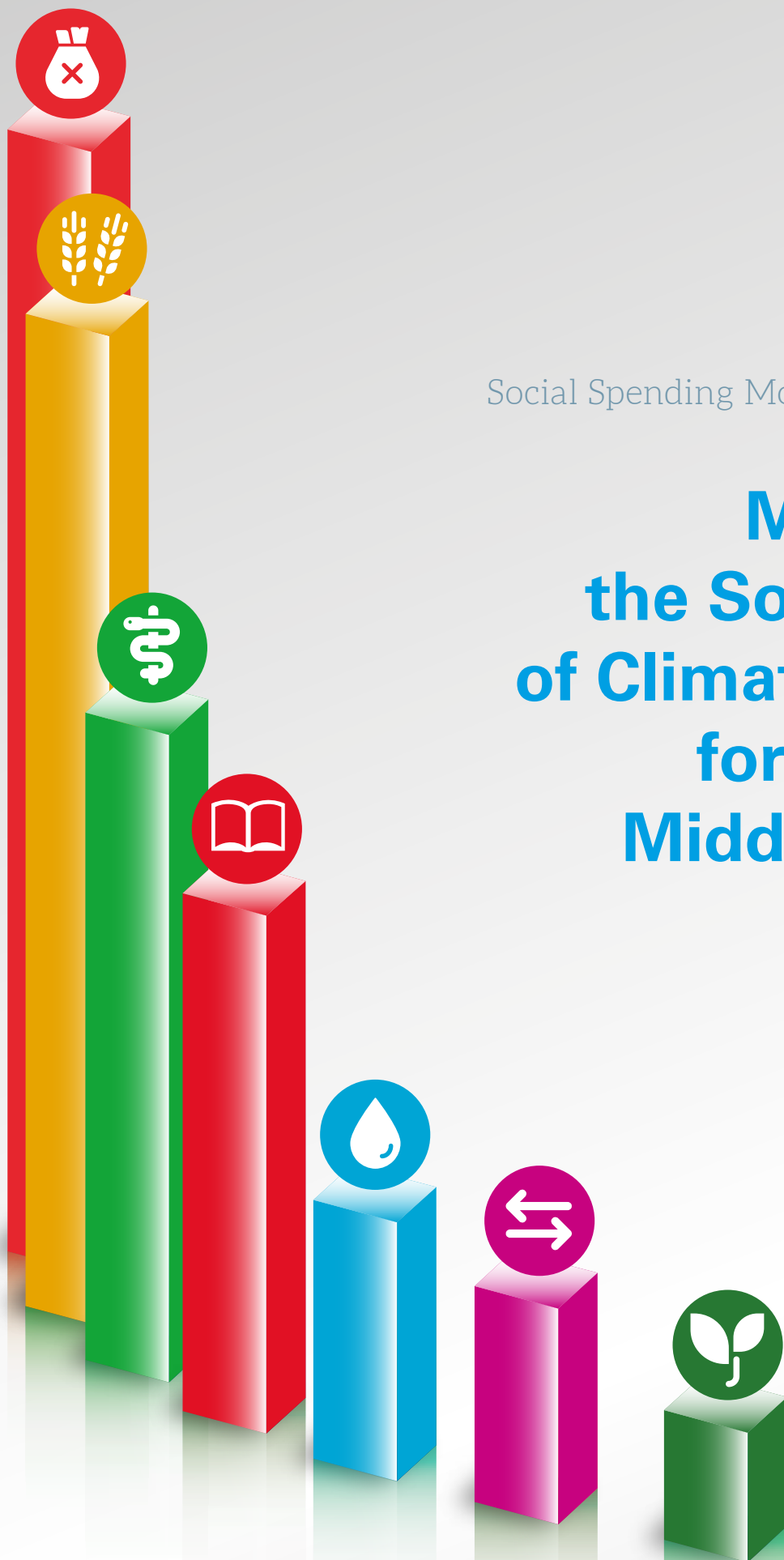


Social Spending Monitor: Policy Brief 3

Monitoring the Social Costs of Climate Change for Low- and Middle-income Countries

August 2022



UNICEF OFFICE OF RESEARCH – INNOCENTI

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Contents

Key messages	4
Background	5
1. THE IMPACT OF THE CLIMATE CRISIS ON ECONOMIES IN LOW- AND MIDDLE-INCOME COUNTRIES: SQUEEZING THE RESOURCE ENVELOPE FOR SOCIAL SECTOR INVESTMENT	8
2. THE INCREASED INVESTMENTS REQUIRED FOR CLIMATE CHANGE ADAPTATION FOR THE SOCIAL SECTORS	11
Adaptation costs	11
3. IS SOCIAL SPENDING BEING SUFFICIENTLY INCORPORATED INTO CLIMATE CHANGE ADAPTATION STRATEGIES?	14
3.1. The cost of climate change to the health sector	14
3.2. The cost of climate change to the education sector	17
3.3 Costing social protection in a changing climate	19
3.4 Summary of increased social spending investment needs triggered by climate change	22
4. CAN ADAPTATION COSTS FOR THE SOCIAL SECTORS BE COVERED BY CLIMATE FINANCE PLEDGES?	23
5. RAISING DOMESTIC AND INTERNATIONAL CLIMATE FINANCING FOR SOCIAL SPENDING	26
5.1 Green budgeting	26
5.2 Investing in prevention	27
5.3 Carbon pricing and energy subsidy reform	27
5.4 Energy subsidies and equity	29
5.5 Green financing initiatives	31
Conclusions	32
Policy recommendations	34
References	36

BOXES	Box 1. Nationally Determined Contributions (NDC) under the Paris Agreement	11
	Box 2. Global climate finance	23
	Box 3. Linking subsidy reforms to social spending	30
TABLES	Table 1. Mid-century GDP changes with different temperature rises and economic impact severity, relative to a no-climate change world	9
	Table 2. The 10 countries most affected by the economic impact of climate change in 2019 (ordered in terms of impact on GDP), and children at risk	10
	Table 3. Adaptation costs as described in countries' NDCs (in US\$ millions) by country income group	13
	Table 4. Number of NDCs with adaptation plans costed and average costs per income group	13
	Table 5. Ghana's estimates of adaptation costs for the health sector	16
	Table 6. Climate change expenditure by social sector, Cambodia (billions KHR)	18
	Table 7. Increased costs and investment needs by sector	22
FIGURES	Figure 1. Potential cumulative reduction in GDP by 2050, by income group, based on a projected 2.6° C temperature rise	8
	Figure 2. Adaptation finance needs, by sector, based on 26 developing countries' NDCs	12
	Figure 3. Proportion of countries identifying their health sector as vulnerable, by income group, in their NDC submission to the IPCC	15
	Figure 4. Total global climate finance from public and private sources, by region of destination (US\$ billion)	24
	Figure 5. Domestic and international adaptation finance by region (US\$ billion)	24
	Figure 6. Adaptation financing gap by region based on costs outlined in NDCs minus pledged international and domestic climate finance (US\$ billion)	25
	Figure 7. Energy price revenues and subsidies, by sector, in selected countries as percentage of GDP	28

Key messages

The climate crisis has had, and continues to have, a serious economic impact on the poorest countries, and adapting to the impact of climate change will bring added costs. Current estimates of adaptation costs do not include the significant climate bill facing the social sectors. It is crucial that future social sector spending requirements are adequately costed for and financed as part of climate financing mechanisms, including National Adaptation Plans. Failure to invest adequately in the social sectors can exacerbate poverty and inequalities resulting from climate change, and undermines the potential contributions these sectors can make to climate change adaptation and mitigation.

Climate change disproportionately affects the poorest households and children, with poverty and the lack of access to such essential services as health, education and social protection compounding the negative impact of climate shocks. Adaptation measures need to be designed to support those groups most affected, based on a rights-based approach, with the effective involvement of disadvantaged communities. This brief identifies countries where social spending for children may be most at risk due to the combined socio-economic effects of climate change.

In the context of the often-competing priorities of mitigation, adaptation and development, low- and middle-income countries are facing a significant financing gap for planned adaptation measures. In the face of growing evidence of the potential of universal health, education and social protection policies to help countries prepare for and mitigate the worst effects of the climate crisis, international climate financing needs to consider enhancing allocations to the social sectors. The cost of inaction will be much higher.

Investing in social sectors will be key to managing the effects of the climate crisis, and there are positive opportunities for low- and middle-income countries to be part of this investment. Developing countries now have the opportunity to leverage green technologies in new capital investments, potentially avoiding the costs of economic restructuring faced by industrialized countries. There is potential to reform energy subsidies equitably to bring in much-needed revenue and support the groups most exposed to climate shocks. Green financing initiatives have the power to bridge more of the adaptation financing gap, while more intentional alignment of national budgets to climate and inclusion goals can make better use of existing resources. However, an urgent and concerted effort is needed to raise finance and investment now; this generation's children, who bear the burden of climate change, cannot wait.

Background

The impact of climate change is creating major socio-economic challenges for low- and middle-income countries, further exacerbated by the COVID-19 crisis, which tipped an additional 100 million children into poverty worldwide (UNICEF, 2021a).¹ Adaptive, shock-responsive and risk-informed social policies are required to help prevent the climate crisis further increasing child poverty and undermining progress towards the Sustainable Development Goals (SDGs). However, it is essential that these policies are developed through inclusive processes that acknowledge the potential trade-offs between broader climate mitigation measures and development, while protecting the rights and livelihoods of the poorest and most vulnerable groups, and ensuring an equitable and just transition.

The costs of climate change are already becoming clear for economies struggling to recover from COVID-19: in 2021, the International Monetary Fund (IMF) cited climate change as a key threat to the global economic recovery. The IMF also stressed that climate action in the form of green development has the potential to expand the global economy if carbon prices were to rise steadily over the next decade (IMF, 2021). Under the Paris Agreement, more than 160 countries have now submitted Nationally Determined Contributions (NDCs), outlining their plans to cut emissions and adapt to the impact of climate change over the next five years. However, even with these plans in place, the most recent report of the United Nations Intergovernmental Panel on Climate Change (IPCC) warns that global warming of more than 2° C by the end of the century is the most likely scenario based on current commitments, as expressed in the NDCs (IPCC, 2022a). It is essential that mitigation and adaptation measures to address the climate crisis are based on an equitable, rights-based approach to a just transition, with community resilience supported by adaptive health, education and social protection services (IPCC, 2022b)

Recent policy responses to COVID-19 have stalled progress on the move towards climate-friendly fiscal policies, with immediate policy responses, including the introduction of fuel subsidies and utility bill waivers, being predominantly climate-negative (OECD, 2022; UNICEF-Innocenti, 2021).² As a result, although containment of the pandemic saw travel bans and a slowdown in economic activity, which resulted in a temporary drop in carbon emissions, there is little sign of countries 'growing back greener', with emission levels recovering quickly (UNEP, 2021a). Just 6 per cent of total fiscal stimulus from G20 nations went to the 'green economy', with some countries, including China, India

1 Including: low-income countries (LICs), lower-middle income countries (LMICs), middle-income countries (MICs) and upper-middle income countries (UMICs).

2 These responses were, in the main, time-limited.

and South Africa, heavily subsidising their coal industries in order to cut electricity prices in an effort to prevent hardship (Nahm and Scott, 2022). The conflict in Ukraine has triggered a new challenge, placing pressure on energy prices due to increased gas and oil prices, with many countries expected to maintain energy subsidies, especially due to the concurrent impact on food prices and increasing levels of food insecurity (UNICEF, 2022). This highlights the tensions inherent in securing a just transition which ensures that global and domestic policy interventions work to mitigate the economic, social and health impacts on the poorest communities. Financing these policies will require achieving green growth within the framework of the SDGs (IMF, 2021).

UNICEF argues that the [climate crisis is also a child rights crisis](#), infringing on health, education and social protection services as its effects begin to be felt more strongly (UNICEF, 2021c). There is growing evidence that climate change has a disproportionate effect on the poorest, with children in the poorest families being significantly more likely to be affected by extreme weather events (WEF, 2021). Awareness of the climate crisis is high among the young: 83 per cent of young people in low- and middle-income countries support bold government action on climate change (in comparison to 70 per cent in high-income countries) ([UNICEF Changing Childhood](#) Project). Nonetheless, concrete progress is slow.

Achieving an environment fit for children will require investment in climate mitigation and adaptation across social sectors, including health, education and social protection services. Social sectors are already integrating critical dimensions to enhance their role in climate adaptation: Social protection systems will need to be strengthened further to prepare effectively for, mitigate and respond to climate risks; health and nutrition services face new and increasing environmental hazards – from pollution to famine, with the need to strengthen the resilience of food systems against climate variability and extremes and with the threat of new disease prevalence on the horizon; while the education sector faces the challenge of training young people in the skills they will need to live in the fast-changing environment of the future. Health and education infrastructure costs are also likely to increase, with the need to climate-proof hospitals and schools in many regions. These are critical investments to ensure that social policies and programmes are risk-informed and offer the opportunity to build more comprehensive social protection systems for a changing world.

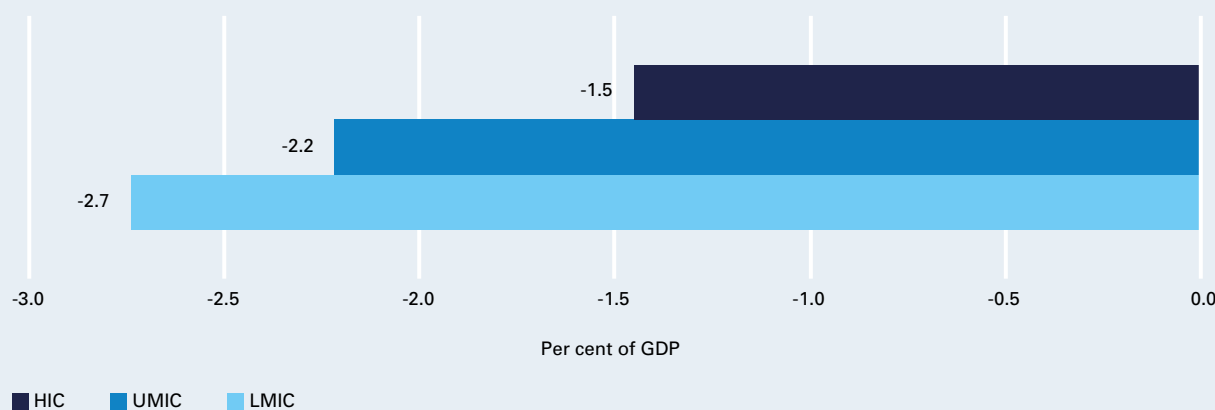
This brief firstly looks at the predicted impact of the climate crisis on gross domestic product (GDP) growth in low- and middle-income countries using the global risk indices from the Swiss Re Institute and Germanwatch. It goes on to assess the extent to which low- and middle-income countries are explicitly factoring in adaptation costs for the social sectors in their NDCs using data from the German Development Institute (DIE). Finally, it looks at options for raising domestic and international climate financing for social spending aimed at children in low- and middle-income countries. The brief aims to add to our understanding of what climate change means for social sector budgets, and the extent to which social sectors are being prioritized in the climate response. It will also outline ways in which green climate financing policies might help to address the widening social sector funding gap, particularly in areas that require risk-informed adaptation, while ensuring that adaptation measures do not disproportionately affect the poorest. Specifically, this policy brief aims to address key questions within the parameters of available global data.

- 1. Is the impact of the climate crisis on economies in low- and middle-income countries squeezing the resource envelope for social spending?**
- 2. What are the increased investments required for climate change adaptation for the social sectors?**
- 3. Is social spending being sufficiently incorporated into climate change adaptation strategies?**
- 4. Can adaptation costs for the social sectors be covered by climate finance pledges?**
- 5. What are the options for increasing domestic and international climate finance for social spending?**

1. The impact of the climate crisis on economies in low- and middle-income countries: squeezing the resource envelope for social sector investment

Low- and middle-income countries are more exposed than richer countries to the physical risks of the climate crisis, with the increasing frequency of extreme weather events threatening conflict over resources in poorer regions (Eckstein, 2021; ICRC, 2020). In 2021, more than 78 per cent of the United Nations’ humanitarian appeals involved an extreme weather event, up from 36 per cent in 2000 (Carty and Walsh, 2022). Our analysis, based on a risk index compiled by the Swiss Re Institute, suggests that, while countries in all income groups will be negatively impacted, GDP losses in lowermiddle income countries are predicted to be greater (-2.7 per cent) by 2050 than in high-income countries (-1.5 per cent). Upper-middle income countries are due to experience GDP losses of - 2.2 per cent compared with a no-climate change scenario (based on a projected rise of 2.6° C; see Figure 1) (Swiss Re, 2021).³

Figure 1. Potential cumulative reduction in GDP by 2050, by income group, based on a projected 2.6° C temperature rise



Source: Author’s analysis using Swiss Re data and World Bank income group classifications, based on findings from 48 countries. Comparable data not available for low-income countries.

³ This finding is based on research that simulates the economic outcomes of the physical risks associated with ongoing and gradual climate change over time in 28 countries worldwide, factoring in impact variables, such as the impact of supply chain disruptions and migration.

Regionally, the biggest impact is likely to be seen in South and East Asia, the Middle East and Africa, with the relative impact increasing with the severity of global warming. The impact on the Middle East and Africa is calculated to be the equivalent of -2.4 per cent of GDP by mid-century based on current trajectories. A global temperature increase of 2.6° C could see a loss of -4.6 per cent of GDP in the Middle East and Africa. On the other hand, Europe and Organisation for Economic Co-operation and Development (OECD) nations will be much less affected, with a global temperature increase of 2.6° C predicted to result in a loss of less than -0.8 per cent of GDP by mid-century. This difference in impact on richer and poorer regions threatens to widen further the wealth gap between developing and advanced economies, potentially impacting the resource envelope for social spending (see *Table 1*).

Table 1. Mid-century GDP changes with different temperature rises and economic impact severity, relative to a no-climate change world

Region	Paris target	Current trajectory	
	< 2° C increase	2.0° C increase	2.6° C increase
Europe	-0.2%	-0.7%	-0.8%
OECD	-0.4%	-0.8%	-0.9%
North America	-0.5%	-0.9%	-1.0%
South America	-0.4%	-1.1%	-1.4%
Oceania	-0.5%	-1.3%	-1.7%
Asia	-0.7%	-1.7%	-2.4%
Middle East and Africa	-0.7%	-2.4%	-4.6%
Association of Southeast Asian Nations (ASEAN)	-0.8%	-2.4%	-4.1%
World average	-0.51%	-1.37%	-1.99%

Source: Swiss Re, 2021.

This analysis may underestimate the risk for sub-Saharan Africa, due to the lack of data available from low-income countries.⁴ An alternative scenario analysis from Germanwatch, which identified the 10 most affected countries in 2019, highlights the potential risk facing the poorest countries. Taking into account fatalities and GDP losses, their Global Risk Index finds that the Bahamas, Mozambique, Zimbabwe and Malawi were the most affected, followed by Bolivia, South Sudan and Niger. The most severe impacts were predominantly caused by cyclones and flooding, and drought, with climate change exacerbating

⁴ This is based on data from 17 low- and middle-income countries and 29 high income countries.

the frequency and severity of extreme weather events. This supports other findings that the poorest countries will be hardest hit by the costs of climate change (UNDRR, 2018), with 8 out of 10 of the most affected being low or low- or lower-middle income countries, and half being in sub-Saharan Africa. Only 2 of the top 10 most impacted countries in 2019 were high-income countries (see Table 2).

The economic impact of climate change on countries to a large extent links to the countries in which children are most at risk due to climate change, as measured by the Children's Climate Risk Index (CCRI) compiled by UNICEF. The CCRI highlights the threat facing children in Africa, with countries in the subcontinent comprising the top 10 places where children are most at risk due to a combination of climate and environmental factors and vulnerability (UNICEF, 2021c). In terms of the countries where social spending on children might be most at risk from climate change, Mozambique, Niger and South Sudan fall into the most severe category, with children in Afghanistan, India and Malawi also facing a significant increase in socio-economic vulnerability due to climate change (UNICEF, 2021c).

Table 2. The 10 countries most affected by the economic impact of climate change in 2019 (ordered in terms of impact on GDP), and children at risk

Country	Losses as percentage GDP	Income group	UNICEF Children's Climate Risk Index (CCRI) ranking*
The Bahamas	31.59	HIC	n/a
Mozambique (Republic of)	12.16	LIC	10
Zimbabwe	4.26	LMIC	51
Malawi	2.22	LIC	40
Bolivia	0.76	LMIC	80
South Sudan	0.74	LIC	7
Niger	0.74	LIC	7
India	0.72	LMIC	26
Islamic Republic of Afghanistan	0.67	LIC	15
Japan	0.53	HIC	94

Source: Global Climate Risk Index 2021 (Buchner, 2021), Eckstein, Künzel and Schäfer, 2021; [UNICEF Children's Climate Risk Index \(CCRI rankings\)](#). Countries where social spending on children is most at risk are highlighted in red; those significantly affected are highlighted in orange (based on CCRI: *1 = most at risk.).

2. The increased investments required for climate change adaptation for the social sectors

Box 1. Nationally Determined Contributions (NDC) under the Paris Agreement

The Paris Agreement requires each country to set out their post-2020 climate action plans to reduce emissions and adapt to the impacts of climate change (a Nationally Determined Contribution, or NDC). The format and content of these documents is decided at national level. Most countries now include mention of adaptation in their NDC, although the level of detail provided varies widely. Low- and middle-income countries may set out their emissions reduction plans over a longer timeframe within the context of sustainable development. Moreover, it is understood that moving forward on these plans is partially dependent on the climate finance commitments pledged at COP26. In terms of adaptation priorities, analysis suggests that the most common adaptation priority areas outlined in the NDCs are food production and nutrition, followed by water resources. Other priority areas include: ecosystems; human health; and key economic sectors such as energy, infrastructure, tourism and transportation. Ideally, NDCs detail a financing strategy, however, so far, only a minority have done so.

A registry of NDC submissions may be found [here](#).

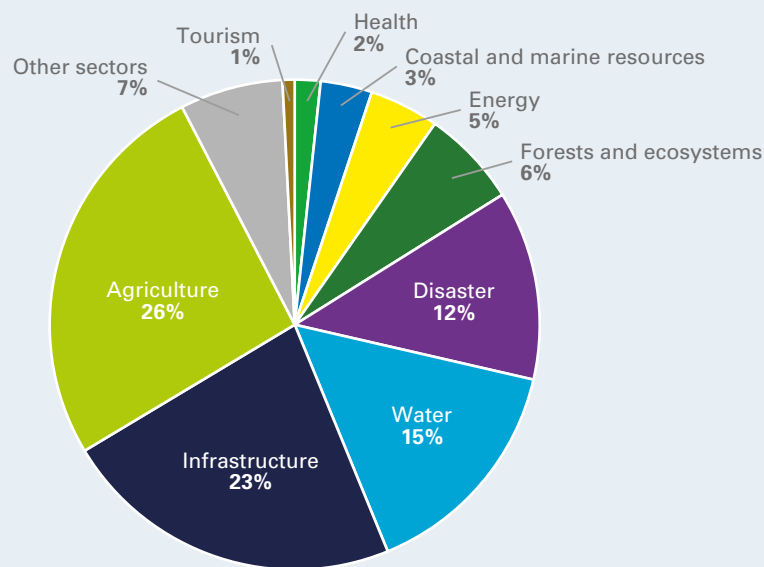
Source: [UNFCCC](#) website; [United Nations](#) website (NDCs).

Adaptation costs

Added to the economic impact of climate change on the economies of low- and middle-income countries, come the predicted costs of adapting to a changing climate. Estimated costings of adaptation measures remain at an early stage in most countries. At the global level, the most common source of cost estimates are from the NDCs submitted to the IPCC in line with the Paris Agreement (*see Box 1*). Here, as in calculations done by the United Nations Environmental Programme (UNEP) (2021b) and others, NDC estimates are used as a proxy for a country's commitment to climate change adaptation. However, while over 160 countries have now submitted updated NDCs, only just over a third of these (59) have included any mention of adaptation costs, and, in some cases, they give only a very broad indication of costs. In addition, although NDCs cover the period up to 2030, the costs indicated may be partial or cover only a portion of this time. Consequently, these documents quote widely varying cost estimates ranging from under US\$1 billion to up to US\$250 billion (*see Table 3*).

In most countries, the health sector is the only social sector for which adaptation costs have been budgeted (see Figure 2). Despite this, less than 2 per cent of total adaptation financing as outlined in the NDCs has been budgeted for the health sector. To date, adaptation costs associated with education and social protection needs remain unrecorded in these documents.

Figure 2. Adaptation finance needs, by sector, based on 26 developing countries' NDCs



Source: UNEP, 2021b.

Nonetheless, although these estimates are likely to underrepresent the extent of the costs involved, the costs outlined in the NDCs do represent a significant budgeting commitment on behalf of many low- and middle-income countries. The total cost of adaptation to 2030 quoted in NDCs is around US\$876.7 billion based on reporting from one third of countries.⁵ Spread over a decade, this would be an outlay of approximately US\$87.7 billion annually on climate adaptation by 2030. Global estimates are higher. UNEP estimates that the costs of adaptation for developing countries are likely to be an estimated US\$140–300 billion per year by 2030, and US\$280–500 billion per year by 2050.⁶ Based on estimates from countries that have costed these measures, adaptation costs to 2030 amount to an average of US\$8.5 billion per country in low-income countries, rising

⁵ This is based on reporting from 60 per cent of LICs, 50 per cent of LMICs and 25 per cent of UMICs.

⁶ The available evidence has limitations but suggests that estimated adaptation costs, and likely adaptation financing needs in developing countries, are 5 to 10 times greater than current international public adaptation finance flows.

to US\$20.9 billion for lower-middle income countries. Upper-middle income countries calculate costs of US\$15.9 billion. The higher level of spending commitment in lower-middle income countries potentially signals the greater needs and/or awareness of threat in these countries (see *Tables 3 and 4*).

Table 3. Adaptation costs as described in countries' NDCs (in US\$ millions) by country income group

Adaptation costs US\$ millions	LIC	LMIC	UMIC	HIC	Total
No costs mentioned	12	26	37	32	107
<100	2	2	3	2	9
<500	1	5	2	1	9
<5,000	7	10	4	-	21
<10,000	2	2	-	-	4
<100,000	6	5	2	-	13
<250,000	-	2	1	-	3
Not submitted	-	3	1	-	4

Source: Author's calculations, *NDC Explorer Tool* DIE/German Development Institute.

Note: Costs of reaching the adaptation contribution as described in countries' NDCs (in US\$). Some countries provide full cost estimates, some partial cost estimates, and others provide costs of individual projects.

Table 4. Number of NDCs with adaptation plans costed and average costs per income group

	NDCs with adaptation plans	No. of adaptation plans incl. costs	Average costs per country NDC (USD bn)
LIC	30	18	8.5
LMIC	52	26	20.9
UMIC	49	12	15.0
HIC	35	3	0.13

3. Is social spending being sufficiently incorporated into climate change adaptation strategies?

Within the context of increasing pressures on national government budgets for limited resources, social sectors are themselves predicted to face rising costs due to climate change. While global costings of the increased investment needs by social sector have not yet been carried out, this section reviews the available evidence from published studies on the costs of required investments in health, education and social protection sectors in low- and middle-income countries.

3.1 The cost of climate change to the health sector

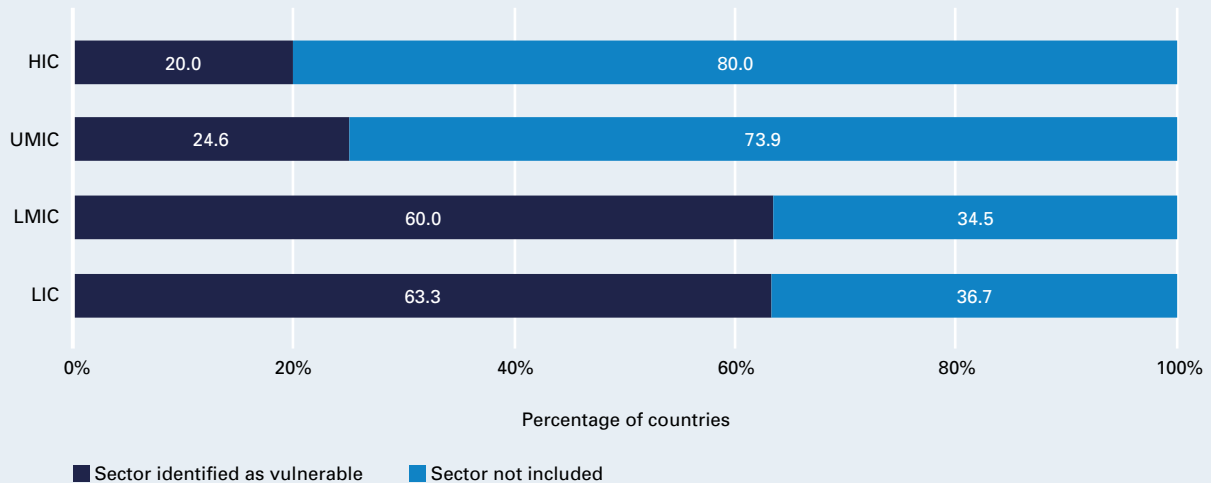
It is increasingly evident that social sectors are vulnerable to climate change. As the United Nations argues, climate change is the single biggest health threat facing humanity ([UN website](#), climate change key findings). Impacts on health will be widespread and will include more extreme weather events, changed patterns of disease affecting agricultural production, and the disruption of food systems, with climate change predicted to cause an additional 250,000 deaths per year from malnutrition, malaria, diarrhoea and heat stress alone ([WHO website](#)). The majority of low- and middle-income countries identify health as a priority sector vulnerable to climate change in their NDCs. Climate-related health risks include: increased vector-borne diseases (malaria, dengue, diarrhoea); malnutrition and contaminated water; air pollution and heat stress (Sheffield and Landrigan, 2011). Nearly 90 per cent of the global burden of these diseases associated with climate change is borne by children (Sheffield and Landrigan, 2011). In addition, the health impact of fossil fuel air pollution is leading to an increased prevalence of diseases such as asthma and heart conditions, with UNICEF calculating that more than [one billion children](#) are exposed to exceedingly high levels of pollution. Increasingly, frequent extreme weather events also damage or disrupt access to essential health services and clinics (WHO, 2021). To give just one example, in 2015 floods damaged or destroyed at least 60 hospitals and clinics in Malaysia, at a cost of RM281 million (US\$64 million) (AstroAwani, 2015).

The climate impact on health is already coming with a large economic cost. The health and economic costs of climate change and benefits from its mitigation in China alone are calculated to include heatwave-related mortality, which amounted to US\$176 million in 2020 (about 17 times higher than the costs in 2002) and heat-related labour productivity loss of US\$175 billion (2.3 times higher), in addition to air pollution-related mortality from fossil fuel use (at a cost of US\$7.36 billion in 2019, despite falling numbers affected) (Wenjia et al., 2021).

On top of these costs, greater investment in health infrastructure will be needed to build climate-resilient health systems, with capital development an already neglected element of many national budgets in low- and middle-income countries. Addressing these costs needs to be seen as an investment as part of improving the environment on which we all depend. Although climate change is identified as the most important health threat facing countries across the world, addressing both the drivers and impacts of the climate crisis is an opportunity to improve population health (Romanello et al., 2021).

While the health sector is increasingly recognised as vulnerable to climate change in countries' NDCs, the significant economic costs of climate-related health impacts have so far not received adequate attention from governments (Romanello et al., 2021). Forty per cent of all countries identify the health sector as vulnerable, and this proportion increases to more than 60 per cent of all low- and lower middle-income countries (see Figure 3).

Figure 3. Proportion of countries identifying their health sector as vulnerable, by income group, in their NDC submission to the IPCC



Source: DIE/German Development Institute, *NDC Explorer Tool*.

However, despite growing evidence of the extent of these costs, and recognition of the need to enhance the climate resilience of public health systems, investment in climate health adaptation and mitigation is barely a feature of most countries' NDCs (Climate and Health Alliance, no date). In most NDCs, health is the only costed social sector, and as previously noted altogether just 2 per cent of adaptation

financing has been budgeted for health in these documents (see *Figure 2*). Few countries provide any details of their proposed investment in the health sector, and only a handful of low- and middle-income countries have embarked upon identifying costs through other public expenditure reviews.

There are a few notable exceptions. Countries that have made most progress in costing and budgeting for climate-related health and social protection include Ghana, which calculates that investment needs for health adaptation amount to US\$1.4 billion. However, more than two thirds of this is conditional on international climate financing (see *Table 5*). Another country providing costings as part of its Public Expenditure Review, Cambodia, indicated health adaptation budget of KHR35.7 billion (US\$10 million), which would amount to just 1.5 per cent of the country's proposed climate change expenditure (Ministry of Education, Cambodia).

Table 5. Ghana's estimates of adaptation costs for the health sector

NDC policy actions	Programme of actions	Supporting national policy and measures	Investment needs (US\$ millions)	Status
Health: Managing climate-induced health risks	Strengthen climate-related disease surveillance in vulnerable communities in three Districts	National Health Policy	919	Conditional on international climate finance
	Adopt climate change-informed health information systems, including traditional knowledge on health risk management		492	Unconditional
Social Protection: Resilience for gender and the vulnerable	Implementation of community-led adaptation and livelihood diversification for vulnerable groups	National Climate Change Policy	1,023	Unconditional

Source: Ghana NDC, UNFCCC website.

Given the slow progress in recognizing the potential economic and health impacts of climate change, few detailed national estimates of health adaptation costs have been conducted. There is an urgent need for further research based on more reliable data to inform the adaptation measures required, in order to calculate a more accurate estimate of the essential additional investments required. Part of this cost will require additional funding for research into the health impacts of climate change. One study recommends that high-income countries invest at least 1 per cent of their health and social research budgets in research on the impact of climate change; and as much as 5 per cent of total

health research budgets in low- and middle-income countries (Ebi et al., 2019). These investments are essential. It is estimated that reducing children's exposure to climate-related disease alone could reduce the climate vulnerability of around 10 million children (UNICEF, 2021c).

3.2 The cost of climate change to the education sector

Climate-related environmental degradation affects children's ability to go to school, through its impact on health and well-being of both students and teachers. It is estimated that the education of at least 37.5 million children is disrupted by climate-related weather events each year (TheirWorld, 2018), although this is likely to be an underestimate given that at least one billion children are currently thought to be at extremely high risk of the impacts of the climate crisis (UNICEF, 2021a). Climate change is also affecting the relevance of the skills schools provide: education systems need to be redesigned so that they give children the skills and training they need to address the challenges of the future and the growing green economy. In their NDCs, over half the countries mention education in all income groups, focusing on climate change education and skills training. Details on the measures that countries intend to take to address the impact of climate change on education are, however, lacking. Only eight countries mention the need for adapting school buildings and education infrastructure to accommodate the changing climate, and just nine indicate the need to invest in teacher training and new teaching materials to incorporate climate change education into school curriculums (Education International, 2022). Moreover, only two NDCs – Cambodia and Myanmar – specify that more funding needs to be directed to the education system.

As Myanmar outlines in its NDC, education will both be affected by, and impact, the climate crisis:

“Climate change leading to, for example, more frequent and intense disasters, will affect access to education. This, in turn, could result in deteriorating livelihoods. Education is often one of the first expenditure cuts for households to cope with the effects of economic or hazard stresses. Children are often the hardest hit, and if their access to education is restricted, this could make them more vulnerable. A sound knowledge base regarding climate change and access to education more broadly are prerequisites for Myanmar to become resilient to climate change impacts and continue to cultivate technology to achieve a climate-resilient and carbon-efficient economy.”

– UNFCCC database: Myanmar NDC

Myanmar calls for multi-stakeholder partnerships to access and manage climate finance to ensure climate-responsive education. However, specific costings are not given. Cambodia does give costs, with its latest Public Expenditure Review indicating that KHR1.2 billion (US\$0.3 million) will be allocated to the Ministry of Education for climate change expenditure. This amounts to just 0.1 per cent of the country's total climate change expenditure (see *Table 6*).

Table 6. Climate change expenditure by social sector, Cambodia (billions KHR)

Ministry	2020 (billions KHR)	%Percentage of climate change expenditure
Min. of Education, Youth and Sport	1.2	0.1
Min. of Health	34.7	1.5

Source: Government of Cambodia per (2022).

The omission of education in the remaining country NDCs means that education needs have so far been almost invisible in climate change financing discussions.⁷ However, urgent actions are needed to climate-proof the sector, including 'climate-smart' investments in school infrastructures (UNICEF, 2019). These could include the use of natural ventilation, cooling and heating systems in school architecture to reduce energy needs and allow for a safe and conducive learning environment, in hot climates in particular. Further adaptation and mitigation investments in infrastructure may also be required both to move schools from flood-prone areas, and/or to ensure adequate water, sanitation and hygiene (WASH) facilities in the face of growing water shortages, in order that children can learn in safety. Governments are already having to provide additional support to ensure school safety. In Cambodia, school hours have been reduced for the second year in a row due to record heat waves (Study International, 2019). In the Democratic Republic of Congo, the Government had to step in to ensure the safe return to school of at least 3.6 million children when the country was affected by flooding in 2020 (UNICEF photo essay, 2021a). In 2016, 27 per cent of primary and secondary schools and 30 per cent of early education centres were destroyed by a cyclone in Fiji (TheirWorld, 2016). There is evidence that girls are disproportionately affected by extreme weather events, with additional time spent walking to collect drinking water and firewood having an impact on school absenteeism and drop-out rate among girls in rural communities (WEF, 2021). Adverse weather events will almost certainly also create additional barriers to children with disabilities.

⁷ It is, however, possible that some school infrastructure adaptations have been costed under general infrastructure budget lines.

In addition, there is growing pressure to speed up the integration of climate education into national curriculums, in line with SDG 4.7. In 2019, Italy became the first country in the world to incorporate climate change into its national curriculum as a standalone subject, with one hour a week devoted to climate change issues (Jones, 2019). Other countries cover climate change as part of their school curriculums, or have the objective to integrate it into national curriculums in the future. To date, almost 50 per cent of countries have emphasised the issue in their national-level legislation, policies or teaching plans (Iyengar and Kwauk, 2021). This will entail additional funding for curriculum reform, teacher training and teaching materials.

It is evident that education needs to be financed as a climate-related sector, with funding and resourcing of education systems adapted to growing climate needs. There is also growing evidence that investing in climate change education has the power to mitigate the impact of climate change on the poorest and most vulnerable (Sims, 2021; Drawdown project 2017). Education is also part of the solution to mitigating the impact of pandemics on societies, empowering local communities to show leadership and make decisions that are beneficial to the environment.⁸ Studies show that education reduces vulnerability to climate-related disasters in low- and middle-income countries, with communities that are informed better prepared and more adaptive in their response to and recovery from natural disasters.⁹ There is also emerging evidence that increasing levels of education in low- and middle-income countries, in particular girls' secondary education, will be key to reducing the impact of future climate events (Sims, 2021; [Lutz et al., 2014](#)). Various studies have found that female education levels can have a positive effect on reducing vulnerability across generations, and that better educated households show a higher adaptive capacity to recover the income loss from natural disasters ([Lutz et al., 2014](#)). This highlights the case for making investment in education a higher priority in climate change discussions and financing. However, countries are still not giving adequate attention to the need to strengthen education systems to face the climate crisis.

3.3 Costing social protection in a changing climate

As growing numbers of the world's population are threatened with extreme poverty by climate change ([World Bank, 2020](#)), the urgent need to scale up investments in universal social protection systems becomes apparent ([UNICEF-Innocenti and FCDO, 2021](#)). Children are twice as likely to live in extreme poverty as adults, and currently 1.2 billion children are estimated to be multidimensionally poor, without

8 Sims, 2021.

9 Lutz et al., 2014; www.ecologyandsociety.org/vol19/iss1/art42

adequate access to basic education, nutrition, health, housing and WASH (UNICEF, 2021b). Almost [three out of four](#) children are not covered by social protection, with wide global disparities, leaving children in particular the poorest in Africa, the Middle East and South Asia, more vulnerable to climate shocks (ILO, 2021; EOD, 2016). Social protection is now recognized as essential to address both individual and societal risks, reducing poverty and inequality and maintaining social fabric during times of transition (Costella et al., 2021). Social protection has a key role to play in supporting climate change adaptation and the SDGs, but existing programme designs may need to be reconfigured to build adaptive capacities in the most affected communities (IPCC, 2022b). Climate-responsive social protection will require climate-aware planning and predictable ex-ante financing to respond to more frequent weather-related shocks (Browne, 2014). Climate change models can inform improved targeting of the populations most vulnerable to the impact on their livelihoods and habitats (Solórzano and Cárdenes, no date). However, in many countries, climate is not sufficiently integrated into social protection programme design and targeting (Solórzano and Cárdenes, no date). As climate vulnerability affects increasing numbers, social protection systems need to continue to adapt and expand in order to build and strengthen their risk-informed designs and implementation mechanisms. Countries therefore face the challenge of designing scalable and flexible social protection programmes, with the increased financing requirements of expanding social protection coverage. Increased investment will be required to build risk-informed and shock-response, climate-resilient social protection systems.

To date, no comprehensive assessment has been carried out on the increased costs of climate change to social protection systems. Recent modelling conducted for the World Bank finds that climate change is likely to tip between 38 million (low climate change) and 100 million (high climate change) extra people into extreme poverty by 2030. This equates to between 0.7 per cent and 1.9 per cent of the total population. Sub-Saharan Africa will be the most affected region, with an estimated extra 39.7 million people pushed into extreme poverty, followed by South Asia (35.7 million); East Asia and Pacific (7.5 million) and Latin America and the Caribbean (5.8 million). In the poorest regions, the impact of climate change on food prices is likely to be the biggest cause of poverty (Jafino et al., 2020). Currently, approximately 3.3 per cent of the total population of low- and middle-income countries live in extreme poverty (World Development Indicators). An additional 1.9 per cent increase of numbers in extreme poverty (high climate impact) would therefore lead to a 57 per cent increase in the proportion of the population urgently in need of social assistance. This gives some indication of the extent of the minimum investment required to provide social assistance to the most vulnerable populations. In 2021, developed nations pledged US\$750 million in

additional assistance at the COP26 conference, recognising that that low- and middle-income countries cannot bear the costs of climate change through increased domestic financing alone. However, there is currently a lack of clarity surrounding the use of climate finance under the Paris Agreement for poverty reduction in the context of sustainable development. There are historical examples where international climate financing boards have not systematically considered applications for adaptation programmes with development aims. For example, an application to fund a resilience programme from Ethiopia was rejected by the Green Climate Fund (GCF), the world's largest climate fund, due to having broader cross-cutting development aims, rather than the more targeted focus on WASH and infrastructure expected by the Fund (Longhurst et al., 2021). While there are a few examples of the allocation of climate financing to support long-term social protection programmes,¹⁰ there remains untapped potential for investing climate finance in strengthening social protection systems, and supporting poverty reduction within the context of the SDGs (Aleksandrova, 2021). This should not divert funds away from other climate-relevant SDG objectives. Ultimately, additional money needs to be found to align social protection and climate goals.

Closer alignment of climate and social protection financing is needed at both the domestic and international levels. Domestically, some countries are already developing new energy levies to finance expanded social protection programmes. For example, Egypt has removed its energy subsidies and reallocated a share of the budget to social assistance programmes targeting the poorest. In India, a coal levy has raised US\$13.3 billion through a Clean Environment Cess,¹¹ a part of which can be diverted to social protection (IIED, 2021). Other countries have introduced risk-informed social protection benefits. In Paraguay, environmental conditional cash transfers (E-CCT) will be provided in exchange for community-based climate-sensitive agroforestry. This will serve as a bridge for communities dependent on traditional forestry methods until new farming models are financially sustainable (Green Climate Fund). A similar approach was modelled in Brazil between 2011 and 2015, when the Bolsa Verde (or Green Grant) programme offered cash transfers to residents living in the Amazon to maintain forest coverage, potentially reducing deforestation by up to 50 per cent of what it would have been otherwise, with carbon reduction savings calculated at around US\$335 million (Oxfam International, 2020).

10 Examples include: the Namibia 'Integrated Landscape Approach for Enhancing Livelihoods and Environmental Governance to Eradicate Poverty' project funded by GEF; and the 'Strengthening Comoros Resilience Against Climate Change and Variability' project funded by the LDCF.

11 A cess is an additional tax levied for a specific purpose.

Investment in shock-responsive social protection is a crucial policy response to climate change, and essential to ensuring that the poorest and most vulnerable are not disproportionately disadvantaged by the challenge of the crisis. Planning for, developing and financing adaptive social protection policy instruments will be crucial. Expanding domestic financing to extend the coverage of core and shock-responsive social protection will require increasing tax revenue, building contingency funds and expanding contributory social protection, as well as innovative instruments such as risk financing, carbon market revenues, debt restructuring and green bonds (Longhurst et al., 2021). As increasing numbers become exposed to climate vulnerability, costs will inevitably rise. Despite this, social protection as a sector is not a priority reported in NDCs, nor in international climate financing reporting.

3.5 Summary of increased social spending investment needs triggered by climate change

Table 7 summarizes the increased investment needs confronting the social sectors in the face of climate change. While we have focused here on the education, health and social protection sectors, the issues faced are cross-sectoral, and often overlap with challenges facing the WASH and nutrition sectors. As has long been recognized, water is the main resource through which climate change is experienced, whether through floods causing the displacement of communities, and damage to and destruction of infrastructure (including to schools and hospitals), or through lack of access to safe drinking water (UNICEF, 2016). Lack of adequate WASH infrastructure increases the risk of both contamination and water- and vector-borne diseases. In turn, changing rain patterns impact food security, leaving increased proportions of populations dependent on social assistance. The impacts of climate change, therefore, need to be considered as intersecting across the social sectors, with the need for investment in climate-resilient infrastructure and adaptive, innovative policy solutions common across all.

Table 7. Increased costs and investment needs by sector

Education	Health	Social protection
Climate-resilient infrastructure and WASH facilities (schools, universities)	Climate-resilient infrastructure and WASH facilities (hospitals, health centres)	New populations at risk, including internally displaced persons; increased housing and WASH needs
Development of new curricula	Reducing mortality rates (heat, pollution, natural disasters)	Increasing food shortages and nutrition needs
Teacher training (in-service)	Responding to increased disease prevalence (water- and vector-borne)	Addressing livelihood loss; investment in environmentally conditional transfers
Public information campaigns	Strengthened research budgets; pandemic prevention	Development of adaptive, risk-informed policies and targeting strategies

4. Can adaptation costs for the social sectors be covered by climate finance pledges?

NDC pledges for many low- and middle-income countries are either partially or fully dependent on the external financing that developed countries committed to under the Paris Agreement. This is true for around half the countries with submitted NDCs (Pauw et al., 2020). Put simply, many countries' commitments depend on external financing.

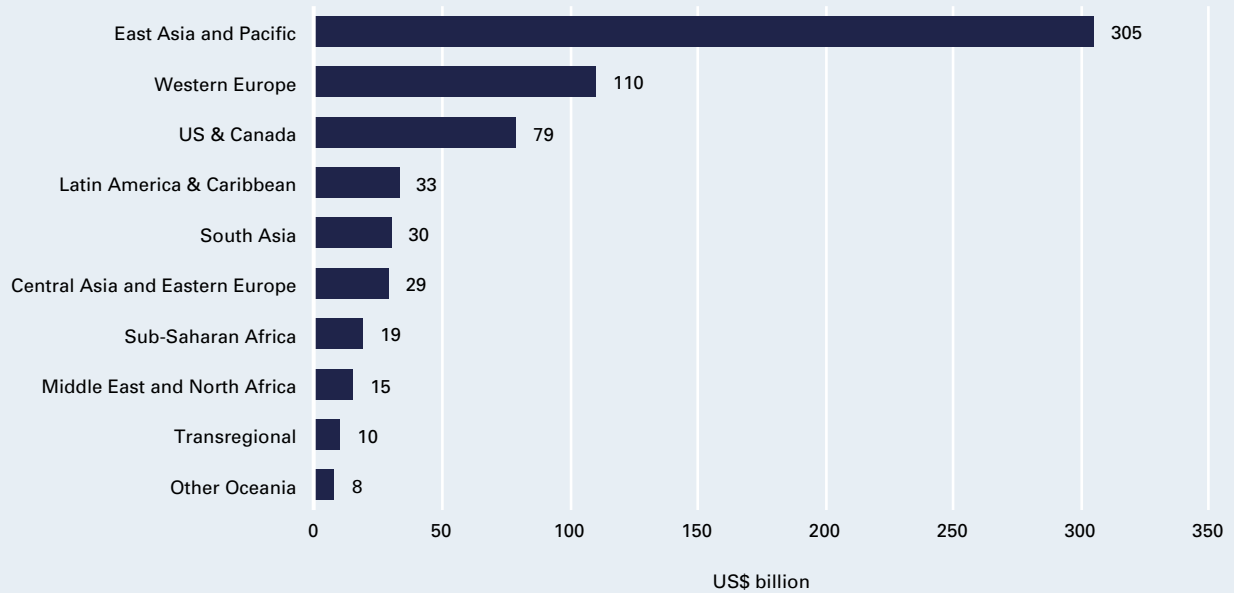
Box 2. Global climate finance

Under the United Nations Framework Convention on Climate Change (UNFCCC), the Kyoto Protocol and the Paris Agreement, developed countries pledged to provide developing countries with financial assistance for both mitigation of, and adaptation to, the adverse impacts of climate change. Under the UNFCCC, financial assistance should aim to achieve a balance between mitigation and adaptation, although to date less than 10 per cent of climate finance has been pledged to adaptation. Support is provided through the umbrella funds – the [Global Environment Facility](#) (GEF) and the [Green Climate Fund](#) (GCF) – which also manage the [Special Climate Change Fund](#) (SCCF) and the [Least Developed Countries Fund](#) (LDCF). In addition, the [Adaptation Fund](#) (AF) was established in 2001 to manage adaptation programmes in developing countries.

Source: <<https://unfccc.int>>; Global Landscape of Climate Finance 2021 (Buchner et al., 2021).

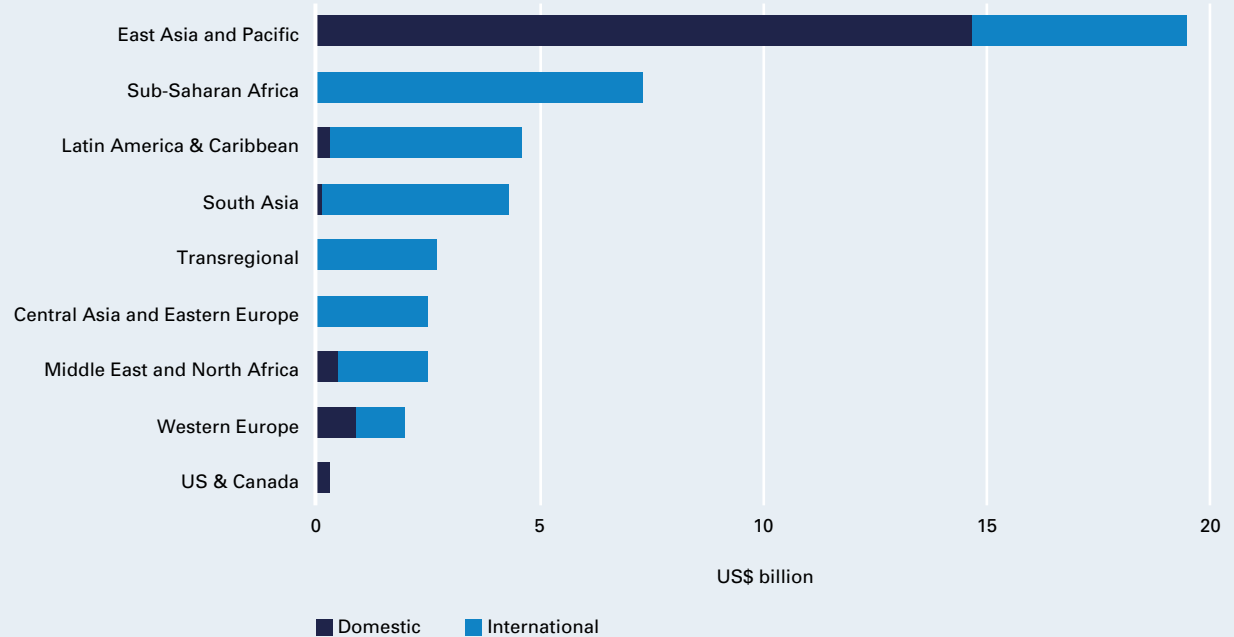
Global climate finance from both public and private sources was estimated in 2020 to amount to US\$638 billion (Climate Policy Initiative, 2021), just over half of which came from public sources, with private investments making up the remainder, and at least 75 per cent from domestic sources. The majority of climate finance (61 per cent, US\$384 billion) was raised as debt, of which only 12 per cent (US\$47 billion) was low-cost or concessional debt. East Asia and the Pacific received the majority of climate financing (US\$305 billion), with sub-Saharan Africa and Middle East and North Africa receiving a fraction of this (US\$19 billion and \$15 billion respectively) (Buchner et al., 2021) (*see Figure 4*). However, only around 7 per cent (US\$46 billion) of climate finance goes to adaptation, with the rest going to mitigation. While extrapolations vary, UNEP calculates that adaptation financing requirements for low- and middle-income countries are around 5 to 10 times greater than available international climate financing (UNEP, 2021b). International climate financing forms the majority of climate financing in most low- and middle-income regions. The exception to this is East Asia and Pacific, which accesses the largest share of adaptation financing, where more than 75 per cent of total finance comes from domestic sources (*see Figure 5*).

Figure 4. Total global climate finance from public and private sources, by region of destination (US\$ billion)



Source: *Global Landscape of Climate Finance 2021* (Buchner et al., 2021).

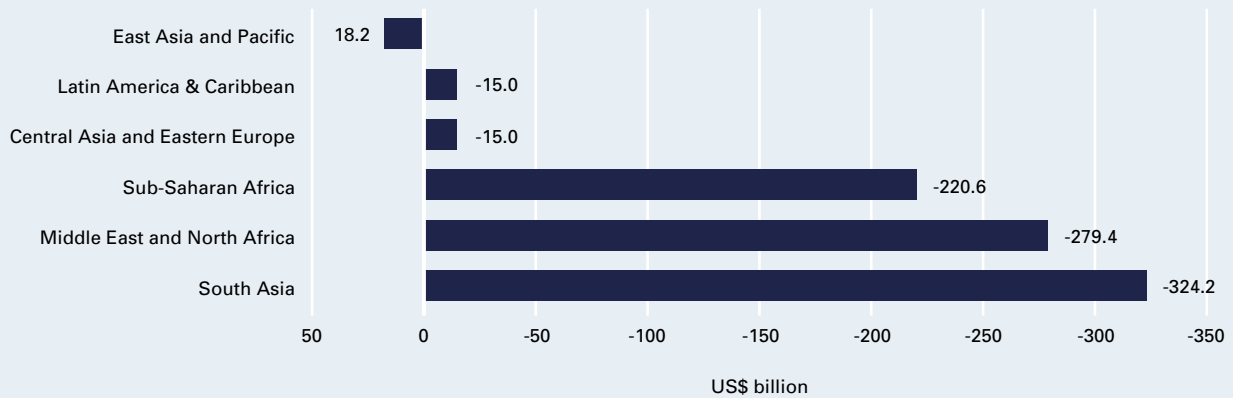
Figure 5. Domestic and international adaptation finance by region (US\$ billion)



Source: *Global Landscape of Climate Finance 2021* (Buchner et al., 2021).

A rough calculation comparing the adaptation costs as outlined in countries' NDCs and the total financing (domestic and international) available, illustrates the large financing gap facing low- and middle-income countries. This overview highlights the significant financing challenge facing South Asia, the Middle East and North Africa, and sub-Saharan Africa in particular. East Asia and Pacific is perhaps the only region that has adequate backing for the costings as outlined in their NDCs. However, it should be stressed that the costs based on NDCs represent reporting from just one in three countries and will be a significant underestimate of total costs, which could amount to almost three times as much (see Figure 6).

Figure 6. Adaptation financing gap by region based on costs outlined in NDCs minus pledged international and domestic climate finance (US\$ billion)



Source: Author's calculations, 2021, based on data from German Development Institute (DIE) and Climate Policy Initiative.

5. Raising domestic and international climate financing for social spending

Greater domestic and international financing of social spending is urgently required, with the current shortfalls in social spending in low- and middle-income countries likely to increase in the context of climate change (UNICEF-Innocenti, 2022). Ultimately, investment in social spending itself is an effective means of supporting climate-resilient development, with growing evidence of the mitigation effects of universal health and education policies that contribute to slashing carbon emissions. Green budgeting processes can be a powerful tool in aligning financing to climate objectives, facilitating transparency and helping to steer budget decision-making towards areas requiring increased investment (I4CE, 2021). However, these investments will need to be financed. While it is essential that pledged levels of international climate financing are disbursed, low- and middle-income countries are also exploring new and innovative ways of raising domestic climate-informed social spending for children. These include: carbon pricing and energy subsidy reform, as well as green and/or risk financing options. Moreover, well-designed budget processes that integrate climate and social inclusion objectives have the potential to direct public resources towards policies and programmes that support the social and economic inclusion objectives of the SDGs and the climate objectives of the Paris Agreement (Gulrajani and Bosworth, 2022).

5.1 Green budgeting

More than 50 countries have now produced budget reviews that take climate and environmental policies into account (I4CE, 2021). The proportion of expenditure determined to benefit the environment in these analyses ranged from 1.7 per cent of total expenditure in Guatemala to 20 per cent in Kiribati, 27 per cent in Nepal and 31 per cent in the Indian state of Odessa (I4CE, 2021; figures from 2018). In raising the transparency of climate-relevant budget allocations, this analysis highlights both financing trends and gaps in spending. Bangladesh's Climate Budget report reveals, for example, that despite being the country's highest climate-related allocation, the proportion of total expenditure allocated to food security, social protection and health has declined from 57.4 per cent to 46.1 per cent of budget expenditure in the past five years. In contrast, climate-related spending on infrastructure more than doubled in relative terms – from 12.7 per cent of total budget expenditure in 2014–2015 to 28.4 per cent of total budget in 2018–2019 (Bangladesh Ministry of Finance, 2019). There is evidence that countries conducting green budgeting practices have significantly increased climate-related expenditure, with spending in Bangladesh increasing by 81 per cent during this period, and similar

trends found in Nepal and the Philippines. However, progress in this area is currently fragmented, and there is scope for greater integration of budgeting for climate adaptation and the SDGs (Gulrajani and Bosworth, 2022). Currently, just 11 per cent of countries in sub-Saharan Africa have a climate budget tagging methodology in place or in design (Mitra and Vu, 2021).

5.2 Investing in prevention

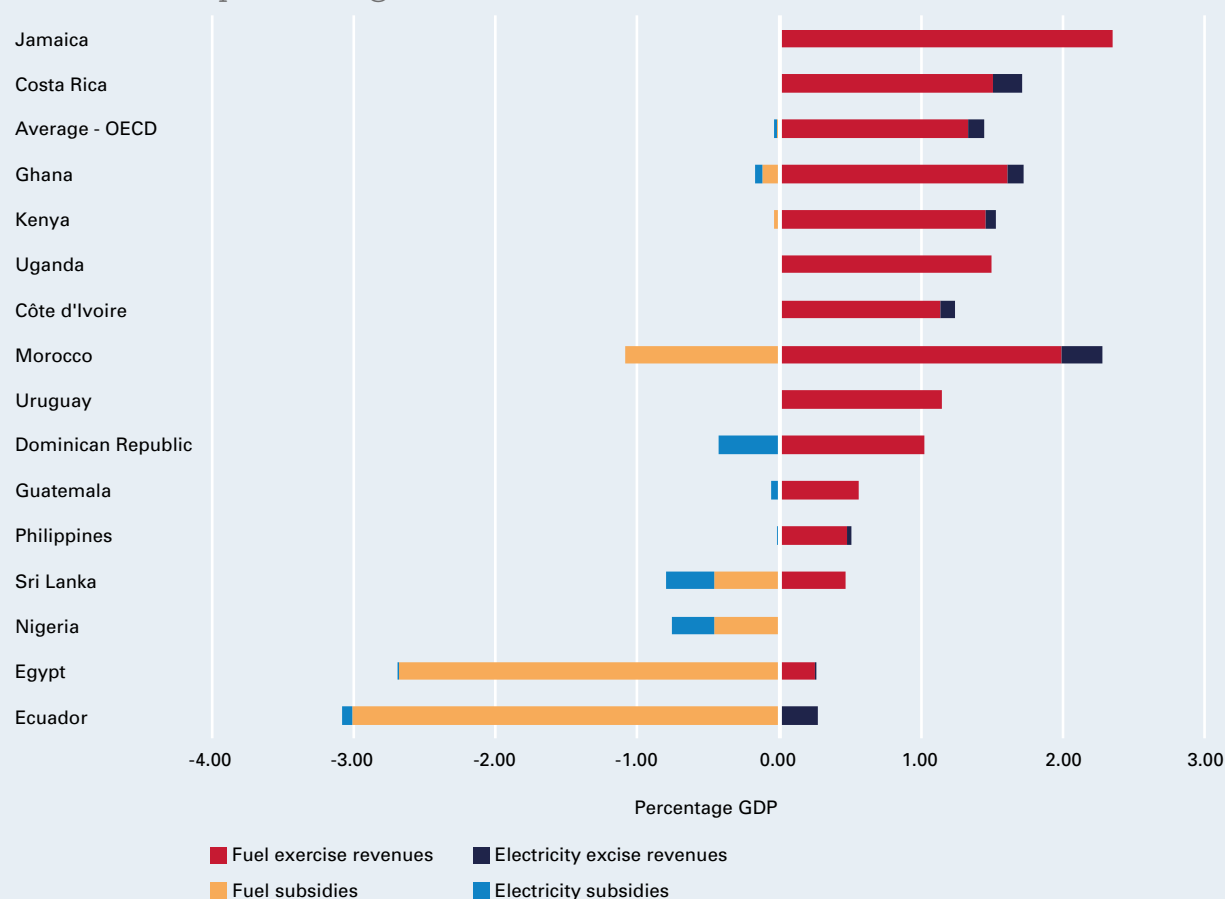
Investing in prevention of the more extreme scenarios of global heating will be key to managing the climate crisis. A study conducted for Project Drawdown, based on two rights-based solutions, finds that universal access to health and basic education will be essential to achieving the United Nations' population medium global projection of 9.7 billion people by 2050. Its modelling suggests that, if the health and education goals were to be achieved, emissions could be significantly reduced in comparison with current trajectories. Effectively implementing selected universal health and education policies for children would avoid 85.42 billion tons of carbon dioxide-equivalent emissions from 2020 to 2050, based on the provision of universal access to quality, voluntary reproductive health resources and education for both boys and girls (based on Hawken, 2017). To put this into perspective, in 2019, total global emissions from human activities were 43.1 billion tons (The World Counts).

5.3 Carbon pricing and energy subsidy reform

Although developing countries account for a relatively small share of carbon emissions and are therefore sometimes overlooked in the debate on carbon pricing, carbon taxes offer low- and middle-income countries an important, and administratively simple, revenue source for financing the SDGs (IMF, 2019). The IMF calculates that carbon taxes at US\$35 per ton could typically raise as much as 1–2 per cent of GDP, with the OECD suggesting that developing countries could raise at least 1 per cent of GDP through carbon price reform (IMF, 2019; OECD 2022). Although some argue that, in upper-middle income countries, the removal of subsidies may contribute to increasing energy poverty among lower-income families, carbon taxes are a more progressive means of taxation in developing countries, where higher-income families are the main consumers of fuel and electricity ([Institute for Fiscal Studies](#), 2021). Fifteen developing countries are exploring introducing, or have already introduced, carbon taxes (OECD, 2021). An alternative option is subsidy reform, with a new report estimating that around 2 per cent of global GDP is spent on subsidies that are contributing to the climate crisis and damaging the environment (Business for Nature, 2022). Fossil fuel subsidies alone account for around US\$640 billion a year globally (Business for Nature, 2022).

Reforming energy subsidies would free up government resources for social and other spending, although it will be important that the removal of subsidy schemes and introduction of taxes is conducted in a just manner and in accordance with SDGs 7 and 12, ensuring that the poorest are not disproportionately affected. Governments would need to explore sustainable means of financing clean and affordable energy for their citizens, potentially by diverting tax revenue and subsidy savings to investment in social protection systems, and to ensure a just transition. In Poland, for example, a key challenge has been how to create incentives for the reform of a pension system that was largely structured around coal production.

Figure 7. Energy price revenues and subsidies, by sector, in selected countries as percentage of GDP



Source: Author's calculations, based on OECD database.

There is certainly potential for low- and middle-income countries to realize more fiscal space through fuel and energy subsidy reforms, especially if this is complemented by raising excise duties. Data from the OECD suggests that, on average, low- and middle-income countries raise a lower proportion in net revenue from carbon taxes than do high-income countries. As Figure 7 illustrates, in most low- and middle-income countries, fuel and electricity subsidies are higher, and carbon taxes are lower, than the OECD average. Most of these countries subsidize carbon industries at a higher rate than the OECD average (although it should be noted that the OECD still spends significant amounts on electricity subsidies in real terms: amounting to around US\$11.5 billion in 2021). Ecuador, Egypt, Nigeria and Sri Lanka currently subsidize these industries at an average of 1.6 per cent of GDP, compared to 0.02 per cent of GDP in OECD nations (*see Figure 7*). To put this in perspective, if net revenues were reformed in line with the OECD average, this could raise as much as an additional 3.2 per cent of GDP. These figures will vary country to country, and the removal of subsidies themselves may have knock-on effects that will require additional spending. However, they do highlight the fiscal potential of both raising energy taxes, and cutting subsidies, in many lower-middle income countries. Ultimately, the social cost of carbon, measured as the total damage of an additional ton of carbon dioxide on human outcomes, is far higher than the social impact of cutting subsidies, especially when looked at on a global scale. While estimates vary, the US Government now puts the social cost of carbon at around US\$50 per ton (Pindyck, 2021). In both real terms, and from the perspective of the cost of inaction, subsidy reform will be crucial for bringing in additional revenue from ‘green taxes’ to help support social spending for children.

5.4 Energy subsidies and equity

However, it is important that any reform of energy subsidies includes measures to ensure the burden does not fall on the poorest in society, especially those whose livelihoods are linked to fossil fuel industries. As the IPCC argues, a just transition is also likely to be the fastest and most effective way forward (IPCC, 2022). Linking subsidy reform to improved social protection systems is one way that this can be done (*see, for example, measures taken by Ukraine and Zambia in Box 3*).

Box 3. Linking subsidy reforms to social spending

Ukraine reformed its energy subsidies in 2015 to meet the budget deficit reduction targets set by the IMF, which led to steep price increases. In order to mitigate the impact on poor and vulnerable households dependent on gas for heating and hot water, the Government simultaneously raised funding for social protection providing social support for utility payments for up to one half of households (the household energy assistance programme). This was based on both an income assessment and the expected volume of energy consumption. Other measures included an increase to the minimum wage and eliminating a tax on pensions for poorer pensioners (Yemtsov and Moubarak, no date). These measures have reduced the subsidization of the energy sector from 10 per cent GDP to 2.3 per cent GDP between 2012 and 2016, with energy efficiency increasing by 12.5 per cent during the same period (IEA, 2020; Antonenko et al., 2018). While the design of the social protection programme utilizes means-testing, it is based on discounted tariffs to customers rather than direct cash transfers to those most in need. This suggests there is scope to improve the targeting of the programme, especially in the wake of the recent conflict.

Zambia's Government has established a Ministry of Green Economy and Environment, signalling its wider green agenda, which includes the removal of energy subsidies as part of an agreement with the IMF to slash its budget deficit and curb borrowing. While recognising this may raise fuel and electricity prices in the short term, Zambia's Secretary to the Treasury, Felix Nkulukusa, argues:

“The Treasury is using about US\$107 million per month or US\$1.3 billion per year on fuel and electricity subsidy. What is even more interesting is that more than 60% of fuel and/or electricity in Zambia is consumed by the mines with only less than 2% of the two products being consumed by the ordinary and vulnerable people who are genuinely supposed to be subsidised. This means that the mines are being subsidised by US\$780 million every year in fuel and electricity while the ordinary and vulnerable Zambians are only getting a subsidy of a partly US\$26 million per year.”

– Africa-Press, 2022

In addition, Zambia is in discussions with African Development Bank (AfDB) about a debt-for-climate swap, which could use outstanding debt servicing payments for agreed-upon national climate action programmes and projects. Part of this agreement is that the money saved on subsidies would allow a greater proportion of spending on health and education (Mfula, 2021).

Other countries have extended financing to education and health. Both the governments of Ghana and Indonesia have extended support to middle-class families as part of energy subsidy reform packages. Ghana eliminated fees for state-run primary and secondary schools, set a price ceiling on public transport fares, and invested in electrification. In Indonesia, regional block grants for education were introduced. Both countries increased funding for health care in poor areas (Yemtsov and Moubarak, no date).

5.5 Green financing initiatives

Green financing and risk financing both offer potential means of leveraging private finance for social spending. Good examples are provided by the second round of the [Joint SDG Fund](#), which aims to blend public and private finance to bridge the financing gap for the SDGs. With four key action areas – energy and climate, the blue economy, food systems and agriculture – and leaving no one behind, the fund has invested US\$114 million in the current round, and aims to leverage US\$5 billion in private finance. Eleven countries (Egypt, Indonesia, Jordan, Kazakhstan, Madagascar, Moldova, North Macedonia, Sudan, Uganda, Uruguay and Zimbabwe) have been selected as climate action countries. Innovative financing initiatives include a US\$44.4 million Green Financing Facility in Macedonia, ocean-based blended finance transactions, and SDG sovereign and green bonds, among others. This complements initiatives in other countries, which are working on raising SDG financing through domestic resourcing (including Armenia, Bhutan, Jordan, Kazakhstan, Maldives, Tunisia and Vietnam). However, it is important that renewable incentive schemes are perceived to be transparent and fair in order to gain widespread public acceptance. One study from the western Balkans, for example, found some evidence that perceived corruption and nepotism in the renewables incentives system endangered public acceptance of the whole transition to an energy-efficient, renewables-based energy system (Knez, Štrbac and Podbregar, 2022).

There are also other mechanisms for raising the substantial funds required, for example the IMF Resilience and Sustainability Trust Fund, which supports the use of Special Drawing Rights (SDRs) to assist low- and middle-income countries in addressing longer-term structural challenges. Eligible expenditure could include climate-related social spending, such as the energy-efficient retrofitting of infrastructure and building, and social protection investment to mitigate the impact of carbon transitions or elimination of subsidies (IMF, 2022a). Access to, and disbursement of, these funds for low- and middle-income countries needs to remain a priority.

Conclusions

Climate change is disproportionately affecting children in low- and middle-income countries, with those in the poorest countries most at risk from the physical, economic and social impacts of the crisis. Adapting to the impacts of climate change will require increased investment in climate-resilient development policies, and governments will be faced with competing priorities for limited resources. However, it is crucial that social sector spending is not left out of climate finance discussions. Currently, adaptation costs as pledged in countries' Nationally Determined Contributions (NDCs) do not include the significant adaptation costs potentially facing the core social sectors. Health is the only costed sector for most countries, but the health sector is currently set to receive less than 2 per cent of total adaptation financing. With the exception of two countries, the adaptation needs of the education and social protection sectors remain as yet uncoded. This means that NDCs costings are likely to be an underestimate of the true extent of adaptation needs. Despite this, current levels of domestic and international financing remain inadequate to address the measures pledged in these documents.

Globally, estimating the adaptation costs of social sectors remains at an early stage. This is despite growing evidence of the costs to the health and education sectors of adverse climate events, as well as the power of universal health, education and social protection policies to mitigate the more extreme impacts of the climate crisis. While domestic governments are exploring new ways to expand and finance social protection systems, international climate financing requires a needs to give greater priority to social spending, with particular support for social protection.

Despite the gloomy picture, it is becoming clear that investing in social spending will be key to managing the climate crisis. Progress is being made in harnessing green finance and carbon pricing to fund social protection measures. There is growing evidence that investing in universal health, education and social protection policies is integral to both reducing carbon emissions and reducing the adverse effects of climate change on society. In addition, investing in education will be key in providing the next generation with the tools they need to thrive in a changing environment. Ensuring a rights-based, equitable and just transition to a climate fit for the next generation is the only way forward.

While richer countries bear the responsibility for the current climate crisis, positive opportunities for low- and middle-income countries remain. Investment in social spending will generate long-term savings, lowering the economic costs of health impacts, an ill-adapted and trained workforce and poor productivity. Developing countries may have the edge in applying green technologies to still growing economies. They may be in a position to seize any comparative advantage (i.e., in solar potential for countries in the global south), as less agile, advanced economies struggle to wean off their dependence on fossil fuels. Investment in health, education and social protection is part of the solution, and planning for, and financing, this investment needs to be part of the wider climate finance calculations. By investing in social spending for future generations, all countries will have the chance to build an environment fit for children and youth.

Policy recommendations

Meeting international climate financing commitments under the Paris Agreement

- Governments and development partners need to work together to provide quality education, health and social protection services and ensure that these are risk-informed and climate-resilient. There is growing evidence that climate change disproportionately affects not only the poorest regions of the world but also the poorest families and children within countries. Ultimately, the cost of inaction will potentially be much greater than the cost of adequately funded health, education and social protection services. Investment in children is climate action and needs to be recognized as such.
- A concerted effort among the international community is required to address the adaptation financing gap for low- and middle-income countries, particularly in Africa and South Asia and the Middle East. International financing funds will need to embrace a more holistic understanding of the impact of climate change on communities and livelihoods, and the potential trade-offs between poverty reduction and climate adaptation. They will need to extend funding to development programmes that aim to alleviate the social and economic impacts of the crisis on families and children.

Increasing domestic investment in climate-resilient development

- Social spending needs to be fully incorporated into climate finance discussions at domestic and international levels. Each country's Nationally Determined Contributions (NDCs) should be complemented by fully costed adaptation plans, with acknowledgement of the costs for education, health and social protection needed to realize these plans. Identification of the key priorities facing each country and sector is essential in order that the extent of the resources required, and the necessary assistance, are fully articulated. More data on costs of climate change for the social sectors are needed, and further research on the impacts on the social sectors needs to be financed.

Policy recommendations (cont.)

- Increased domestic financing of social spending is crucial to address these challenges. This brief has discussed several promising options, but greater progress on carbon pricing and the reform of energy subsidies must be made. Further research is needed on the potential of ‘green taxes’ to bring additional revenue to help support social spending. Both rich and poor countries should also consider windfall taxes on the current high profits that large oil and gas companies have drawn post-pandemic. Ring-fencing these levies for children, with a focus on education, health and social protection services for the most vulnerable, could command widespread political support.

Utilising ‘green’ financing strategies for investment in children

- Green budgeting is a powerful tool to align financing for climate mitigation and adaptation with the social spending required to achieve the Sustainable Development Goals (SDGs). So far, little consistent progress has been documented on climate budget tagging at country level. There is scope to build linkages between budgeting for sustainable development, within the framework of the SDGs, and climate mitigation and adaptation ([Gulrajani and Bosworth, 2022](#)). This should include: closer integration between climate, sustainability and inclusion, with the prioritization of social spending for children; the reallocation of resources from climate-negative expenditures (such as fossil fuel subsidies) to SDG priorities; and identifying efficiency savings through holistic measures to address climate impact.

References

- Africa-Press (2022). *Why Energy Subsidy Removal Beneficial, But after Some Pain: How other African countries succeeded*. Africa-Press – Zambia. 20-01-2022. <www.africa-press.net/zambia/all-news/why-energy-subsidy-removal-beneficial-but-after-some-pain-how-other-african-countries-succeeded>
- Aleksandrova, M. (2021). *The Untapped Potential of Global Climate Funds for Investing in Social Protection*. Briefing Paper 7/2021. Bonn: German Development Institute / Deutsches Institut für Entwicklungspolitik (DIE). <www.idos-research.de/briefing-paper/article/the-untapped-potential-of-global-climate-funds-for-investing-in-social-protection/>
- Antonenko, A., et al. (2018). *Reforming Ukraine's Energy Sector: Critical unfinished business*. 06 February 2018. <<https://carnegieeurope.eu/2018/02/06/reforming-ukraine-s-energy-sector-critical-unfinished-business-pub-75449>>
- AstroAwani (2015). *Hospitals and Clinics Destroyed in Floods*. News report published January 2015. <www.astroawani.com/berita-banjir/hospitals-and-clinics-destroyed-floods-estimated-rm281-mil-28754>
- Bangladesh Ministry of Finance (2019). *Bangladesh Citizens' Budget Report 2018–2019*. <<https://reliefweb.int/report/bangladesh/bangladeshs-citizens-climate-budget-report-2018-19?adlt=strict&toWww=1&redig=D381680FF3F941DC914820906746CDBF>>
- Browne, E. (2014). *Social Protection, Climate Change Adaptation and Disaster Risk Reduction*. Birmingham, UK: GSDRC, University of Birmingham. <<https://gsdrc.org/publications/social-protection-climate-change-adaptation-and-disaster-risk-reduction>>
- Buchner, B., et al. (2021). *Global Landscape of Climate Finance 2021*. December 14, 2021. <www.climatepolicyinitiative.org/publication/global-landscape-of-climate-finance-2021>
- Business for Nature (2022). *Financing Our Survival: Building a nature positive economy through subsidy reform*. Prepared by The B Team and Business for Nature, based on a study from Doug Koplow and Ronald Steenblik. February 2022. <www.businessfornature.org/s/Subsidy-Research-Press-Release-FINAL-17-Feb-2022-0600am.pdf>
- Carty, T., and L. Walsh (2022). 'Footing the Bill: Fair finance for loss and damage in an era of escalating climate impacts'. *Policy and Practice*. DOI 10.21201/2022.8977. <<https://policy-practice.oxfam.org/resources/footing-the-bill-fair-finance-for-loss-and-damage-in-an-era-of-escalating-clima-621382/>>
- Climate and Health Alliance. *NDC Scorecards Tool*. <<https://climateandhealthalliance.org/initiatives/healthy-ndcs/ndc-scorecards>>
- Climate Policy Initiative (2021). *Preview: Global landscape of climate finance 2021*. <www.climatepolicyinitiative.org/publication/global-landscape-of-climate-finance-2021>
- Costella, C., et al. (2021). *Social Protection and Climate Change: Scaling up ambition*, Social Protection Approaches to COVID-19 Expert Advice Service (SPACE), DAI Global UK Ltd, United Kingdom.
- DIE/German Development Institute. *NDC Explorer Tool*. <www.die-gdi.de/en/ndc> ; accessed April 2022.
- Hawken, P. (2017). *Drawdown: The most comprehensive plan ever proposed to reverse global warming*. <<https://drawdown.org/publications/drawdown-solutions-policy-brief-health-and-education-solution>>
- Ebi, K. L., et al. (2019). *Health System Adaptation to Climate Variability and Change*. Rotterdam and Washington, DC. <www.gca.org/reports>
- Eckstein, D., V. Künzel and L. Schäfer (2021). *Global Climate Risk Index 2021*. GermanWatch. <www.germanwatch.org/en/19777>
- Education International (2022). *Climate Action and Literacy: Teach for the planet*. Education International. Blog post. March 2022. <www.ei-ie.org/en/item/26371:on-the-road-to-cop27-the-mena-region-is-far-behind-on-climate-change-education-ambition>

Enriquez, S., B. Larsen, and E. Sánchez-Triana (no date). 'Local Environmental Externalities Due to Energy Price Subsidies: A focus on air pollution and health'. Good Practice Note 8. *Economy & Environment*. World Bank.

EOD (2016). *Social Protection and Climate Resilience*. DOI: <http://dx.doi.org/10.12774/eod_tg.may2016.wallisandbuckle>

Ghana NDC. UNFCCC website. <[www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Ghana First/GH_INDC_2392015.pdf](http://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Ghana%20First/GH_INDC_2392015.pdf)>

Government of Cambodia (2022). *Cambodia Climate Public Expenditure Review 2020*. <<https://ncsd.moe.gov.kh/node/12800>>

Gulrajani, R. and J. Bosworth (2022). *Budgets for Climate, Sustainability and Social Inclusion: A rapid review of approaches and tools*. UNICEF. Initiative on Financing for Development in the Era of COVID-19 and Beyond.

International Committee of the Red Cross (2020). *When Rain Turned to Dust*. Research report. <www.icrc.org/sites/default/files/topic/file_plus_list/rain_turns_to_dust_climate_change_conflict.pdf>

International Energy Agency (2020). *Ukraine Energy Profile*. IEA, Paris. <www.iea.org/reports/ukraine-energy-profile>

Advani, A., et al. (2021). *What Is the Case for Carbon Taxes in Developing Countries?* Institute for Fiscal Studies. <<https://ifs.org.uk/publications/15817>>

International Labour Organization (2021). *World Social Protection Report 2020-22: Social protection at the crossroads – in pursuit of a better future*. <www.ilo.org/global/publications/books/WCMS_817572/lang-en/index.htm>

International Monetary Fund (2019). *Putting a Price on Pollution: The case for carbon taxation*. Ian Parry. December 2019. Finance & Development. <www.imf.org/Publications/fandd/issues/2019/12/the-case-for-carbon-taxation-and-putting-a-price-on-pollution-parry>

International Monetary Fund (2021). *Securing a Green Recovery*. <www.imf.org/en/News/Articles/2021/04/15/sp041521-securing-a-green-recovery>

International Monetary Fund (2022a). *Tax Coordination Can Lead to a Fairer, Greener Global Economy*. Blog post. <https://blogs.imf.org/2022/04/12/tax-coordination-can-lead-to-a-fairer-greener-global-economy/?utm_medium=email&utm_source=govdelivery>

International Monetary Fund (2022b). *Proposal to Establish a Resilience and Sustainability Trust*. April 18, 2022. <www.imf.org/en/Publications/Policy-Papers/Issues/2022/04/15/Proposal-To-Establish-A-Resilience-and-Sustainability-Trust-516692>

Intergovernmental Panel on Climate Change (2022a). *AR6 Synthesis Report: Climate change 2022*. <www.ipcc.ch/report/sixth-assessment-report-cycle>

Intergovernmental Panel on Climate Change (2022b). *AR6 Synthesis Report: Working Group II – Impacts, adaptation, and vulnerability*. <www.ipcc.ch/report/sixth-assessment-report-working-group-ii>

Iyengar, R., and C. T. Kwauk (2021) (eds). *Curriculum and Learning for Climate Action: Toward an SDG 4.7 roadmap for systems change*. Series: IBE on Curriculum, Learning, and Assessment, Vol. 5. UNESCO, 2021.

Institute for Climate Economics (I4CE) (2021). *“Green Budgeting”: Paths to creating real added value*. <<https://ideas4development.org/en/green-budgeting-paths-real-added-value>>

Jafino, B., et al. (2020). *Revised Estimates of the Impact of Climate Change on Extreme Poverty by 2030*. Policy Research Working Paper; No. 9417. World Bank, Washington, DC. <<https://openknowledge.worldbank.org/handle/10986/34555>>

Jones, G. (2019). *Exclusive: Italy to make climate change study compulsory in schools*. November 5, 2019. <www.reuters.com/article/us-climate-change-italy-exclusive/exclusive-italy-to-make-climate-change-study-compulsory-in-schools-idUSKBN1XF1E1>

Knez, S., S. Štrbac, and I. Podbregar (2022). 'Climate Change in the Western Balkans and EU Green Deal: Status, mitigation and challenges'. *Energy, Sustainability and Society*, vol. 12, no. 1. <<https://energysustainsoc.biomedcentral.com/articles/10.1186/s13705-021-00328-y>>.

Longhurst, D., et al. (2021). *What Are Future Financing Options for Shock Responsive Social Protection? A technical primer*. Social Protection Approaches to COVID-19 Expert Advice Service (SPACE), DAI Global UK Ltd, United Kingdom. <<https://socialprotection.org/discover/publications/space-what-are-future-financing-options-shock-responsive-social-protection-0>>

Lutz, W., et al. (2014). 'Education is Top Priority for Climate Change'. *Ecology & Society*, vol. 19, no. 1. <www.ecologyandsociety.org/vol19/iss1/art42>

Mfula, C. (2021). *Zambia's IMF Programme Will Entail Removing Energy and Farm Subsidies*. Reuters. 06 December 2021. <www.reuters.com/markets/rates-bonds/zambia-imf-programme-will-entail-removing-energy-farm-subsidies-2021-12-06>

Ministry of Education. Cambodia. <<https://ncsd.moe.gov.kh/node/12800>>

Mitra, P., and H. Vu (2021). *Boosting Climate Responsiveness in Sub-Saharan Africa's Public Investment*. IMF F&D Special Feature. December 2021.

Nahm, J.M., S. M. Scott and J. Urpelainen (2022). 'G20's US\$14-trillion Economic Stimulus Reneges on Emissions Pledges'. *Nature*. <www.nature.com/articles/d41586-022-00540-6>

Organisation for Economic Co-operation and Development (2021). *Taxing Energy Use for Sustainable Development*. <www.oecd.org/tax/tax-policy/taxing-energy-use-for-sustainable-development.pdf>

Organisation for Economic Co-operation and Development (2022). *Towards a Sustainable Recovery? Carbon pricing policy changes during COVID-19*. <www.oecd.org/coronavirus/policy-responses/towards-a-sustainable-recovery-carbon-pricing-policy-changes-during-covid-19-92464d20>

Organisation for Economic Co-operation and Development (OECD) database. <<https://stats.oecd.org/Index.aspx?DataSetCode=TEUSDCCR>>

Oxfam International (2020). *Protecting People and the Forest: Bolsa Verde, Brazil*. <<https://oxfamlibrary.openrepository.com/bitstream/handle/10546/621099/cs-bolsa-verde-protecting-people-planet-131120-en.pdf;jsessionid=F13F05B5F19F4CE4733C4862F96D516F?sequence=4>>

Pauw, W. P., et al. (2020). *Conditional Nationally Determined Contributions in the Paris Agreement: Foothold for equity or Achilles heel?* *Climate Policy*, vol. 20, no. 4, pp. 468–484, DOI: 10.1080/14693062.2019.1635874

Pindyck, R. S. (2021). 'The Social Cost of Carbon Revisited'. *Journal of Environmental Economics and Management*, vol. 94, March 2019, pp. 140–160. <<https://doi.org/10.1016/j.jeem.2019.02.003>>; <<https://news.stanford.edu/2021/06/07/professors-explain-social-cost-carbon/#Costs-Emissions>>

Romanello, M., et al. (2021). *Lancet Countdown on Health and Climate Change*, vol.398, no. 10311, pp. 1619–1662, 30 October 2021. DOI: <[https://doi.org/10.1016/S0140-6736\(21\)01787-6](https://doi.org/10.1016/S0140-6736(21)01787-6)>; <<https://www.thelancet.com/countdown-health-climate>>

Sheffield, P. E., and P. J. Landrigan (2011). 'Global Climate Change and Children's Health: Threats and strategies for prevention'. *Environmental Health Perspectives*, vol. 119, no. 3. <<https://ehp.niehs.nih.gov/doi/full/10.1289/ehp.1002233>>

Sims, K. (2021). *Education, Girls' Education and Climate Change*. K4D Emerging Issues Report 29. Institute of Development Studies. DOI: 10.19088/K4D.2021.044

- Solórzano, A., and I. Cárdenes (no date). *Social Protection and Climate Change*. World Food Programme in collaboration with Oxford Policy Management. <www.wfp.org/publications/social-protection-and-climate-change>
- Study International (2019). 'How to Implement Climate Change Education in Schools'. Blog post. Study International Staff. 19 August 2019. <www.studyinternational.com/news/climate-change-education-schools>
- Swiss Re (2021). *The Economics of Climate Change: No action not an option*. <www.swissre.com/dam/jcr:e73ee7c3-7f83-4c17-a2b8-8ef23a8d3312/swiss-re-institute-expertise-publication-economics-of-climate-change.pdf>
- The World Counts. 'Tons of CO2 Emitted into the Atmosphere'. <www.theworldcounts.com/challenges/climate-change/global-warming/global-co2-emissions/story>
- TheirWorld (2016). *Their World News Report*. 01 March 2016. <<https://theirworld.org/news/fiji-cyclone-leaves-240-schools-destroyed-or-damaged>>
- TheirWorld (2018). *Safe Schools: The hidden crisis – A framework for action to deliver safe, nonviolent, inclusive and effective learning environments*. <<https://s3.amazonaws.com/theirworld-site-resources/Reports/Theirworld-Report-Safe-Schools-December-2018.pdfh>>
- United Nations website: Climate change. <www.un.org/en/climatechange/science/key-findings>
- United Nations website: NDCs. <www.un.org/en/climatechange/all-about-ndcs>, accessed May 2022.
- United Nations Office for Disaster Risk Reduction (2018). *UN 20-year Review*. <www.undrr.org/news/un-20-year-review-earthquakes-and-tsunamis-kill-more-people-while-climate-change-driving>
- United Nations Environment Programme (2021a). *Press Release Climate Action*. 16 September 2021. <www.unep.org/news-and-stories/press-release/covid-19-caused-only-temporary-reduction-carbon-emissions-un-report>
- United Nations Environment Programme (2021b). *The Gathering Storm: Adapting to climate change in a post-pandemic world*. UNEP Adaptation Report 2021. <www.unep.org/resources/adaptation-gap-report-2021>
- United Nations Framework Convention on Climate Change (UNFCCC) database: Myanmar NDC. <<https://unfccc.int/process-and-meetings/the-paris-agreement/nationally-determined-contributions-ndcs/nationally-determined-contributions-ndcs>>
- United Nations Framework Convention on Climate Change (UNFCCC) website. <<https://unfccc.int/process-and-meetings/the-paris-agreement/nationally-determined-contributions-ndcs/nationally-determined-contributions-ndcs#eq-1>>; accessed May 2022.
- United Nations Framework Convention on Climate Change (UNFCCC) website: Introduction to Climate Finance. <<https://unfccc.int/topics/climate-finance/the-big-picture/introduction-to-climate-finance>>; accessed June 2022.
- UNICEF. *Changing Childhood* interactive microsite. <www.unicef.org/globalinsight/reports/changing-childhood-project>; accessed May 2022.
- UNICEF (2016). *The Ripple Effect: Climate change and children's access to water and sanitation*. Programme Division (WASH section). UNICEF. <www.unicef.org/documents/ripple-effect-climate-change-and-childrens-access-water-and-sanitation>
- UNICEF (2019). *It's Getting Hot: Call for Education Systems to Respond to the Climate Crisis*. UNICEF report. <<https://www.unicef.org/eap/reports/it-getting-hot>>
- UNICEF photo essay (2021a). *The Impacts of Climate Change Put Almost Every Child at Risk*. 19 August 2021. <www.unicef.org/stories/impacts-climate-change-put-almost-every-child-risk>
- UNICEF (2021b). *Preventing a Lost Decade*. UNICEF report. <www.unicef.org/reports/unicef-75-preventing-a-lost-decade>

UNICEF (2021c). *The Climate Crisis is a Child Rights Crisis*. <www.unicef.org/reports/climate-crisis-child-rights-crisis>

UNICEF (2022). *Severe Wasting: An overlooked child survival emergency*. <www.unicef.org/child-alert/severe-wasting>

UNICEF Children's Climate Risk Index (CCRI). <www.unicef.org/wca/reports/unicefs-children-climate-risk-index-places-children-wca-most-risk>

UNICEF-Innocenti (2021). *Social Spending Monitor* website: < www.unicef-irc.org/social-spending-monitor>

UNICEF-Innocenti and FCDO (2021): <www.unicef-irc.org/files/documents/d-4211-gender-transformative-social-protection-climate-change-FCDO-webinar-summary.pdf>

World Economic Forum (WEF) (2021). *Climate Change: How is it affecting girls' education?* WEF blog post. 16 November 2021. <www.weforum.org/agenda/2021/11/climate-change-girls-education-gender-equality>

Wenjia, C., et al. (2021). 'The 2021 China Report of the Lancet Countdown on Health and Climate Change: Seizing the window of opportunity'. *Health Policy*, vol. 6, no. 12. <[www.thelancet.com/journals/lanpub/article/PIIS2468-2667\(21\)00209-7/fulltext](http://www.thelancet.com/journals/lanpub/article/PIIS2468-2667(21)00209-7/fulltext)>

World Health Organization (2021). *WHO Fact Sheet*. 30 October, 2021. <www.who.int/news-room/fact-sheets/detail/climate-change-and-health>

World Health Organization website. <www.who.int/health-topics/climate-change#tab=tab_1>; accessed May 2022.

World Bank (2020). *Revised Estimates of the Impact of Climate Change on Extreme Poverty*. <<https://documents1.worldbank.org/curated/en/706751601388457990/pdf/Revised-Estimates-of-the-Impact-of-Climate-Change-on-Extreme-Poverty-by-2030.pdf>>

World Development Indicators database. <<https://databank.worldbank.org/source/world-development-indicators#>>; accessed May 2022.

Yemtsov, R. Moubarak, A. (no date). *Assessing the Readiness of Social Safety Nets to Mitigate the Impact of Reform*. Good Practice Note 5. World Bank. <<https://documents1.worldbank.org/curated/en/180951530884246896/pdf/ESRAF-note-5-Assessing-the-readiness-of-Social-Safety-Nets-to-Mitigate-the-Impact-of-Reform.pdf>>

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