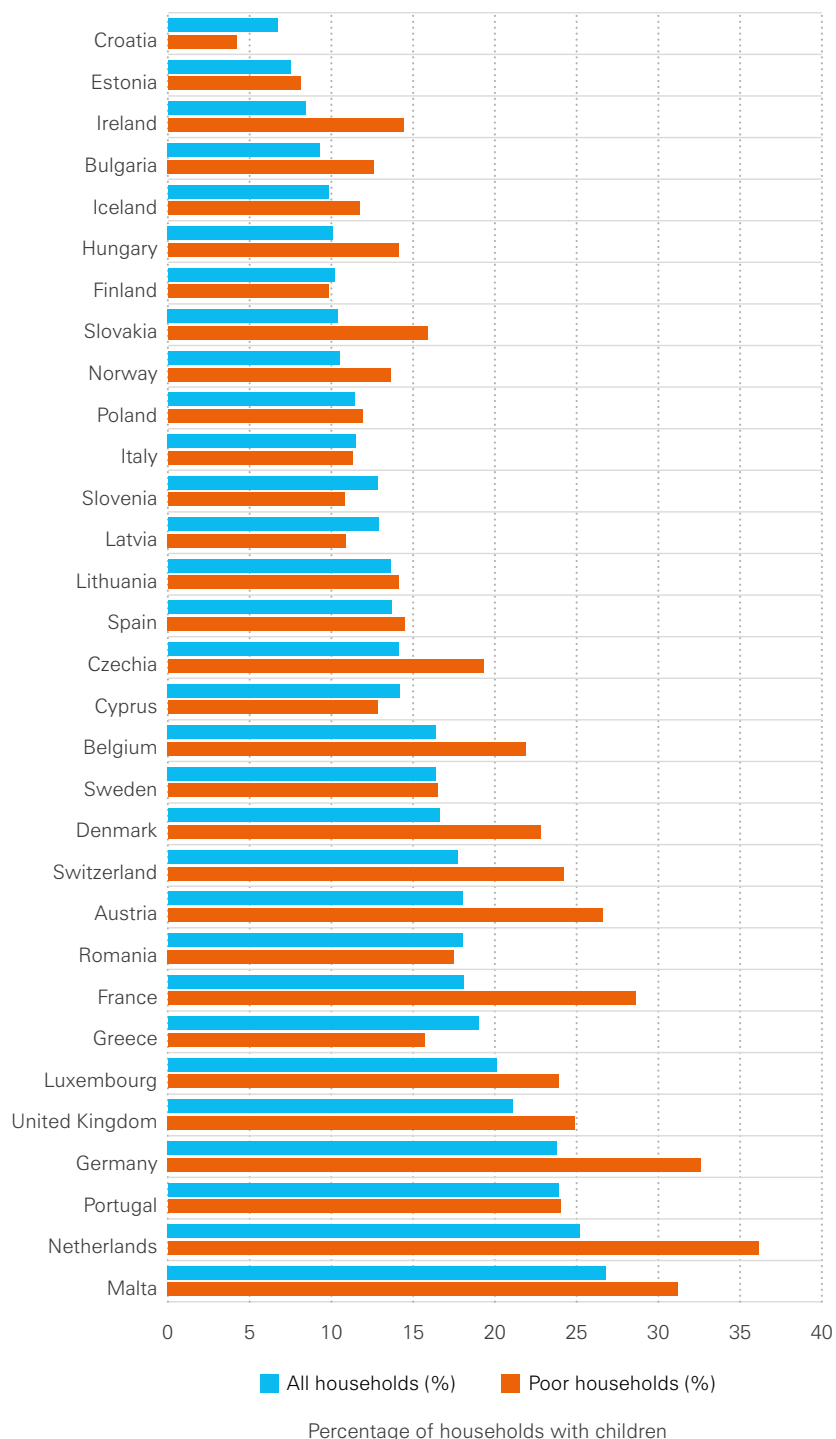
**Note:** Chart refers to 2019 (2018 for Iceland and Turkey). The United Kingdom is excluded as data was marked as 'unreliable'. Poor defined as below 60 per cent of median equivalized income.  
**Source:** EU-SILC (indicator ilc\_mdho04c).

### Noise

Noise – both indoor and outdoor – is an environmental hazard that can have serious consequences for children. Noise pollution is linked to various adverse health effects, including poor birth outcomes, stress, cognitive functioning and school performance. Traffic and aircraft noise increases stress responses in children.<sup>16</sup> There is also a relationship between noise and cardiovascular disease in both children and adults.<sup>17</sup> Figure 10 shows the percentage of households in European countries that are affected by noise. In most countries, the rate is higher among poorer households.

**Figure 10: In many European countries, over a tenth of families with children are affected by noise**

Percentage of households with children affected by noise, by poverty status (2019)



Note: Chart refers to 2019, except Iceland and United Kingdom (2018). Poor defined as below 60 pr cent of median equivalized income.  
Source: EU-SILC (indicator ilc\_mddw01).

### Hazardous substances

Hazardous substances can affect children before they are even born (see *Spotlight 2*).

While there are many hazardous and toxic substances, suitable, comparative data on health impacts for *Report Card* countries are only available for lead and pesticide pollution.

#### Lead pollution

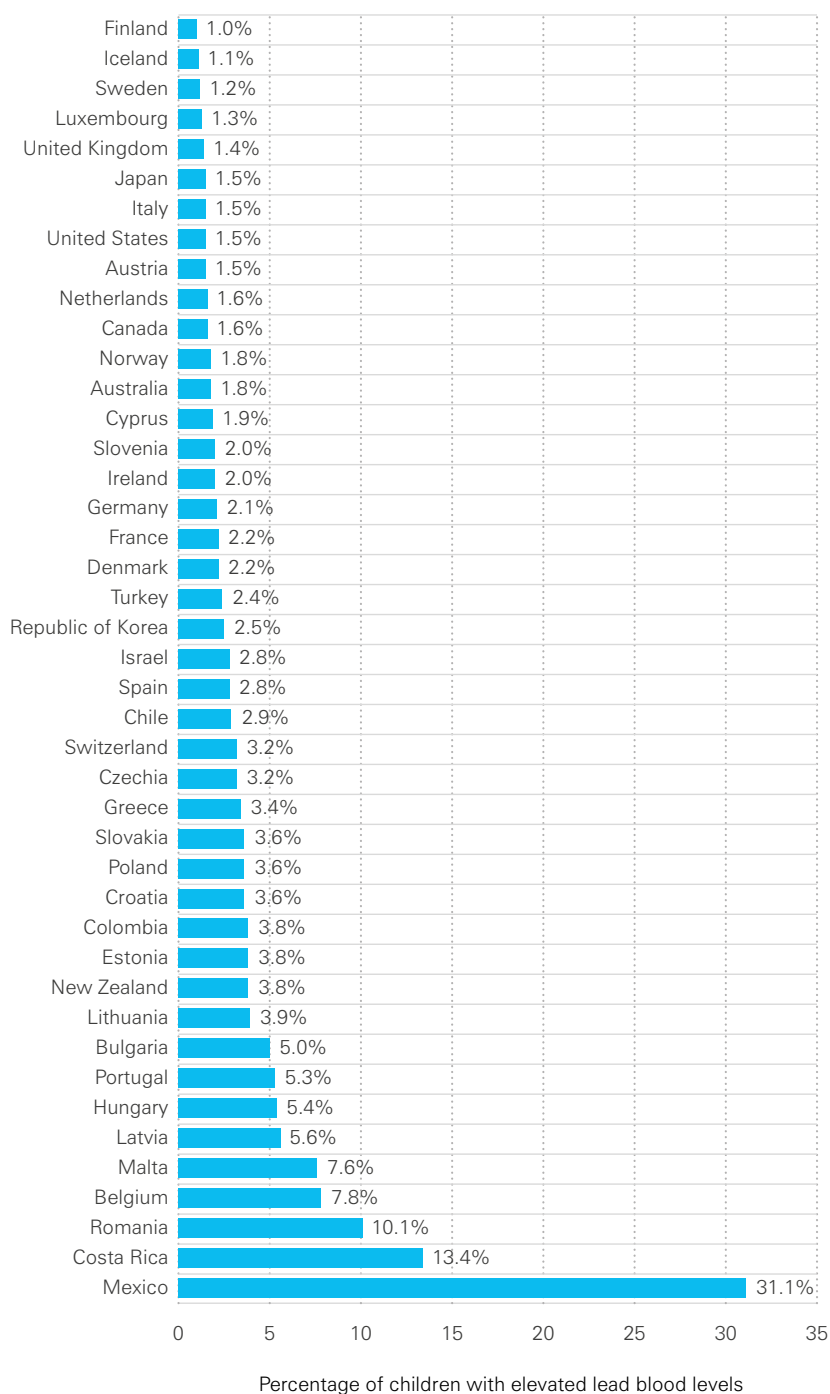
Lead poisoning affects hundreds of millions of children globally.<sup>18</sup> Lead is a neurological and cardiovascular toxicant, which is globally responsible for more deaths than malaria, war and terrorism, or natural disasters.<sup>19</sup> Not only does it affect children's bodily functions, but it also has adverse effects on attention span, memory (both long and short term) and the ability to plan and solve problems.<sup>20</sup> It can also increase aggression and antisocial behaviour.<sup>21</sup> Boys are especially vulnerable to brain damage and cognitive impairment due to lead poisoning,<sup>22</sup> probably because higher levels of oestrogen and oestradiol in girls act as neuroprotectants.<sup>23</sup> The exposure of girls to lead early on in life, or even in the womb, may disrupt their hormonal patterns and has been associated with delayed puberty.<sup>24</sup>

Children can encounter lead at home from various sources – cosmetics, paints and pigments, toys, clothing, jewellery, dishes and cookware, and even water pipes and fixtures may all contain lead.<sup>25</sup> Lead can even enter our food supplies through the soil or water.<sup>26</sup> Historical pollution from leaded petrol can still be found in soils around the world.<sup>27</sup> In the past, lead was present in children's products, such as painted toys. Today, it can still feature in lead-glazed ceramics (e.g., in Mexico), lead pellets used in hunting (a major source of lead among children who eat wild game in Norway), new paint, and in spices that are mixed with lead to increase the weight or add colour (often produced in South Asia, but imported around the world).<sup>28</sup>

There are no safe levels of lead – the detrimental effects of lead exposure appear even at very low levels of lead concentration in the bloodstream.<sup>29</sup> In all *Report Card* countries, at least 1 child in a 100 had elevated levels of lead in the blood (see *Figure 12*). In most countries, the proportion is more than 1 in 50; and in Costa Rica and Mexico, 13 per cent and 31 per cent of children, respectively, have elevated levels of lead in their blood. Explanations for the high figure in Mexico could include the use of lead-glazed ceramic tableware and the less-stringent regulation of lead content in paints used in the home.<sup>30</sup>

**Figure 11: In nine OECD/EU countries, more than 1 child in 20 is being poisoned by lead**

Percentage of children with levels of lead in the blood of over  $5\ \mu\text{g}/\text{decilitre}$  (2019)



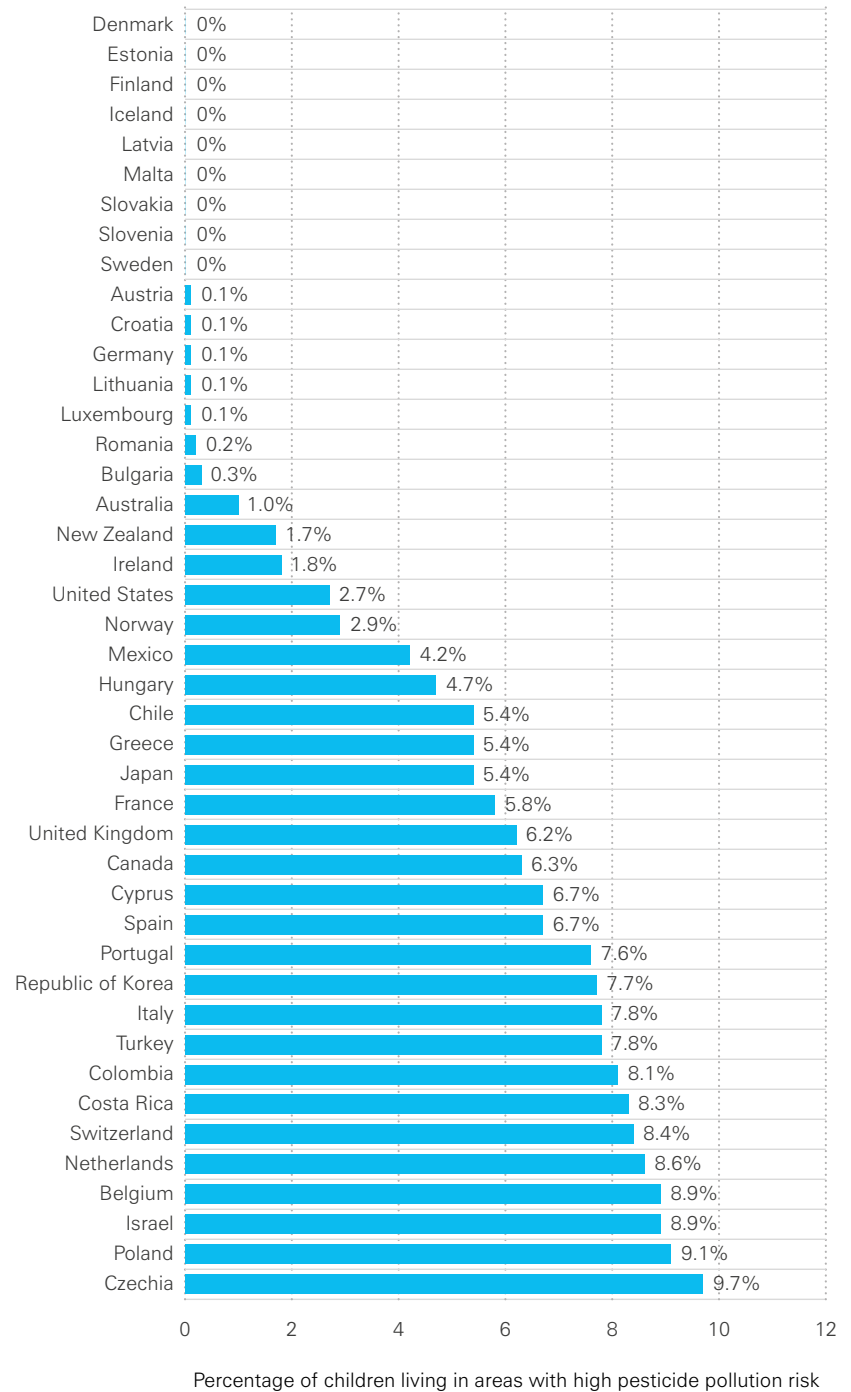
Source: Own calculations based on number of children with elevated levels of lead in the blood from Rees and Fuller (2021) and United Nations Department of Economic and Social Affairs (2021) population projections.

### *Pesticide pollution*

Agricultural activities interact with the environment in a myriad of ways. First, and perhaps most obviously, agricultural activities require land: according to recent estimates, 37 per cent of the global land surface is used for agriculture.<sup>31</sup> The clearing of land for crops and grazing, and poor agricultural practices, are major drivers of environment degradation.<sup>32</sup> Moreover, agriculture, forestry and other land use are responsible for 24 per cent of global greenhouse gas emissions.<sup>33</sup>

Agricultural activities can also release toxic materials that have a direct impact on physical health. Children are at higher risk than adults of suffering serious health effects from exposure to pesticides. Such pollution has been linked to damage to children's nervous, cardiovascular, genitourinary, digestive, reproductive, endocrine, blood and immune systems. It has also been associated with cancer, including childhood leukaemia. And it can cause harm to skin and eyes, as well as developmental delays.<sup>34</sup> Early exposure to pesticides may likewise be linked to attention deficit disorder and autism spectrum disorder, although more research is needed on this topic.<sup>35</sup>

**Figure 12: In most OECD/EU countries, more than 1 child in 20 lives in an area of high pesticide risk**  
 Percentage of children under 18 living in areas with high pesticide pollution risk (2019)



Source: UNICEF (2021).

## Spotlight 2 Child brain development in the womb is particularly sensitive to environmental chemicals – results from the NeuroTox study

Chemical pollution is a continuously increasing problem and among the largest threats to child health and development worldwide. Since the 1950s, over 140,000 chemicals and pesticides have been produced,<sup>36</sup> most of which have never been tested for child safety or for any toxic effect on the developing brain. Meanwhile, since the 1980s, attention deficit hyperactivity disorder (ADHD) and autistic spectrum disorder (ASD) have come to be diagnosed increasingly frequently in developed countries, leading to concerns that hazardous substances in the environment may be among the causes of these disorders.<sup>37</sup> Environmental toxicants in our food and drinking water, in appliances, cosmetics and the air may adversely affect child brain development, even as the foetus grows in the womb.

Expectant mothers are exposed to chemicals daily, and some of them are stored in the body for long periods of time. During pregnancy and breastfeeding, toxicants can pass from mother to child. Infants are also exposed to toxicants through the food, water and consumer products they come into contact with. Young children's bodies are less able than those of adults to protect themselves from toxic chemicals, and their brains are particularly sensitive to the impact of these. Levels that would be considered tolerable for adults may be harmful for children,<sup>38</sup> and may cause irreversible effects that emerge in later childhood and adolescence, including mental health and behavioural problems, learning disabilities and cognitive impairments.<sup>39</sup>

The NeuroTox study investigated pregnant women's exposure to toxins and the subsequent development of their children, using 3,500 mother-child pairs from the Norwegian Mother, Father and Child Cohort study. On the basis of these data, the study explored the potential link between the levels of environmental toxicants in

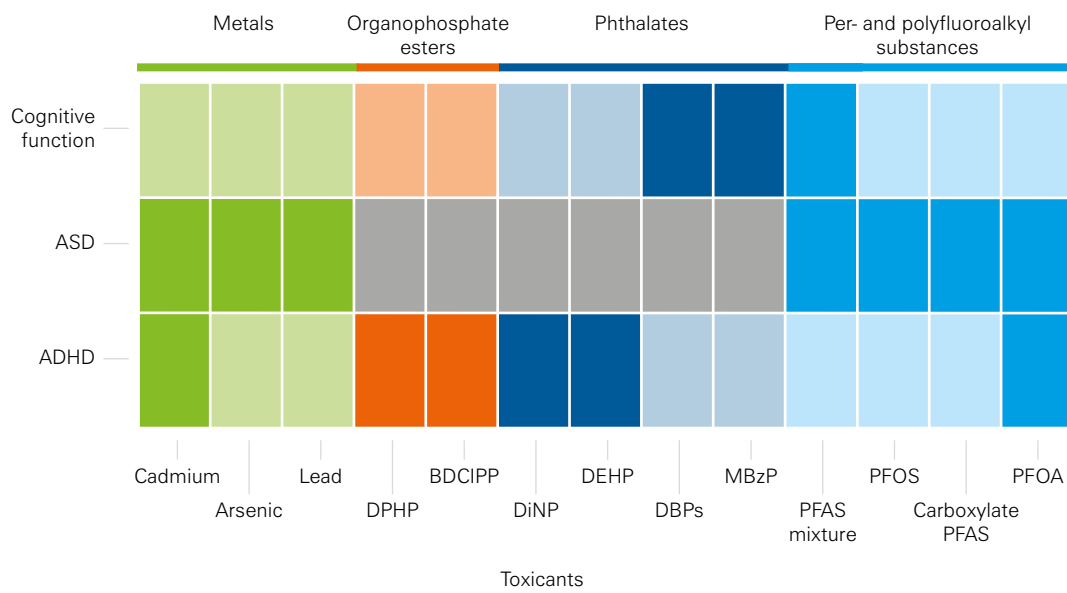
pregnant women's blood and urine, and the later risks to their children of ADHD, ASD and cognitive impairment.

The findings show a number of connections:

1. Elevated maternal levels of some phthalates<sup>40</sup> and per- and polyfluoroalkyl substances (PFASs)<sup>41</sup> were associated with a reduction in cognitive functions (such as working memory) in the child (see *Figure 13*).
2. Elevated maternal levels of several toxic metals (cadmium, lead and arsenic)<sup>42</sup> and of PFASs (e.g. perfluorooctanoic acid (PFOA) and perfluorooctane sulfonic acid (PFOS))<sup>43</sup> were associated with increased risk of ADHD and/or ASD in the child.
3. Some plastic toxicants (organophosphate esters (OPEs) and phthalates) were associated with increased risk of ADHD.<sup>44</sup>

These toxic chemicals are found in food, drinking water as well as in everyday items that we cook with and store our food in, put on our bodies and consume: packaging, utensils, pots and pans, cosmetics, fabrics and even medical products.

The burden of mental health conditions attributable to pollution, and in particular hazardous chemicals in the environment, is hugely underestimated.<sup>45</sup> The results from the NeuroTox study indicate the need for stronger global action to increase knowledge of the harmful impact of chemical exposure, and to prevent early life exposure to toxicants.

**Figure 13: Impact of hazardous chemicals in the environment on child brain development**

**Note:** Toxicants are colour-coded by group: metals in green; OPEs in orange; phthalates in navy blue; and PFASs in turquoise. Darker filled boxes denote an adverse effect, while a lighter shade indicates no finding or not yet investigated. Grey boxes indicate that the relationship was not tested.

DPHP = diphenyl phosphate; BDCIPP = bis(1,3-dichloro-2-propyl) phosphate; DiNP = diisononyl phthalate; DEHP = di(2-ethylhexyl) phthalate; DBP = Dibutyl phthalate (including mono-n-butyl phthalate and mono-iso-butyl phthalate); MBzP = mono-benzyl phthalate.



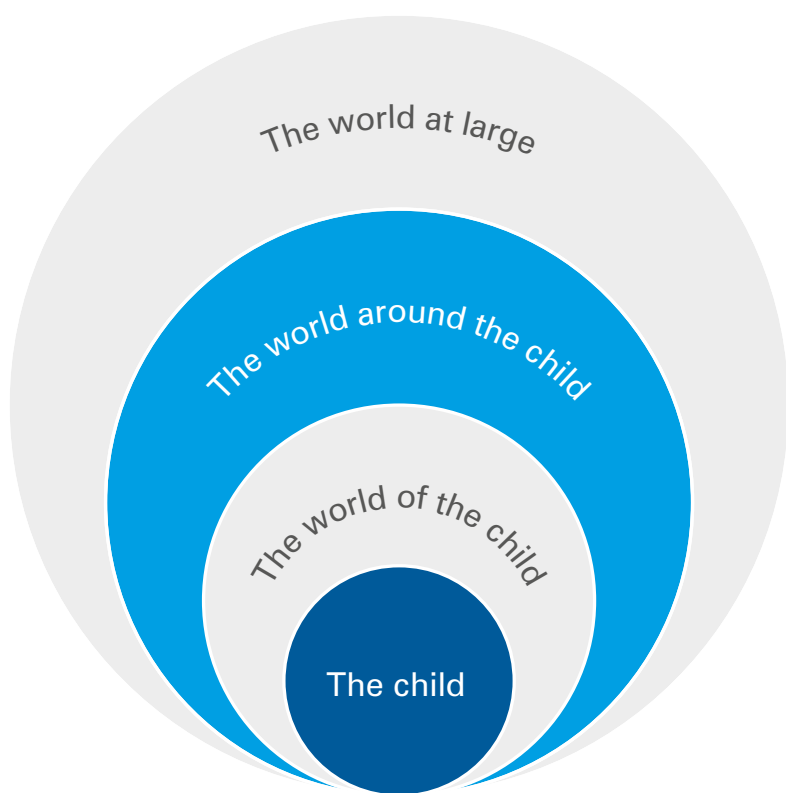




**SECTION 4**  
**THE WORLD AROUND THE CHILD**

## SECTION 4

# THE WORLD AROUND THE CHILD



This section looks at the aspects of the natural and built environment with which children interact directly. The quality, enjoyability and safety of homes and surrounding public spaces influence children's daily lives. They have implications for the children's physical and mental health, as well as for their cognitive, emotional and social development. Interactions between housing quality and the quality of local surroundings further shape children's well-being. Issues to do with transport systems and mobility likewise have many implications for children's well-being and development. Our focus is on the links between these factors and children's outcomes: mental well-being, physical health and skills.

### The home

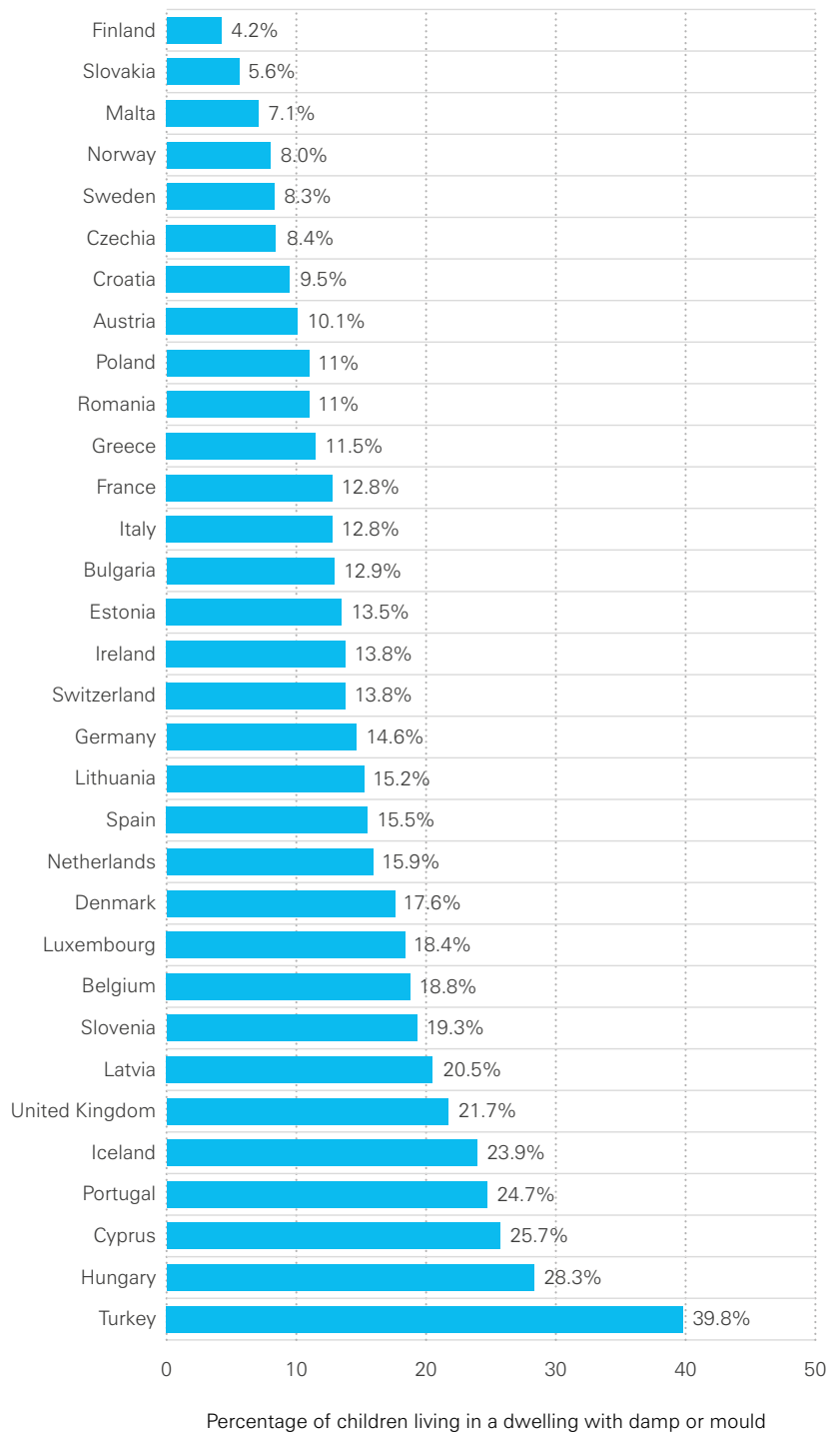
Children, especially in the early years, spend much of their time indoors at home.<sup>46</sup> They are particularly susceptible to the effects of the home environment – not only because of the amount of time they spend in it, but also because of their unique physiological, biological and social characteristics. Their immune systems are still developing, they tend to breathe more rapidly and have more hand-to-mouth activity than adults, rendering them more exposed to pollutants.<sup>47</sup> Therefore, better conditions inside the home can go a long way in promoting children’s health and development.

Section 3 discussed the way in which the presence and quality of facilities in the home can affect children’s well-being. For example, a lack of safe cooking or heating facilities forces families to burn solid fuels, which pollute indoor air. Similarly, even if the infrastructure of water is adequate, basic facilities need to be present in the home for children to benefit fully from them.

### Damp

Damp and mould are major environmental risk factors within the home. Upper respiratory infections, asthma and bronchitis are substantially and significantly associated with mould and damp in the dwelling.<sup>48</sup> For instance, estimates of the proportion of asthma cases attributable to these factors ranges from 6 per cent in one study in the Netherlands to 20 per cent in another study in the United States.<sup>49</sup> According to European data, even in Finland – the highest-ranked country – more than 1 child in 25 lives in

**Figure 14: In 22 countries, over a tenth of children live in a damp house**  
Percentage of children living in a dwelling with damp or mould (2019)



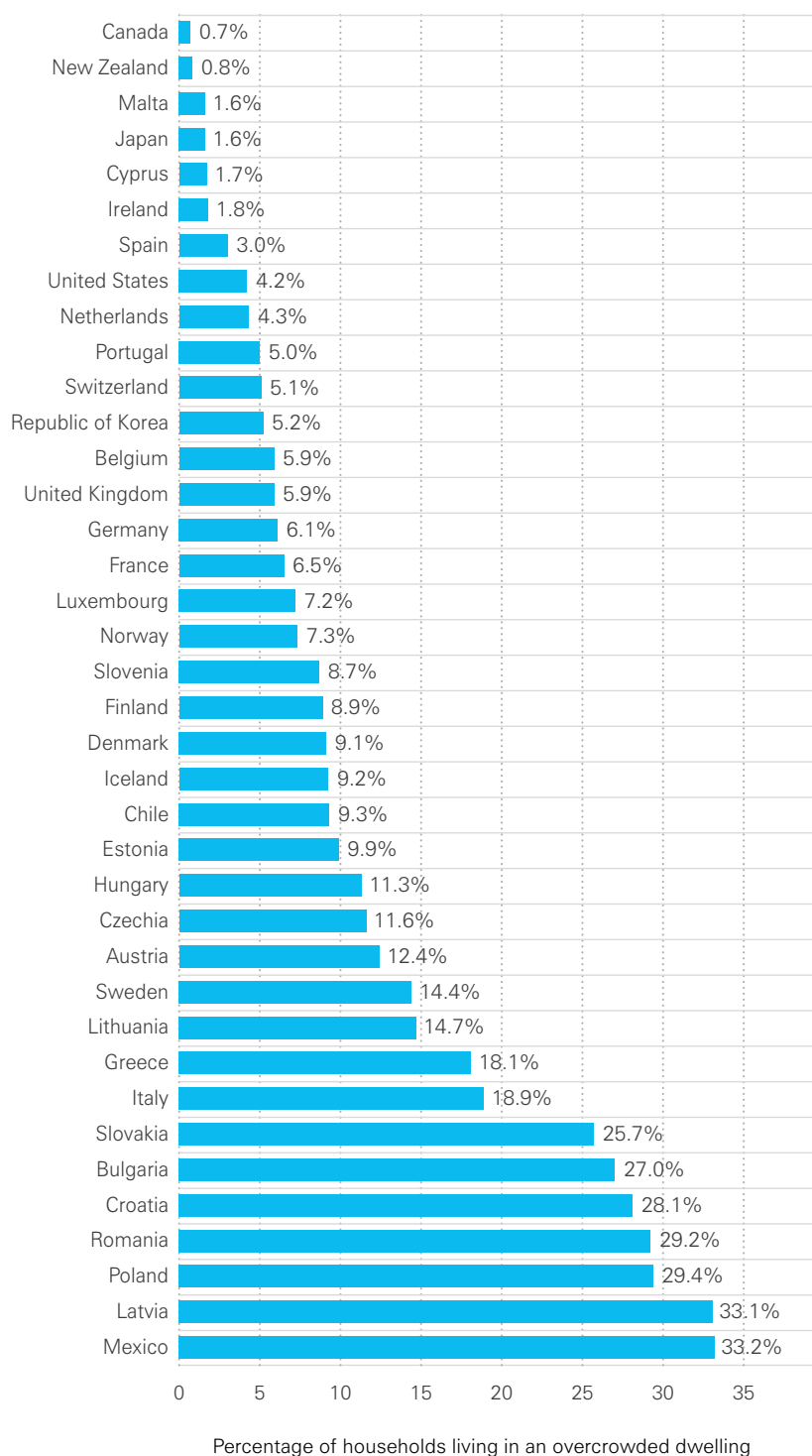
**Notes:** Indicator refers to the child population living in a dwelling with a leaking roof, damp walls, floors or foundation, or rot in window frames or doors. Data refer to 2019 (2018 for Iceland and Turkey).  
**Source:** EU-SILC (indicator ilc\_mdho01c).

a home with wet walls, mould or rotting doors or window frames. In Turkey, Hungary, Cyprus, Portugal, Iceland, the United Kingdom and Latvia, more than one child in five is exposed to damp and mould.

Space in the home can affect various aspects of children's lives, including their health, social relationships, privacy and academic performance. Overcrowding in the home creates social tension (including between adult members and children) and has a negative effect on the quality of parent-child relationships and household members' physical and mental health. Surveys have found overcrowding to be related to socio-economic status, meaning that lower-income households are more likely to have inadequate living space.<sup>50</sup> Insufficient space at home can contribute to the intergenerational transmission of social inequalities.

The home environment also plays an important role in children's education – particularly since the COVID-19 pandemic forced schools to close and students to study at home. Overcrowding has strong adverse effects on learning outcomes.<sup>51,52</sup> In Latvia and Mexico, more than one household in three, and in Slovakia, Bulgaria, Croatia, Romania and Poland, more than one in four, suffers from overcrowding (see Figure 15). Households in Canada and New Zealand have the most space available at home, with less than 1 per cent of them experiencing overcrowding.

**Figure 15: In the average country, one household in nine is overcrowded**  
Percentage of households living in an overcrowded dwelling (2019)



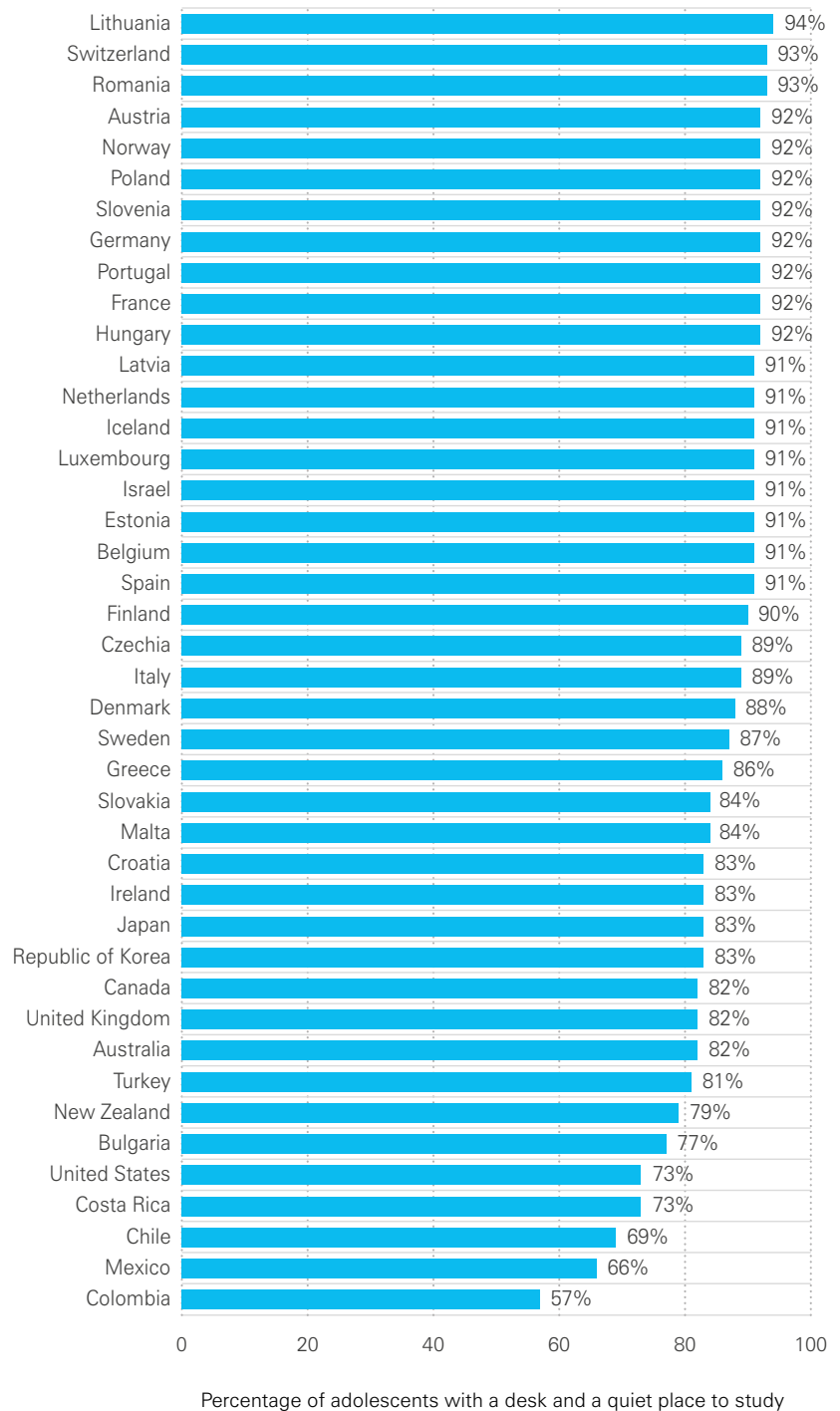
Source: OECD Affordable Housing Database, <<https://www.oecd.org/housing/data/affordable-housing-database/housing-conditions.htm>>, accessed 16 February 2022.

Having a quiet space of one's own provides both privacy and a good environment in which to study. On average, almost 9 adolescents in 10 (86 per cent, unweighted average) in *Report Card* countries said they had their own desk and a quiet place to study in 2018 (see *Figure 16*). However, more than 30 per cent of 15-year-olds in Chile, Mexico and Colombia did not have these facilities. In all the countries included in the OECD Programme for International Student Assessment (PISA), children who had a quiet place to study at home registered higher science test scores than children who did not. However, this difference in test scores is probably not caused solely by having a quiet place to study. The socio-economic position of the family, for instance, could affect both student performance and the space available in the home. In other words, some of the relationship between test scores and private space could be explained away by household socio-economic status.

This issue of educational inequalities related to the home learning environment has come to the fore during the lockdowns triggered by the COVID-19 pandemic. Children have been educated at a distance for lengthy periods of time, and many households, particularly poorer ones, have lacked the space and equipment for this to happen effectively.

**Figure 16: In an average country, one in seven 15-year-olds lacks facilities for studying**

Percentage of schoolchildren aged 15 with their own desk and a quiet place to study (2018)



Source: PISA 2018.

### Severe housing deprivation

Even in wealthier countries, children often experience overlapping deprivations in their home environments. Here we look at the risk of severe housing deprivation, understood as overcrowding overlapping with either damp, darkness, or inadequate sanitation. The risk varies not only across countries, but also across different age groups within a country (see Figure 17).

In most *Report Card* countries, the youngest children are those least likely to live in conditions of severe housing deprivation: families and societies do a better job of providing safe and healthy homes for the youngest. In Romania, Latvia and Lithuania, the gap between younger and older children in terms of the rate of severe housing deprivation is rather large, with 12- to 17-year-olds being those most at risk. In Romania, more than one child in four in this age group lives in a dwelling that is both overcrowded and either damp or has insufficient light or inadequate water or sanitation. In Denmark and Iceland, a larger share of children under the age of 6 experience severe housing deprivation than in the case of older children.

Severe housing deprivation among children appears to be more common among the EU Member States with higher child poverty rates, signalling the predictive role of socio-economic status in housing conditions.

**Figure 17: In seven countries, over a tenth of adolescents live in housing deprivation**

Percentage of children living in severe housing deprivation, by age group (2020)



**Note:** Chart refers to 2020, except for Norway, Cyprus, Spain, Iceland, Germany, Slovenia, France, Sweden, Croatia, Denmark, Lithuania, Bulgaria, Romania (2019); Slovakia and Italy (2018). Eurostat defines severe housing deprivation as “the percentage of population living in the dwelling which is considered as overcrowded, while also exhibiting at least one of the housing deprivation measures. Housing deprivation is a measure of poor amenities and is calculated by referring to those households with a leaking roof, no bath/shower and no indoor toilet, or a dwelling considered too dark.”  
**Source:** EU-SILC (indicator ilc\_mdho06a).

## The neighbourhood

We now turn to the places where children spend time beyond the home. The quality, enjoyability and safety of public spaces around them influence many aspects of their lives, such as their physical and mental health, skills and social relationships.

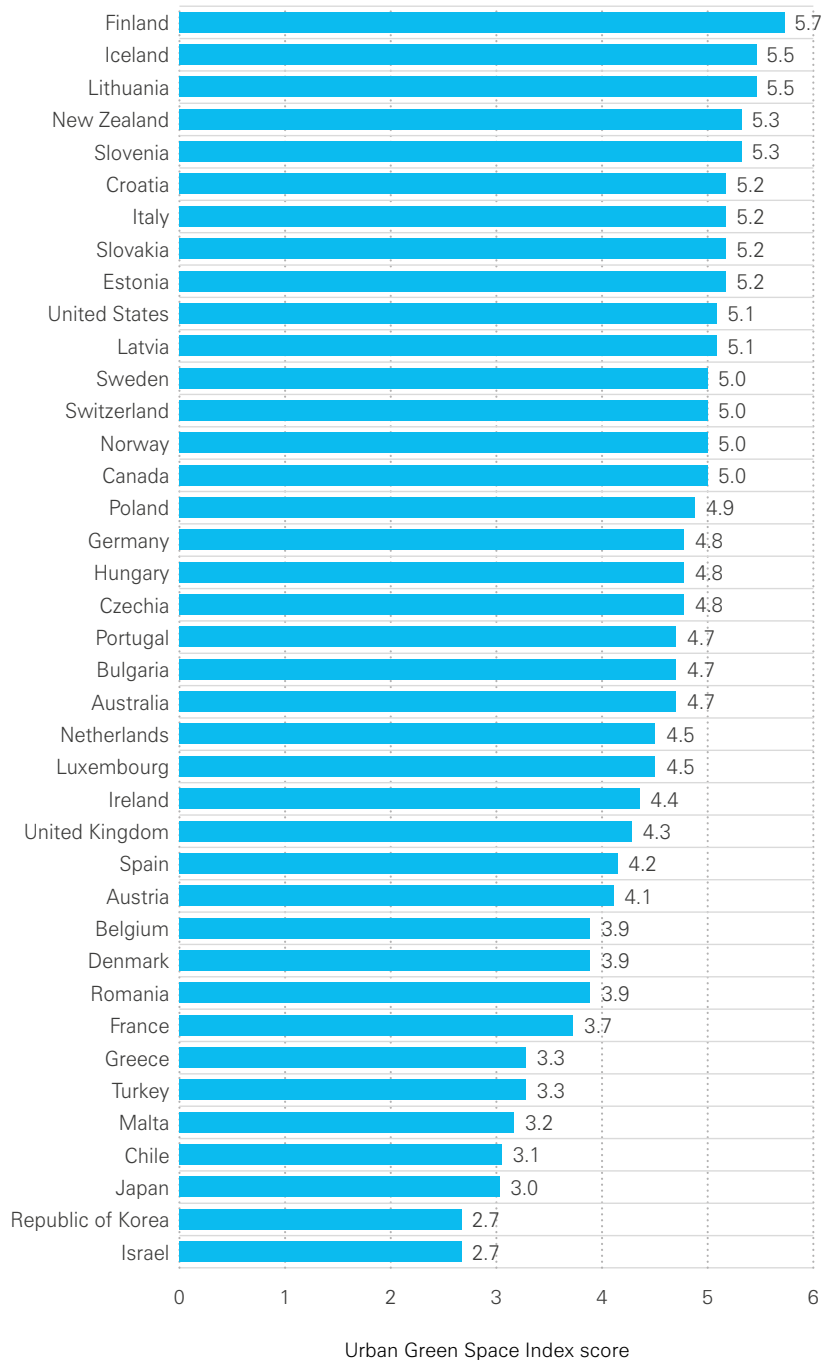
### Access to green space

Child-friendly neighbourhoods provide children with the opportunity to play and exercise outdoors. The World Health Organization (WHO) lists green spaces among the social determinants of health. Physical activity in nature improves emotional well-being, and sedentary childhoods are associated with a higher likelihood of developing mental health problems.<sup>53</sup> Better mood, higher self-esteem, enhanced resilience to daily stressors<sup>54</sup> and lower prevalence of depression and anxiety are some of the established mental health effects of green spaces. Experimental evidence finds that the proximity of green spaces and walks in nature can reduce the symptoms of attention deficit disorder and increase self-discipline in affected children.<sup>55</sup>

Recent data that rely on satellite imagery of urban spaces indicate rather stark differences in the extent to which parks and green recreational areas are available to city dwellers in *Report Card* countries.<sup>56</sup> Among those countries with data, Finland leads in terms of urban green spaces, followed closely by Iceland and Lithuania. Cities in Israel and the Republic of Korea are the least green: their Urban Green Spaces Indexes rank

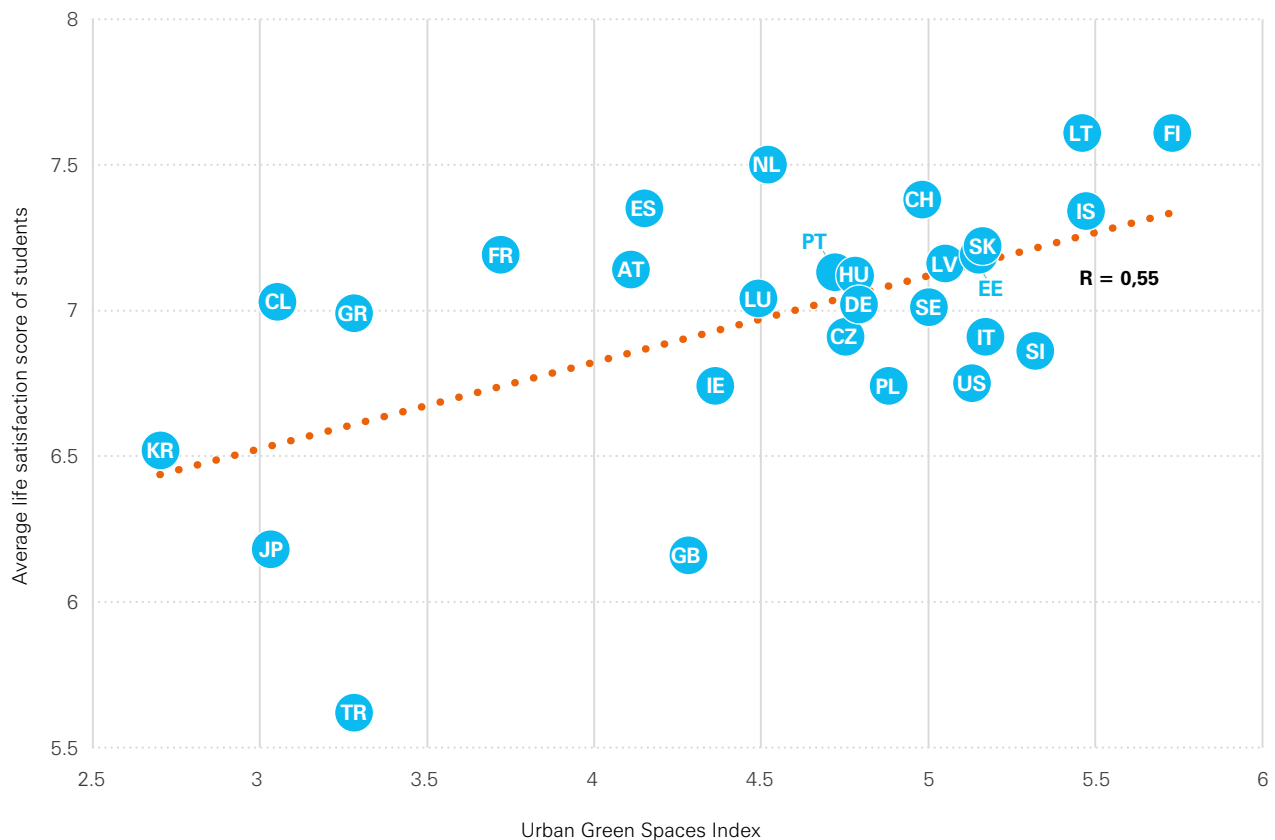
**Figure 18: Finland, Iceland and Lithuania have twice as much urban green space per person as the Republic of Korea and Israel**

Urban green space per person (2018)



**Note:** Urban green spaces index is calculated based on the Normalized Vegetation Index per capita in urban areas. Satellite imagery was collected during the summer: June to September 2018 for the Northern Hemisphere and December 2017 to February 2018 for the Southern Hemisphere.  
**Source:** Kwon et al. (2021). Urban green space and happiness in developed countries. *EPJ Data Science* 10(1).

**Figure 19: Children in greener countries are more satisfied with life**  
Life satisfaction of 15-year-olds (2018) and urban green spaces (2018)



Source: PISA 2018 and Kwon et al. (2021).

them the lowest, with their urban areas having less than half the green spaces of Finnish cities (per capita). This study found that life satisfaction among adults is higher in countries with more urban green spaces. To see whether this relationship holds for children as well, Figure 19 plots students' average life satisfaction scores from PISA 2018 against the Urban Green Spaces Index. Although many more factors may be at play, we see a positive correlation.

Access to green spaces is even more important for children living in high-density, high-rise housing, given the lack of gardens and greenery connected to the home.

A sense of security may also contribute to children enjoying their neighbourhoods. While violence and crime are often strongly associated with socio-economic markers of the neighbourhood, prior research has found elements of the built environment that can strengthen people's sense of security and reduce the incidence of crime.

At night, streetlights transform the urban environment: they have a large impact on what we see and how we feel. Hence, streetlights can provide reassurance and a sense of security, particularly among people who are fearful of using public spaces.<sup>57</sup> Streetlights also came up in our consultations as elements of the built environment that contribute to children's sense of security. Classical works of urban planning agree that neighbourhoods that accommodate walking, sitting and generally spending time make more secure urban environments.<sup>58</sup>



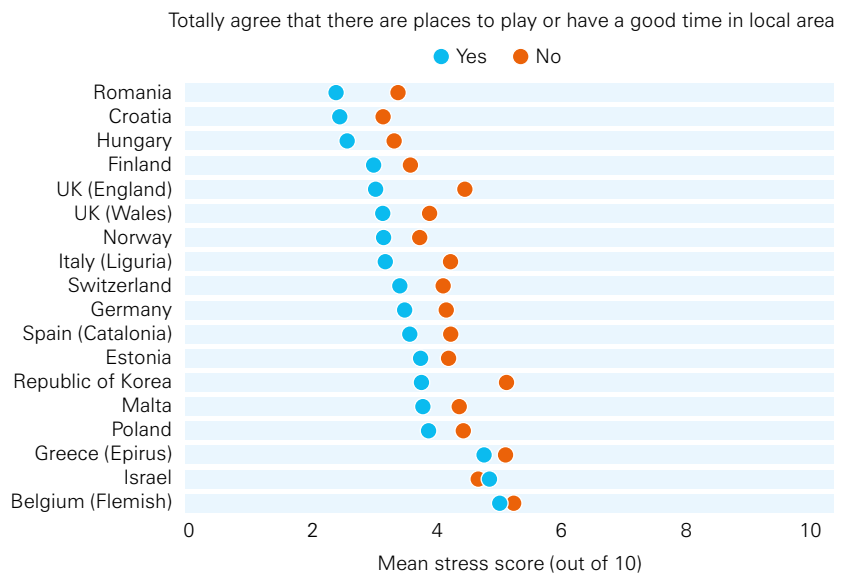
### Play and leisure facilities

Access to neighbourhood facilities for play and leisure is a key environmental dimension that can impact children's well-being. *Innocenti Report Card 16* showed that, across a sub-group of *Report Card* countries for which data are available, children who felt that there were enough places in their local area where they could play and spend time also reported higher levels of happiness. Figure 20 shows a similar picture for children's self-reported feelings of stress. In most of these countries, children who felt there were good recreation facilities also reported lower stress levels.

As Figure 21 shows, older children were less likely to report that their neighbourhoods had adequate recreation facilities. There were no consistent gender differences in this respect, with variations in both directions in different countries.

Despite policy concerns with the planning of accessible and walkable neighbourhoods, few studies include people with different abilities and of different ages.<sup>59</sup> The quality of neighbourhood environments shapes the agency, mobility and social participation of all children, but especially of those with disabilities.<sup>60</sup> Data on the accessibility of public spaces for children with mobility impairments are scarce: to the best of our knowledge, there is no information that would enable a comparison of countries' performance in this respect.

**Figure 20: Children who live in areas with places to play are less stressed**  
Feelings of stress and neighbourhood recreation facilities (2017–2019)

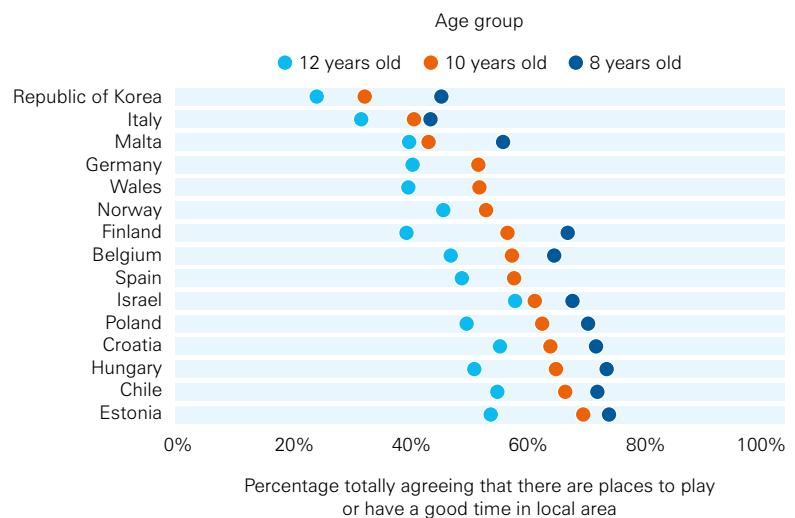


**Note:** Children aged around 10. Representative schools-based samples of whole countries or specific regions (where indicated in brackets).

**Source:** Children's Worlds survey, Wave III.

**Figure 21: As children grow up, they become less satisfied with places to play in their neighbourhood**

Age-group differences in children's satisfaction with neighbourhood recreation facilities



**Note:** Representative schools-based samples of whole countries or specific regions (where indicated in brackets).

**Source:** Children's Worlds survey, Wave III.

## Spotlight 3 The Child-Friendly Cities Initiative: Wanju County, Republic of Korea

In child-friendly cities, children's rights, voices and priorities form an integral part of decisions and planning. The UNICEF Child-Friendly Cities Initiative brings local government, civil society organizations, the private sector, the media and academia together with children themselves, to help make the cities more child friendly. The initiative was launched in 1996 and is now being pursued in 48 countries.

Wanju County, in the Republic of Korea, was the second municipality in the country to be recognized as a child-friendly city. Its Children and Youth Parliament (CYP) is an example of the involvement of children in governance. It not only represents

children's voices in local matters, but also gives them an opportunity to decide on important policies and to allocate a budget. Since 2015, the CYP has been an official authoritative body in Wanju County, empowered by a local ordinance. Members of the CYP are selected through open election, where any child living in the county can run and all children can vote. The interests of children from diverse backgrounds are ensured by the proportional representation of minorities.

Every year, the CYP creates a strategic agenda. Proposals come both from the child representatives themselves and from the public: all children in the county are free to submit initiatives online, and



Wanju County's Children and Youth Parliament

© Korean Committee for UNICEF, Wanju County's Festival for Child and Youth Rights Week

these are discussed by the CYP during the plenary sessions. Once the CYP has agreed on a list of policy items that it wishes to take forward, a public vote is held among local children to finalize the agenda. The CYP is then supported by the local government, relevant professionals and the public to create an action plan and a budget. The resulting policy is implemented the following year.

Over the years, the CYP has initiated a long list of projects to make Wanju County more child friendly. Spaces have been created in which young people can socialize, such as a Youth Café and Mall and a Treehouse hideout. The Imagination Playground and the Wonder Water Pool – both designed by

children for children – provide opportunities for outdoor play. Other CYP projects have focused on making existing public facilities more accessible to children: for example, lower coat hooks have been installed in libraries and lower handrails on buses. Children also voted to improve the conditions facing student workers in Wanju and organized a Children and Youth Rights Festival. Since 2017, Wanju County and its CYP have held an annual Child Rights Film Festival. And in 2020, children participated in the International Documentary Film Festival in Amsterdam with a film created by themselves.



Children discussing an agenda proposed by the member of the Children and Youth Parliament; Building a safe bus stop nearby a school in 2018.

© Korean Committee for UNICEF, Wanju County's Children and Youth Parliament

### *Interactive effects between the home and the local environment*

Research suggests that the quality of the home and the local environment interact in shaping well-being. Better-quality neighbourhood environments can offset some of the adverse effects on mental health of sub-par housing.<sup>61</sup> Urban planning solutions within the community can mitigate the negative implications of home overcrowding – for example, by providing outdoor play space or facilities where older children can study.<sup>62</sup>

### **Transport and mobility**

Safe mobility is vital if children are to experience happy and healthy childhoods and develop. Transport links the home, the school and other public and private places in the lives of children. Children's active and independent mobility has been declining in many countries, fuelled by parents' views about the safety of the local environment, as well as by an increase in car use and a decrease in walking and cycling.<sup>63</sup> This trend is undesirable, because independent mobility has various physical, social and skill-development benefits for children.<sup>64</sup> Boys tend to be granted greater and earlier independent mobility and autonomy than girls,<sup>65</sup> suggesting that the adverse effects associated with the decrease in children's mobility could affect girls disproportionately.

Probably the most important threat to children's freedom of movement in the urban space is the growth of motorized traffic. This has several negative implications:

- First, motorized traffic is a threat to children's safety, as evidenced by the high number of children involved in road accidents: pedestrian and traffic accidents are among the leading causes of child death around the world.<sup>66</sup>
- Second, cars pollute our environments both in the immediate and the longer term: they increase the concentration of fine particulate matter in the air and contribute to greenhouse gas emissions.<sup>67</sup>

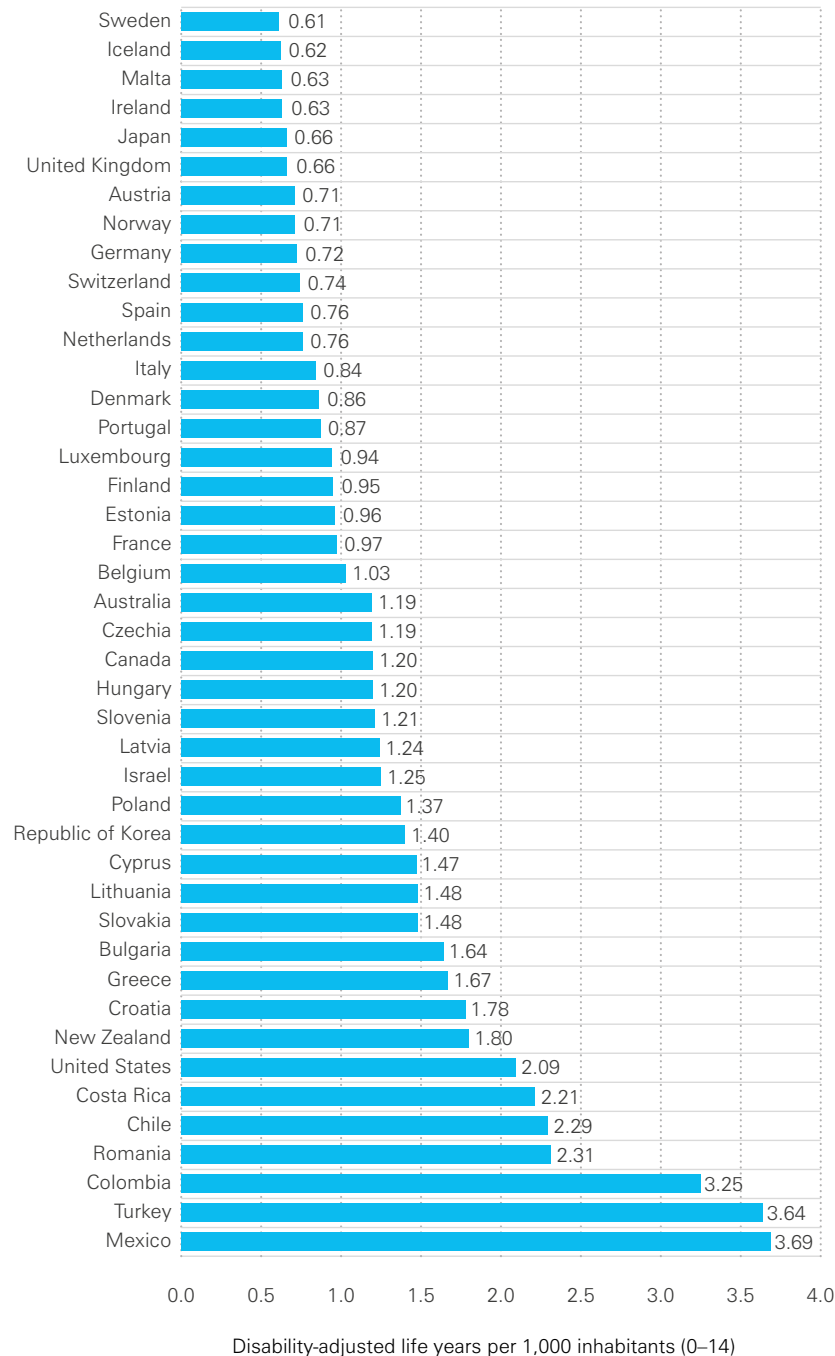
- Third, vehicles require space: particularly in dense, urban areas, car parking competes directly with other elements of the built environment, such as pavements, parks and playgrounds. While children often used to play in front of their homes, these spaces are also increasingly scarce and threatening, due to the presence of cars. Children's outdoor play has declined over time,<sup>68</sup> bringing about negative consequences for children's health (motor skills), cognitive skills (mapping), social capital (children's networks) and well-being.

Adolescents are at heightened risk of being involved in road accidents, due to complex socio-cultural and neurodevelopmental factors. They spend more time unsupervised and have greater access to risky situations than earlier in life. Their decision-making processes are affected by maturational changes in their brain function, making them more tolerant of risk and ambiguity.<sup>69</sup> It is also well known that boys are more likely to suffer road accidents: in 2019, the global rate for boys fatally injured in a road accident was 1.4 times higher than it was for girls.<sup>70</sup>

OECD data on child road casualties show that it is indeed possible to create road infrastructure that is safe for children. In Iceland, Luxembourg and Norway, not a single child was killed in a traffic accident in 2019. In an average country, 1.34 years of healthy life are lost per 1,000 children due to traffic accidents – ranging from fewer than 0.65 in Sweden, Iceland, Malta and Ireland to over 3 in Colombia, Turkey and Mexico

**Figure 22: Even in the safest countries, the toll of road traffic accidents is high**

DALYs due to road traffic accidents among children aged 0–14  
(3-year average: 2017, 2018, 2019)



Source: Global Burden of Disease Study 2019. <<https://ghdx.healthdata.org/gbd-results-tool>> accessed on 20 March 2022

(see Figure 22). On the other hand, a small number of child pedestrian accidents may simply indicate that children are spending little time outdoors.

The quality, affordability and accessibility of public transport has far-reaching consequences for mobility and access to services in both urban and rural settings. We are not aware of internationally comparable data that could be used to assess and track progress in mobility and public transport. Given the importance of these factors in children's lives, this is a knowledge gap that should be filled – including with an analysis of inequalities.

## Spotlight 4 Children's journeys to school

Rapid urbanization and the increase in motorized traffic have transformed children's environments. These changes have also altered their journeys to school: while walking or cycling to school used to be a common daily experience just a few decades ago,<sup>71</sup> travelling by private car or school bus has now become the norm in many industrialized countries.<sup>72</sup> Contemporary childhood research shows that the decline in children's independent mobility – and the consequent lack of engagement with their outdoor surroundings – has had negative implications for their physical, psychological and social well-being.

But what are children's own perceptions of their journeys to school? What meaning do they attach to their daily commutes? A growing body of participatory research shows that the journey to school has meaning beyond merely physical activity and mobility.

In both the United Kingdom and Canada, children who walked to school highlighted their journeys as opportunities to engage with their built and natural environments. Some of them listed interactions with flora and fauna among the elements they liked during their journeys: smelling the flowers, listening to birds, or seeing beautiful places.<sup>73</sup> In Canada, the visual narratives of those children who actively travelled to school showed a greater degree of attachment to the environment than was observed among their peers who were driven by car.<sup>74</sup>

Journeys to school provide an opportunity for both socializing and solitude. Some children in the United Kingdom said that they enjoyed having time for introspection and to get lost in their thoughts during their daily walks.<sup>75</sup> Others emphasized the

opportunity to socialize, to play and to talk to their peers while walking or taking the bus to school. For these children, the time before the start of school provided important moments for social interaction in nearby public spaces (playgrounds, parks close to the school). In New Zealand, children who were taken by car felt like they missed out on these chances to socialize.<sup>76</sup>

Children who travelled to school unsupervised also enjoyed the opportunity to make their own decisions. For example, they could spontaneously decide to stop for impromptu play, pick a different route, or walk by the park on their way home from school.<sup>77</sup> Children who travelled by car also reported making the most of their journey to school – but in their case by engaging in more passive actions than their peers who walked or cycled. For some, long drives meant that they could relax, sleep, listen to music or look at their surroundings through the window.<sup>78</sup>

The journey to school, however, is not without risk. Children who travel independently are aware of the dangers of traffic: in a photovoice study conducted in the United Kingdom, many of the photographs depicted busy junctions and difficult crossing points.<sup>79</sup> In another study, both active travellers and those driven by their parents expressed fear of traffic as a barrier to independent school journeys, seeing cars as making the travelling environment hostile.<sup>80</sup> The built environment can enhance children's sense of safety en route to school – bridges for safe crossing, traffic signs and quiet alleys away from busy roads were often photographed and mentioned by children who participated in various research projects.

## SECTION 5

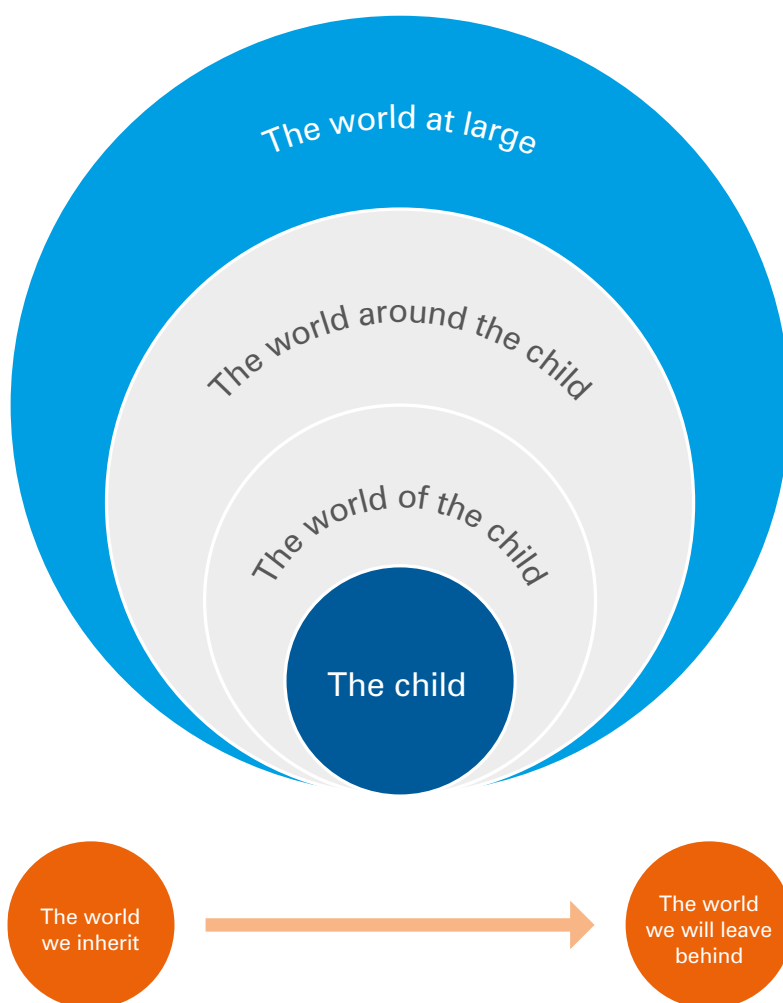
## THE WORLD AT LARGE



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## SECTION 5

# THE WORLD AT LARGE



The world at large refers to broader aspects of the physical and policy environments surrounding children's microsystems (the worlds around children). It includes elements of the built and natural environment at the local, regional, national and global levels. While children do not directly interact with them, these elements shape children's experiences.



### Climate change and extreme weather events

Countries, including wealthy nations, vary in terms of the frequency, type and severity of the natural disasters they face. Extreme weather events have become increasingly common and devastating in recent years,<sup>81</sup> but there is little that countries can do to reduce the occurrence of natural disasters within their borders. Both children's physical and mental health and their education are threatened by disasters.<sup>82</sup>

Extreme weather events pose direct dangers to physical health. They also bring about indirect effects through stress. Prenatal exposure to Hurricane Katrina, for example, was associated with an increased risk of low birth weight and preterm births.<sup>83</sup> Children affected by disasters are more likely to develop post-traumatic stress disorder, anxiety and depression than are their unaffected peers, according to evidence from the United States (and territories)<sup>84,85,86</sup> and Japan.<sup>87</sup>

An example of the way in which natural disasters can have an impact on children's lives, and affect different groups of children unequally, is forest fires. Over the past few years, there has been an increasing incidence of forest fires globally.<sup>88</sup>

Such fires can have a devastating impact on individuals, households and whole communities. They also affect children directly in a number of specific ways. For example, on a single day in November 2018, school classes for over one million school children in California were cancelled due to wildfires.<sup>89</sup> Children are more affected than adults by air pollution and experience negative short-term and long-term effects through exposure to the smoke from forest fires.<sup>90</sup>

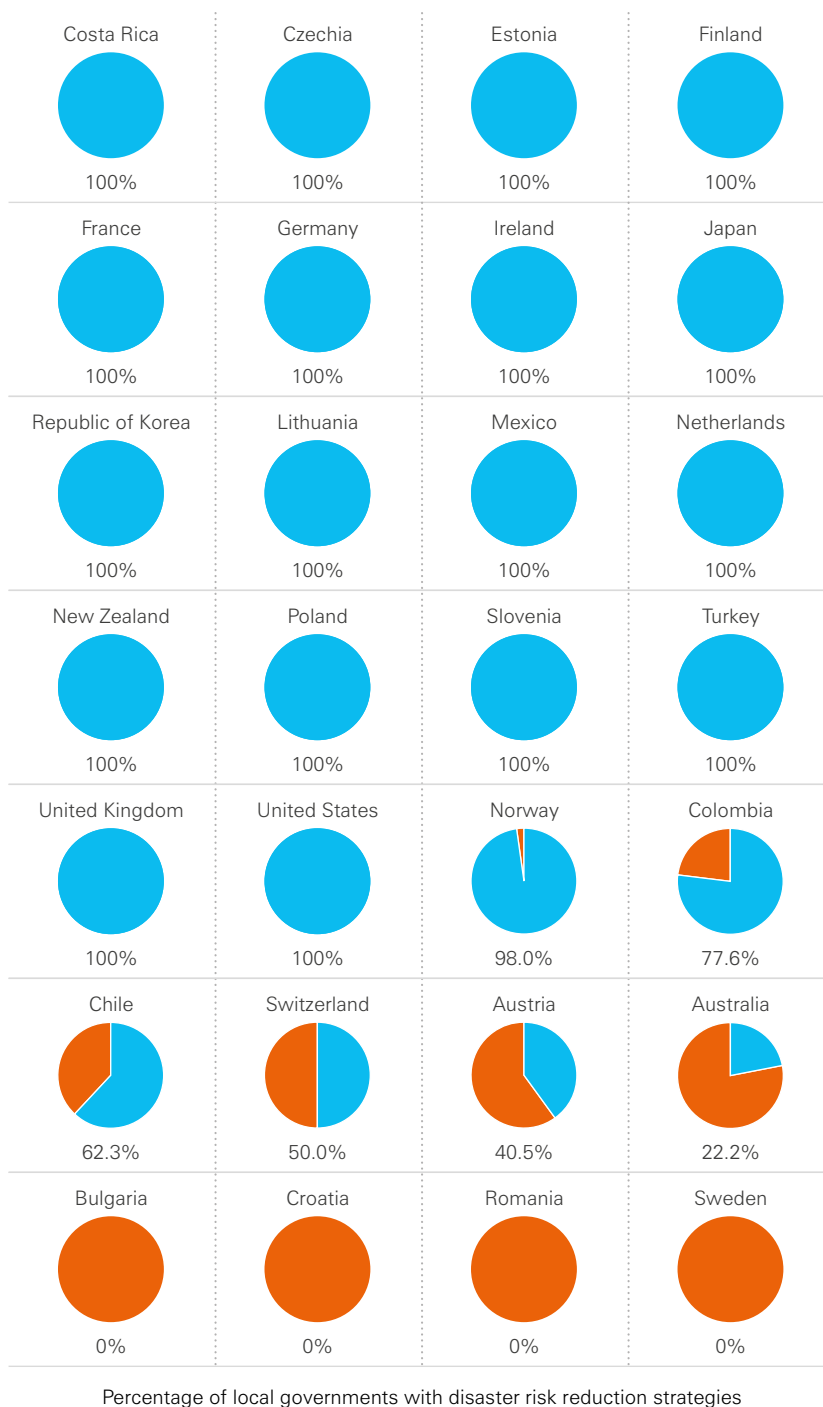
There are also inequalities in the impact of this type of disaster on children. Indigenous populations in south-eastern Australia were more likely than others in the population to be affected by bushfires in 2019–2020.<sup>91</sup> The indigenous population also has a younger age profile than the general population, including a greater proportion of children. Another study in the United States found negative psychological effects of wildfires on children with disabilities in California in 2017.<sup>92</sup> Their needs relating to their disability were an important factor and may require specific disaster preparedness planning. These examples highlight the importance of greater attention to adaptation to the impact of climate change that is already occurring.

As our climate continues to change due to human activity, adaptation to climate change plays a key role in reducing people's exposure and vulnerability. Adaptation is defined as "the process of adjustment to actual or expected climate and its effects in order to moderate harm or take advantage of beneficial opportunities".<sup>93</sup> In other words, it is the effort to protect ourselves and our environments from the adverse effects of climate change.

Countries can take action in various forms. Disaster risk-reduction strategies refer to formalized protocols of action that aim to reduce the exposure and vulnerability of people to natural hazards. The importance of such strategies for sustainable development has been recognized in various international agreements, including the 2030 Agenda for Sustainable Development (Goal 11). The SDGs include a target to increase the number of countries with national and local disaster risk-reduction strategies substantially by 2020. The progress of countries towards this target is monitored as the percentage of local governments that adopt and implement local disaster risk-reduction strategies that are in line with national disaster risk-reduction strategies. National disaster risk-reduction strategies are determined on a country-by-country basis, depending on the specific natural hazards relevant to a given context. Many countries have adopted such protocols, but we find some striking exceptions: Bulgaria, Croatia, Romania and Sweden (see Figure 23).

**Figure 23: In Bulgaria, Croatia, Romania and Sweden, no local governments implemented disaster-reduction strategies**

Proportion of local governments that have adopted and implemented local disaster risk-reduction strategies in line with national strategies (2019)



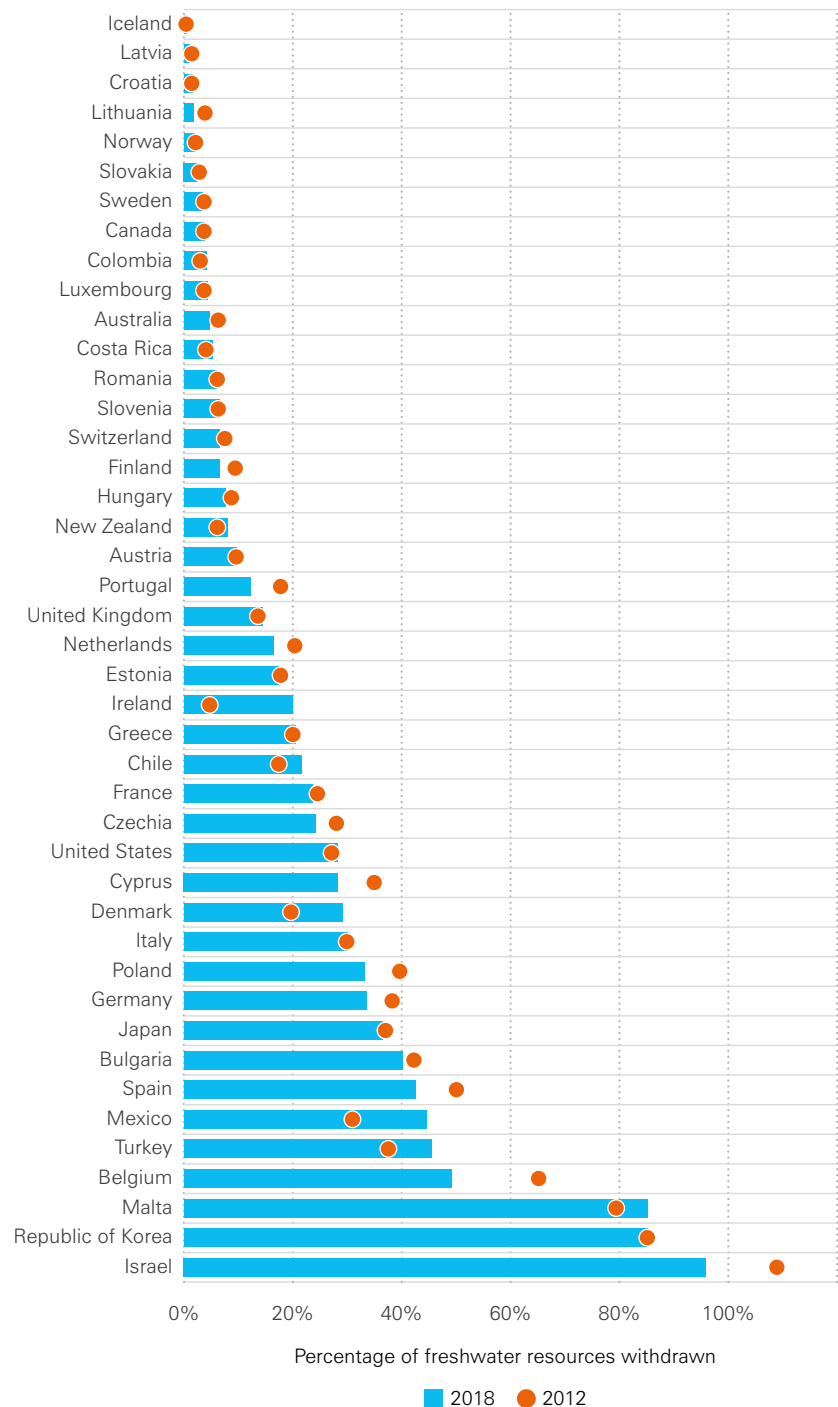
Source: SDG Indicator 11.b.2. <<https://unstats.un.org>>, accessed on 28 February 2022.

### Pressure on natural resources

Access to safe, clean drinking water and sanitation is necessary for a healthy life. Water is also instrumental in growing food and producing energy, goods and services in all sectors of society. Water thus underpins all the systems that enable children to grow and develop. Moreover, it is the cornerstone of healthy ecosystems around the world. But water is also finite: the amount of fresh water available on planet earth is fixed. Therefore, the way we use and manage this resource matters.

'Water stress' measures the burden on a country's freshwater resources. It refers to the amount of fresh water withdrawn by all sectors as a share of total (renewable) freshwater resources in the country. High levels of water stress indicate a risk of water shortage, which thus poses a threat to sustainable resource use and healthy ecosystems. Water stress is likely to be lower in countries with abundant fresh water, but the efficiency and sustainability of resource management is just as important. *Report Card* countries vary enormously in their levels of water stress – from 0.4 per cent in Iceland to 95.9 per cent in Israel (see Figure 24). The Food and Agriculture Organization of the United Nations (FAO) categorizes values over 75 per cent as 'high stress', which is where Malta, the Republic of Korea and Israel fall. Although the water stress level is still highest in Israel, it has dropped since 2012 (when the rate was over 100 per cent).

**Figure 24: Malta, the Republic of Korea and Israel withdraw the highest proportion of their freshwater resources**  
Water stress levels, 2012 and 2018



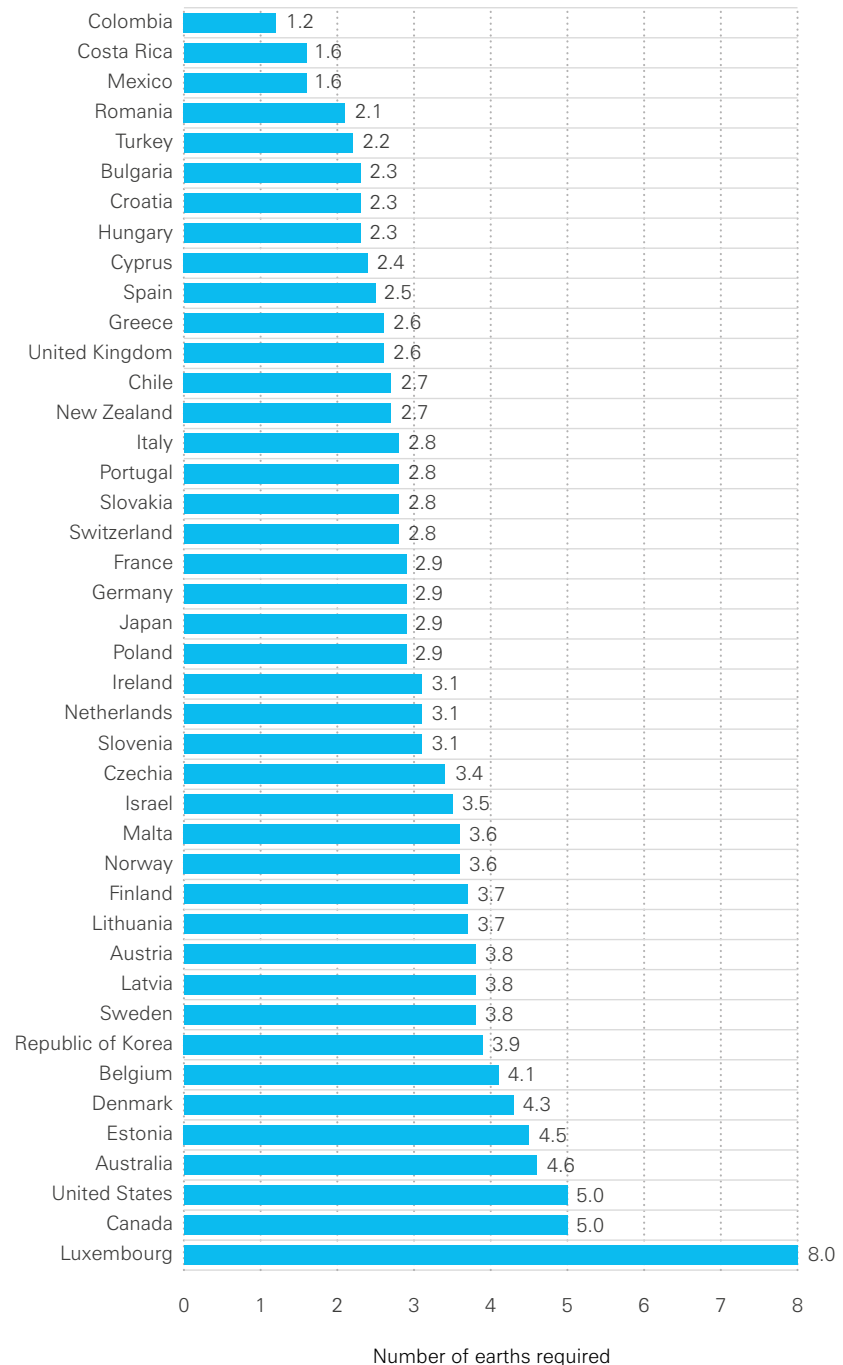
**Note:** Water stress is freshwater withdrawal as a proportion of available freshwater resources. It is the ratio between total freshwater withdrawn by all major sectors and total renewable freshwater resources, after taking into account environmental flow requirements.  
**Source:** FAO Aquastat. <<https://www.fao.org/aquastat/statistics/query/index.html?lang=en>>, accessed on 28 February 2022.

## Consumption

It is increasingly being recognized that in many countries the current levels of consumption of resources are unsustainable. Some countries have a particularly great impact on the earth, relative to their population size. To illustrate the issue of each country's responsibilities towards the global picture, Figure 25 shows the overconsumption of the earth's resources in each of the *Report Card* countries. All of the countries in this group are consuming resources at an unsustainable pace. If everybody in the world lived like the average person from *Report Card* countries, we would need 3.3 globes to sustain their lifestyles. There is considerable variation in the number of earths we would need if everyone lived like citizens from each of these countries: ranging from 1.2 in Colombia to 8.0 in Luxembourg.

**Figure 25: If everybody in the world consumed resources at the rate people in the United States, Canada or Luxembourg do, we would require the equivalent of more than five earths to satisfy their needs**

Number of earths required to sustain current consumption (2018)



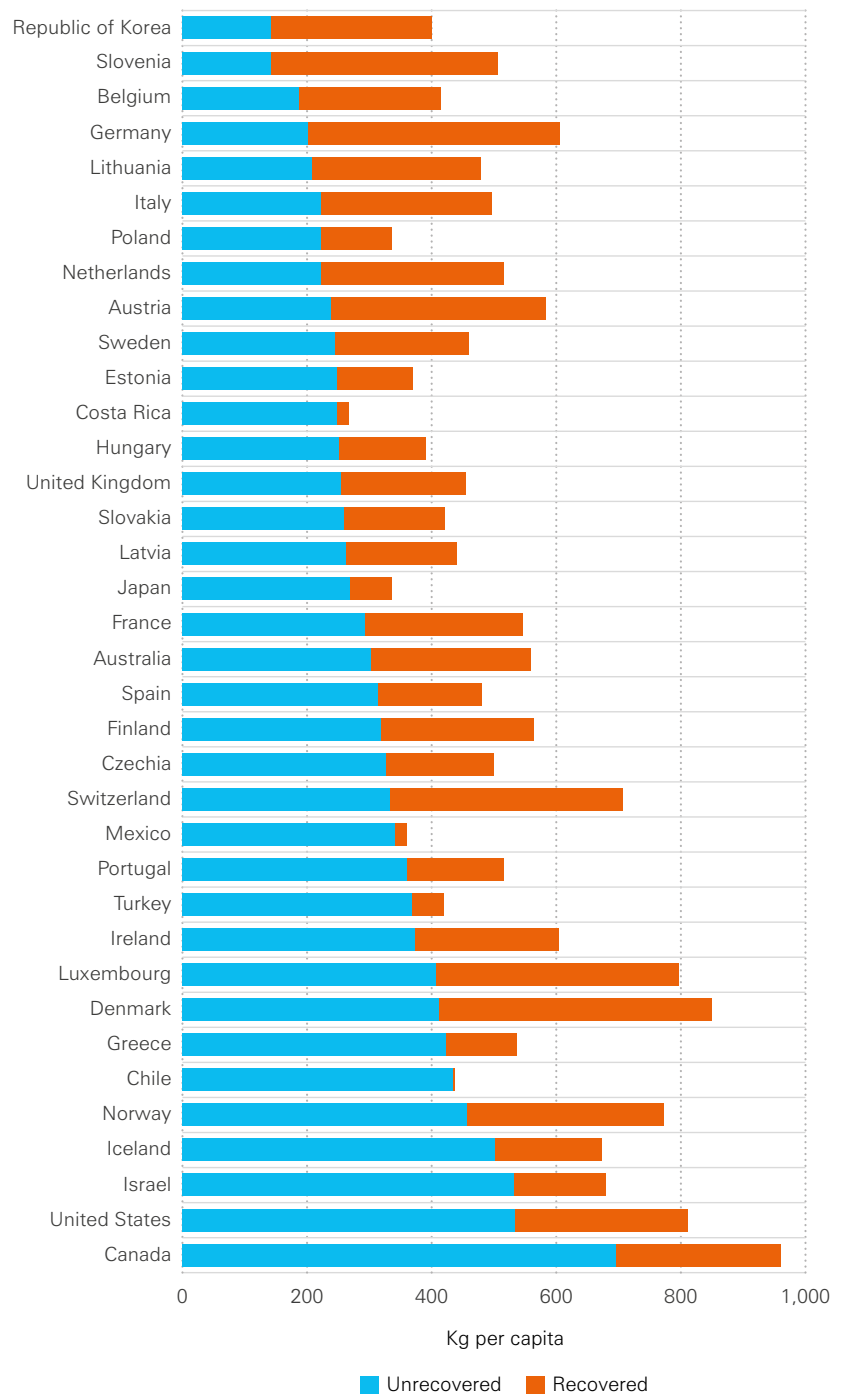
**Note:** The ratio of a country's ecological footprint of consumption to its biocapacity in global hectares per person. Data not available for Iceland. Data for 2018 (2017 for Canada).

**Source:** Global Footprint Network. <<https://www.footprintnetwork.org/licenses/public-data-package-free/>>, accessed on 23 February 2022

### Waste production and management

Effective waste management is a prerequisite for a healthy environment for all, both now and in the future. Preventing the creation of waste is the most effective solution, followed by reuse (through eco-design, repair, refurbishment, re-manufacturing), recycling and composting, before energy recovery and, finally, disposal. Across rich countries, waste production increased from an average of 484 kg per person in 2010 to 534 kg per person in 2019. These averages mask a huge gap: from around 266 kg in Costa Rica to 960 kg in Canada (see Figure 26). The ratio of recovered to unrecovered waste also varies: Slovenia has the best ratio, as it recovers 72 per cent of total waste. On the other hand, some countries combine a low recovery ratio with a low volume of waste generated: although Costa Rica recovers very little waste, it still generates less unrecovered waste per capita than most countries.

**Figure 26: In 25 countries, most waste is still unrecovered**  
Municipal waste (kg per year per capita)



**Note:** Chart refers to 2019, except Canada, Chile, Colombia, Ireland, Japan, Republic of Korea, New Zealand, United States (2018); Australia, Iceland (2017); Mexico (2012). Figures for Canada are own calculations, based on 'amount designated for recovery operations' and 'disposal operations' from OECD, and population statistics from Statistics Canada.  
**Source:** OECD stats. <[https://www.oecd-ilibrary.org/environment/data/oecd-environment-statistics/municipal-waste\\_data-00601-en](https://www.oecd-ilibrary.org/environment/data/oecd-environment-statistics/municipal-waste_data-00601-en)> accessed on 23 February 2022.

### Food waste

Among types of waste, food waste stands out for at least three reasons. First, enough food is produced globally to deliver a sufficient quantity and quality of food for everyone. However, it is not distributed equitably, so that some countries generate substantial amounts of food waste, while in others there is food scarcity. Second, food is a key contributor to climate change. If food waste were a country, it would be the third-biggest emitter of greenhouse gas behind only the United States and China.<sup>94</sup> Third, food production contributes to the loss of nature and biodiversity, as well as to pollution and waste, unnecessarily burdening waste-management systems. Globally, food waste totals 931 million tonnes each year – that is almost a fifth of all food produced. For the average person living in a rich country, that equates to 118 kg of food wasted each year: 79 kg wasted at home, 26 kg wasted in restaurants and 13 kg wasted in shops.

### Electronic waste

Electronic waste (e-waste) is particularly harmful, since it contains hazardous substances, such as mercury, cadmium and lead. These elements damage the human body and brain, and take their highest toll on children. Proximity to unregulated e-waste recycling sites has been associated with adverse birth outcomes, reduced neurodevelopment and learning,<sup>95</sup> and even damage to children's DNA<sup>96</sup> and immune systems.<sup>97</sup>

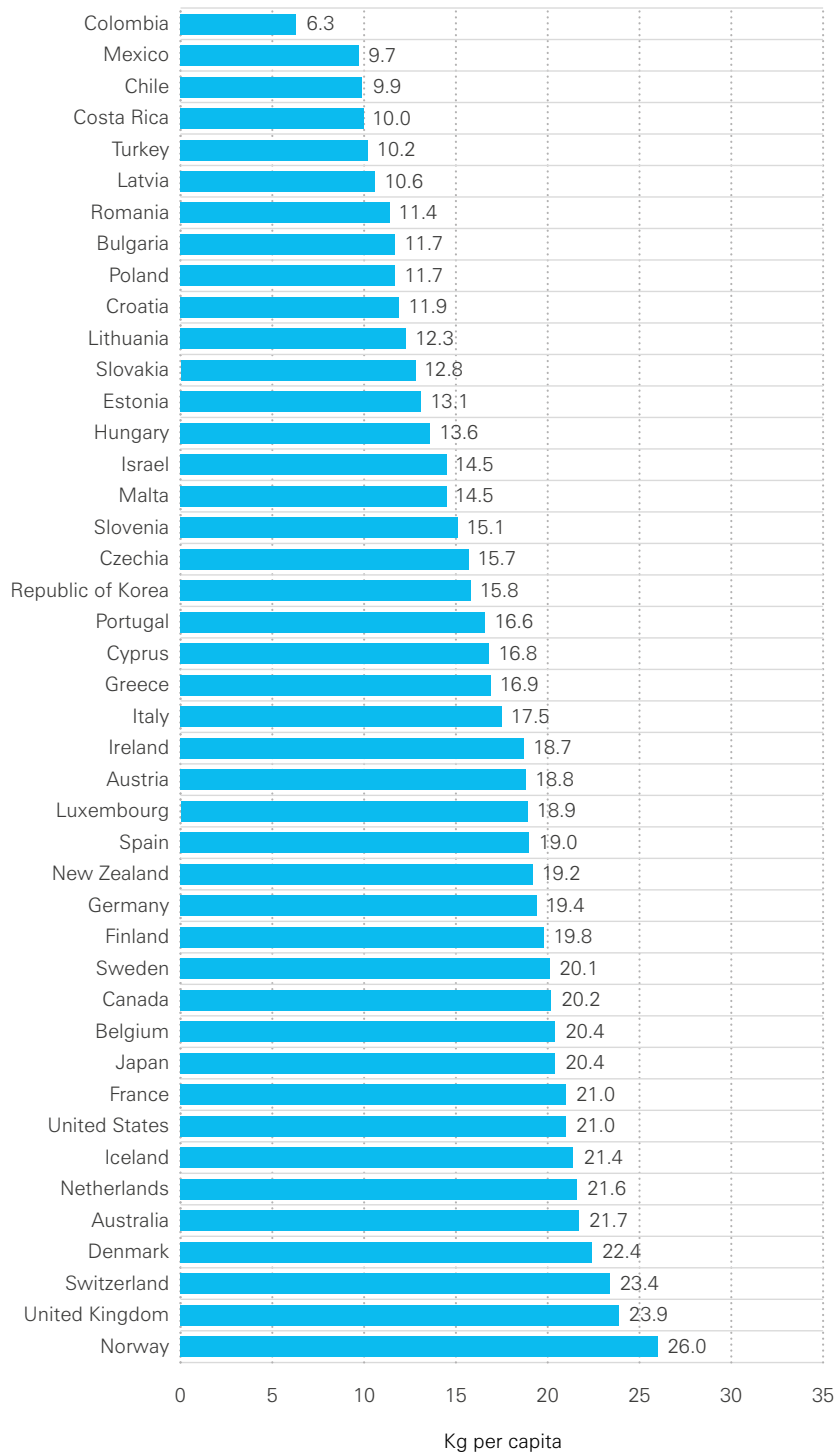
Much of the e-waste is due to planned obsolescence, or the deliberate shortening of a lifecycle, in order to force people to purchase new products, such as phones or computers. Thus, what generates profit also causes harm; this could be curbed by public policy. In 2019, a record 53.6 million tonnes of e-waste was generated worldwide – as much as could be carried by 350 ocean liners the size of the *Queen Mary 2*. There has been a 20 per cent increase in such waste over the past five years, and the figure is expected to almost double in 16 years.<sup>98</sup> E-waste is thus the fastest-growing type of domestic waste.

When we have finished with our laptops, mobile phones, PCs and refrigerators, where do they go? Some e-waste is informally dumped, usually in low- or middle-income countries with weaker environmental regulations. There, it is recycled by informal workers to extract metals that can be resold for profit. The high levels of toxic chemicals found in e-waste can damage the intellectual capacity of children who live close to recycling centres in distant parts of the world.<sup>99</sup>

Some wealthy countries that rank high on the 'world around the child' dimension, such as Norway and Switzerland, are among those that consume and waste the most electronics (see *Figure 27*). Norway generates 26 kg of e-waste a year per capita. In comparison, the per capita e-waste generation in Colombia, Mexico and Chile is less than 10 kg.

**Figure 27: In the average country, the typical citizen generates 17 kg of electronic waste each year**

Annual e-waste generated per person (2019)



Source: Forti et al. (2020).

## Spotlight 5 Toxic exports: Global inequalities in the world of the child

Rich countries export environmental damage in many ways and forms – and some of them can contribute to a health crisis for children in the Global South. Each year, the citizens of the countries covered in this report produce 24.3 million tonnes of e-waste. In an average country, only 42 per cent of this is collected and recycled. The figure ranges from 1 per cent in Colombia to 76 per cent in Estonia. Exports involve somewhere between 7 per cent and 20 per cent of all the e-waste generated.<sup>100</sup> Much of the e-waste harbours hazardous substances, such as mercury and lead; these are released during landfilling or recycling, thus polluting the air, while toxins can leach into the soil and water.

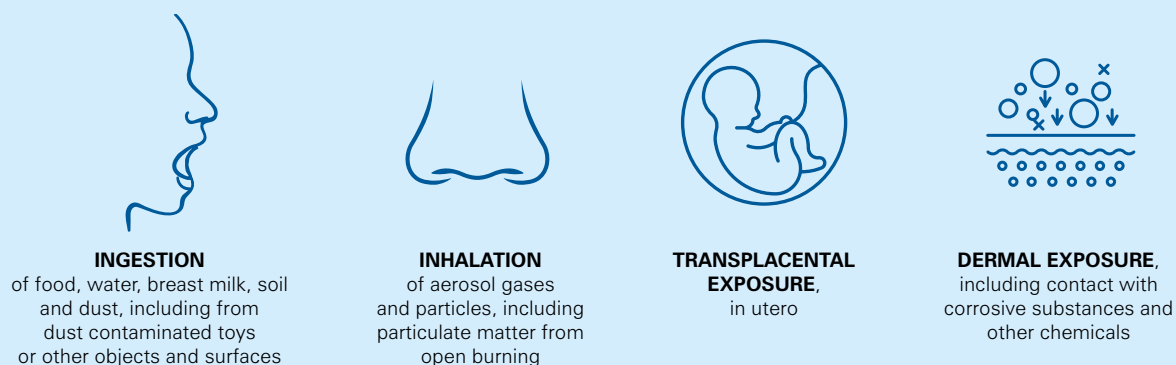
Worldwide, 18 million children work in the informal waste sector, which places them at the front line of hazardous exposure. They extract precious metals from computers and cables by burning the devices or using chemical baths: this exposes them to chemicals and pollutants at home, in the neighbourhood and in the places where they work – often illegally and in hazardous conditions.<sup>101</sup> Children engaged directly in waste work (or who live close to it) are likely to be among the most

marginalized members of society, exposed to multiple risks and hazards associated with poor living conditions.

Metals extracted at informal e-waste sites are hazardous to everyone, but they take the highest toll on children: relative to their size, children breathe more air and digest more food than adults, and so they absorb proportionally more pollutants. When faced with exposure, children are less likely to deal well with toxic substances, due to their underdeveloped organs and immune systems.

E-waste exposure is linked to negative birth outcomes and impaired neurodevelopment in children; respiratory problems; impaired thyroid and cardiovascular function; DNA damage; impaired immune system functions, including greater vulnerability to common infections; and increased risk of certain chronic diseases later in life, including cancer and cardiovascular disease. Foetal exposure to toxicants, even at very low doses, during critical developmental windows of gestation impacts the pregnancy and the newborn's health.

**Figure 28: Routes of children's exposure to toxic substances**



Source: World Health Organization (2021).

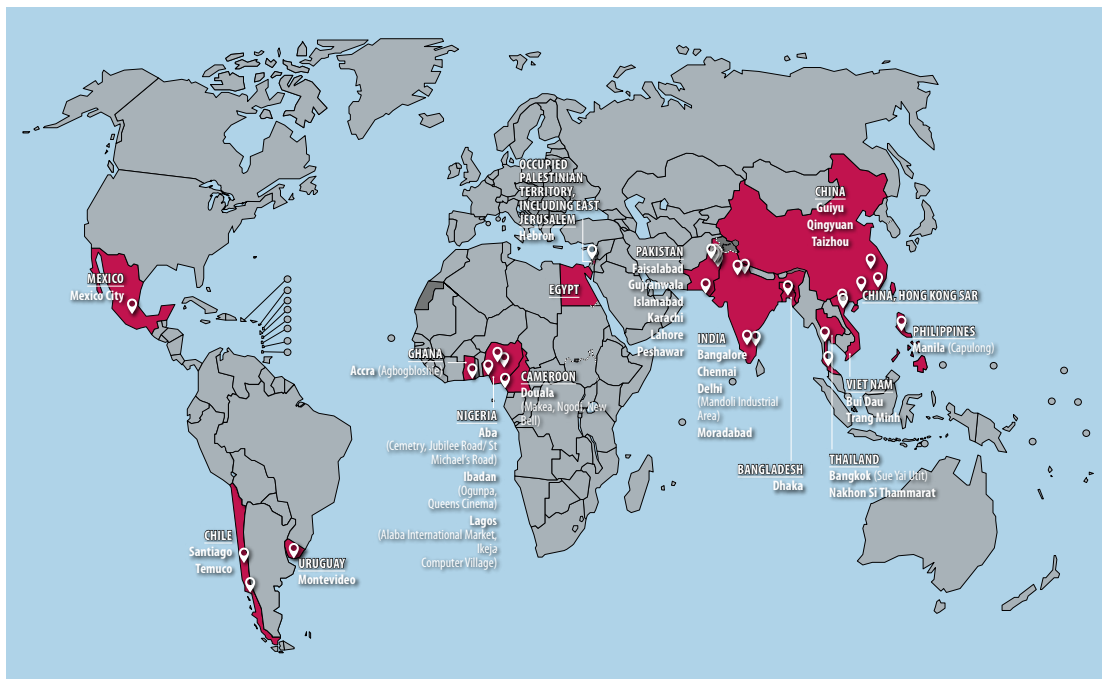


Growing attention to the problem of hazardous exports has resulted in efforts to monitor and amend the toxic fallout. For example, UNICEF Ghana has been raising awareness among affected communities in Ghana about the effects on children of electronic and automobile recycling. It has also called for urgent action to abolish the informal recycling of lead acid batteries. Together with the German development agency GIZ, UNICEF Ghana has provided medical equipment to support child and maternal health services in a clinic located next

to e-waste activities in the country's capital, Accra. The WHO has been calling for better monitoring and tracking of children's health in relation to e-waste dumping.<sup>102</sup>

Corporate dumping highlights the importance of uniform regulation around environmental standards to curb regulatory 'arbitrage' – a process by which regulatory improvements in rich countries and their associated costs for corporations are offset by exploiting weaker standards in poorer countries.

**Figure 29: Locations of main informal e-waste dismantling and recycling sites**



Source: World Health Organization (2021).

Note: The designations employed in this publication and the presentation of the material do not imply on the part of UNICEF the expression of any opinion whatsoever concerning the legal status of any country or territory, or of its authorities or the delimitations of its frontiers.

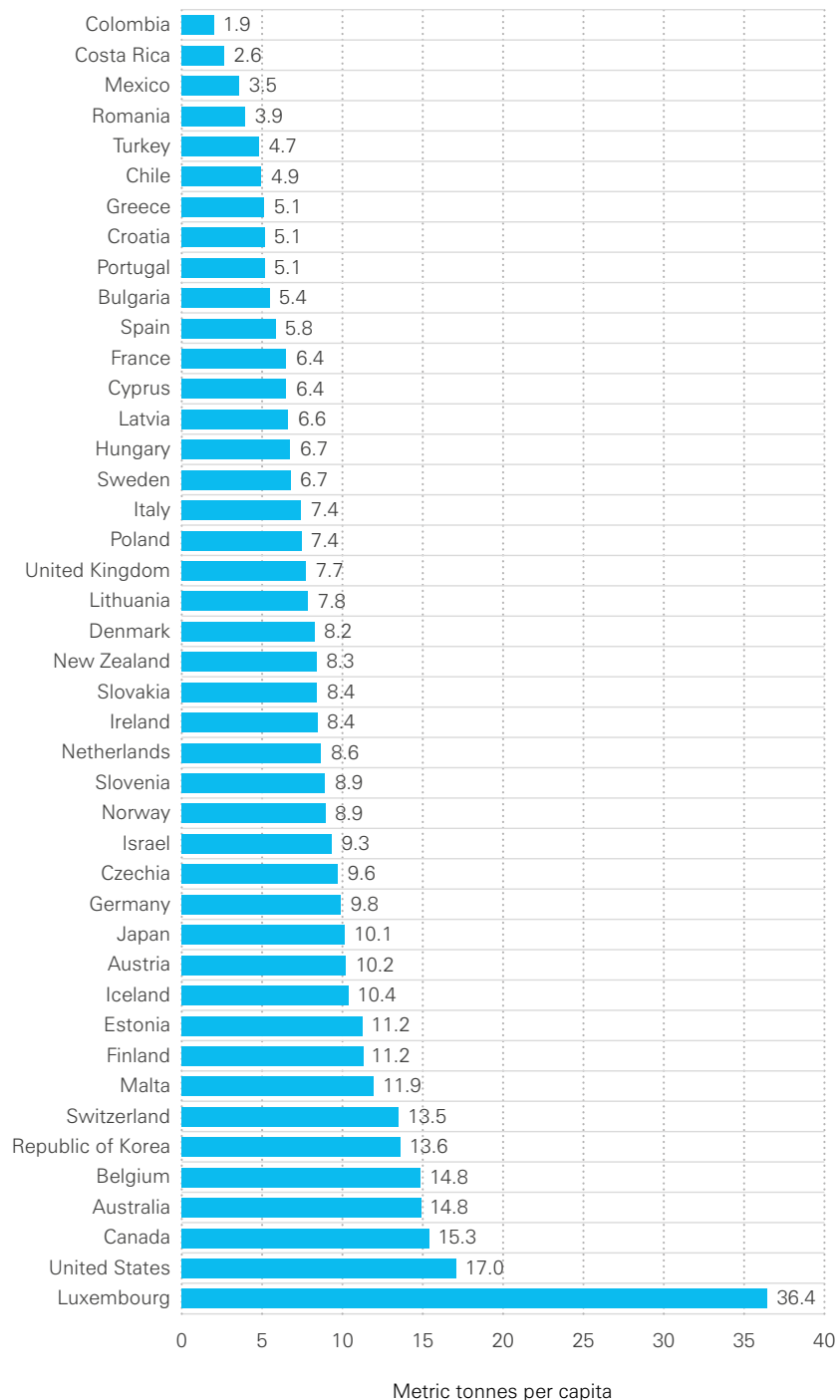
## Carbon emissions

A country's level of greenhouse gas emissions shows its commitment to the well-being and future of children. There is scientific consensus that greenhouse gases, particularly CO<sub>2</sub>, are among the most significant drivers of climate change: it is for good reason that reducing emissions is a priority of the Paris Agreement and is a target of SDG 13: "Take urgent action to combat climate change and its impacts."

CO<sub>2</sub> emissions are typically measured on the basis of a country's production: that is the yardstick that countries use to report on their emissions and to set targets for their reduction.<sup>103</sup> However, production-based estimates of CO<sub>2</sub> do not consider the harm that countries do beyond their borders: their emissions can be reduced simply by moving emissions-intensive activities (e.g., factories) abroad. A consumption-based metric, on the other hand, accounts for all emissions that have occurred in the production of locally consumed goods – even if those goods were imported from other parts of the world. Therefore, consumption-based CO<sub>2</sub> emissions reflect the lifestyle choices and consumption of citizens. In a case study of Iceland, an estimated 71 per cent of household emissions were attributed to imported goods, showing that the burden of Icelandic consumption emissions falls primarily on low- or middle-income countries.<sup>104</sup>

We see some striking differences in the (consumption-based) CO<sub>2</sub> emissions of *Report Card* countries. The carbon footprint of an average citizen of Luxembourg is over

**Figure 30: In the average *Report Card* country, the typical person is responsible for 9 tonnes of CO<sub>2</sub>**  
Consumption-based CO<sub>2</sub> emissions (2019)



Source: Global Carbon Budget Database, <[www.globalcarbonproject.org/carbonbudget/index.htm](http://www.globalcarbonproject.org/carbonbudget/index.htm)> accessed on 28 February 2022. Data for Iceland refers to 2016 and comes from <[www.sciencedirect.com/science/article/abs/pii/S0959652617318267](http://www.sciencedirect.com/science/article/abs/pii/S0959652617318267)> accessed on 28 February 2022

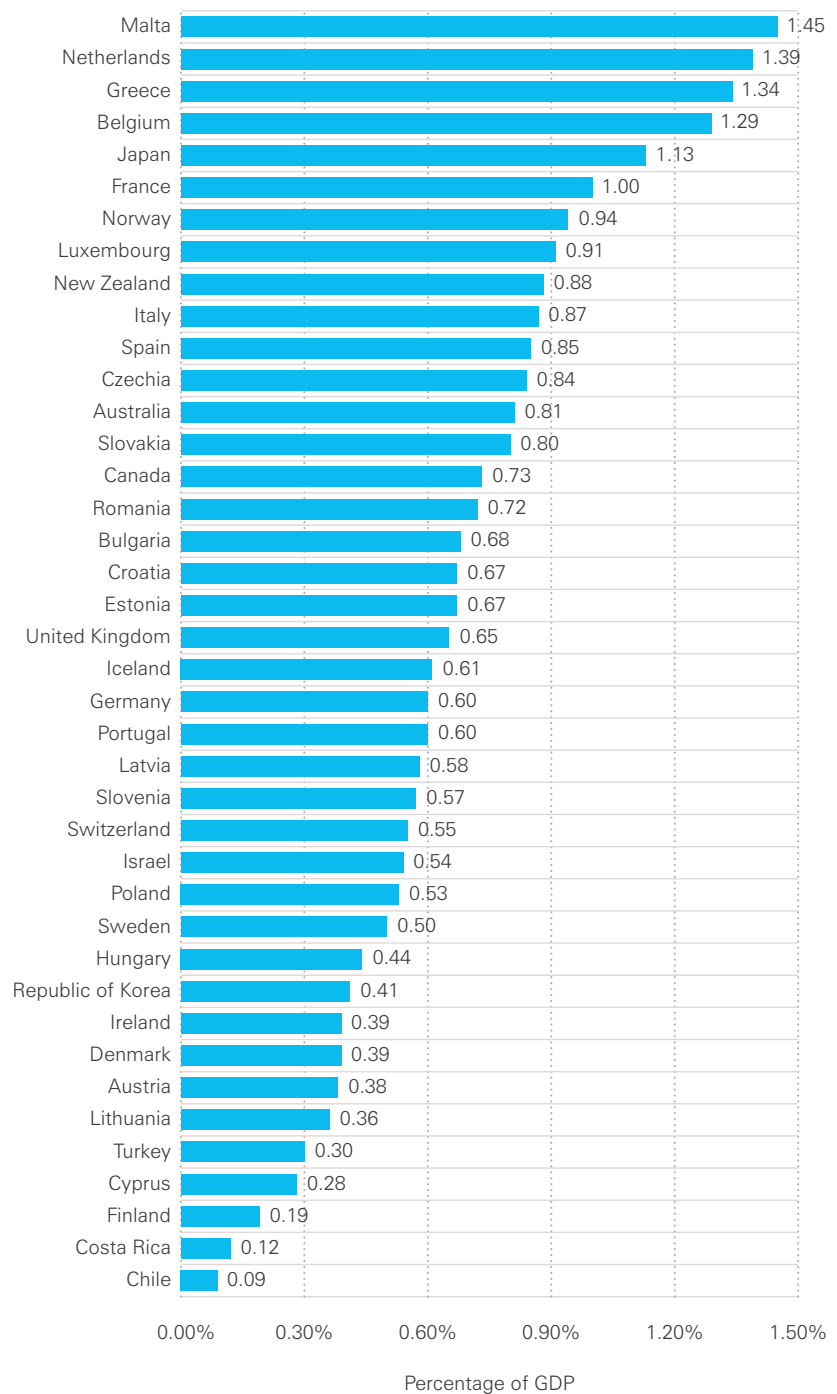
36 metric tonnes per year – more than the footprints of a Colombian, a Costa Rican, a Mexican, a Romanian, a Turkish, a Chilean, a Greek and a Croatian citizen combined. The per capita CO<sub>2</sub> emissions of Luxembourg are more than double those of the United States, which is the country that emits the second-highest amount of CO<sub>2</sub>.

### Government expenditure on environmental protection

Protecting our ecosystems and ensuring our children's right to a healthy environment requires financial commitment from governments. The International Monetary Fund (IMF) collects data on how much money governments spend on environmental protection (as a share of GDP), covering pollution abatement, the protection of biodiversity, waste management, research and development, and other activities. Government expenditure on protecting the environment gives a good indication of how committed a country is to ensuring a healthy, safe and sustainable world for all children.

The amount of money spent on environmental protection by *Report Card* countries is shown in Figure 31. Overall, a relatively small proportion of a country's economic resources is dedicated to this function: 0.7 per cent of GDP on average. Malta (1.45 per cent) and the Netherlands (1.39 per cent) spend twice as much of their GDP on the environment as the average *Report Card* country. Finland, Costa Rica and Chile are at the bottom of the distribution, all spending less than 0.2% of GDP on protecting the environment.

**Figure 31: The governments in this report on average spend 0.7 per cent of GDP on environmental protection**  
Government expenditure on environmental protection as percentage of GDP (2019)



Note: Data not available for Colombia, Mexico and the United States. Data for 2019 or the latest available (2018 for Chile and Hungary, 2010 for the Republic of Korea).

Source: IMF Climate Data <[climatedata.imf.org/datasets/d22a6decd9b147fd9040f793082b219b\\_0/about](https://climatedata.imf.org/datasets/d22a6decd9b147fd9040f793082b219b_0/about)>, accessed 16 February 2022.

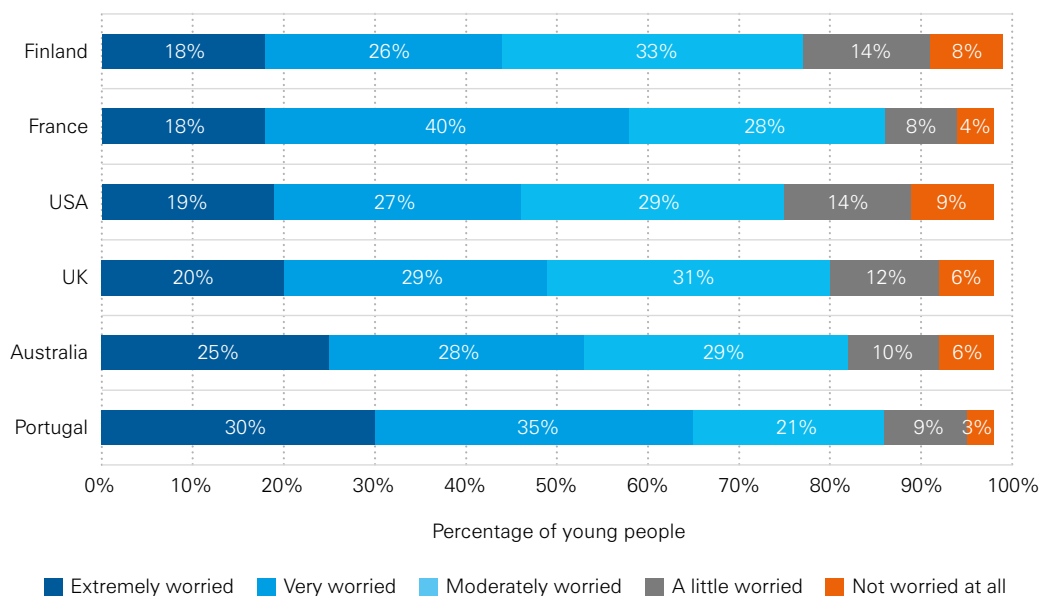
## Spotlight 6 Eco-anxiety: the mental toll of climate change

Anxiety, an emotion that alerts people to danger, is widely felt by young people in relation to the environment. Climate change, associated concern and inadequate government response are chronic stressors that threaten their well-being and mental health. A 2021 survey covering Australia, France, Finland, Portugal, the United Kingdom and the United States found that most young people aged 16–25 believed their governments had failed them with regard to the environment. Two in five were hesitant about becoming parents in the future, because of the climate crisis.

In all countries, most young people were bothered by climate change: 53 per cent were very or extremely worried and 81 per cent were at least moderately worried. Most distressed were young people in Portugal, which has witnessed a sharp rise in the number of wildfires since 2017: 65 per cent of young people there described their worry as high or extreme. Yet, even in the United Kingdom, a country relatively protected from extreme weather events, 49 per cent of young people were extremely or very worried (see Figure 32).

**Figure 32: Across six rich countries, four young people in five are at least moderately worried about climate change**

Worry about climate change in six countries (2021)



Note: n=1,000 per country.  
 Source: Marks, E. et al. (2021). Young people’s voices on climate anxiety, government betrayal and moral injury: A global phenomenon. *The Lancet Planetary Health*, 5(12), e863–e873, <<http://dx.doi.org/10.2139/ssrn.3918955>>, accessed 16 February 2022.

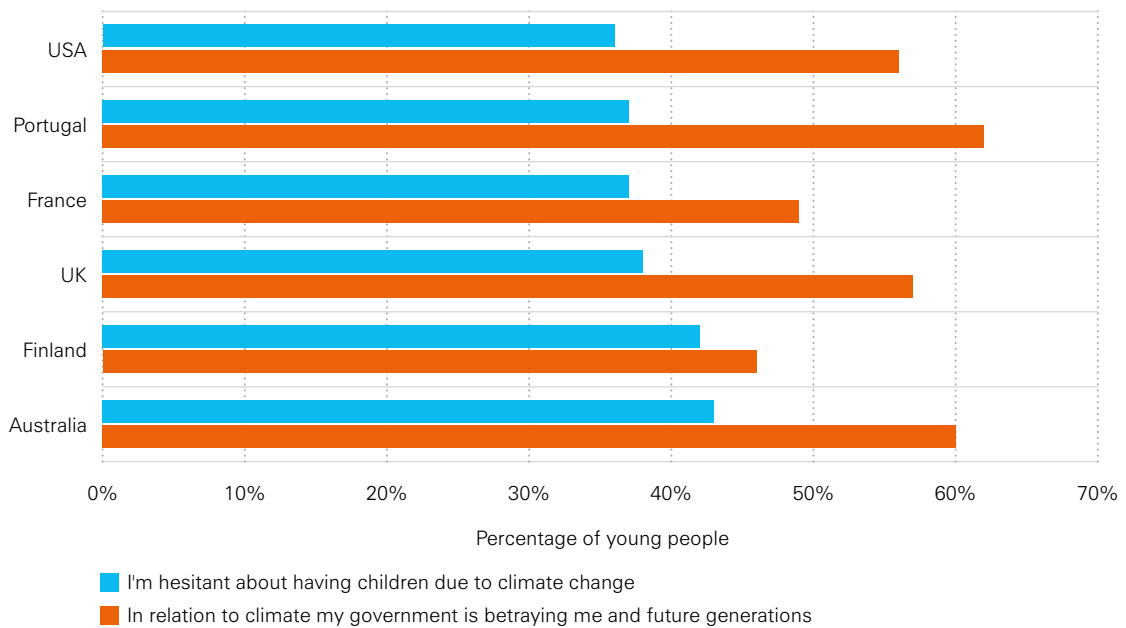
Nearly half of the young people felt distressed about climate change to an extent that was affecting their daily functioning. Fear (62 per cent), sadness (62 per cent), anxiety (57 per cent) and anger (55 per cent) were the feelings most provoked by the climate crisis. More than half (52 per cent) believed that because of this crisis they would not have access to the same opportunities as their parents had had. Feelings associated with climate change are linked to young people's family plans, as 39 per cent were hesitant about

becoming parents. This ranged from 36 per cent in the United States to 43 per cent in Australia.

Negative feelings were greatest when the young people believed that their government's response was inadequate – a common opinion in all the countries researched. Over half (55 per cent) of young people felt that their government was betraying both them and future generations with regard to the climate (see *Figure 33*).

**Figure 33: Two in five young people are hesitant about having children due to climate change, and most feel betrayed by their government**

Percentage of young people who are hesitant about having children and who feel betrayed by their government over climate change (2021)



Note: n=1,000 per country.  
Source: Marks et al. (2021).

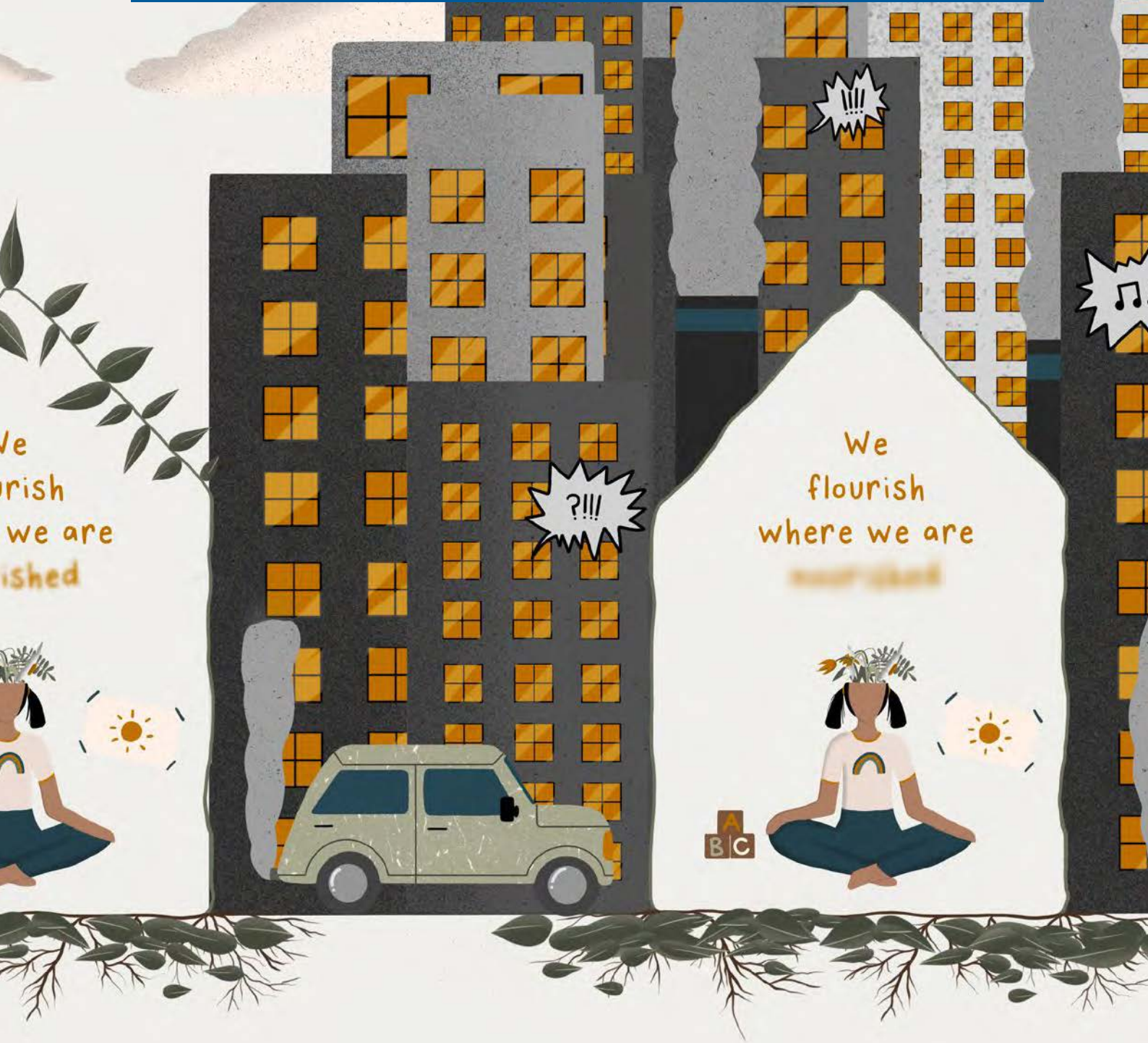


We flourish where we are nourished

We flourish where we are nourished

SECTION 6

KEY THEMES



## SECTION 6

### KEY THEMES

The evidence presented in the previous three sections highlights the complex nature of the ways in which environmental factors can affect children's well-being. In this section, we draw together three key threads that run through these dimensions: interlinkages, inequalities and influence.

#### Interlinkages

The ecological framework that we have adapted for this report clarifies connections between factors operating at the same or different levels (*see Figure 1*). To shed light on this issue, Figure 34 depicts a (non-exhaustive) network of influences of air quality on children's physical health. Within the 'world of the child', both indoor and outdoor air quality are important factors. In the 'world around the child', a range of factors in the natural and built environments is identified, along with behaviours of the child and of family members. For example, road traffic and the presence of green space will have potentially countervailing effects on outdoor air quality. At the macro-level, policy and expenditure decisions by national, regional and local governments will influence children's immediate physical environments. For example, transport and planning policies will partly determine local traffic levels and the availability and accessibility of green space.

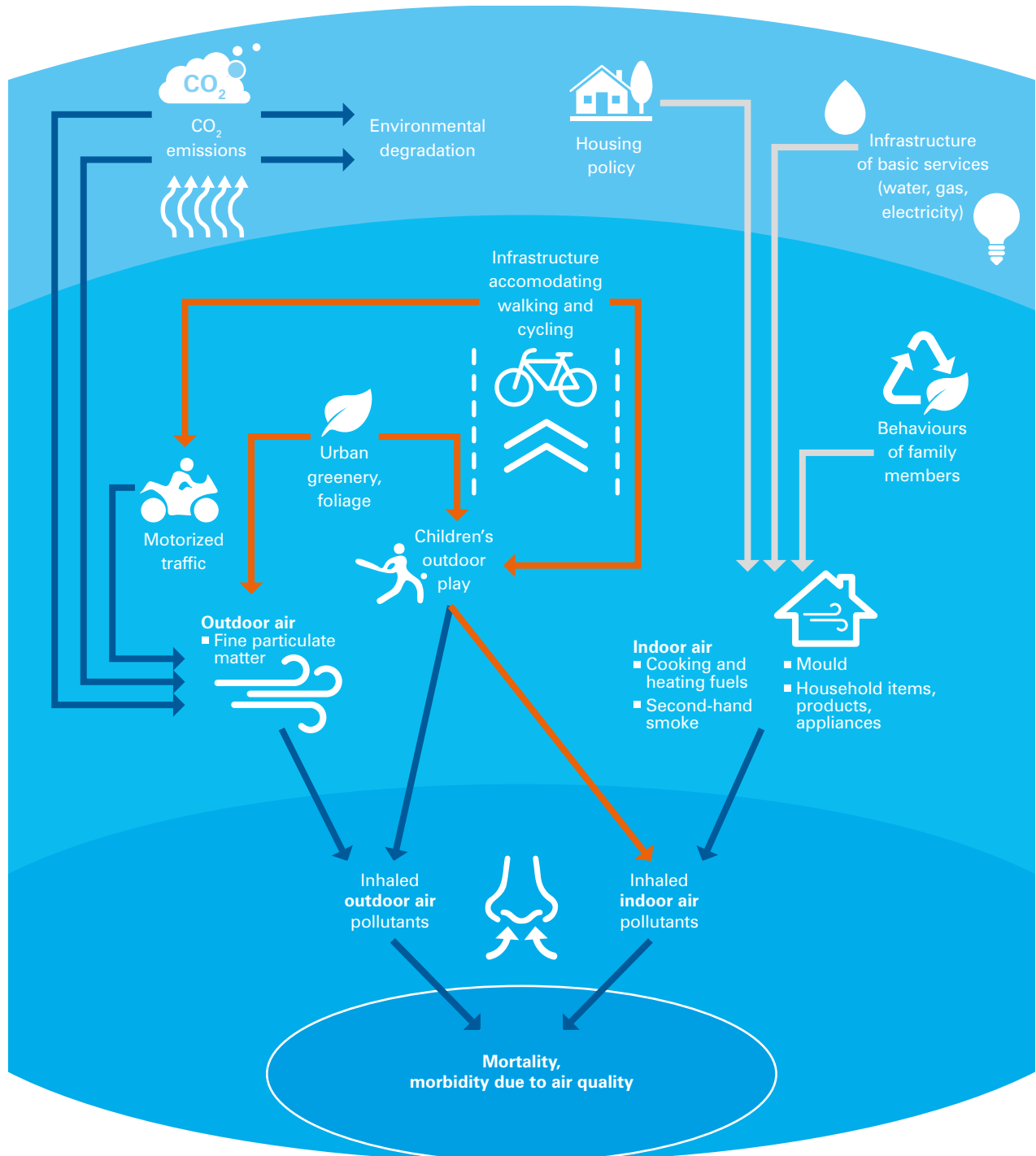
In considering environmental issues, interlinkages are not limited to those within specific countries at the present time: they also have a broader geographic and time dimension.

In terms of geography, no country can completely insulate itself against environmental changes or events that take place in other countries. This was brought into sharp relief in 1986, by the failure of the Chernobyl nuclear power plant. Due to the wind direction, this incident affected the safety of agricultural production even in some of the most westerly parts of Europe. When it comes to the environment, the whole world is inherently interconnected. As discussed in Section 5, the conscious actions of particular countries (such as waste disposal) can affect children's lives in other countries.



**Figure 34: Examples of pathways within and across levels that are relevant to the impacts of air quality on children's health**

Pathways of influence: how air quality impacts children's health



**Note:** Orange arrows depict primarily positive pathways; navy blue arrows depict primarily negative ones; and grey arrows depict pathways that can work in both directions.

**Source:** Authors' own elaboration.

The globally interconnected nature of the issues discussed in this report must also be taken into account from a dynamic perspective: the world in which we live today is the one that we inherited from our predecessors and is a product of whatever actions they took in the past;

and the actions that we take today will define the world that we leave behind us for future generations. The feature on the following pages explores this issue, juxtaposing each country's ranking in the league table for current environmental conditions that support children's well-being

(see *Figure 3*). It includes indicators of each country's historical environmental record and the actions it is taking to support a sustainable future.

The issues of sustainability are of major concern to young people (see *Spotlight 6*).

## A dynamic perspective: The world we inherit and the world we will leave behind

The league table presents a snapshot of the current environmental conditions for children in each country. But this static picture tells only part of the story. Countries have very different historical environmental records and are moving at different speeds towards a more sustainable future. These are key issues underlying the current international discussions – such as COP26 – aimed at reaching an agreement about the way forward.

### The world we inherited

A key milestone in international discussions on tackling climate change was the adoption of the Kyoto Protocol in 1997. This agreement committed the industrialized countries and economies in transition to limiting and reducing greenhouse gas emissions. So, how have countries fared over the past quarter of a century in terms of emissions? One measure is the level of per capita CO<sub>2</sub> emissions over that time.

Figure 35 shows the volume of the emissions that each country has produced since 1997 and compares it with that country's position in the league table of this report. Cyprus, Portugal and Spain, which are near the top of the league table of current environmental conditions, also have relatively low historic emissions. This contrasts with countries such as Australia and Canada, which have average-low performances in the league

table, but are among the highest historic emitters. The United States stands out as a country that has high historic emissions, and yet fares poorly in the league table. Bulgaria, Costa Rica and Romania are ranked low in the league table but have emitted less CO<sub>2</sub> than average across this group of countries in the past 25 years.

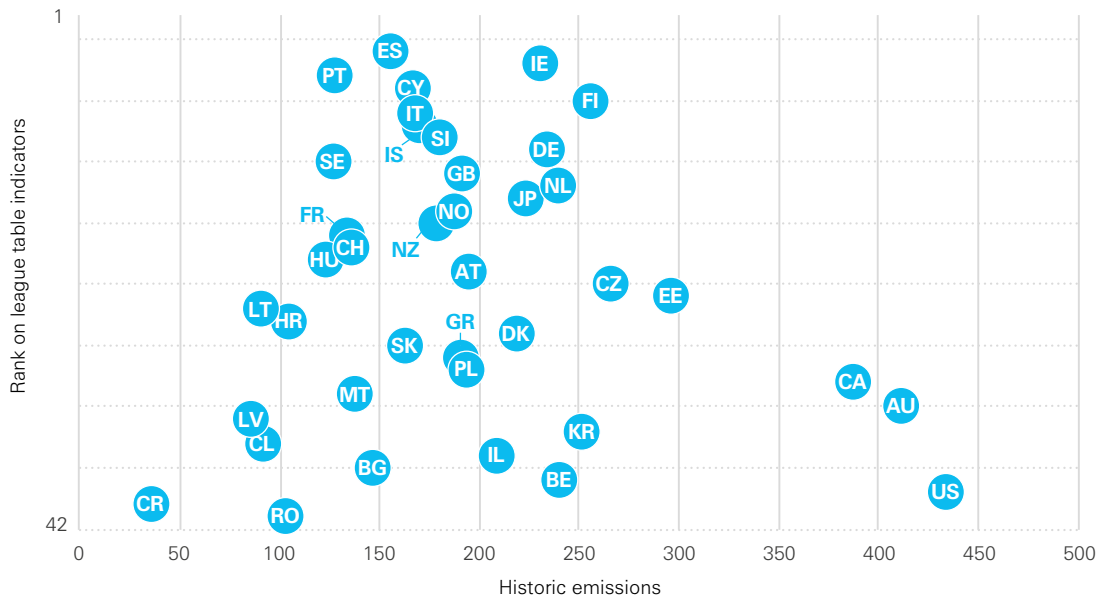
### The world we will leave behind

Our second perspective looks ahead. It considers the actions that countries are currently taking to improve the world we leave behind for future generations. Figure 36 charts the percentage of domestic energy supply that is from renewable sources against the league table ranking of current environmental conditions. There is some evidence of a positive relationship – countries that use higher proportions of renewable energy are also countries that have better environmental conditions for children. In this sense, the present and the future appear – to some extent – to go hand in hand.

## A dynamic perspective: The world we inherit and the world we will leave behind

**Figure 35: The United States, Australia and Canada emitted most CO<sub>2</sub> since the Kyoto Protocol**

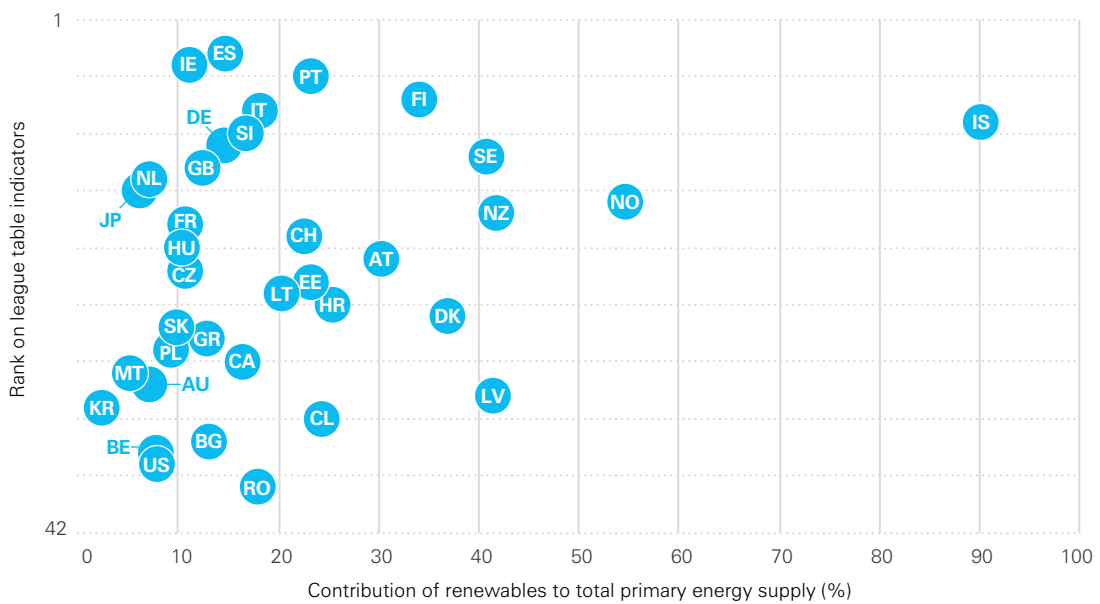
CO<sub>2</sub> emissions per capita in last 25 years vs. league table score



Source: Historical emissions – CO<sub>2</sub> emissions since 1995 (metric tonnes per capita) (x-axis) are sourced from the World Bank Databank. For league table ranks (y-axis), see Figure 3.

**Figure 36: Countries that derive more energy from renewables rank higher in our league table**

Percentage of energy from renewable sources vs. league table score



Note: Bulgaria, Croatia, Cyprus, Malta and Romania (2018).

Source: The percentage contribution of renewables to total primary energy supply (x-axis) is sourced from the OECD <<https://data.oecd.org/energy/renewable-energy.htm>> accessed 28 February 2022. For league table ranks, see Figure 3.

### Inequalities

There are substantial inequalities in children’s exposure to environmental risks, and in the impact such exposure has on children’s well-being now and will have in the future. This applies both within countries and between countries. Sections 3 and 4 of this report highlight many ways in which environmental risks and harms are unevenly distributed. Children living in poorer households face much greater risk and harm, while they also may experience poorer-quality neighbourhoods.

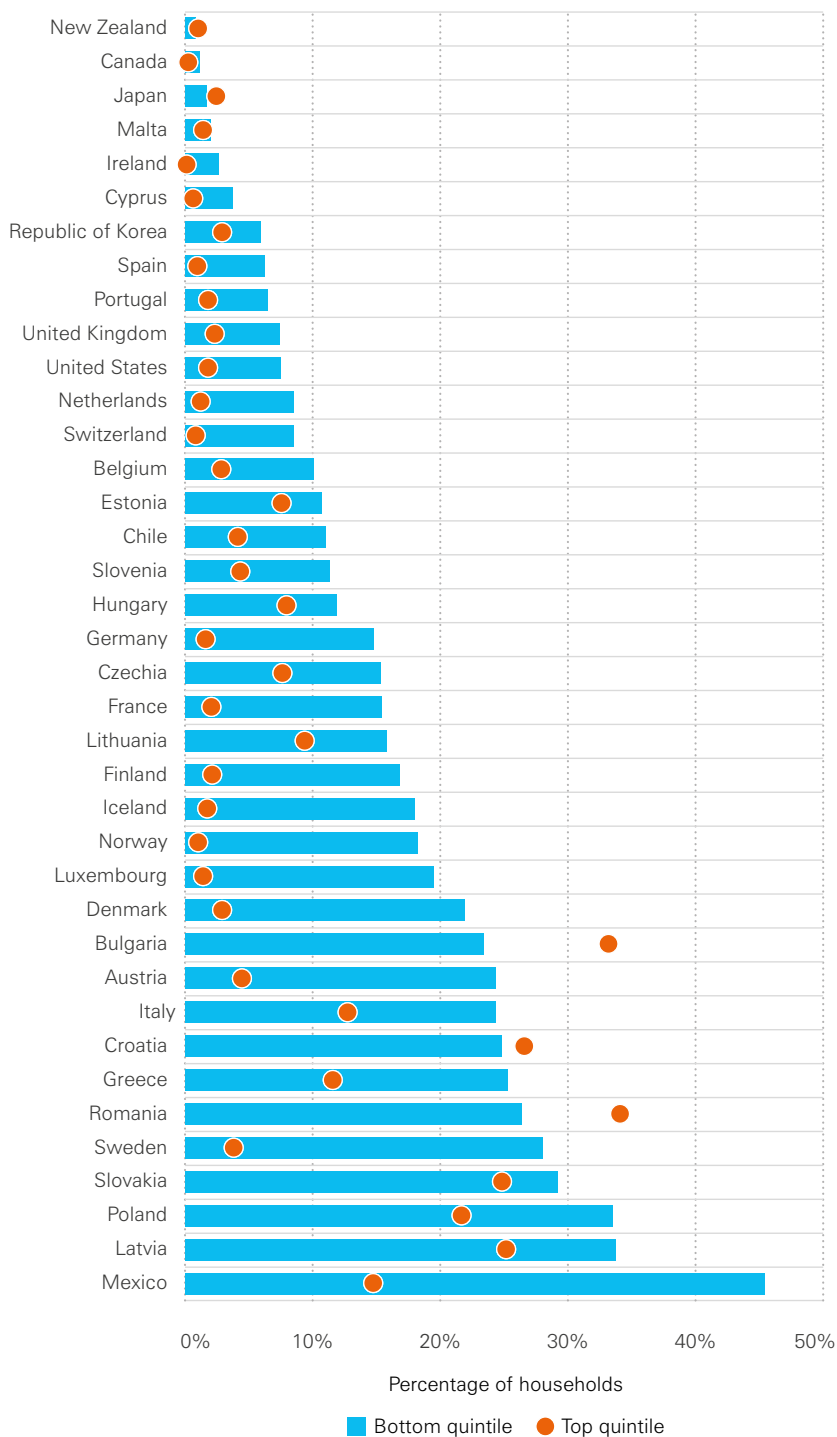
#### *Inequalities in the conditions of children’s homes*

Many children experience deprivations in their home environments. Some of these – such as in relation to water and sanitation – have to do with a lack of adequate infrastructure and public services. Other aspects – like the choice of fuel for cooking and heating, or the amount of space available at home – are intrinsically linked to poverty. Some environmental health risks, such as exposure to second-hand smoke, depend on the behaviour of those living with children.

Data from EU-SILC allow for an analysis of inequalities in housing conditions in European Union Member States (see Figure 37). Overcrowding appears to be a problem that disproportionately affects children living in households at risk of poverty: in almost all countries (except for Bulgaria, Croatia and Romania), children below the poverty line are more likely to live in overcrowded dwellings, and in a number of countries the gap between bottom quintile and top quintile is over 10 percentage points.

**Figure 37: Low-income families are twice as likely to live in overcrowded dwellings**

Overcrowding by income status (2019)



Source: OECD Affordable Housing Database. <<https://www.oecd.org/housing/data/affordable-housing-database/housing-conditions.htm>> accessed 15 March 2022

### Neighbourhood inequalities

Urban and rural neighbourhoods have different strengths and challenges. The ‘urban advantage’ refers to easier access to services and economic opportunities in cities and is well documented for children in low- and middle-income countries. Children in rural areas may have more space in and immediately around the home; but on the other hand, they may live in older, poorer-quality housing that lacks essential services. Good transportation seems to be particularly important for children in rural areas, where populations are sparse and where services and retail are distributed over larger areas. Cities, and even neighbourhoods, differ in how they accommodate children, particularly

when it comes to safe mobility and outdoor play.<sup>105</sup>

Some insight into inequalities in children’s access to neighbourhood recreation facilities is provided by the Children’s Worlds study.<sup>106</sup> As Figure 38 shows, children who experience higher levels of material deprivation are also less likely to report that their neighbourhoods have adequate recreation facilities.

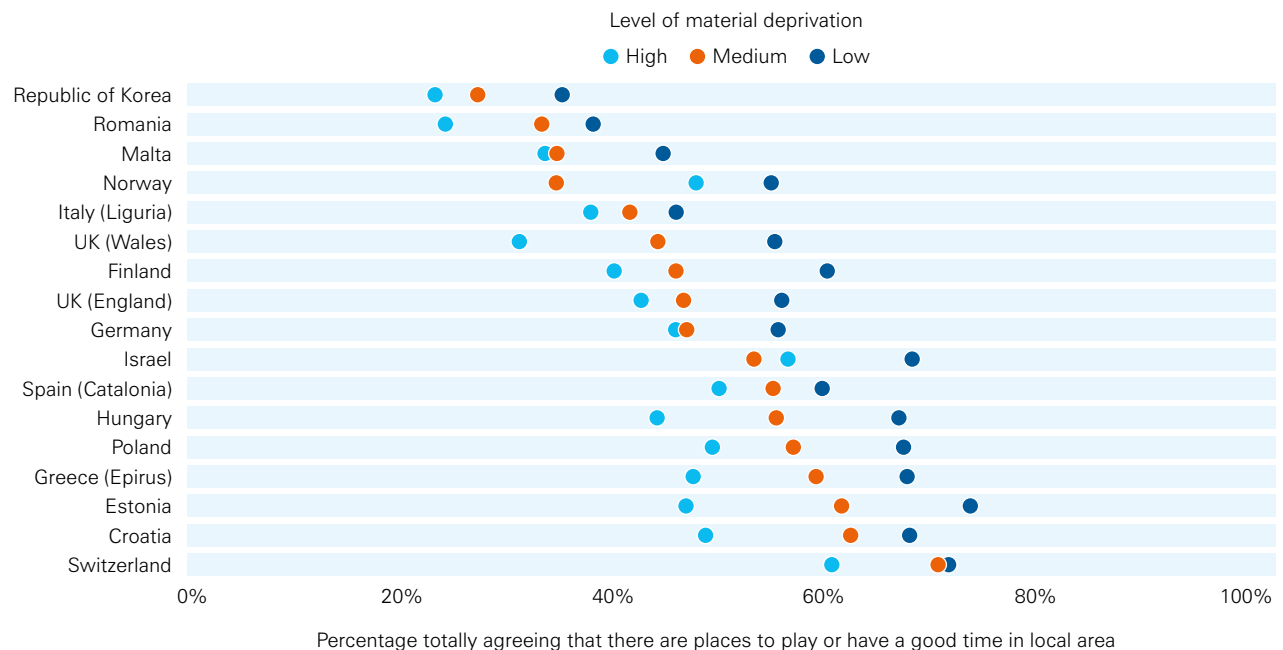
Intersecting with these socio-economic patterns, there may be differences in the nature and impact of environmental conditions and challenges according to age and gender, and for specific minority sub-groups of children. Improving the environment for children’s well-being therefore

implies not only raising average standards, but also considering and addressing the specific situations and challenges faced by different children, in order to achieve greater environmental equality.

Children also experience unequal effects of environmental influences, depending on their developmental status and sex.<sup>107</sup> Children’s vulnerability to adverse environmental factors, particularly hazardous chemicals, is highest at key developmental stages, such as before birth and during infancy. The effects of some toxins, including lead, are mediated by the endocrine system and affect the bodies and minds of boys and girls differently.

**Figure 38: Materially deprived children are less likely to have places to play in their neighbourhood**

Differences in children’s satisfaction with neighbourhood recreation facilities, by level of individual child deprivation (2017–2019)



**Note:** Children aged around 10. Representative schools-based samples of whole countries or specific regions (where indicated in brackets).

**Source:** Children’s Worlds survey, Wave III.

### Influence

Over the past few years, children and young people have demonstrated a growing desire and ability to influence debates about the environment. Today's children are growing up in the shadow of the mounting crisis of climate change. They will have to live with the consequences of current actions, and it is they who will have to tackle the environmental challenges that lie ahead. It is therefore imperative for them to have the opportunity to influence events now, and not only once they are adults.

Three key elements of enabling children to have an influence are knowledge, skills and opportunities.

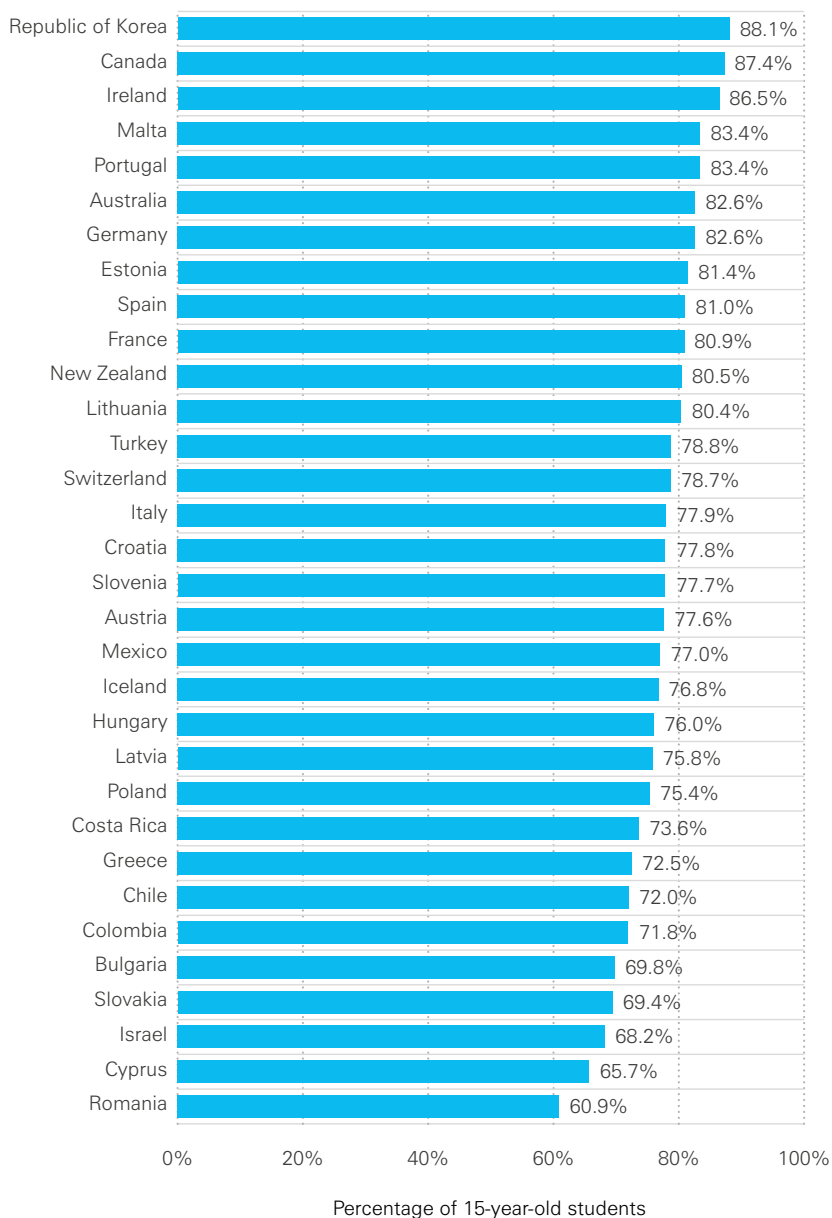
### Knowledge

Research into children's climate change education is still at an early stage.<sup>108</sup> Basing our findings on reports by teachers across 18 countries that participated in the PISA 2018 survey, we can say that many children still do not receive education on global issues, such as climate change.<sup>109</sup> This is reflected in pupils' own assessments. On average, 76 per cent of children reported that they were aware of, or were very familiar with, climate change and global warming, with the highest rates in the Republic of Korea (88 per cent) and the lowest in Romania (61 per cent) (see Figure 39).

The levels of awareness of issues affecting the environment may vary by gender. It is generally accepted that women show more environmental concern than men, although recent research has found that this pattern also depends on countries' socio-

**Figure 39: In most countries, over a fifth of 15-year-olds are unaware of climate change**

Awareness of climate change and global warming, students aged 15 (2018)



Note: Data not available for Belgium, Czechia, Denmark, Finland, Japan, Luxembourg, Netherlands, Norway, Sweden, United Kingdom (apart from Scotland) and United States.  
Source: PISA 2018.

cultural contexts.<sup>110</sup> According to PISA 2018 data, adolescent girls have higher levels of awareness

of global issues than do boys in all Report Card countries, except for the Republic of Korea.<sup>111</sup>

## Spotlight 7 Environmental involvement and skills for the future

The mere inclusion of environmental topics in the school curriculum does not necessarily translate into environmental awareness or pro-environmental behaviour among students. Across 32 nations, the great majority of headteachers claimed that their school had such a curriculum topic, and in the average country, 87 per cent of students formally receive lessons about climate change and global warming in the school curriculum – ranging from 50 per cent in Israel to 99 per cent in Poland.

However, fewer students feel that they are aware of the topic; and even fewer are capable of tackling a relevant science problem. Across 32 countries, 77 per cent of 15-year-olds say they are familiar with climate change and global warming. However, teenagers are likely to acquire their knowledge from sources other than the school: only in Australia, Colombia and Germany was there a link between the presence of environmental topics on the curriculum and students' environmental awareness. Despite their declared awareness, only 16 per cent of students could solve a science task about rising sea levels – ranging from 9 per cent in Colombia to 25 per cent in Canada. All in all, this suggests that awareness does not necessarily translate into the skills needed to understand the future impact of climate change and global warming.

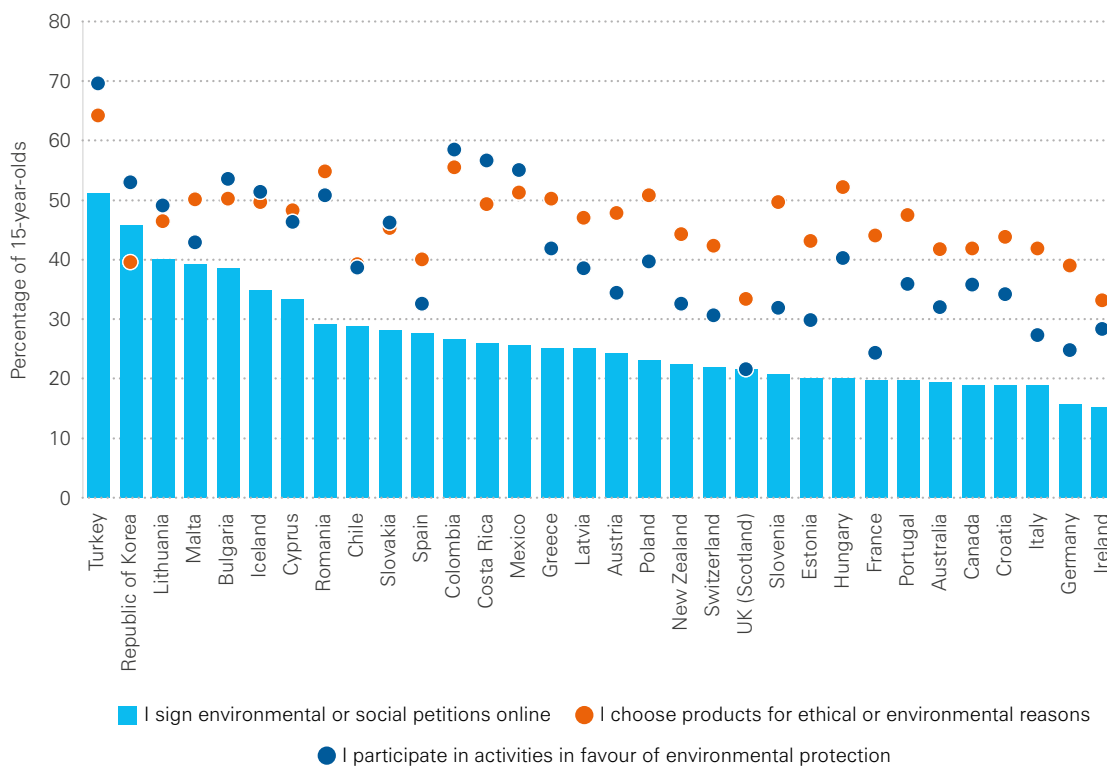
The school curriculum also showed no relationship with pro-environmental behaviour ( $r=-0.01$ ). Nevertheless, adolescents did display such behaviour: their most common involvement was in reducing the energy consumed at home, in order to protect the environment (71 per cent) – ranging from 63 per cent in Turkey to 87 per cent in Ireland. Other things they got involved with included: choosing products for ethical or environmental reasons, even if those items are a bit more expensive (46 per cent); participating in activities that support environmental protection (40 per cent); boycotting products or companies for political, ethical or environmental reasons (27 per cent); and signing environmental or social petitions online (26 per cent).

Environmental awareness was related to some aspects of behaviour (such as trying to reduce energy consumption or consciously choosing certain products), but not to others (e.g., signing petitions, boycotting companies or participating in activities). Even when there was a link, it was non-linear: for example, it did not matter whether a 15-year-old had no, little or medium environmental awareness – the decision to choose products for environmental reasons only emerged when the young person had a high level of awareness.

Spotlight 7 Environmental involvement and skills for the future

**Figure 40: In eight countries, most 15-year-olds engage in activities in support of environmental protection**

Percentage of 15-year-olds who engaged in three aspects of pro-environmental behaviour (2018)



Note: At least 75 per cent of all 15-year-olds were covered in all nations, apart from Romania, Austria, France, Scotland (UK) and Canada. Source: PISA 2018.

Some gender differences presented themselves, with slightly more boys engaging in behaviour with a political angle: 29 per cent of boys and 23 per cent of girls would boycott a company for political, ethical or environmental reasons; and 27 per cent of boys and 25 per cent of girls would sign an environmental or social petition online. By contrast, slightly more girls were likely to seek to reduce energy consumption at home, in order to protect the environment; to choose certain products for ethical or environmental reasons; and to participate in activities that supported environmental protection. Yet, there is nothing inherently gendered in these aspects of behaviour. If we look at individual nations, we find that the difference was driven by nine post-communist and Mediterranean countries. In the remaining 23 countries, the gender difference was minor or non-existent.

In Chile, Germany, Ireland, Italy, Korea, Mexico, Portugal, Croatia and Malta, parents were asked about the same aspects of their behaviour. In each of those countries, every pro-environmental aspect of the students' behaviour was significantly related to the behaviour of their parents.<sup>112</sup> For example, in Germany, those students whose parents boycotted products or companies for political, ethical or environmental reasons were 2.4 times more likely than their peers to do the same. The participation of teenagers is bound up in something larger, where the 'informal' curriculum of providing models of pro-environmental behaviour matters more than the formal school curriculum. This shows us that we cannot rely solely on schools to promote awareness of environmental issues and to develop the science skills and behaviour required to address these issues.



## Spotlight 8 Fridays for Future: Global child activism on climate change

Every school day in the three weeks leading up to the Swedish general election on 9 September 2018, 15-year-old Greta Thunberg sat outside the Swedish parliament to demand action on the climate crisis. By the time of the election, she had been joined by many other children and young people, whose school strike soon sparked an

international movement: Fridays for Future. Today, young people all over the world are raising their voices in an attempt to get policymakers to listen to science, to ensure climate justice and equity, and to keep global temperatures 1.5 °C above pre-industrial levels.

**Figure 41: Global map of Fridays for Future strike events**



Source: <<https://fridaysforfuture.org>>, accessed 16 February 2022.

Fridays for Future has become a youth-led and youth-organized climate movement with a truly global reach. By early 2022, over 139,000 strike

events had been organized in 8,500 cities, by 16 million child and adult activists, across all the continents of the world.

### Skills

With support, children can develop the skills they need to influence events in the present. They can also be provided with opportunities to learn skills that could benefit society and the world in tackling environmental issues in the future (see *Spotlight 7*).

### Opportunities

With a foundation of knowledge and skills, it is also vital that children should have the opportunity to participate in decision making, and that their views should be taken seriously. An example of this principle being put into practice is the activity of the Children's Parliament in Scotland, which has

contributed recommendations on climate change to the Scottish Parliament.<sup>113</sup> There are also many examples of children initiating environmental action themselves (see *Spotlight 8*).



**SECTION 7**  
**CONCLUSIONS**

## SECTION 7

# CONCLUSIONS

Children need healthy and safe environments in which to flourish. This report has demonstrated the wide range of influences that the environment has on their lives, particularly their physical health, mental well-being and development. These include not only present, local environmental factors to be found in children's homes, schools and communities, but also the immediate and future effects of global environmental change.

The performance of rich nations is mixed. Despite their relative wealth, the countries of the OECD and the EU have not succeeded in guaranteeing a healthy environment for all their children. Major environmental inequalities exist within these countries.

Children in poorer households and other disadvantaged sub-groups experience the greatest environmental risk and harm. At the same time, many of the world's richest countries contribute disproportionately to pollution, environmental degradation and climate change. These actions are harmful not only to the current generation of children, but also to future generations.

Rectifying the injustice and damage, and realizing children's environmental rights, requires policy action at all levels. International cooperation is needed to find global solutions. But some problems can and should be tackled by individual countries.

No country is doing well in all areas, and all need to take action individually, as well as collectively. Two international instruments – the United Nations Convention on the Rights of the Child and the 2030 Agenda for Sustainable Development – are important frameworks for achieving these objectives (*see Spotlight 1*).

# RECOMMENDATIONS

We conclude with recommendations to improve the environments in which children live and develop:

## 1. Focus on children now, protect the future

Today's environmental problems are costing children healthy years of life. In most cases – including with waste and pollution – the same issues that are damaging the planet in the long run are also damaging children's lives today. **Governments at the national, regional and local level** need to lead on improvements to children's environments today, by reducing waste, air and water pollution, and by ensuring high-quality housing and neighbourhoods where children can live, develop and thrive.

## 2. Improve environments for the most vulnerable children

The COVID-19 pandemic has revealed stark inequalities both between and within countries. Children in poor families tend to face greater exposure to environmental harm than do children in richer families. This entrenches and amplifies existing disadvantage. To reduce inequalities, **national, regional and local governments and authorities** should prioritize investments designed to improve the quality of housing and neighbourhood conditions for the poorest families, so that all children have environments that are fit for them to grow up in.

## 3. Ensure that environmental policies are child sensitive

**Governments and policymakers** should make sure that the needs of children are built into decision making. Children are more affected than adults by certain environmental risks, because their bodies are still developing; and the needs they have of their environments are distinct. All countries should ensure that policies are child sensitive, in accordance with the United Nations Convention on the Rights of the Child. Examples can be taken from those governments that have already implemented child rights impact assessments for all policies – and from the many governments that are presently seeking to make their environments more child friendly. Adaptation to climate change should also be at the forefront of action for both **governments and the global community**, and across various sectors from education to infrastructure. Efforts should be child sensitive and include the construction of children's adaptive capacity.

## 4. Involve children, the main stakeholders of the future

Children will face today's environmental problems for the longest time; but they are also the least able to influence the course of events. Adult decision makers at all levels, from **parents to politicians**, must listen to their perspectives and take them into account when designing policies that will disproportionately affect future generations. Through examples such as child and youth parliaments and citizens' assemblies, children should be involved in environmental debates and decisions, and in designing their immediate environments.

## 5. Take global responsibility, now and for the future

Environmental impacts have no respect for national borders. Air pollution produced within one country harms neighbouring countries and the entire world. Policies and practices must safeguard the natural environment on which children depend. **Governments and businesses**, through regulations and/or incentives, should identify and mitigate their global impact on the environment. **Governments** should take effective action now to honour the environmental commitments they have made to the Sustainable Development Goals, including to reduce greenhouse gas emissions by 2050.



## NOTES AND REFERENCES

## NOTES AND REFERENCES

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