

CHAPTER 3

CLIMATE CHANGE: EXACERBATING POVERTY AND INEQUALITY



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KEY MESSAGES

- The effects of climate change are experienced to varying degrees across and within countries due to differences in exposure, susceptibility and coping capacities. If left unaddressed, climate change will lead to increased inequality both within and among countries and could leave a substantial part of the world further behind.
- Developing countries, particularly small island developing States, face disproportionate risks from an altered climate, while high-income countries are generally less vulnerable and more resilient.
- Within countries, people living in poverty and other vulnerable groups – including smallholder farmers, indigenous peoples and rural coastal populations – are more exposed to climate change and incur greater losses from it, while having fewer resources with which to cope and recover.
- Climate change can generate a vicious cycle of increasing poverty and vulnerability, worsening inequality and the already precarious situation of many disadvantaged groups.
- Just as the effects of climate change are distributed unevenly, so too are the policies designed to counter them. As countries take climate action, there will be trade-offs to consider between the positive and negative effects of mitigation and adaptation measures and distributional impacts.
- An equitable transition towards green economies calls for integrating climate goals with social and economic policies aimed at reducing vulnerability, supporting those affected by climate change and creating decent jobs.
- At the international level, climate finance, technological transfer and capacity-building can support developing countries in implementing a just transition.

INTRODUCTION

Climate change is accelerating environmental degradation and increasing the frequency, duration and intensity of extreme weather and climate events.⁵⁹ Countries and societies are now increasingly facing excessive or insufficient precipitation, rising sea levels, extreme temperature changes, storms, droughts, floods and other climate hazards that are only expected to intensify in the future (Hoegh-Guldberg, and others, 2018).⁶⁰

Whether they manifest as individual shocks or gradual environmental degradation, the effects of climate change are contributing to the loss of lives and homes, poor health, and damage to infrastructure, livelihoods and environmental resources. In extreme cases of flooding and coastal erosion, the physical survival of whole communities – or even nations, in the case of small island developing States – may be at stake. In 2010, deaths resulting from climate change were estimated at 400,000 (DARA and the Climate Vulnerable Forum, 2012). By the end of the century, this number may increase to 1.5 million per year if the rate of emissions remains unchanged (Climate Impact Lab, 2018). Assessing the effect of climate change on displacement is challenging. However, one estimate puts the number of people forced to move as a result of weather events and natural disasters at an average of 24.1 million people per year from 2008 to 2018.⁶¹ In the 20 years between 1998 and 2017, losses from extreme weather events amounted to an estimated \$174 billion (PPP) annually (Eckstein, Hutfils and Winges, 2018). As climate change progresses, these losses are expected to rise and will increase in severity unless urgent climate action is taken.

Aside from the direct damage that the effects of climate change inflict on human society and the environment, emerging research indicates that they can also increase inequality within and among countries. Indeed, the effects of climate change are not uniform in their reach or magnitude – nor are the abilities of countries and communities to cope and respond. The most severe impacts of climate to date have been in tropical regions, where most developing countries are located. Such impacts are expected to become more intense. These countries often have little capacity to recover on their own, and losses from climate hazards can hamper or even reverse years of development efforts. Countries in the Caribbean, for instance, are severely affected by climate events such as hurricanes, with Dominica and Antigua and Barbuda suffering damages estimated at 46 per cent and 215 per cent of GDP (PPP), respectively, in 2017 (ibid.).

In developing and developed countries alike, persons who are disadvantaged (socioeconomically or because of where they live), or whose livelihoods are reliant on climate-sensitive resources, are disproportionately affected. People living in poverty

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⁵⁹ Article 1(2) of the United Nations Framework Convention on Climate Change defines climate change as a "change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods."

⁶⁰ The Intergovernmental Panel on Climate Change benchmarks global temperature increases against a baseline from a "pre-industrial" period of 1850-1900. The Paris Agreement aims to limit this temperature increase to well below 2 degrees, although trends indicate that global warming and other effects of climate change are proceeding at a quicker pace than previously projected.

⁶¹ Author's calculations based on displacement data from the Internal Displacement Monitoring Centre: www.internal-displacement.org/database/displacement-data.

are more frequently exposed to climate hazards than their wealthier counterparts. They also tend to lose relatively more when affected, as do smallholder farmers, rural coastal populations and indigenous peoples. Having suffered setbacks – such as livelihood losses or deteriorating health – from climate hazards, those who are disadvantaged may have few resources to enable them to cope and recover.

This chapter discusses how the effects of climate change can exacerbate inequality. Section A introduces a conceptual framework outlining the linkages between the two. Section B illustrates how climate change can increase inequality across countries, through varying effects in different geographic regions and by level of income. Section C examines how climate change is linked to inequality within countries, describing the particular challenges encountered by people living in poverty and other disadvantaged groups that are especially at risk. Section D presents a brief assessment of the inequality impacts of adaptation and mitigation strategies and discusses policy implications. The section concludes that climate action policies can act in tandem with social and economic policies to reduce inequality.

A. Climate change through an inequality lens

The links between climate change and inequality are dependent on: (1) the channels through which climate impacts are felt and (2) the determinants of how these impacts are experienced by different people or groups.⁶²

1. Channels through which climate change exerts its effects

Whether they are immediate or pan out over time, climate change impacts are felt both directly and indirectly on livelihoods, health and mortality, agriculture and food prices, and labour productivity. These effects reinforce one another: the negative effects of a changing climate on health, agriculture, food prices and labour productivity may also undermine opportunities to make a living. The inability to sustain decent livelihoods, in turn, is likely to exacerbate the harmful health effects of climate change.

a. Livelihoods

Climate change has a direct impact on the assets and resources needed to earn a living. The destruction of homes and infrastructure, degradation of ecological resources and loss of biodiversity affect all, but the wealth of those in poverty is more likely to be concentrated in material forms, such as housing or livestock, and their assets are more fragile. In addition, environmental damage severely harms livelihoods that are climate-sensitive, including agriculture and fishing. The erosion of natural assets can force those reliant on them for their livelihoods to seek other sources of income, such as by shifting from crop-based to hybrid livestock-based agriculture, or wage labour employment. However, alternatives may not always be available or feasible. Such shifts may also incur high costs, or entail the acquisition of new technical

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⁶² Climate change can also exacerbate intergenerational inequality, since worsening conditions present greater challenges for succeeding generations. Impacts that occur today can have long-lasting effects, particularly if environmental damage reduces livelihood opportunities for the future. The potential effects of climate change on intergenerational inequality are not discussed in this chapter.

know-how. Outcomes can be particularly disastrous when climate hazards occur in quick succession, leaving little time for those already afflicted to recover, readjust and rebuild their assets and livelihoods.

b. Health and mortality

Changes in temperature and the occurrence of heat waves, droughts and floods, among other extreme events, also affect human health and mortality, with the greatest burdens expected to fall on lower-income countries (Smith and others, 2014). Extreme temperatures, for instance, aggravate cardiovascular and respiratory disease and increase mortality (UNFCCC, 2017). Fluctuating and increased precipitation levels compromise freshwater supplies and raise the risk of diarrhoea, waterborne illnesses and diseases transmitted through insects and animals. Changing climatic conditions will not only lengthen periods of disease transmission, but also expand their geographic range.

Children and older persons are especially at risk due to their limited mobility, vulnerability to infectious diseases, lower caloric and nutritional intake and, for older persons, greater social isolation (Field and others, 2014). Young children are more likely to suffer or die from diarrhoeal diseases and floods, while older persons are particularly susceptible to heat stress, droughts and wildfires. Climate change is also likely to affect pregnancy and maternal health outcomes, since pregnant women are especially vulnerable to climate hazards and infectious diseases, including malaria, foodborne infections and influenza (Smith and others, 2014).

Moreover, increased carbon dioxide levels have been linked to poorer nutritional quality in crops and may even compromise food safety through increasing foodborne pathogens, or by inducing chemical changes that raise the concentration of toxic compounds in agricultural produce (FAO, 2018).

The World Health Organization (2014) estimates that, in 2030, sub-Saharan Africa will have the greatest burden of mortality attributable to climate change, while in 2050 South-East Asia will be the region most affected by the health impacts of climate change.⁶³ Globally, between 2030 and 2050, climate change is projected to cause an additional 250,000 deaths per year from increased rates of malaria infection, diarrhoea, heat stress and undernutrition; direct health damages will cost an estimated \$2 billion to \$4 billion a year by 2030 (WHO, 2018a and 2018b).⁶⁴ According to one study, even after accounting for adaptation and possible reductions in mortality caused by cold weather, if the rate of emissions remains unchanged, climate change will result in an estimated 1.5 million deaths per year by the end of the century (Climate Impact Lab, 2018).^{65, 66}

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⁶³ WHO (2014) uses the following country grouping for South Asia: Afghanistan, Bangladesh, Bhutan, India, Nepal and Pakistan.

⁶⁴ Estimates of additional deaths are based on global climate-health models of mortality from these four causes, comparing projections between (i) a future world of medium-high emissions, and (ii) a future world where climate conditions remain at 1961-1990 average levels.

⁶⁵ Climate Impact Lab's estimation models utilize historical mortality data covering 399 million deaths in 41 countries, and simulate future global scenarios taking into account projected changes in emissions, income and population.

⁶⁶ Although cold-related mortality and morbidity are projected to decrease in some areas due to fewer cold extremes, globally this will be outweighed by the harm caused by temperature rise.

c. Agricultural production and food prices

Shifts in climatic conditions exert both direct and indirect effects on agricultural yields, aquaculture, livestock and fisheries production (FAO, 2018). In regions other than those with low baseline temperatures, higher temperatures will damage plant cells and reduce crop yields, and adversely affect animal growth rates and dairy production. Increased frequency and intensity of extreme weather events will diminish agricultural yields. Damages and losses from pests, diseases and livestock mortality are also expected to rise.

According to some estimates, by 2050, international producer food prices are expected to grow by an average of 20 per cent (Nelson and others, 2014). Although higher prices could benefit farmers, this gain may not be enough to offset drastically lower yields. In addition, higher food prices will put a strain on households that spend a significant proportion of their income on food.

d. Labour and economic productivity

High temperatures and heat waves result in lower economic output in countries around the world (Burke, Hsiang and Miguel, 2015). Production losses in climate-sensitive industries, increased workplace accident risks and heat-related illnesses contribute partly to this phenomenon. Studies have identified decreased labour productivity as a major factor affecting economic growth in a majority of countries (ibid.; Day and others, 2019; UNDP, 2016). Thermal conditions affect worker performance in both physical and mental tasks, a problem most severely affecting manual labourers and those who work outdoors in hot conditions.

These effects of climate change on productivity and livelihoods will also be felt at the household and community levels. For example, children pulled out of school in the aftermath of a disaster are significantly less likely to complete their schooling than other students in the same communities, with consequences for future productivity (Hallegatte and others, 2017).

Beyond the four channels described above, the negative effects of climate change are also increasingly reflected in the displacement and forced movement of people attempting to avoid climate hazards or following such disasters. Estimating the extent of migration stemming from climate change is challenging. Nevertheless, it is emerging as a key concern for the future as climate change intensifies and inflicts even greater damage to homes and habitats (see box 3.1).

2. Determinants of the uneven impacts of climate change

The effects of climate change are not experienced by everyone in the same way due to differences in exposure to climate hazards, their susceptibility to the damage caused by such hazards, and their ability to cope with the effects and recover. These determine the overall climate risk profile of a country, an individual or group.

BOX 3.1**Climate change and migration: what we know so far**

A good deal of uncertainty surrounds the scale of climate-induced migration. The decision to move is motivated by myriad factors, climate risk being only one of them. Therefore, isolating the primary driver of this process is extremely complex. Nevertheless, climate change is affecting the movement of people and is likely to continue due to four factors: (1) increased frequency and intensity of weather-related natural disasters, (2) the effects of climate change on livelihoods, health, food and water security, which will increase pre-existing vulnerabilities, (3) rising sea levels, which could make coastal areas and low-lying islands uninhabitable, and (4) competition over increasingly scarce resources, which could exacerbate tensions and potentially lead to conflict and displacement (IOM, 2014). If no appropriate action is taken to mitigate the effects of climate change, it is reasonable to expect that climate-induced migration will continue to increase.

Most of this displacement is currently internal, but some people are forced to cross borders (GMDAC, 2018). The most severe effects of climate change will not only drastically limit livelihood options; they are also likely to result in environmental conditions that are increasingly uninhabitable. This is a concern for many Pacific communities living on small, low-lying islands, such as the Tebunginako village in Kiribati. Coastal erosion and saltwater intrusion have pushed residents to relocate their village farther inland (Republic of Kiribati, 2019). However, as climate change worsens and the area of habitable physical land continues to decrease, residents may be forced to leave the island altogether.

Exposure refers to the presence of people and their livelihoods, environmental resources and infrastructure, or economic, social or cultural assets in places that could be adversely affected by climate hazards (IPCC, 2012). Location and living conditions are important determinants of exposure. Elevation and proximity to the sea, for example, determine the extent to which an area is exposed to coastal flooding. The nature of the work or activity undertaken at a location also has a role in determining exposure, by affecting how much a person is outdoors and the extent to which activities are sensitive to changes in climate.

Two communities or households that are identically exposed to a climate hazard, however, may not experience the same degree of damage. They may have different levels of *susceptibility* to the damage caused by climate events. Housing quality is a major factor determining susceptibility. Those living in solid, well-constructed homes, for example, are less likely to experience damage than neighbours living in houses built out of thin, structurally weak materials.

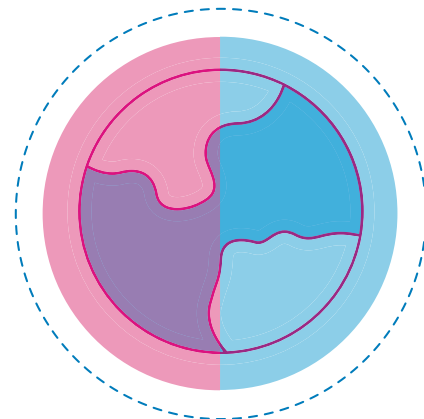
Ability to cope with and recover from losses can differ, too. Individuals and households have varying levels of resources or access to resources needed for reconstruction or to rebuild one's health or livelihood following a climate hazard. Beyond personal assets such as savings and property, this also includes access to formal social protection and informal support, including familial networks, and the ability to tap into community resources.

In some cases, individuals or households may decide to reside in an area affected by climate hazards – even though they are aware of its risks – to take advantage of certain (often livelihood-related) benefits, such as fertile soil in coastal deltas. Many others, however, face these risks due to lack of awareness and knowledge, insufficient resources to relocate or adapt, or because of circumstances beyond their control (as in the case of refugees and internally displaced persons, for example).

Countries also differ in climate change exposure, susceptibility and coping capacity. In addition to location, the level of development/income and the structure of the economy, in terms of its reliance on climate-sensitive industries and/or natural resources, are also important factors. Development status has particularly significant ramifications for both the wealth and income levels of a country's citizens, and on a society's ability to take necessary mitigation and adaptation measures (see box 3.2). At the same time, developing countries are also those whose economies tend to lean towards climate-sensitive and natural resource-focused industries, such as agriculture and fishing.

B. Unequal exposure and impacts across countries

Unaddressed, the impacts of climate change will exacerbate inequalities among countries. Diffenbaugh and Burke (2019) find that, from 1961 to 2010, higher temperatures improved economic growth in cool countries (most of which are developed), while they negatively affected growth in warm countries (most of which are developing). The researchers estimate that the ratio between the incomes of the richest and the poorest 10 per cent of the global population is 25 per cent larger than it would be in a world without global warming. Developing countries – including small island developing States – face significantly higher climate-related risk and have fewer resources for mitigation or adaptation than developed countries. Many of these



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BOX 3.2**Mitigation and adaptation: preventing and preparing for climate change**

Mitigation aims to slow the process of climate change by limiting or preventing greenhouse gas emissions, and by removing these gases from the atmosphere. Greenhouse gases are emitted from a range of sources, and mitigation can take place across all sectors and activities of different levels, including national policies curbing industrial carbon emissions, reforestation that aids the removal of carbon dioxide in the atmosphere, and changes in individual consumption aimed at reducing one's carbon footprint.

Adaptation, on the other hand, involves changes that facilitate adjustment to actual or expected future climate, by moderating the harmful effects or taking advantage of beneficial opportunities arising from it. While climate change is a global issue and mitigation efforts benefit the international community, adaptation is often felt and dealt with on a more regional or local scale. Adaptive measures can be reactive, as a response to conditions that have already changed, or proactive, in anticipation of future impacts. Examples include strengthening buildings to better withstand storms, restoring the environment, building early warning systems, and developing climate-resilient crop varieties.

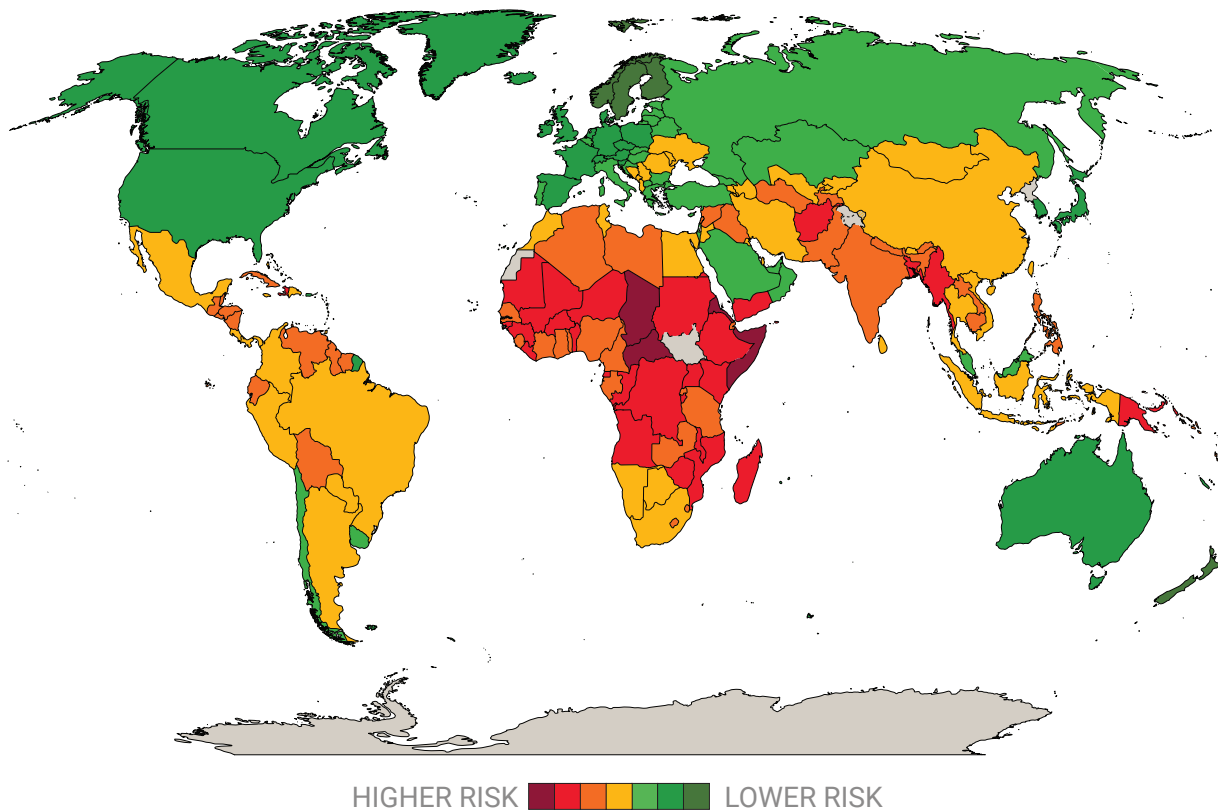
These two forms of climate action are complementary and equally vital. In the absence of mitigation, societies will have to grapple with ever-worsening climate change regardless of the adaptation measures taken. Mitigation delays the impacts of climate change and allows more time for the development and adoption of newer adaptive methods. However, mitigation alone, without adaptation, is insufficient to help communities cope with the climate impacts that are already occurring, or those that will transpire in the near future.⁶⁷

countries will find it increasingly difficult to recover from worsening climate conditions and more extreme events. In fact, unless appropriate action is taken, climate change threatens to leave a substantial part of the world further behind.

Countries in different regions suffer from different levels of exposure and susceptibility to the effects of climate change and possess varying capacities to cope with them. A country's location is an important determinant of the level of exposure. Mean temperatures are projected to increase in most land and ocean regions, with hot extremes in most inhabited regions becoming more frequent. The number of hot days is projected to increase, with tropical regions affected most. Additionally, increased heavy precipitation will affect certain regions, while some others – including semi-arid and arid areas in the Mediterranean, Southern Africa and northeastern Brazil – will

⁶⁷ Even if global emissions were drastically reduced, continued warming is expected to a certain extent from greenhouse gases already present in the atmosphere, and those that will be released from melting polar ice caps. In other words, it is likely that adaptation will continue to be necessary, even if mitigation efforts increase significantly.

FIGURE 3.1
Climate risk by country, 2017



Source: Based on University of Notre Dame Global Adaptation Initiative Index (available at <https://gain.nd.edu/>).

Note: The climate risk of each country is based on its ND-GAIN Index score for 2017. The ND-GAIN Index is a composite measure, with a range of 0-100, of a country's vulnerability to climate change and its readiness to improve resilience. Vulnerability is quantified by the level of exposure, sensitivity and adaptive capacity of six life-supporting sectors (food, water, health, ecosystem services, human habitat and infrastructure). Readiness measures a country's ability to realize adaptive actions in the economic, governance and social spheres. ND-GAIN score ranges for each of the seven colour groups used in the map, from dark brown (higher risk) to dark green (lower risk), are as follows: [20 to 28.5], (28.5 to 37], (37 to 45.5], (45.5 to 54], (54 to 62.5], (62.5 to 71] and (71 to 80].

face worsening drought and precipitation deficits (Cisneros and others, 2014). Hoegh-Guldberg and others (2018) note that projected changes in precipitation are more uncertain than changes in temperature, pointing out that there is larger variation among models projecting precipitation changes. Climate change will also cause a global rise in sea level, with significant consequences for coastal regions.

Figure 3.1 shows the risk level experienced by countries due to climate change, as measured by the Notre Dame Global Adaptation Initiative (ND-GAIN) Index. Africa and Southern Asia – currently the two poorest regions in the world – are more vulnerable to climate change and less ready to strengthen resilience than other regions.

The threat posed by climate change does not depend solely on a country's location and degree of exposure. The level of development, infrastructure, composition of the economy and coping capacity are also important factors in influencing a country's climate resilience. According to data from ND-GAIN, for instance, Singapore is highly

TABLE 3.1
Average ND-GAIN scores by country income group

Income group	ND-GAIN Index Range 0 to 100 (Higher is better)	Vulnerability Range 0 to 1 (Lower is better)	Readiness Range 0 to 1 (Higher is better)
High	62	0.36	0.59
Upper middle	49	0.41	0.40
Lower middle	41	0.50	0.33
Low	34	0.57	0.25

Sources: University of Notre Dame Global Adaptation Initiative Index (available at <https://gain.nd.edu/>).

Note: The ND-GAIN Index is a composite measure of a country's vulnerability to climate change and its readiness to improve resilience. Vulnerability is the average score of 36 indicators, scaled from 0 to 1, quantifying the level of exposure, sensitivity and adaptive capacity of six life-supporting sectors (food, water, health, ecosystem services, human habitat, and infrastructure). Readiness is the average score of nine indicators, scaled from 0 to 1, that measure a country's ability to realize adaptive actions in the economic, governance and social spheres. The ND-GAIN Index score is calculated using the following formula: ND-GAIN Index = (Readiness – Vulnerability + 1) * 50.

exposed to climate change as an island city-state near the equator, ranking as the 18th most exposed country out of 192 countries (ND-GAIN, 2019). However, when susceptibility and coping abilities are taken into account, Singapore's overall level of climate risk, as rated by the ND-GAIN Index score, is the 9th lowest out of 181 countries. Among other things, this is related to the country's developed infrastructure, high disaster preparedness and the structure of its economy, which has a low reliance on climate-sensitive sectors such as agriculture. On the other hand, Mauritania is the 42nd least exposed country, but its overall level of climate risk is the 28th highest. A significant proportion of its population relies on agriculture for their livelihoods and, as a least developed country, Mauritania has limited resources with which to implement adaptation strategies.

Table 3.1 shows a breakdown of the levels of climate risk, vulnerability and resilience-readiness of countries based on their level of income. According to the scores shown, high-income countries are generally less vulnerable to the risks posed by climate change and are more prepared to handle its consequences. In comparison, many developing countries are disproportionately at risk, owing to their location, lower levels of income, lack of high-quality infrastructure, and reliance on climate-sensitive industries and natural resources. For Africa and Asia, the Fifth Assessment Report (2014) of the UN Intergovernmental Panel on Climate Change identifies the following risks: compounded stress on water resources; reduced crop productivity; increased risk of heat-related mortality; and increased risk of drought-related water and food shortages, which could lead to malnutrition.

The economic consequences of heightened vulnerability and reduced readiness among low- and lower-middle-income countries are substantial and have implications for their future development. In absolute terms, economic losses due to climate-related disasters were highest in high-income countries from 1998 to 2017 (CRED and UNISDR, 2018).

FIGURE 3.2
Climate-related economic losses by country income group, 1998-2017



Source: CRED and UNISDR (2018).

Note: Economic losses are defined as the amount of damage to property, crops and livestock due to climate-related disasters (floods, landslides, storms, extreme temperatures, droughts and wildfires). For each disaster, the absolute value of loss registered corresponds to the damage value at the moment of the event, adjusted to 2017 US\$ using the consumer price index for the United States of America (with 2010 as the base index value of 100) from the World Bank (as of June 2018). Economic losses as a percentage of GDP for each income group are calculated by averaging the corresponding percentages for all countries within the group.

However, as illustrated in figure 3.2, losses relative to GDP were far more substantial in lower-income countries. For example, in a scenario of continued high emissions and the absence of climate policy, by 2050, temperature and precipitation changes alone in Eastern and Western Africa are projected to reduce annual GDP per capita growth rates by more than 10 per cent (Baarsch and others, 2019).

Climate change also has varying effects on agricultural output and food security across countries. Tropical and arid regions, where most developing countries are located, are expected to experience reduced yields and outputs in agriculture and aquaculture – sectors that make up a significant share of their GDP and employment (FAO, 2018). Agriculture in these countries is also more reliant on weather conditions due to lack of infrastructure such as irrigation or flood control systems. The overall resilience to extreme weather events is much lower in low-income developing countries compared to their more developed counterparts. In light of these changes, countries that are net exporters or self-sufficient may have to rely on imports for their food in the future. Depending on the extent of impact, global progress made in ending hunger and malnutrition, particularly in developing countries, may be reversed (WMO, 2019).⁶⁸

On the other hand, temperate zones – where most developed countries are located – could benefit from warmer weather. Some may even become more competitive in a wider range of agricultural products, and could gain from increases in fisheries catch potential due to spatial shifts of marine species from warmer waters (FAO, 2018;

⁶⁸ Following decades of decline, the percentage of the global population suffering from hunger stagnated from 2015 to 2018, while the absolute number of people going hungry rose annually over those three years (FAO, 2019). Climate change has contributed to this lack of progress and threatens to further hamper efforts in reaching SDG 2 on reducing world hunger and malnutrition.

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Field and others, 2014). In certain areas, rising temperatures due to climate change may even facilitate the development of an agricultural sector where, historically, it has not been profitable, such as cereal production in marginal areas in Finland.

Some countries are facing extreme risks, possibly existential, from climate change. A group at particular risk are the small island developing States, with 3 in 10 people living in locations less than five metres above sea level (UNDP, 2017). These countries have experienced first-hand the effects of worsening storms, loss of livelihoods, and salinization of agricultural land. All the while, few have the resources required to adequately defend themselves against these changing conditions. The Government of Kiribati, for example, acknowledges that the long-term survival of the island is severely threatened by climate change.⁶⁹ As climate conditions worsen, its citizens may be forced to relocate. Similar concerns hold true for other small island developing States, and this has motivated their commitment to demonstrate global leadership in the areas of climate change, disaster risk reduction and sustainable development. Indeed, their very existence depends on it.

C. Unequal exposure and impacts within countries

Within countries, population groups differ in their degree of exposure, susceptibility to damage and their ability to cope with climate change. Income and asset levels influence these differences, as do social networks and community resources. People living in poverty as well as other population groups that are socioeconomically vulnerable or disadvantaged are particularly affected by climate change. They are also at greater risk of death from climate change causes, owing to their higher exposure and susceptibility and low access to adaptation tools (International Actuarial Association, 2017). The disproportionate effects on these groups will exacerbate economic and other forms of inequality.

1. People living in poverty

Hallegatte and others (2016) estimate that, even under a low-impact scenario where mitigation and adaptation strategies are successful, climate change could result in an additional 3 million to 16 million people living in poverty by 2030. Under a high-impact scenario, between 35 million and 122 million could fall into poverty (Hallegatte and Rozenberg, 2017). These individuals and those already in poverty face high levels of climate risk.

a. Exposure

Because disaster-prone areas tend to be more affordable, people living in poverty are disproportionately exposed to climate change, feeding a vicious cycle of poverty and exposure. Poverty is indeed higher in marginal areas and other precarious locations that are prone to climate hazards, despite general awareness of the related risks. These locations include arid areas, which are highly exposed to drought and often experience water scarcity, and the bottom of hill slopes, which are prone to mudslides that are increasing in frequency (United Nations, 2016b; Sepúlveda and Petley, 2015).

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⁶⁹ See: www.climate.gov.ki/category/action/relocation/.

Notwithstanding exceptions such as prime coastal residences for high-income households, many of those who are impoverished also live in coastal and low-lying areas, which are prone to flooding and erosion.

In Bangladesh, for example, many lower-income households live in slums that tend to be located in low-lying areas. During Cyclone Aila in 2009, 1 in 4 poor households were affected by the storm, compared to 1 in 7 non-poor households (United Nations, 2016a; UNICEF, 2009; Akter and Mallick, 2013). Similarly, in New Orleans, in the United States, a majority of residents living in low-lying districts in 2005 were lower-income households that suffered disproportionately during Hurricane Katrina (United Nations, 2016a; Logan, 2006).

Income is linked to exposure to climate hazards at work as well, since less-skilled low-earning workers are more likely to do physical or manual labour out of doors. They are at greater risk of sustaining the health impacts of high temperatures, including injuries, cardiovascular and respiratory diseases, and even death. Their labour productivity also suffers in hot weather, making it more difficult or time-consuming to complete a task, which can negatively affect wages, production of goods for sale, and subsistence farming output.

Women living in poverty may face particular circumstances that increase their exposure to climate change. In 7 out of 10 developing countries, for example, women are primarily in charge of collecting water for the household (Sellers, 2016). As climate change reduces the availability of safe water sources, they often have to walk longer distances in search of water, increasing their exposure to climate hazards.

b. Susceptibility

At similar levels of exposure, people in poverty are more susceptible to damage from climate change than those who are better off. Differences in housing quality and local infrastructure, including whether adaptation strategies are in place, is a major determinant of their susceptibility. Overall, the assets of those who are impoverished are more fragile than those of their wealthier neighbours. During Cyclone Aila, in Bangladesh, the homes of lower-income households incurred significantly more damage than those of higher-income groups (Hallegatte and others, 2016; United Nations, 2016a). In Honduras, lower-income households affected by Hurricane Mitch lost a greater percentage of their assets compared to affected higher-income households (Carter and others, 2007).

Many people in poverty make their living from agriculture and fishing, sectors highly susceptible to the effects of climate change. In 2013, 65 per cent of people living on less than \$1.90 a day worked in agriculture (Castañeda and others, 2016). Be it subsistence farming, fishing, full-time labour employment or seasonal work, livelihoods are threatened as climate change impacts cause losses in agricultural yields and fisheries production. The problem is compounded when the natural assets on which these livelihoods depend are located in hazard-prone areas. The land plots

of farmers residing in coastal zones, for instance, are exposed to saltwater intrusion from the sea, a process aggravated by climate change that decreases agricultural productivity (Dasgupta and others, 2014; Rabbani, Rahman and Mainuddin, 2013).

The lack of asset diversification and access to formal financial markets also contributes to increased susceptibility among people living in poverty. Unlike richer households that are better able to invest in a range of physical and financial assets, lower-income households tend to have their wealth concentrated in their homes, crops and livestock, all of which are more susceptible to climate change impacts. Labour is also a more important asset for lower-income households, and the capacity to work can be affected by climate-related injuries and diseases (Douglas and others, 2008).

In addition, people in poverty are more susceptible to malaria and other waterborne diseases that climate hazards help to spread (Hallegatte and others, 2016). Their areas of residence are often more conducive to the breeding of malaria vectors, and they tend to have more limited access to piped water than their wealthier counterparts. During floods, their water sources can be contaminated with pathogens, which increases the risk of waterborne diseases.

In developing countries, women living in poverty tend to be disproportionately susceptible to food insecurity, which can be aggravated by climate change. They are often the first ones to reduce food consumption in the event of lowered crop yields and crop failure, or in cases of food shortage after a drought, flood or storm (Sellers, 2016).

c. Ability to cope and recover

Faced with the negative consequences of climate change, people living in poverty often have fewer resources with which to cope and recover. Among other challenges, they have limited capacity to relocate to safer areas, build structurally stronger homes, or pay for the costs of adaptation and coping methods. These obstacles are affected by differences in local infrastructure and resources. People living in poverty in a poor region, for instance, are likely to have less access to recovery options and public resources than people in wealthier areas or countries.

Adapting livelihoods to climate hazards and changing climatic conditions, through the use of technological solutions or shifting to other forms of employment, for example, is a major challenge. In the midst of reduced rainfall, lower-income farmers in Uganda have found it more difficult than wealthier farmers to change their crop patterns and access water-saving technology and water storage sources (Hill and Mejia-Mantilla, 2015). In the Sahel region of West Africa, where desertification is worsening, farmers living in poverty are less able to expand their land resources, intensify farming to stabilize food production, or diversify to non-agricultural production (Dietz, Ruben and Verhagen, eds., 2004).

Compared to wealthier households, those in poverty are much less likely to have insurance or access to other financial instruments, including loans for disaster recovery. Globally, half of adults without an account at a financial institution or a mobile money

WOMEN LIVING IN POVERTY TEND TO BE DISPROPORTIONATELY SUSCEPTIBLE TO FOOD INSECURITY, WHICH CAN BE AGGRAVATED BY CLIMATE CHANGE

provider in 2017 were from the poorest 40 per cent of households in their countries (Demirgüç-Kunt and others, 2018). They may also encounter obstacles in accessing remittances or informal, community-based resources. In order to pay for vital housing repairs and health expenses in the aftermath of a climate hazard, they often have to resort to selling their physical assets, which limits future efforts to rebuild their livelihoods and income earnings (Clarke and Dercon, 2015). Alternatively, they might reduce expenses to preserve their assets, which can be detrimental for health if food consumption and health care are compromised. This is the case in sub-Saharan Africa where, following extreme weather events, children of asset-poor households are more likely to receive lower-quality nutrition and less likely to be taken to medical facilities if they are ill (Hallegatte and others, 2016). If climate hazards occur in quick succession, households will have even less time to recover and rebuild their assets; this can push disaster-affected households into not just transient but chronic poverty and exacerbate the challenge for households that were already impoverished (Olsson and others, 2014).

**DISASTER-AFFECTED
HOUSEHOLDS ARE AT
RISK OF FALLING INTO
CHRONIC POVERTY**

Climate change will also lead to lower nutritional levels in crops, reduced agricultural yields and higher food prices. With food expenses constituting a larger proportion of their budgets, lower-income households will find it harder than affluent households to cope with food insecurity, undernourishment and chronic hunger. Undernourishment is made even worse when lower-income households are unable to diversify their food consumption in the face of rising prices. Often, they resort to eating mainly staple foods while cutting consumption of more expensive but nutrient-rich vegetables and protein-rich foods (FAO, 2018). In the United Republic of Tanzania, declining nutrient intake associated with increased maize prices have contributed to iron and vitamin A deficiencies among the rural poor (ibid.).

Women face particular barriers in coping with the effects of climate change. Household responsibilities can place time and labour constraints on women, hampering their ability to seek paid formal employment when primary livelihoods are threatened by climate change (Sellers, 2016). Being confined to domestic duties also limits their social networks and access to information – especially since women use communication tools such as mobile phones less often than men. Gender prejudice can aggravate the social exclusion of women already living in poverty, increasing their difficulty in accessing communal resources.

Finally, gender-biased land-tenure practices limit land ownership for women, diminishing their ability to make decisions on the adaptation or diversification of farming activities (ibid.). This inability to own land, which can serve as collateral, further restricts women's access to the loans needed to finance livelihood diversification and adaptation. In rural areas, forest resources are also often unavailable to women, given their low levels of representation in governance committees in a male-dominated sector (ibid.).

2. Other vulnerable groups

Due in part to their geographic location and way of life, some population groups are especially vulnerable to the impacts of climate change. These groups are at a disproportionately high risk of poverty and share many of the challenges faced by those who are impoverished: typically, they live in disadvantageous locations with high exposure to climate hazards, are heavily reliant on climate-sensitive natural resources for their livelihoods, and have limited options in terms of coping strategies, such as diversifying into climate-resilient income sources.

a. Smallholder farmers

Smallholder farmers tend to rely heavily on family labour to work on small agricultural lands no larger than two hectares (Rapsomanikis, 2015). Many of them live in marginal areas and depend on rain-fed agriculture. Since irrigation systems are often unaffordable for most smallholders, livelihoods are at risk as rainfall patterns become increasingly erratic, resulting in decreased and unstable crop yields (Ubisi and others, 2017).

Unlike industrial-scale farmers, smallholders are constrained by their low utilization of technology, the small size of their agricultural lands and poor soil quality. All of these factors hinder their ability to diversify their crops, especially to ones that are less sensitive to precipitation patterns. On the whole, smallholders lack the technical and financial means needed to increase agricultural productivity, and may not have access to public services and support mechanisms due to their remote locations (Donatti and others, 2018; Rapsomanikis, 2015).

For example, many of the estimated 2.3 million smallholder farmers in Central America work on steep lands with thin soils (Harvey and others, 2018). The crops they plant are sensitive to high temperatures and unstable rainfall, and extended droughts and extreme rain events mean that many of them struggle with food insecurity. Moreover, these small farms regularly suffer from hurricane damage to their crops and to infrastructure such as roads and bridges, which further impairs crop yields and transportation (Philpott and others, 2008). Like smallholders in other regions, their insecure land tenure, limited capital and lack of access to financing and technical solutions constrain their ability to cope and adapt to a worsening climate.

b. Indigenous peoples

The repercussions of climate change are severe for indigenous peoples, many of whom already face social exclusion in addition to poverty. Their reliance on natural resources for their living makes them markedly exposed and susceptible to climate change and its impacts.

For generations, their way of life has relied on traditional farming, foraging and hunting methods, some of which are no longer effective due to the changing environment (McLean, 2012; Baird, 2008). Shifting climate conditions and landscapes reduce the usefulness of traditional knowledge, and erratic weather patterns mean that

generations-old habits for planting crops are no longer reliable. With their primary livelihoods increasingly under threat, indigenous peoples will be less able to generate produce needed to trade for goods that they lack.

Increasingly unpredictable climate conditions can damage the confidence of indigenous groups that their traditional knowledge of the environment can guarantee their livelihoods. This raises the risk of a loss of culturally important practices, as members, in order to survive, forego traditional livelihoods.

The marginalization faced by many indigenous peoples affects their ability to cope with climate change, since their needs may not be taken into account in climate mitigation and adaptation policymaking (Baird, 2008). In addition, they may face institutional barriers to accessing resources and securing land tenure. Indigenous Aymara farmers from the Plurinational State of Bolivia, for example, have been struggling with water shortages and irrigation problems following the retreat of the Mururata glacier, along with an increase in flash floods and delayed rainfall (McDowell and Hess, 2012). Discrimination and, often, a lack of infrastructure in areas where many of them live make it challenging to obtain the loans and property rights that would facilitate a recovery of their way of life.

THE
MARGINALIZATION
FACED BY MANY
INDIGENOUS
PEOPLES AFFECTS
THEIR ABILITY
TO COPE WITH
CLIMATE CHANGE

Health impacts can be a concern as well. For many indigenous peoples in Latin America who live on marginal lands, climate change has resulted in the spread of diseases that previously could not thrive in those locations, causing a rise in respiratory and diarrhoeal diseases (Kronik and Verner, 2010).

Finally, it must be noted that the social and cultural identities of indigenous peoples are strongly tied to the environments in which they have lived for generations. Climate change can accelerate the disappearance of some of these elements of identity and culture as well as the destruction of natural habitats, as indigenous groups find themselves increasingly at risk of displacement.

c. Rural coastal populations

Coastal regions are highly exposed to sea-level rise, ocean acidification and temperature increases, along with storms and changes in precipitation. Rural areas of such regions are often inhabited by those living in poverty and other marginalized groups, who cannot afford to move to safer locations (Barbier, 2015).

Due to their remoteness and low levels of development, rural coastal areas may lack protection infrastructure such as storm shelters, seawalls and embankments (Barbier and Hochard, 2018). Instead, natural barriers such as mangroves are relied on for protection, but these habitats are gradually being lost to climate change, leaving residents increasingly exposed to coastal climate hazards.

In addition to the possible destruction of their houses and food gardens by rising sea levels and storms, rural coastal populations also face threats to their livelihoods. Many of them depend on marine and coastal resources for fishing or coastal agriculture,

and climate change is affecting the viability of these ecosystems. In addition to the destruction caused by extreme weather events, changes in ocean temperature and acidity reduce the yields of fisheries, while saltwater intrusion lowers the quality of coastal agricultural lands, adversely affecting farming productivity (ibid.).

Given their poverty and lack of access to resources, coping strategies are limited for many rural coastal households. Ships and equipment for fishing in deeper waters are often prohibitively expensive, as are new, climate-resilient crop varieties or the building of coastal protection infrastructure. Other forms of economic opportunities may also be unavailable in remote locations.

In such challenging circumstances, lower-income residents in rural coastal regions are prone to poverty-environment traps, which also affect other communities, including those living in drylands (see box 3.3).

D. Distributional effects of climate action: implications for policy

Policies have an important role to play in addressing climate risks and building climate resilience. However, just as climate change impacts are unevenly distributed, so too are policies built to counter them. As countries take climate action, there will be trade-offs between the positive and negative effects of mitigation and adaptation measures, and distributional impacts to consider.

1. The effect of mitigation and adaptation policies on inequality

Climate action strategies have the potential to reduce inequalities, but may not always incorporate this objective. Beyond their core intended purposes, these strategies often have other effects – both positive and negative – that can differ greatly for individuals from different income levels and social groups.

a. Mitigation policies

Whether mitigation policies curb energy consumption, encourage the use of cleaner, renewable energy or promote reforestation, the primary goal is one that benefits the global community – slowing down climate change through a reduction in carbon emissions/levels. In meeting emissions targets, mitigation policies have the potential to decrease air pollution and improve air quality, which has positive health effects. This can help to reduce inequality, since the greatest benefits are expected to accrue to lower-income households, which are more likely to live in areas heavily affected by air pollution and poor air quality (Hajat, Hsia, and O'Neill, 2015; Pratt and others, 2015).

Mitigation policies have also contributed to advances in small-scale renewable energy. The resulting proliferation and lower costs of these technologies, which include solar, wind and hydropower, are bringing electricity to remote areas unconnected to conventional power grids, addressing the energy needs of the rural poor in many countries (UNDP and ETH Zürich, 2018; REN21, 2017).

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BOX 3.3**Climate change and poverty-environment traps**

People living in poverty in agricultural areas deemed “less-favoured” or in rural, low-elevation coastal zones are at particular risk of falling into so-called poverty-environment traps. Barbier and Hochard (2018) explore the implications of climate change on poverty in these regions. Less-favoured agricultural areas include land where agricultural production is difficult because of environmental conditions (such as poor soil quality, difficult terrain and a harsh climate) and “favoured” agricultural land that has limited market access. Low-elevation coastal zones are coastal areas below 10 metres of elevation, and are highly exposed to sea-level rise and coastal erosion, among other challenges. Lower-income households in these regions are largely dependent on natural resources for their living.

Climate-induced resource degradation and declining productivity pushes those affected to search for outside work to supplement their income (ibid.). Considering the regional nature of the climate impacts encountered, however, it is likely that households living in the same area will take the same action – to seek alternative employment. If too many people pursue this strategy, the spike in labour supply will inevitably result in falling wages, which may force households to forego alternative employment and refocus on increasing production at home. This, in turn, puts further stress on local resources and accelerates degradation, fuelling a vicious cycle. The following two examples illustrate the poverty-environment trap and ways in which communities are attempting to cope, with government support.

Fishing communities in southwest Bangladesh (Dasgupta and others, 2016)

In Bangladesh, the incidence of poverty is particularly severe in the low-lying coastal region in the country’s southwest. The area is prone to tidal surges, salinization and cyclones, and living conditions are often challenging. In the coming years, vulnerability to flooding and salinization is expected to increase, according to climate projections. People in poverty will be heavily affected by these trends, since they rely on the local ecosystem for their livelihoods and have limited mobility due to their economic circumstances. Over the years, the region’s inland fishing grounds have been degraded due to over-exploitation, destructive fishing practices and salinization, among other factors. Climate-induced sea-level rise and subsequent salinization will adversely affect many of the fish species, which are crucial food and economic resources for local residents. The Government of Bangladesh has taken action to promote sustainable fishing practices and increase community access to technological and financial resources. Whether this will be enough to enable these communities to extricate themselves from this poverty-environment trap remains to be seen.

Dryland communities in Yangguan Town, China (Cao and Zheng, 2016)

Yangguan Town lies at the edge of the Kumtag Desert in China. It faces similar challenges to many other impoverished regions in the world’s drylands: limited water availability, remoteness and worsening environmental conditions due to climate change – mainly desertification and flooding. From the 1960s to the 2000s, average precipitation in the area during the rainy season increased by almost 70 per cent. Since desert soil cannot absorb large quantities of water from a single event, the risk of flooding has increased. The community has tried to adapt by building basic flood defences and attempting to develop a fruit industry, but they have found it difficult to stay out of poverty. In collaboration with a private firm that came to Yangguan in 2000 to gain access to its meltwater resources for fish production, additional flood defences were created, a series of artificial lakes were constructed and non-forest vegetation was established. These adaptive measures provided a clean water supply, security and job opportunities for the local community. The town has managed to successfully escape from the poverty-environment trap, quadrupling average per capita income in the decade from 2005 to 2015.

Given that climate change affects disadvantaged groups disproportionately, these groups stand to benefit more from global mitigation efforts in the long term. However, as with any process of structural transformation, climate action brings challenges in the short term. Green energy requirements, for instance, can be a source of financial strain for those in poverty, many of whom rely on coal and traditional fuels for cooking and heating, and are unable to afford the upfront costs of newer technology or the ongoing costs of more expensive, cleaner fuels. Rising fuel prices have spiked protests from low- and middle-income households in more than one country (see box 3.4). Large-scale land acquisition and increasing demand for biofuel production affects those in poverty and smallholder farmers through the dispossession of land and the shifting of land use from food to fuel production, which can lead to higher food prices. (Collier, Conway and Venables, 2008; Ruel and others, 2010). Displaced households are often pushed onto more marginal lands, which are often highly vulnerable to climate hazards (Rulli, Savioli and D'Odorico, 2013; Weinzettel and others, 2013).

DISADVANTAGED
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LONG TERM, BUT
CLIMATE ACTION
ALSO BRINGS
CHALLENGES IN
THE SHORT TERM

Renewable energy and forest management projects in rural areas can lead to the displacement of rural communities and the loss of livelihoods, especially if resource use and ownership rights are unclear or unenforced. Here, forest-dwelling indigenous peoples are especially vulnerable; their traditional lifestyles may be disrupted by the projects, and they may even lose their homes if customary indigenous land use and property rights are not well defined (Bayrak and Marafa, 2016).⁷⁰

b. Adaptation policies

With regard to adaptation, measures tend to be tied more specifically to a particular locale or target group, with varying reach. Physical housing renovations in a neighbourhood, for example, have a narrower impact, benefiting mostly local residents. Meanwhile, adaptation policies involving public services and system-level changes, such as land-zoning legislation and the enhancement of public water supplies, have a much wider reach. Whether these policies benefit disadvantaged persons or the well-off more will depend on the context and the precise measure taken.

Some adaptation initiatives entail major construction work and changes to the environment that require the resettlement of local residents. Among these residents, those in poverty and other disadvantaged groups may face more severe outcomes, since they are more likely to live in informal settlements and have fewer legal protections. They are also at higher risk of being evicted or receiving lower compensation when dispossessed of their property (Anguelovski and others, 2016).⁷¹ In Dhaka, Bangladesh, construction of flood-prevention embankments has resulted in the displacement of low-income communities living near canals (ibid.).

⁷⁰ Projects may restrict access to the resources in a given area and set regulations on how they can be used, which may be incompatible with the lifestyles and livelihoods of local inhabitants.

⁷¹ For those who are relocated, resettlement sites may continue to be affected by climate hazards, in addition to being farther away from economic centres and disconnected from social networks.

BOX 3.4**Tempering public reaction to rising fuel prices: a balancing act**

Reforming fossil fuel subsidies can play an important role in reducing emissions. Yet enacting such changes can be politically fraught.

The *gilet jaunes* movement in France exemplifies the backlash that government policies of this nature can bring when viewed as inequitable and implemented without regard to distributional consequences. Named after the yellow vests all French drivers must carry, this grass-roots movement started in 2018 when thousands of unaligned individuals from rural and suburban areas united in their opposition to a proposed fuel tax.

The tax was part of a green agenda, which the public generally approved of, but was announced without public dialogue and following a period of economic reforms that were seen to benefit upper-income groups (Council on Foreign Relations, 2019). Because people living outside of urban areas often lack access to public transportation systems, they would be forced to shoulder most of the tax burden. The tax angered a population that was already frustrated by long-stagnant wages and high levels of unemployment in rural and suburban areas. After months of social unrest, the tax was eventually rolled back. Many people in France are calling for a just transition to a low-carbon economy that is not seen to favour the urban elites over the working class.

Many countries in Western Asia and Northern Africa have traditionally subsidized energy prices. Often, the biggest beneficiaries of these subsidies are not those most in need. In addition, the high public cost of the subsidies can prevent the State from implementing equitable and efficient social protection schemes. While subsidies tend to be popular among all income groups, when reforms are linked to improvements in social protection, they tend to be more successful (Inchauste, Mansur and Serajuddin, 2017).

In Jordan, energy subsidies accounted for roughly 40 per cent of government spending in 2012 (El-Katri and Fattouh, 2017). Soaring budget deficits made reforms a fiscal necessity. Yet attempts by the Government to lift petroleum-based subsidies led to intense public protest and widespread political opposition. To counter this, the Government took steps to gain support for the reforms, including a major public communication effort outlining their rationale. To mitigate the impact on households, the Government was able to provide cash transfers to families living in poverty (ibid.). These efforts were key in the eventual public acceptance of the reforms and their viability.

Egypt has also had success in transitioning away from energy subsidies, which by 2013 had grown to more than 20 per cent of the Government's budget. To reduce the impact of the reforms on the most vulnerable, the Government created two new separate social protection schemes. One targeted households in poverty with added benefits for children, and the second provided a social pension to persons with disabilities and individuals aged 65 and older. By defunding a regressive public support system, the Government was able to increase social spending and invest much needed capital into renewable energy sources (Canonge, n.d.; World Bank, 2017b).

These examples illustrate the need for Governments to consider the timing of reforms and take steps to mitigate their negative impacts, ensuring that their implementation is the outcome of a participatory process.

In some instances, the groups most negatively affected by adaptation policies may even be the intended beneficiaries themselves. One area where this may occur is in the building of climate-resilient infrastructure – such as green spaces that lower urban temperatures and alleviate flooding – in low-income areas. As these neighbourhoods become more attractive, property and rental prices can rise significantly from an influx of wealthier residents, pricing out the low-income households that the policy was meant to aid in the

first place (ibid.). An example of this is the St. Kjeld district of Copenhagen, Denmark, where rents increased following the completion of climate resilience projects, leading to some displacement of low-income households (Keenan, Hill and Gumber, 2018).

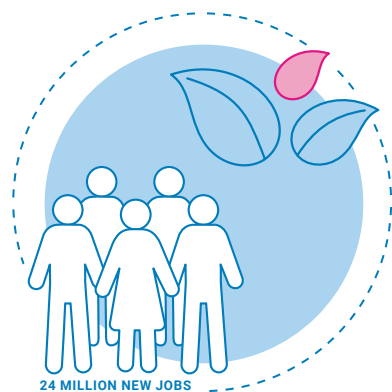
Adaptation measures can also increase inequality when they prioritize higher-income groups and economically valuable areas over low-income or marginalized neighbourhoods (Anguelovski and others, 2016). For example, flood prevention developments in Surat, India, which have focused on protecting economic assets such as oil refineries and textile mills, have contributed to the relocation of communities living in vulnerable riverine and floodplain areas (ibid.). In Manila, Philippines, new drainage infrastructure is often planned for construction in informal settlements, leading to the relocation of residents, even though other forms of urban development also contribute to the congestion of the city's waterways and drainage networks (ibid.).

In addition to the above, inequitable outcomes can emerge if the costs of climate action are passed on to the public through regressive taxation, or if climate action results in price changes that erode the purchasing power of lower-income households. This is particularly relevant where climate action involves expensive technology or fuel sources, or where policies cause an increase in the costs of energy, public transport and basic consumer goods – a financial burden that weighs more heavily on those living in poverty, since they spend a large proportion of their incomes on such goods and services.

On a broader scale, green objectives related to climate action also have repercussions for livelihoods and development. As climate-friendly policies gain traction and as livelihoods and activities adjust to meet emissions-reduction targets, inequality may increase as a result of changes in the economy and the labour market.

The urgency of cutting emissions calls for immediate action to transition to a green economy. Recent progress in the development of low-carbon technologies and the reduction of their costs facilitate this transition. Still, the process may be particularly challenging for existing, more carbon-intensive firms and economic activities. On aggregate, reduced demand for fossil fuels, coupled with an increasing focus on renewable energy and other industries associated with mitigation and adaptation, can lead to job losses and the phasing out of carbon-intensive sectors (ILO, 2019). The removal or scaling back of fossil-fuel subsidies can also disproportionately affect lower-income households. Geographically, the negative impacts could be particularly severe for regions dependent on carbon-intensive sectors. In India, for example, coal royalties constitute almost half of revenue in some states (Gambhir, Green and Pearson, 2018). Disproportionate losses in certain locations could thus contribute to spatial inequality.

INEQUALITY MAY
INCREASE IF THE
COSTS OF CLIMATE
ACTION ARE
FUNDED THROUGH
REGRESSIVE
TAXATION



With well-designed adaptation strategies, the greening of economies can result in 24 million new jobs by 2030

With carefully designed adaptation strategies, however, economic restructuring brought about by the greening of economies can result in the creation of 24 million new jobs worldwide by 2030 (ILO, 2018a). At the same time, at least 6 million jobs will be lost, including many low-skilled jobs in carbon-intensive sectors (ibid.). The net increase of approximately 18 million jobs around the world should be the result of the adoption of sustainable practices, including changes in the energy mix, the projected growth in the use of electric vehicles and increases in energy efficiency in existing and future buildings. The extent to which displaced workers, particularly those with low skills, can take advantage of new opportunities is uncertain. The mismatch of skills is a major challenge, and those who lose their livelihoods may not be sufficiently equipped to enter into new vocations.

Ultimately, the overall impact on inequality will depend on the distribution of new and destroyed jobs. Where losses fall disproportionately on those in poverty and other disadvantaged population groups, inequality will rise unless efforts are made to ensure a just transition.

2. Promoting a just transition with equitable outcomes

In 2015, world leaders took important steps to fulfil the promise of eradicating poverty, reducing inequality and reversing environmental degradation. With the signing of the 2030 Agenda for Sustainable Development, they committed to take urgent action to combat climate change and its impacts while reducing inequality.

The subsequent adoption of the Paris Agreement set forth a concrete road map to achieving climate targets globally. The Agreement includes obligations for developed countries to provide financial resources to assist developing countries with mitigation and adaptation, as well as technology transfer and capacity-building support to build clean, climate-resilient futures.⁷² Five years into the implementation of these agreements, public attention to climate change has intensified as its effects are felt by increasing numbers of people around the globe. Important scientific reports, government statements and calls to action by civil society reflect heightened and growing awareness of this alarming megatrend.

⁷² Article 9 of the Paris Agreement, adopted through Decision 1/CP.21 refers to climate finance, while Article 10 refers to technology transfer and capacity-building.

a. A systems perspective

As public awareness triggers action, ensuring a just transition is of the essence. In this regard, it is important for policymakers to take a systems perspective, integrating mitigation and adaptation measures with goals to reduce inequality. Inequality and climate change are locked in a vicious cycle, where climate change exacerbates existing vulnerabilities of disadvantaged countries, communities, groups and individuals, worsening inequality and raising their climate risk further (United Nations, 2016b). Reducing inequality not only breaks this cycle, but also facilitates the success of climate action policies, which should be formulated in an inclusive, participatory manner so that the perspectives of those most disadvantaged by climate change are taken into account.

In the course of designing solutions, it will be crucial to weigh trade-offs between policy priorities, since measures that advance one development objective, or a particular SDG, may complicate other objectives. Climate-impact assessments are a valuable tool in this process. By quantifying and incorporating multidimensional poverty and inequality into climate scenarios, integrated assessments shed light on the distributional impacts of climate hazards and policy options, yielding scientific evidence to aid decision-making (ibid.; Rao and others, 2017).

Managed well, a just transition would be able to balance sustainable economic growth and job creation at the national and global levels with climate action and inequality-reduction objectives. To this end, policies designed to reduce inequalities that exacerbate vulnerability to climate hazards are sound development policies and are essential to reducing climate risk. That is, social and economic policies that reduce vulnerabilities and support decent job creation and access to equal opportunity are also forms of climate adaptation.

b. Climate action and social protection

At the international level, dedicated climate finance, technological transfer and capacity-building – provided predominately by developed countries – can support developing country plans for adaptation and mitigation. The Green Climate Fund, under the United Nations Framework Convention on Climate Change, is a prominent example of providing resources to developing countries, especially those most vulnerable to climate change, in support of low-emission and climate-resilient development. Specifically, the Fund provides financial and technical assistance to help countries formulate and implement national adaptation plans and to integrate them into national development planning.

At the national level, environmental taxation can play a key role in promoting more sustainable production and consumption patterns, but potential regressive effects have to be mitigated. Subsidies, grants and other forms of accessible financing should be made available to lower-income households and other disadvantaged groups to help them cope with rising food, transport and clean energy prices, adaptation costs,

A JUST TRANSITION
CALLS FOR
INTEGRATING
MITIGATION AND
ADAPTATION
POLICIES WITH
INEQUALITY-
REDUCING
MEASURES

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BLOW OF CLIMATE
SHOCKS AND
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ADAPTIVE CAPACITY
OF HOUSEHOLDS

and expenses incurred in their recovery from climate hazards. Insurance targeted at low-income earners can reduce future climate risk. However, Governments must provide a safe regulatory environment that protects the rights and investments of the insured (Akter, 2012).

Climate action projects such as renewable energy production can be strategically located in poor rural areas to provide the local workforce with employment opportunities (ILO, 2018a). In doing so, the traditional land use and rights of local indigenous peoples should be taken into account, with benefits equitably distributed. Any eventual resettlement should be mutually agreed upon and fairly compensated, with new housing arranged in a location that does not leave residents worse off.

Social protection and access to social services can bolster recipients' capacities to cope with and recover from all manner of shocks. Social protection systems are effective at building resilience by providing an income source that can help individuals and households cope with climate change and other shocks.

For workers at risk of losing their jobs in the green transition, social protection can soften the blow of income losses and strengthen the adaptive capacity of their households. The availability of safeguards against unemployment and income losses also contributes to mitigation efforts by easing public acceptance of green policies that may affect them negatively (ILO, 2018a). As economies and the world of work evolve, however, social protection systems must adapt to deliver continued support to workers coping with the shift to new forms of production and employment.

Public employment programmes can help vulnerable workers by serving as a source of temporary employment, while offering training in new skills when implemented in the form of green transition projects. Governments can consider providing fiscal incentives, such as tax exemptions or social security rebates, to employers to encourage skills training for their employees.

When disasters occur, post-disaster transfers can facilitate or accelerate recovery as well as reduce reliance on negative coping mechanisms. The result is beneficial to the environment as well. With sufficient support, recipients are better able to engage in more sustainable forms of livelihoods, such as agriculture and aquaculture practices that facilitate the care and regeneration of natural ecosystems. Addressing inequality, then, is important not only in and of itself, but also to address the impacts of climate change and strengthen people's resilience.