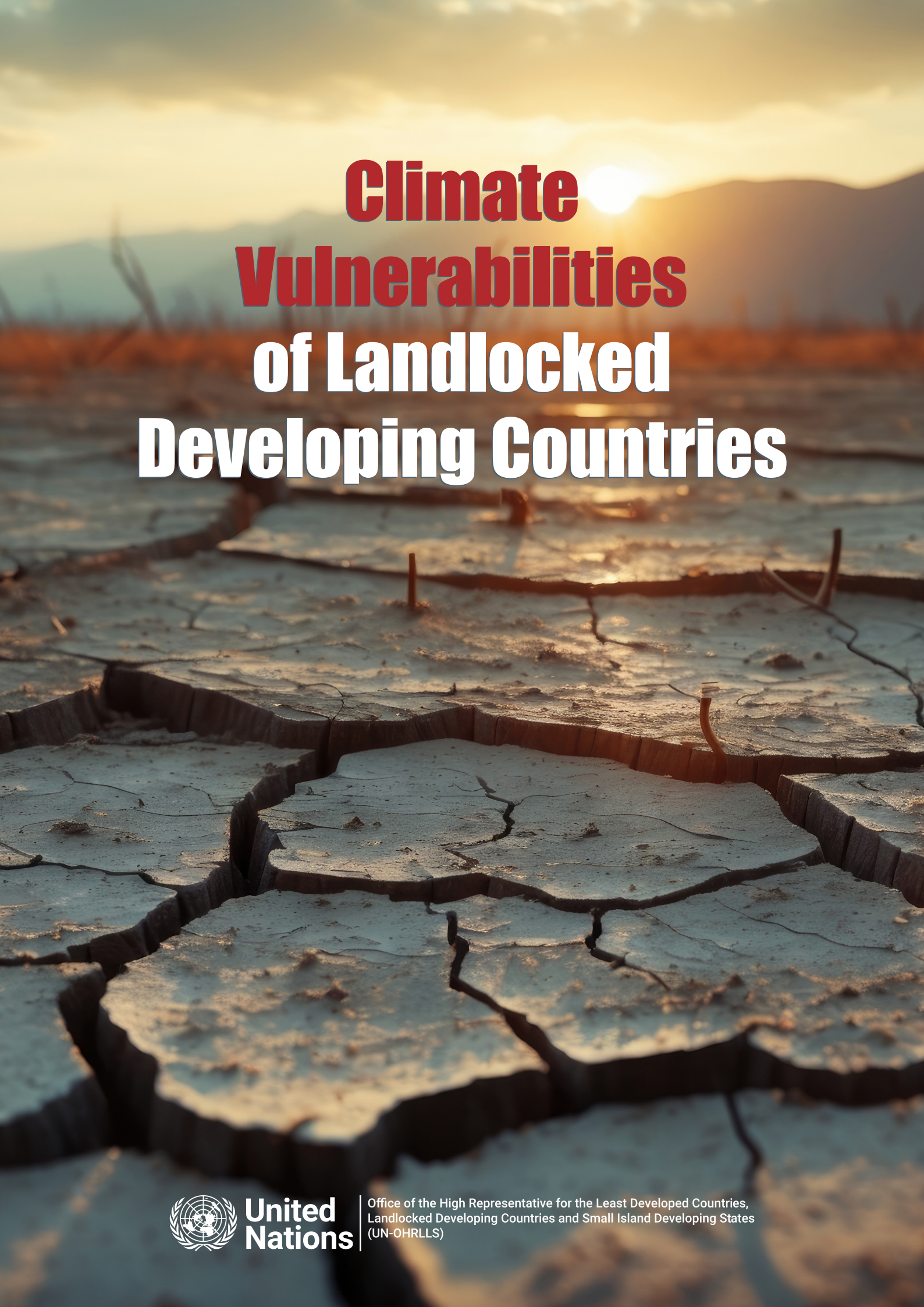


# Climate Vulnerabilities of Landlocked Developing Countries

United Nations
Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States (UN-OHRLLS)

# Acknowledgements

This policy paper was prepared by the United Nations Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States (UN-OHRLLS). The report was drafted by Sine Tepe (Economic Affairs Officer, UN-OHRLLS) and Jamie MacLeod (Economic Affairs Officer, UN-OHRLLS), under the overall guidance of Md. Abdul Alim (Senior Economic Affairs Officer, UN-OHRLLS). The authors would like to express sincere appreciation for the insightful reviews, inputs and comments provided by Aniket Ghai (Senior Economic Affairs Officer, UN-OHRLLS) and Benjamin Scarborough.



**For more information, contact: advocacy-ohrlls@un.org**

## ABOUT UN-OHRLLS

The Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States (UN-OHRLLS) serves the 92 vulnerable member states that are LDCs, LLDCs and SIDS, and is responsible for advocating, supporting, mobilising, co-ordinating and reporting on the implementation of programmes of action and the achievement of the Sustainable Development Goals (SDGs).

Since UN-OHRLLS was established, it has been working through a dedicated unit to advocate for LLDCs; to mobilise and co-ordinate the UN system and other stakeholders towards supporting LLDCs; to monitor implementation of the Programme of Action (PoA) for the LLDCs at the country, regional and global levels; to provide intergovernmental support to the LLDCs; and to build effective linkages between the PoA for LLDCs and those of the 2030 Agenda for Sustainable Development.

www.un.org/ohrlls

UN-OHRLLS (2025). ***Climate Vulnerabilities of Landlocked Developing Countries***, New York: UN-OHRLLS

# Foreword

The challenges posed by climate change are among the most pressing global concerns of our time, with the most severe impacts often felt by the most vulnerable populations. Landlocked Developing Countries (LLDCs), with their unique geographic, economic, and social vulnerabilities, stand at the forefront of this crisis. As this report illustrates, LLDCs are disproportionately affected by climate-induced disruptions, yet their capacity to mitigate and adapt to these challenges remains highly constrained.

The 590 million people of the 32 LLDCs are located in regions—across Africa, Asia, and South America—highly susceptible to the worst impacts of climate change. A considerable portion of LLDCs are located in internal drylands, which are increasingly prone to desertification, severe droughts and erratic rainfall, further stressing their agricultural systems. Many are also in fragile mountainous areas that face the threat of glacier retreat, landslides, and flash floods. Despite accounting for just 7 per cent of the global population, LLDCs experienced 18 per cent of the global impact from droughts and landslides between 2012 and 2023, underscoring the disproportionate burden they carry.

The vulnerabilities of LLDCs are compounded by their economic and social structures. In these countries, 55 per cent of the population is employed in agriculture, far above the global average of 25 per cent. This makes them particularly susceptible to climate-induced droughts, floods, and desertification, which not only threaten food security but also the livelihoods of millions. LLDCs are also highly reliant on hydropower, which accounts for 44 per cent of their electricity generation—significantly higher than the global average of 15 per cent. With agriculture, hydropower, and trade routes all deeply intertwined with the climate, the risks posed by climate change reverberate through LLDCs' economies, affecting food security, energy availability, and economic stability.

Equally concerning is the limited capacity of LLDCs to respond to these mounting challenges. Structural vulnerabilities, such as fiscal constraints, over-reliance on commodities, and complex governance hurdles, often hinder the ability of these countries to implement effective climate adaptation measures. As many as a third of LLDCs were in fragile or conflict-affected situations in 2024, further compounding their vulnerability to both climate change and its socio-economic consequences.

The Programme of Action for LLDCs for the Decade 2024-2034 offers a comprehensive framework to address these challenges. This is the first time that a Programme of Action for LLDCs includes a dedicated focus on climate adaptation, disaster risk reduction, resilient infrastructure, and climate finance to provide a structured approach to help LLDCs enhance their resilience to climate impacts. The successful implementation of this Programme will require reinvigorated global partnerships, as well as a dedicated commitment to strengthening the capacity of LLDCs to respond to climate challenges.

The establishment of the LLDCs as a recognized group of highly vulnerable countries within the United Nations Framework Convention on Climate Change (UNFCCC) is an essential step toward ensuring that their needs are fully integrated into the global climate agenda. As we look ahead, it is crucial that we continue to build on these efforts, ensuring that LLDCs have the tools, resources, and support they need to overcome the challenges of climate change.

This report serves as an important reminder of the distinct challenges confronted by LLDCs as some of the most vulnerable countries to the global climate crisis. It underscores the critical role of international solidarity and cooperation in addressing the unique vulnerabilities of LLDCs to advance their sustainable development. Let us work together to support these countries in building resilience and securing a more sustainable future for all.

***Rabab Fatima***
Under Secretary-General and High Representative
of the Least Developed Countries, Landlocked Developing Countries
and Small Island Developing

# Executive Summary

The 32 landlocked developing countries (LLDCs) face a unique set of vulnerabilities to climate change due to their geographic circumstances, structural economic challenges, and limited mitigation and adaptation capacities.

## UNIQUE GEOGRAPHIC CIRCUMSTANCES

- LLDCs are disproportionately situated in internal drylands, where desertification and heat stress are worsening, and mountainous regions especially exposed to melting glaciers, landslides and flash floods.

- With roughly 12 per cent of the world's land surface, LLDCs suffered more than 20 per cent of the total number of droughts and landslides between 2012 and 2023. And despite representing just 7 per cent of the world's population, LLDCs accounted for about 18 per cent of the globally affected population by droughts and landslides over this period.

- LLDCs depend on complex transit routes for access to international markets. When these routes are undermined by disasters and extreme weather events, LLDCs' access to global markets is severed, jeopardizing their trade and competitiveness.

## STRUCTURAL ECONOMIC AND SOCIAL SENSITIVITIES

- In LLDCs, 55 per cent of the population is employed in the agriculture sector, significantly higher than the global average of 25 per cent. This sector is severely vulnerable to droughts, flooding and desertification.

- LLDCs are highly reliant upon hydropower, which is vulnerable to droughts and flooding. Hydropower provides roughly 44 per cent of LLDCs' electricity compared to 15 per cent for the rest of the world.

- In 2023, 51 per cent of the population in LLDCs faced moderate or severe food insecurity, a substantial increase from 43 per cent in 2014. In 2020-2022, 27 LLDCs were net importers of cereals and exposed to heightened risks of global price fluctuations and potential disruptions in international supply chains.

## LIMITED CAPACITIES FOR MITIGATION AND ADAPTATION

- LLDCs face significant challenges in addressing climate-related issues due to constrained fiscal capacities, reliance on undiversified, commodity-dependent economies, and complex governance hurdles. A third of LLDCs were in fragile or conflict-affected situations in 2024.

- Recognizing the unique climate vulnerabilities of LLDCs and their serious capacity constraints, the Progamme of Action for LLDCs for the Decade 2024-2034 structures actions and support in the areas of climate adaptation, disaster risk reduction, climate finance, resilient infrastructure development, loss and damage, and biodiversity loss.

- Effectively implementing the Programme of Action for LLDCs will require reinvigorated, systematic and sustained partnerships. The formation of the LLDCs as a recognized group of highly vulnerable countries in the relevant processes and negotiations under the UNFCCC is the key first step to providing a structured and institutional framework for such partnerships to address the LLDCs' vulnerabilities and specific needs.

## CONTENTS

# 1. Introduction

The 32 LLDCs, with a combined population of more than 590 million, are already on the frontline of the climate crisis. Spanning over four regions–Africa (16 LLDCs), Asia (10 LLDCs), Europe (4 LLDCs) and Latin America (2 LLDCs)–the LLDCs are severely challenged by geographical and economic remoteness and a lack of direct territorial access to the sea.

Though the climate crisis is a global issue, LLDCs have several climate-specific vulnerabilities owing to their geographic circumstances. Most of them are situated in internal drylands, suffering from desertification and heat stress, or mountainous regions exposed to melting glaciers, landslides, and flash floods. They struggle with complex transport linkages through transit neighbours that can be severed by climate-related disasters, undermining their access to world markets for critical exports and imports.

LLDCs also face a set of structural social and economic sensitivities to climate change. Agriculture, which employs over half the workforce, is highly susceptible to droughts, floods, and desertification. Similarly, 44 per cent of their electricity comes from hydropower, increasingly at risk due to climate change. Exports are heavily concentrated in primary commodities, making transitions from carbon-intensive industries challenging. Compounded by global crises and a sluggish post-COVID-19 recovery, LLDCs have experienced slow economic growth, averaging just 2.6 per cent annually over the past decade, compared to 4 per cent in other developing countries (OHRLLS, *Forthcoming*).

Limited capacities make it difficult for LLDCs to respond to climate mitigation and adaptation challenges. Cascading international crises have drained their fiscal resources, while domestic resource mobilization remains weak, with an average tax-to-GDP ratio of just 12 per cent.[1] Access to external concessional finance is shrinking, borrowing costs are rising, and external debt burdens are growing, with 11 LLDCs at a high risk of or already in debt stress (IMF, 2024). Additionally, nearly one-third are classified as fragile or conflict-affected (World Bank, 2024a), further hindering access to climate finance and the ability to mitigate and adapt to climate change.

This OHRLLS policy paper sets out the challenges faced by LLDCs because of their geographic constraints, remoteness from the global markets, and other structural economic and social factors. Despite these severe and unique vulnerabilities, LLDCs are underappreciated in the global climate action discussions and decisions. This paper outlines LLDCs' exposure to climate change, their economic and social sensitivities, and their limited capacities for mitigation and adaptation. It calls for a structured and institutional response through global recognition of their special vulnerabilities and partnerships to build their capacity and resiliency to climate change through the Programme of Action for the LLDCs (PoA) for the Decade 2024 to 2034.

[1] Data available for 23 countries LLDCs. For each country, only the latest year available data has been used between 2018 and 2022. Data is retrieved from World Bank Indicators.

# 2. Unique geographic circumstances

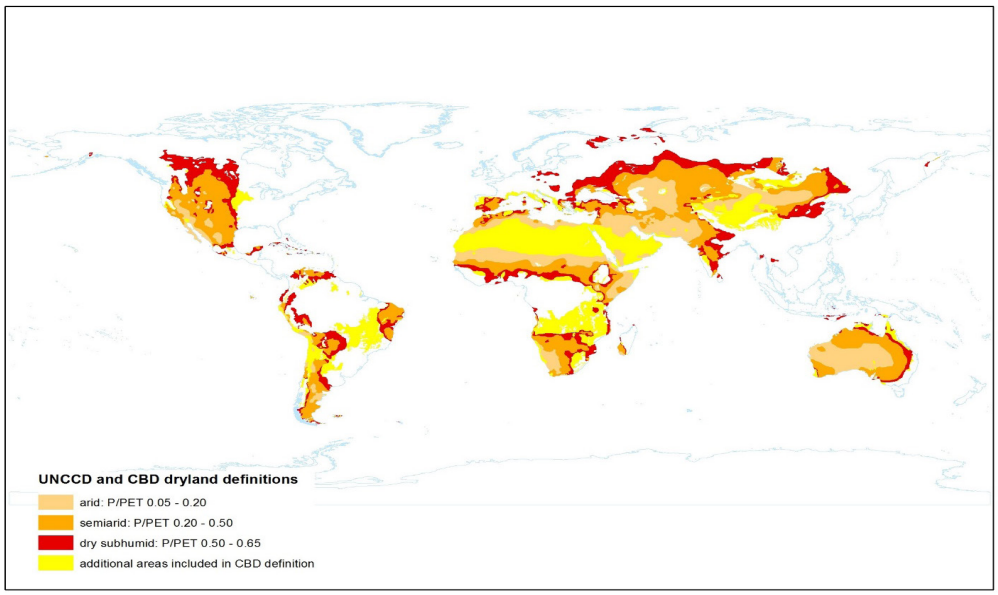
LLDCs face a set of specific geographic circumstances that fundamentally affect their exposure to the risks of climate change. These challenges stem from their location in regions characterized by distinct environmental vulnerabilities, their heightened susceptibility to climate-related disasters, and the severe consequences of such events for their connectivity to global markets.

## Environmental exposures

Far from oceans, LLDCs are disproportionately situated in internal dry regions where hyper-arid, semi-arid and arid conditions prevail (Figure 1). These locations are prone to desertification and land degradation. Approximately 54 per cent of the land in LLDCs is classified as dryland and home to 60 per cent of the total population of people living in LLDCs. The largest dryland-based population is in the Sahel region (Chad, Mali and Niger) but significant populations are also found in Southern Africa (Botswana, Zambia and Zimbabwe), the South American Gran Chaco (parts of Bolivia and Paraguay), and the dryland belt of Eurasia (covering Kazakhstan, Kyrgyzstan, Moldova, Mongolia, Tajikistan, Turkmenistan and Uzbekistan).

***Figure 1. LLDCs are disproportionally located in the vulnerable internal dryland regions of the Sahel, Southern Africa, the South American Gran Chaco and the dryland belt of Eurasia***

*World dryland regions*

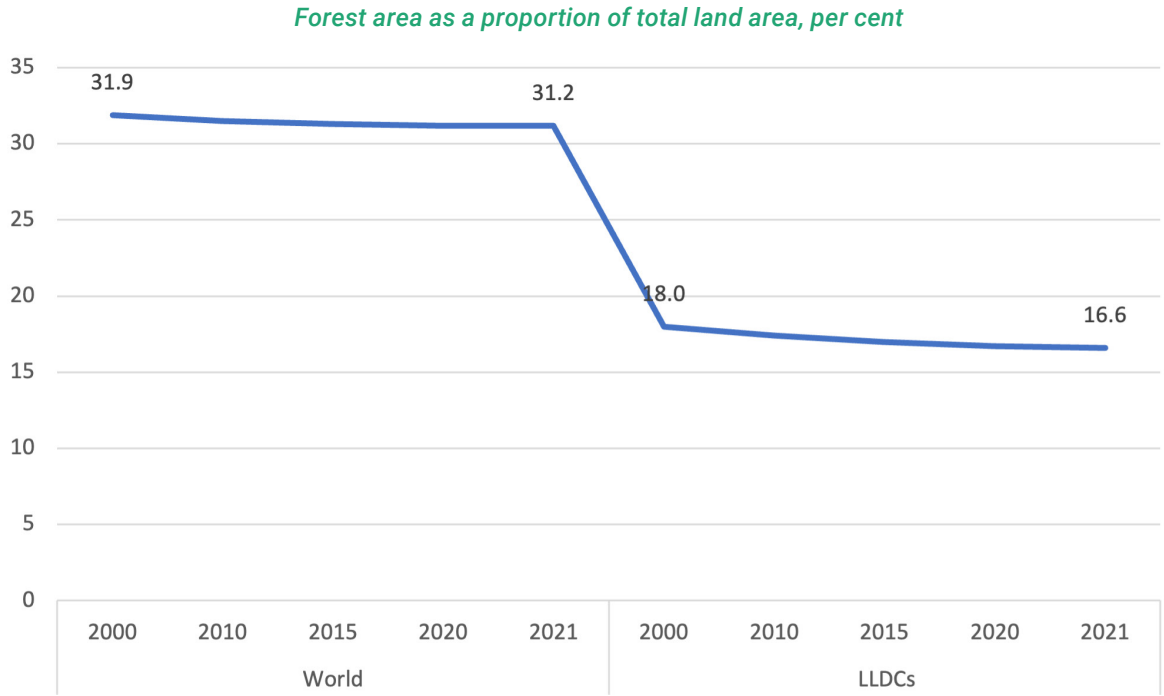



*Source: UNEP-WCMC (2007)*
*Notes: UNCCD (United Nations Convention to Combat Desertification) definition of drylands.*

As a result, forest coverage in LLDCs is critically low at 16.6 per cent, roughly half the world average of 31.2 per cent, and continues to decline. Since 2000, forest land *per capita* has dropped by nearly 45 per cent, weakening the protective role of sustainably managed forests against desertification.

Climate change is further causing land degradation in the LLDCs, with their share of degraded land (defined as reduced biological or economic productivity), increasing from 11.7 per cent in 2015 to 14.7 per cent in 2019 (Global SDG Database, 2024). These trends severely undermine rural livelihoods, deepen poverty and food insecurity, and drive climate migration (Hermans et al., 2023; UNCCD, 2023).

***Figure 2. Forest area is already low in the LLDCs, and falling, hamstringing their fight against desertification and land degradation***




*Source: FAOSTAT (2024)*

The combined effect of worsening environmental conditions with rapid population growth has led to a significant decline in the availability of land and water resources (Figure 3). By 2020, the *per capita* availability of renewable internal freshwater resources in the LLDCs had fallen to just 60 per cent of the world average (FAO, 2024a). This is especially alarming for the many LLDCs where insufficient infrastructure for water extraction, distribution, or conservation exacerbates the risk of water stress and scarcity, jeopardizing the health and well-being of populations. Additionally, the average *per capita* arable land in LLDCs has decreased by 23 per cent since 2000, leaving the agriculture sector increasingly susceptible to the effects of volatile weather conditions (FAO, 2024a).

These environmental challenges are expected to worsen. Projections by the World Resources Institute indicate that 11 LLDCs—Botswana, Turkmenistan, Uzbekistan, Mongolia, Lesotho, North Macedonia, Kyrgyzstan, Armenia, Niger, Burkina Faso—are expected to experience high-to-extremely-high water stress by 2050 (World Resources Institute, 2015).

The case of Lake Chad, bordering Chad, Niger, Cameroon and Nigeria, provides a stark warning. Over the past five decades, the lake shrank by around 90 per cent due to the combined pressures

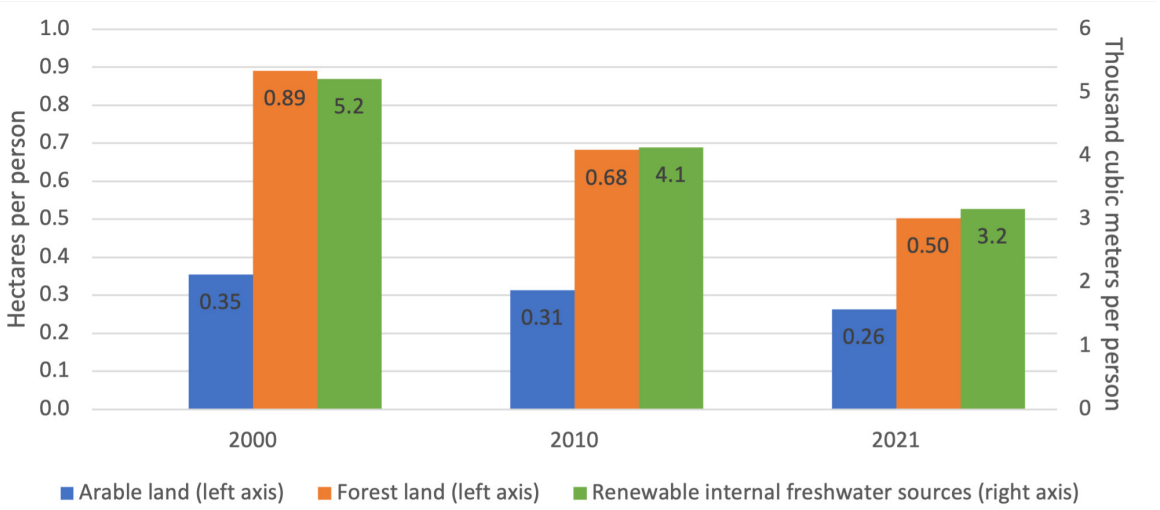
of climate and population growth, risking those dependent on this water losing their main freshwater supply (IOM, 2013).

Other LLDCs face distinct and, at times, overlapping climate-related challenges associated with their location in internal mountainous regions. This includes Armenia, Azerbaijan, Afghanistan, Bhutan, Bolivia, Kyrgyzstan, Nepal, and Tajikistan which are grappling with the impacts of rising temperatures. Accelerated glacial melting in these areas is triggering landslides, flash floods and the sudden collapse of glacial lakes, known as glacial lake outburst floods. (Taylor, et al., 2023). These events not only disrupt traditional water sources but also pose longer term threats, such as shifts in ecosystems and livelihoods.

For example, the glaciers of the Greater Caucasus are projected to largely vanish in the 21st century, exerting severe pressure on water management systems, irrigation networks, hydropower generation, and rural communities in Armenia and Azerbaijan (World Bank, 2021a; World Bank, 2021b).

***Figure 3. Declining arable land, forest land, and freshwater sources, per person, in the LLDCs***

*Hectares of arable land and forest and thousand cubic meters of renewable internal freshwater sources, per capita, in LLDCs (selected years)*




*Source: OHRLLS calculations based on FAOSTAT (FAO, 2024a) and FAO AQUASTAT (FAO, 2024b)*

## Heightened disaster risks

These environmental vulnerabilities place LLDCs at a significantly heightened risk of climate-related disasters such as droughts, floods, and landslides, which impact large populations and create cascading effects on food security (FAO, 2024a). Climate change is amplifying these risks by increasing the likelihood, frequency, and intensity of such events in these countries. For instances, in Central Asia, an estimated 12 million people live in areas classified as having high drought risk (UNCCD, 2023).

The pronounced and growing exposure of LLDCs to climate-related hazards is clearly demonstrated in the Emergency Events Database (EM-DAT). Covering roughly 12 per cent of the world's land surface and 7 per cent of the global population, LLDCs suffered more than 20 per cent of all droughts and landslides and nearly 18 per cent of the globally affected population between 2012 and 2023.[2]

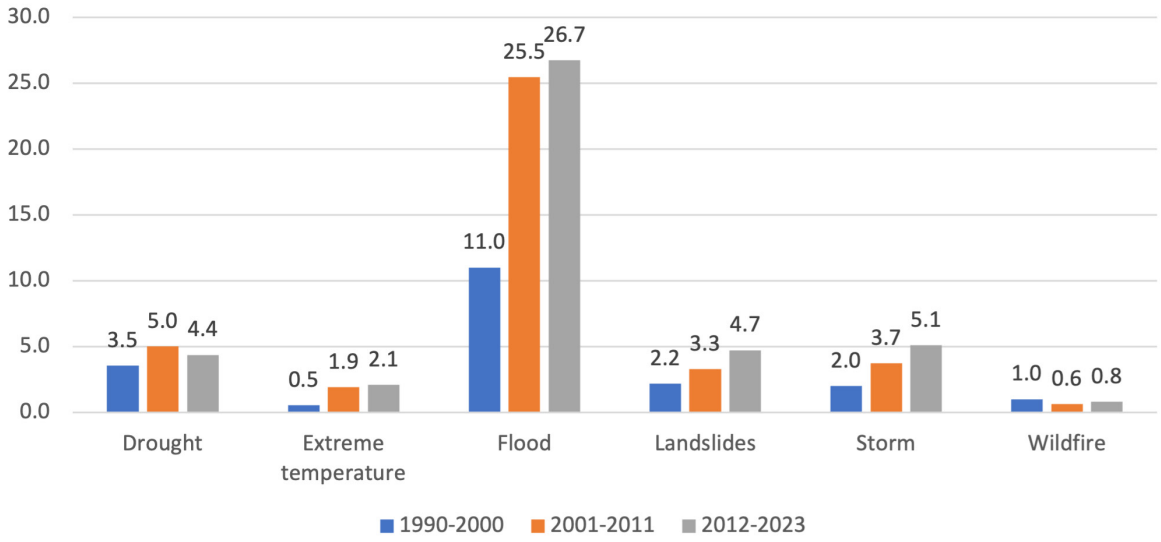
[2] OHRLLS calculations based on EM-DAT (2024)

The data shows both a rising trend in the incidence of weather, climate and water-related disasters across LLDCs (figure 4) and an increase in the number of people affected (Figure 5). Between 2012 and 2023, 482 disasters affected about 180 million people in LLDCs—nearly double the number of disasters and three-times the number of people affected during the 1990-2000 period.[3]

In 2022 alone, more than 40 million people were affected by droughts, particularly in several African LLDCs, while about 2.8 million people suffered from the impact of floods in Chad, South Sudan, Bolivia, and Niger (UNDRR, 2022). These figures underscore the growing vulnerability of LLDCs to climate-related hazards and the urgent need for strengthened resilience measures.

***Figure 4. An increasing number of severe weather, climate and water-related disasters are occurring in LLDCs***

*Average number of large natural disasters per year in LLDCs, for selected natural disasters*




*Source: OHRLLS calculations based on EM-DAT (2024)*

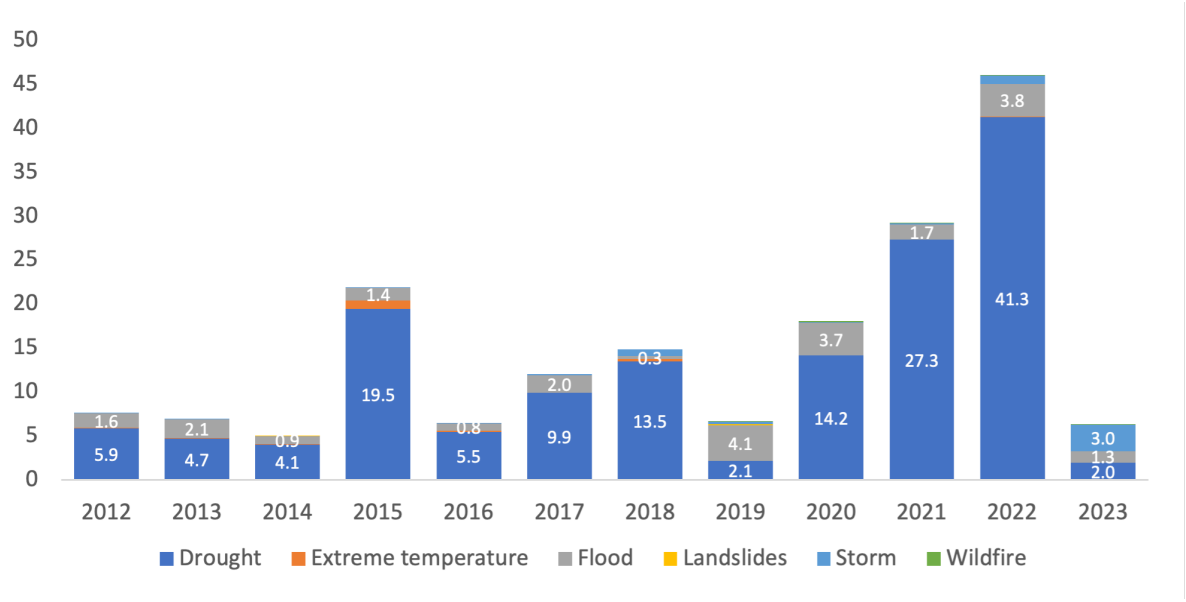
The socioeconomic impacts of natural disasters are especially severe for LLDCs, where limited social protection systems can leave populations heavily reliant on personal funds or humanitarian assistance for recovery and reconstruction. In LLDCs, only a median of about 21 per cent of households are covered by social protection floors—basic social security guarantees designed to prevent or alleviate poverty.[4] This inadequate coverage exacerbates the vulnerability of affected communities, highlighting the critical need for expanding social protection mechanisms in these regions.

[3] While better recording and reporting may partly explain some of the increase in events, much of it is due to a significant rise in the number of climate-related disasters. In the 2012 to 2023 period, the distribution of disasters affecting people was 56% due to flooding, 19% due to droughts, 13% due to landslides.

[4] Data is available for 20 LLDCs, the latest available year data is used. Data is retrieved from ILO (2024a).

***Figure 5. More people are being impacted by climate-related disasters in the LLDCs***

*Millions of people affected by natural disasters in LLDCs, 2012 to 2023, for selected natural disasters*




*Source: OHRLLS calculations based on EM-DAT (2024)*

*Notes: Emergency Events Database of total number of people affected by natural disasters.*
*This is defined as the sum of the injured, affected and those left homeless after a disaster in LLDCs.*
*The 2023 EM-DAT data may be subject to bias due to the impact of recent events and delays in reporting*

## Threatened transit routes

LLDCs face significant challenges in accessing international markets, with the average LLDC requiring to transit across 1370 km reach the nearest seaport. Road networks, which carry 70 per cent of the freight and passenger volumes are the primary mode of transport. However, these critical transport arteries are increasingly vulnerable to extreme weather events and climate-related disruptions (Greenham et al., 2023). Heat, water or snow stress damage road surfaces, necessitating more frequent and costly maintenance. Higher temperatures, especially in humid regions, further hamper construction activities, inflating infrastructure development and maintenance costs (ILO, 2019).

LLDCs face a threefold challenge: reliance on extended transit routes, dependency on neighbouring countries' infrastructure, and severe constraints on global market access when these routes are disrupted. For example, between 2019 and 2022, droughts compromised the Paraná River waterway, a key transit route responsible for over 80 per cent of Paraguay's international trade. In southern Africa, recurring cyclones continue to damage critical transport and energy infrastructure. Cyclone Idai in 2019 caused an estimated $1bn in infrastructure damage (Bloomberg, 2019), while tropical cyclone Freddy in 2023 devastated over 5,000 kilometers of roads, including vital transit routes linking Malawi with the port of Beira in Mozambique (OCHA, 2023).

The indirect costs of climate change events on transport can also be equally severe, often resulting in the loss of access to essential goods and services, such as perishable items, food and medicine supplies, further exacerbating vulnerabilities in LLDCs (Greenham et al., 2023).

# 3. Structural economic and social sensitivities

Countries' vulnerability to climate change depends not just on their exposure to environmental shocks but also the sensitivity of their economies to those shocks. In the special case of the LLDCs, such vulnerabilities are elevated because of reliance on climate sensitive livelihoods, the prevalence of food insecurity, and dependency on climate-vulnerable energy sources.

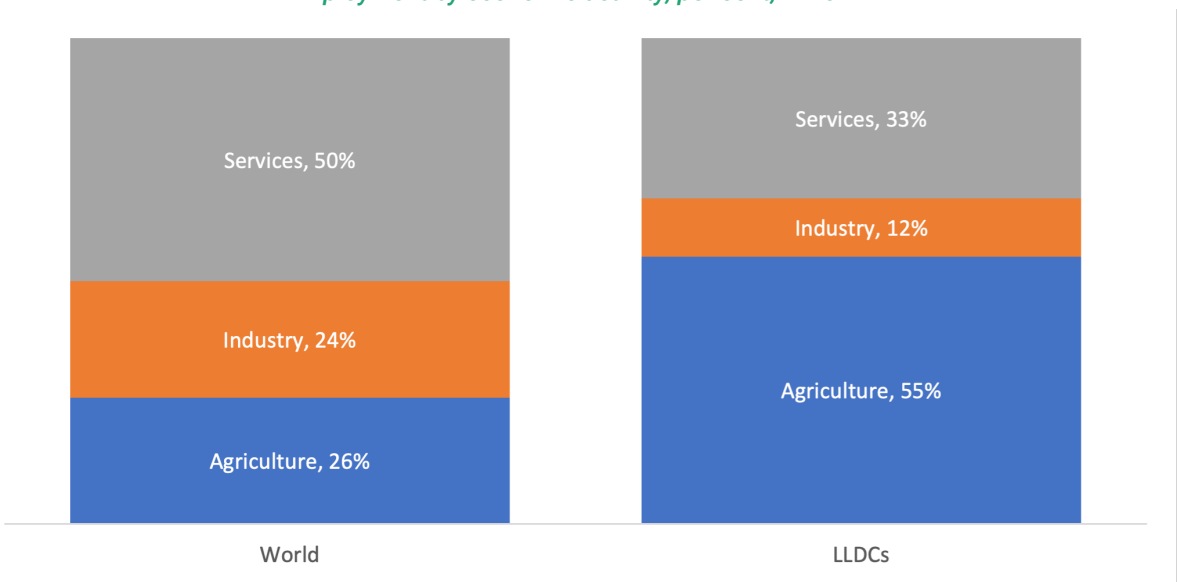
## Dependence on climate-sensitive livelihoods

LLDCs are disproportionately reliant on climate-sensitive agricultural resources for the livelihoods of their populations. Over half of the workforce in LLDCs is employed in agriculture, compared to a world average of 26 per cent (Figure 6). The majority work as smallholder farmers in rural areas and rely on rainfed agriculture, often in dry or semi-arid regions and on marginal lands, making them particularly vulnerable to rainfall scarcity (IOM, 2019).

Desertification and recurrent droughts undermine these agricultural activities, compromising food security, reducing productivity, and straining local economies. These effects often trigger internal displacement and migration, leading to cascading social and economic challenges.

***Figure 6. Livelihoods in the LLDCs are highly concentrated in agriculture, a sector that is vulnerable to droughts, flooding and desertification***

*Employment by economic activity, per cent, in 2022*




*Source: OHRLLS calculations based on ILO (2024b)*

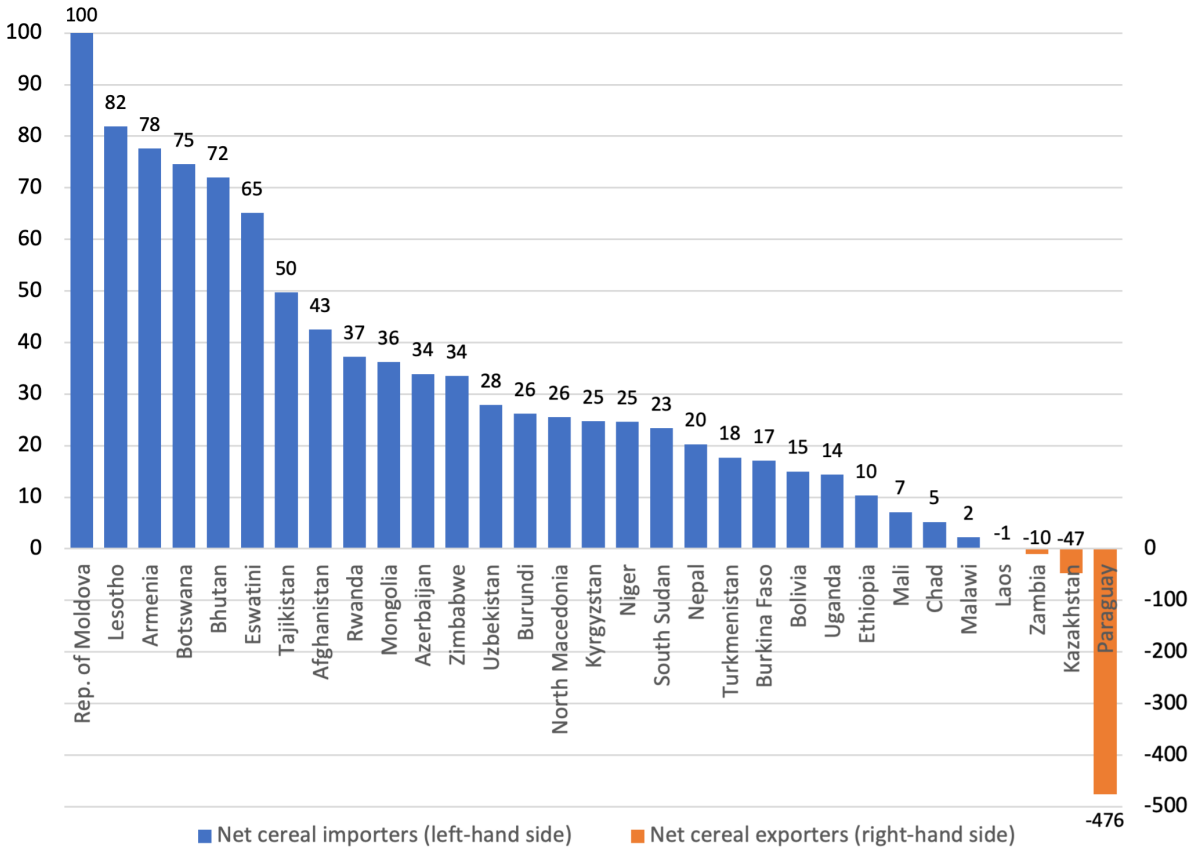
## Prevalence of food insecurity

Food insecurity and malnutrition, particularly among poorer and marginalized groups in LLDCs, is a great and growing concern. In 2023, 50.7 per cent of LLDC populations faced moderate or severe food insecurity, a sharp increase from 42.7 per cent in 2014 (FAO, 2024a). Climate change further exacerbates these vulnerabilities, deepening inequalities and undermining efforts to ensure sustainable development and food security.

An additional challenge faced by LLDCs is their significant reliance on imports to meet a substantial portion of their total cereal supply. The cereal import dependency ratio measures the extent to which the domestic food supply of cereals—an essential set of crops for food security—relies on imports versus domestic production. Currently, 27 LLDCs are net importers of cereals, with more than half of these countries depending on imports for at least a quarter of their available cereal supply (Figure 7). This high level of import dependence exposes these countries to heightened risks from global price fluctuations and potential disruptions in international supply chains.

***Figure 7. Most LLDCs rely heavily on imports to supply food demand for cereals***

*Cereal import dependency ratio (percent), 3-year average, 2020-2022*




*Source: OHRLLS calculations based on FAO (2024a)*

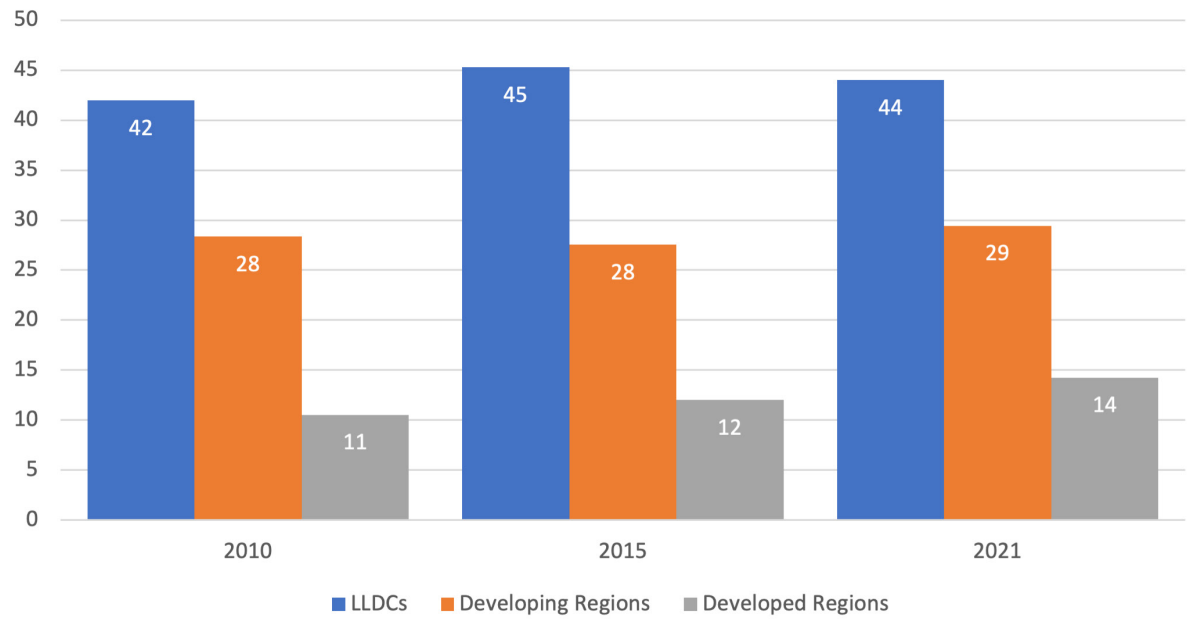
*Notes: Value of imported cereals in total available supply of cereals. Data was unavailable for Central African Republic. Cereals include wheat, maize, millet, oats, rye, barley, sorghum and rice.*

## Reliance on climate-sensitive hydropower

LLDCs are leaders in renewable energy. In 2021, 44 per cent of energy consumption in LLDCs was from renewable sources, significantly higher than the world average of 19 per cent (UN Statistics Division, 2022a), helping to expand electricity access to 60 per cent of the population of LLDCs (UN Statistics Division, 2022b). Hydropower played a particularly critical role, generating 40 per cent of the electricity in LLDCs, compared to a global average of 14 per cent (Figure 8). In 16 of the LLDCs, hydroelectricity accounted for more than half of their energy supplies in 2022.

***Figure 8. The LLDCs are world leaders in renewable energy***

*Renewable energy share in total final energy consumption, per cent, median region value*

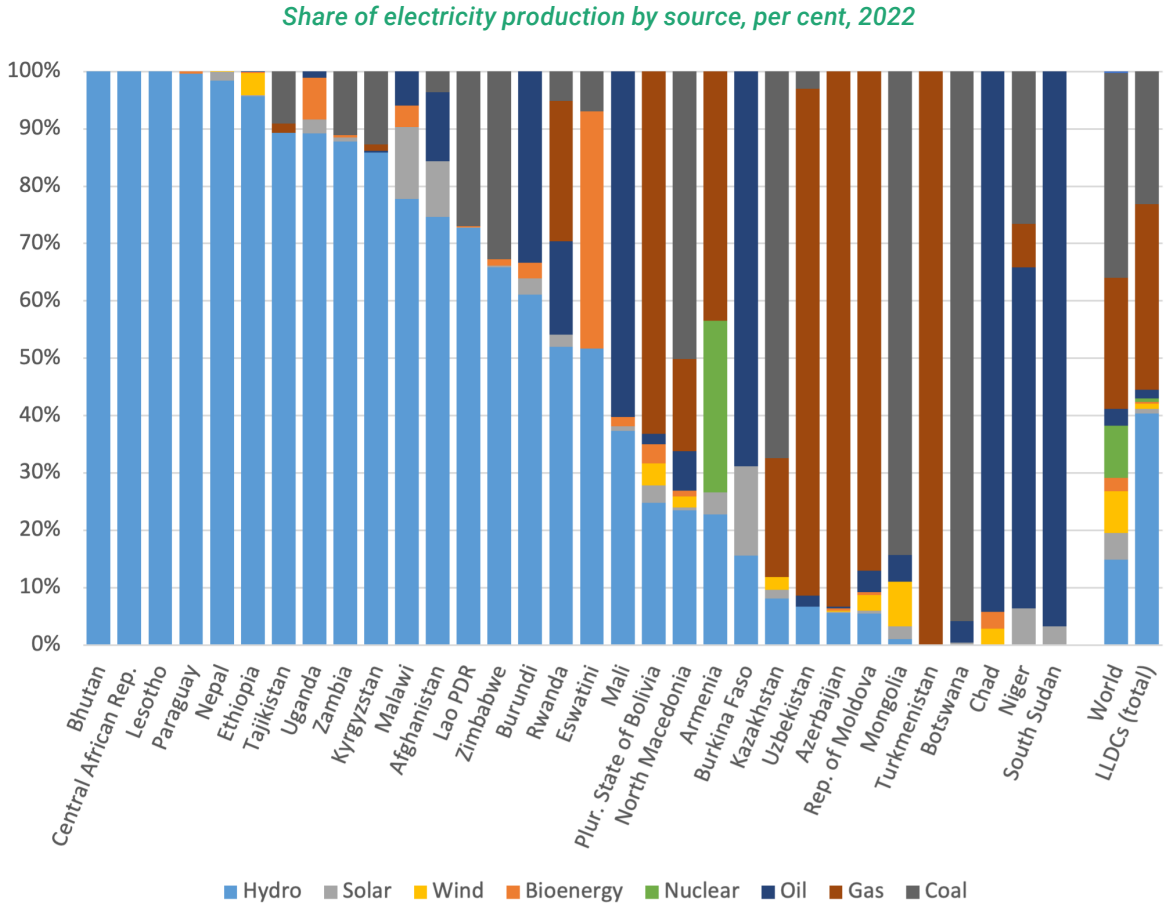



*Source: OHRLLS calculations based on UN Statistics Division 2022a*

However, climate change is increasingly disrupting hydropower generation. Shifts in hydrology, including more frequent and severe droughts and floods, are compromising both the reliability and the efficiency of hydropower infrastructure. Globally, 61 per cent to 74 per cent of hydropower projects are projected to experience reduced generation due to these climate impacts (van Vliet et al., 2016).

In LLDCs, key hydropower projects are already at risk. Projects in countries such as Nepal, Ethiopia, Tajikistan, Kazakhstan, Uzbekistan, Kyrgyzstan, Laos, Uganda, Zambia, and Rwanda face significant challenges from water scarcity and flooding (Opperman et al., 2022). For example, heavy rains in March 2010 forced the opening of floodgates at the Kariba Dam, displacing 6,000 people (Serpell, 2020). Conversely, record low water levels at the same dam in early 2023 led to blackouts in both Zambia and Zimbabwe, illustrating the dual risks of climate-induced extremes on critical energy infrastructure (Mwenda, 2023). Regional power pools and energy integration will form an important part of the solution to these challenges by diversifying energy sources and markets but must be matched by investments in infrastructure resilience.

***Figure 9. Many of the LLDCs are reliant upon hydroelectricity, which is greatly impacted by droughts and flooding***




*Source: OHRLLS calculations based on Ember (2024)*

# 4. Capacities for climate action

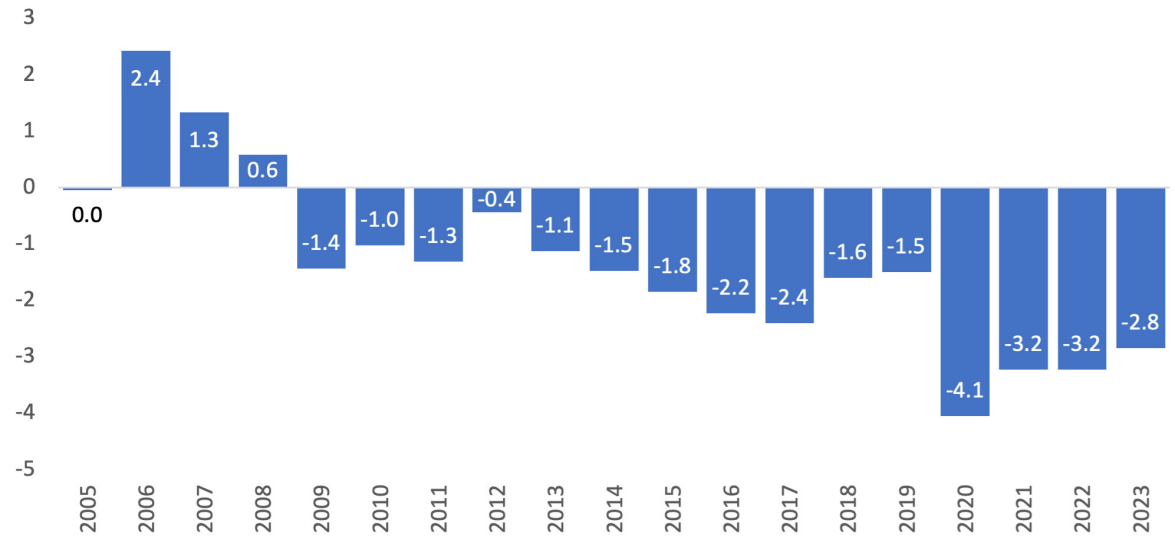
Capacities for climate action include the ability to design and implement effective strategies that respond to evolving hazards and stresses, minimizing risks and harmful outcomes resulting from climate-related hazards. This capacity is stronger where economic structures are resilient, governments effective, and resources readily available. In LLDCs, these capacities are severely constrained by limited fiscal resources, commodity dependency, high carbon transition costs and insufficient dedicated climate finance commensurate with identified needs for adaptation and building resilience.

## Strained fiscal capacities

LLDCs face challenging fiscal pressures. The median primary balance of LLDCs–the difference between the amount of revenue collected by governments and their spendings, excluding interest payments on debt–deteriorated markedly during the COVID-19 pandemic due to increased spending on social protection and healthcare. Other crises including subsequent climate-related disasters, supply chain disruptions, continuing geopolitical tensions and wars, and global inflationary challenges have left primary balance deficits elevated (Figure 10).

***Figure 10. Government primary balance deficits in the LLDCs widened during the COVID-19 pandemic and have remained elevated***

*Ratio of the primary balance to GDP, 2005-2023, per cent of GDP*




*Source: OHRLLS calculations based on data from Kose et al., 2024*

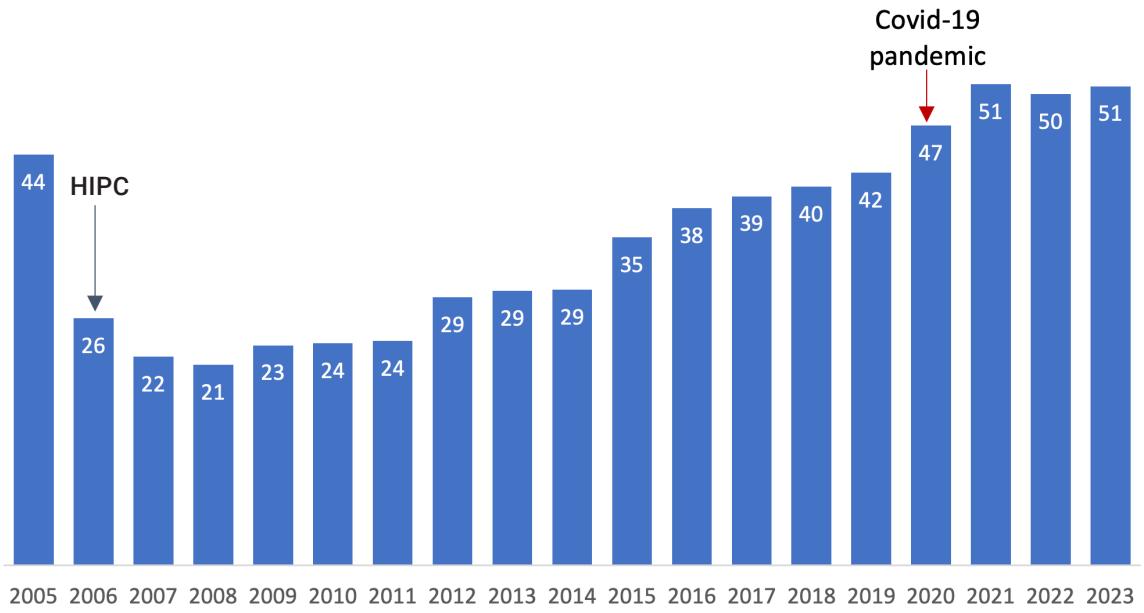
*Note: Median of 29 LLDCs for which data were available for all the years during 2005-2023.*

As a result of recent fiscal pressures, the median general government debt-to-GDP ratio among LLDCs jumped up, from 42 per cent in 2019 to 51 per cent in 2023.[5] This is significantly higher than the levels observed since the eve of the Heavily Indebted Poor Countries and Multilateral Debt Relief Initiatives (HIPC) and Multilateral Debt Relief Initiatives (MDRI), when many LLDCs benefited from substantial debt relief and the median debt-to-GDP ratio for LLDCs fell to 21 per cent (Figure 11).

[5] The increase in average levels was about 8%

*Figure 11. Government debt levels have reached new heights for the LLDCs*

*Ratio of general government debt to GDP, median value across the LLDC group, 2005-2023, per cent of GDP*




*Source: OHRLLS calculations based on data from Kose et al., 2024*

*Note: Median of 29 LLDCs for which data were available for all the years during 2005-2023.*

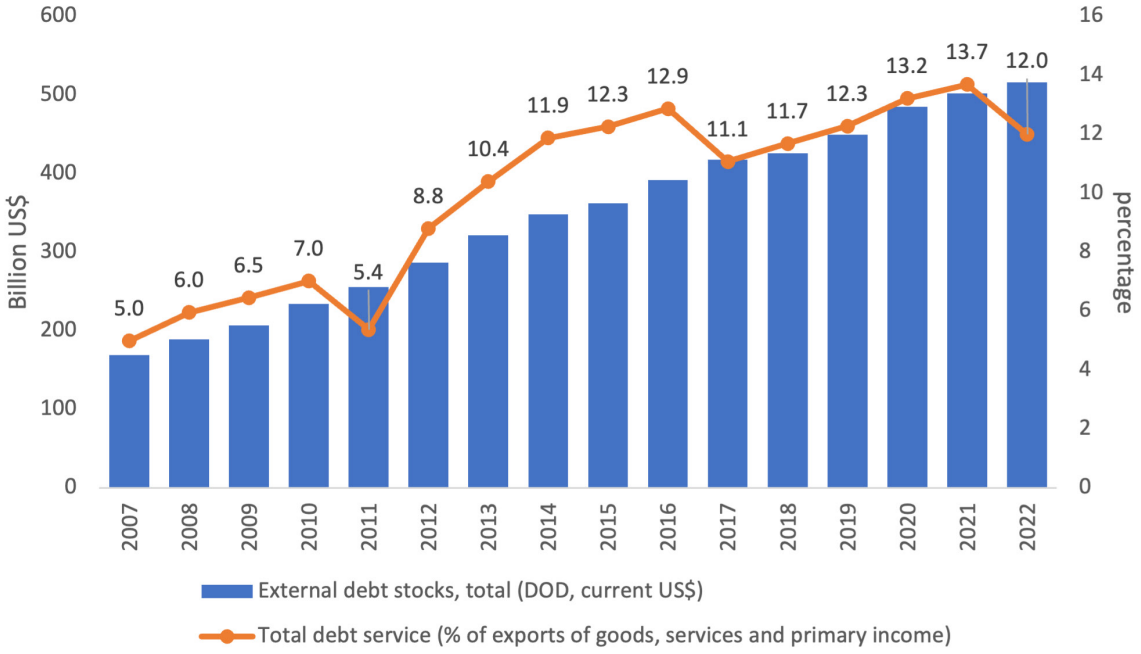
With insufficient access to concessional finance, the composition of the LLDCs' debt has also leaned towards expensive financial instruments including short-term, private, and commercial debt. The combined effect of rising external debt and heightened risk profiles has driven up servicing costs, with the median debt service ratio for LLDCs surging from 5.4 per cent of export earnings in 2011 to 12 per cent 2022 (Figure 12).

These fiscal pressures are pushing an increasing number of LLDCs into debt crises. In 2024, seven LLDCs were identified as being at high risk of debt stress, while four others were classified as already in debt distress, according to the IMF Debt Sustainability Analysis for Low-Income Countries (IMF, 2024). Such constrained fiscal space severely limits LLDCs' capacity to meaningfully respond to and address the challenges of climate change.

Compounding these difficulties, almost a third of the LLDCs (10) were classified as being in either fragile or conflict affected situations in 2024, according to the World Bank (World Bank, 2024a), undermining their institutional capacities to prepare for, plan and respond to climate-related challenges. LLDCs are increasingly being left behind, growing at just 2.6 per cent annually over the previous decade, compared to 4 per cent for all other developing countries (OHRLLS, *forthcoming*), and facing worsening climate pressures.

***Figure 12. Elevated debt levels and servicing costs limit LLDCs' capacity to respond to climate challenges***

*External debt stocks (DOD, current $) and Total debt service*
*(% of exports of goods, services and primary income), median value across the LLDC group, 2007-2022*




*Source: OHRLLS calculations based on data from World Bank (2024b)*

*Note: Median of 27 LLDCs for which data were available for all the years during 2007-2022 were used for total debt service (% of exports of goods, services and primary income). DOD is disbursed and outstanding debt.*

LLDCs are also at a heightened risk of being unable to adequately respond to the fiscal costs of climate-related disasters. Financial buffers and insurance mechanisms could play a vital role in climate adaptation and disaster recovery by enabling faster restoration of livelihoods and infrastructure. For example, African Risk Capacity (ARC) or international initiatives and microinsurance programs such as the InsuResilience Global Partnership and the Global Shield Against Climate Risks help to pool risks and provide insurance instruments. However, these insurance tools are in need of expansion and could benefit from help from the international community.

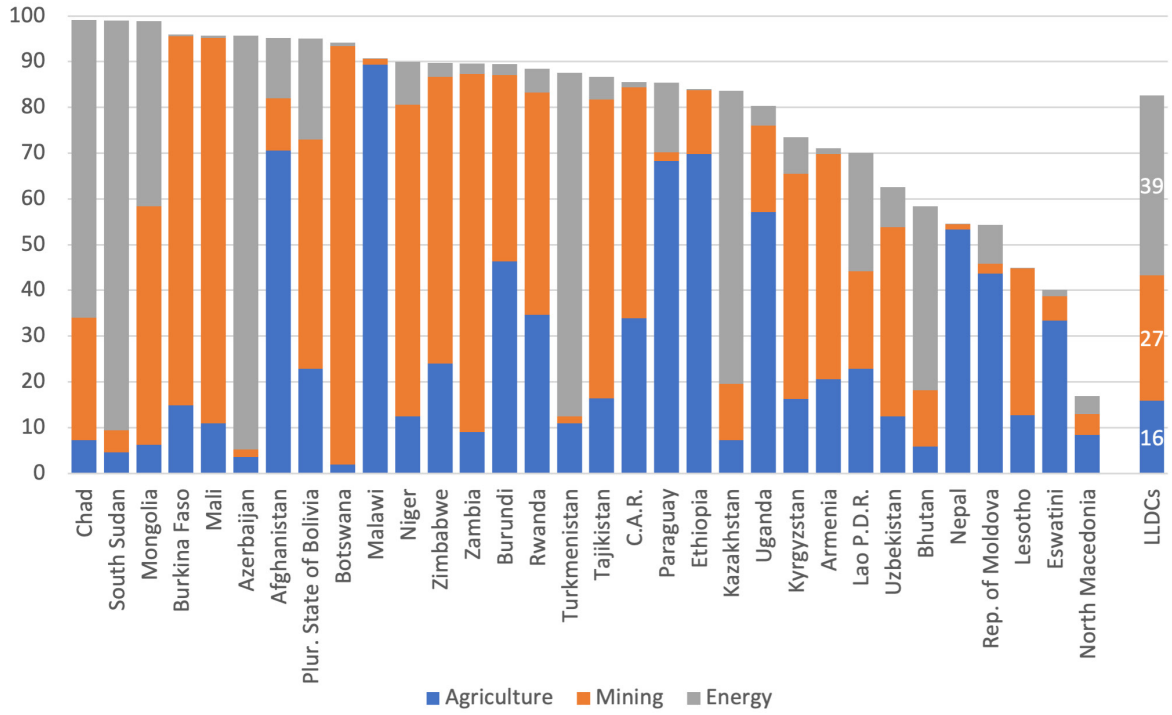
## Dependence on primary commodities

LLDCs are heavily reliant on primary commodities for exports and fiscal revenues, with 26 being classified as commodity-dependent (using the UNCTAD definition of more than 60 per cent of merchandise exports concentrated in primary commodities). Structural transformation remains an unfinished objective, and innovation and productivity growth have been limited. Among the LLDCs, eight primarily export mining products, five rely on agricultural products, four depend on energy exports, and the remainder trade a mix of primary commodities (Figure 13).

This overconcentration in primary commodities has left LLDC economies undiversified and highly vulnerable to both economic shocks and shifts in global demand. Fluctuating commodity prices have led to unstable government revenues and low revenue growth. This instability hampers adaptation and mitigation to climate change.

***Figure 13. The LLDCs remain highly dependent upon exports of primary commodities***

*Primary commodity exports by sector, per cent of total merchandise exports, 2021-2023*



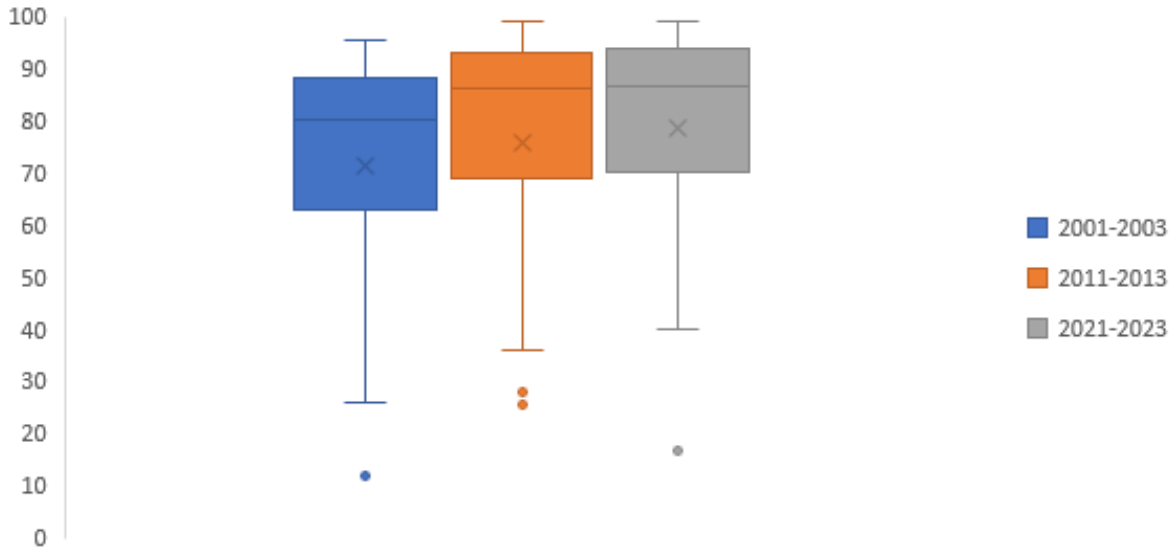

*Source: OHRLLS calculations based on UNCTAD (2024)*

*Notes: Agricultural primary commodities are the raw materials of SITC [0 + 1 + 2 (less 27 and 28) + 4]; Mining primary commodities are SITC [27 + 28 + 68 + 667 + 971]; Energy is SITC [3].*

The LLDCs' reliance on primary commodities has worsened in recent decades. From the early 2000s to the early 2020s, primary commodities have constituted a growing share of exports in an increasing number of LLDCs. This trend is illustrated by the rising and narrowing inter-quartile range boxes in Figure 14, indicating both heightened dependence and limited diversification across these economies. This persisting primary commodity reliance exacerbates LLDCs' vulnerability to global market fluctuations, undermining the availability of sustained resources for climate adaptation and mitigation.

***Figure 14. More LLDCs have become even more commodity dependent over time***

*Box plot showing share of primary commodity exports in total merchandise exports, country datapoints, three-year averages (2001-2003, 2011-2013 and 2021-2023)*



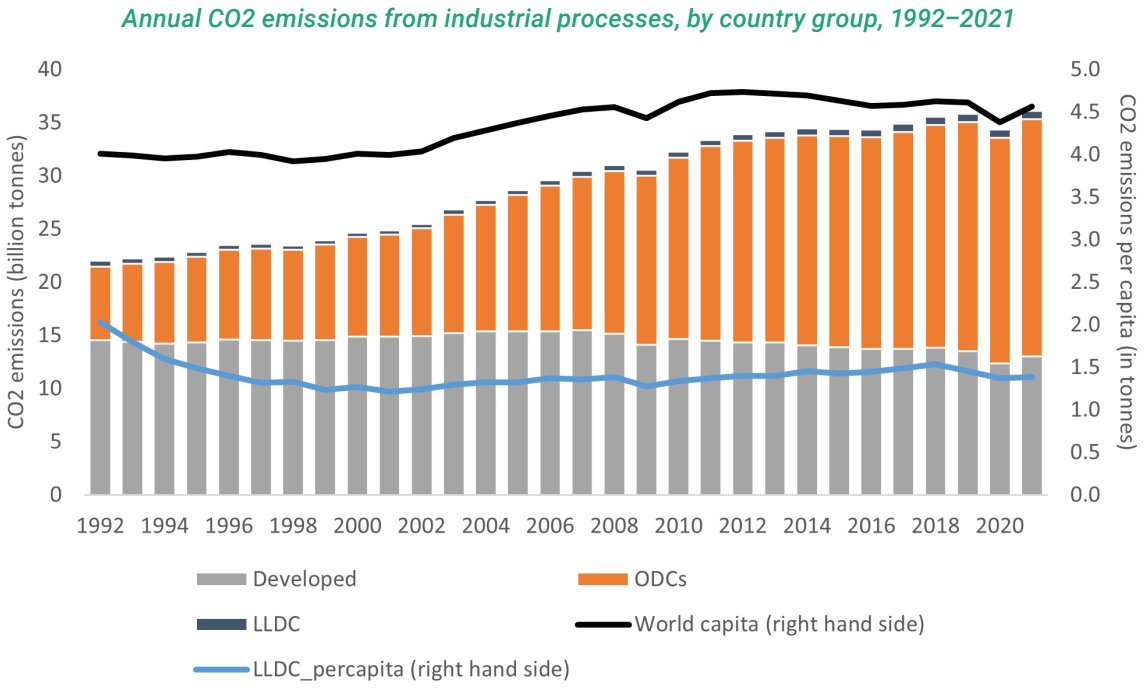

*Source: OHRLLS calculations based on UNCTAD (2024)*

*Notes:* The boxplots present summary information about a sample's center, spread and skewness, while also indicating observations that may be potential outliers. The "box" of the boxplot is defined by the first and third quartiles of the sample in each group. The dotted line indicates the threshold of the commodity export dependence category (60 per cent); horizontal lines in boxes indicate the median of the data set, crosses indicate averages and dots indicate outliers. Owing to insufficient data, South Sudan is not featured in the figure.

## Economic development and carbon dependence

LLDCs account for less than 2 per cent of global CO2 emissions and have per capita emissions that are less than one-third of the global average (Figure 15). This reflects the relatively low GDP levels across LLDCs, which diminish their overall contribution to global emissions.

***Figure 15. LLDCs are accountable for both a negligible share of world CO2 emissions and low CO2 emissions per capita***




*Source: OHRLLS calculations based on Global Carbon Project (2023)*

*Notes: ODC is other developing countries*

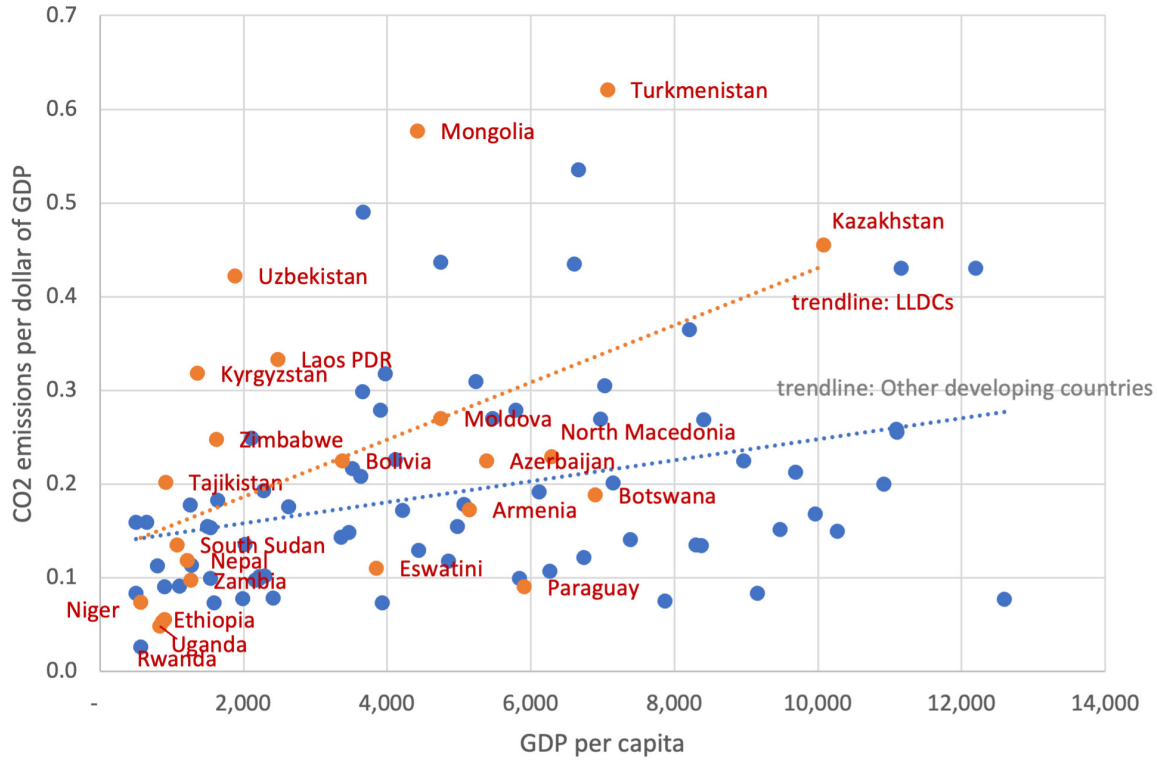
Among LLDCs with higher GDP per capita, there is a relatively greater dependency on carbon emissions per dollar of GDP compared to other developing countries at similar levels of GDP per capita (Figure 16). This will make their transition to greener of economic growth more painful.

This dependency is particularly pronounced in countries like Turkmenistan, Mongolia, Kazakhstan, Uzbekistan, Lao P.D.R, Kyrgyzstan, the Republic of Moldova, where carbon emissions per dollar of GDP exceeded the global average in 2020 (IEA, 2022). This is often attributable to older energy infrastructure or reliance on locally available fossil fuel resources. These factors make the transition to lower-carbon growth more challenging for LLDCs, heightening their vulnerability to climate-mitigation efforts.

To meet the Paris Agreement target of limiting global temperature rise to 1.5 degrees Celsius, the world must transition to a low-carbon economy by shifting consumption and business patterns and phasing out carbon-intensive sectors, particularly fossil fuels. For many LLDCs, achieving such a transition will be impossible without commensurate levels of international support, particularly in renewable technologies and concessional finance, to safeguard their development while reducing emissions.

***Figure 16. LLDCs rely more on carbon emissions to produce each dollar of GDP and will need support for a lower-carbon transition that safeguards their development***

*CO2 emissions per dollar of GDP (PPP), from fuel combustion produced (average 2018-2022), against GDP per capita (average 2018-2022), for all developing countries*




*Source: OHRLLS calculations based on IEA (2022) and World Bank (2023)*

*Notes: Data was unavailable for Afghanistan, Bhutan, Burkina Faso, Burundi, Central African Republic, Chad, Lesotho, Malawi and Mali. CO2 emissions per dollar of GDP (PPP), from fuel combustion produced (average 2018-2022). GDP per capita (average 2018-2022).*

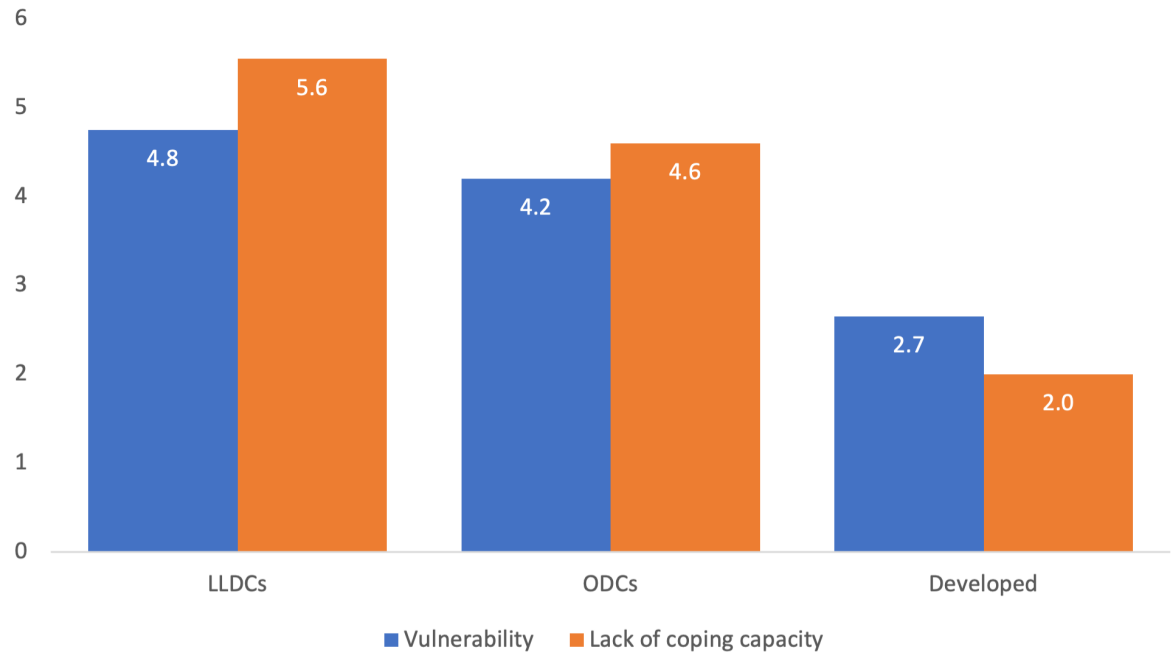
## Vulnerability and coping capacity

LLDCs are among the most vulnerable to the impacts of climate change, with many having limited coping capacities to address these challenges. This is shown in the results of the INFORM Risk Index, developed by the Joint Research Centre (JRC) of the European Commission. This global disaster risk assessment tool evaluates hazards, exposure, vulnerability and a lack of coping capacity, and illustrates the concerning situation for LLDCs (Figure 17).

Compared to other developing countries, LLDCs score worse on key vulnerability indicators, including socioeconomic factors and the presence of vulnerable groups. These gaps widen significantly when LLDCs are compared to developed countries.

LLDCs also underperform on coping capacity, which reflects critical institutional and infrastructure weaknesses that hinder effective disaster response and climate adaptation efforts. This underscores the urgent need for strengthened resilience measures, including investments in infrastructure, institutional frameworks, and social safety nets, to enable LLDCs to better cope with and recover from climate-related shocks.

***Figure 17. LLDCs are among the most vulnerable countries with the lowest capacity to cope with the impacts of climate change***




*Source: OHRLLS calculations, based on data from INFORM (2024).*

*Note: ODC is other developing countries. INFORM Risk Index, developed by the Joint Research Centre (JRC) of the European Commission is a global indicator-based disaster risk assessment tool that combines hazards, exposure, vulnerability and lack of coping capacity indicators. A total of 75 indicators are used for INFORM Risk Index, and annual updates have been provided since 2015. The components are normalized to score of 1 to 10 and aggregated using either an arithmetic or geometric mean depending on the metric. Higher scores indicate higher vulnerability and lower levels of coping capacity. The vulnerability dimension encompasses socioeconomic vulnerability and vulnerable groups. The lack of coping capacity dimension is composed of institutional and infrastructure components.*

## Inadequacy of climate finance support

Since the adoption of the UNFCCC in 1992, climate finance has remained a contentious issue in climate action discourse between developing and developed countries. Article 9 of the Paris Agreement places a clear mandate on developed countries to lead in providing financial resources to support developing countries, including LLDCs, which are among the most resource-constrained and climate-vulnerable countries. Despite this commitment, climate finance flows remain inadequate, particularly in addressing adaptation needs—one of the most critical priorities for LLDCs.

The United Nations Environment Programme (UNEP) forecasts that annual adaptation needs will reach $160–340 billion by 2030 and $315-565 billion by 2050, requiring a 5–10-fold increase in adaptation finance flows. Oxfam highlights that these gaps may be even greater due to overestimation in reported adaptation finance (Carty and Kowalzig, 2022). The Independent High Level Expert Group on Climate Finance estimated that developing countries' (excluding China) will require around $1 trillion annually in external climate finance from all sources—international public, private and others—by 2030; and around $1.3 trillion annually by 2035 (Bhattacharya et al., 2024).

LLDCs face severe resource and capacity constraints in tackling the impacts of climate change yet their share of global climate finance flows doesn't reflect their disproportionate vulnerabilities. Between 2016 and 2021, developing countries received on average $77 billion in climate finance annually, with only a small fraction—about 11 per cent—reaching LLDCs. As shown in Figure 18, the climate finance flowing to LLDCs (stacked columns) has declined from $11.8 billion in 2019 to $8.5 billion in 2021, even as total climate finance to all developing countries (diamond markers) continued increasing.

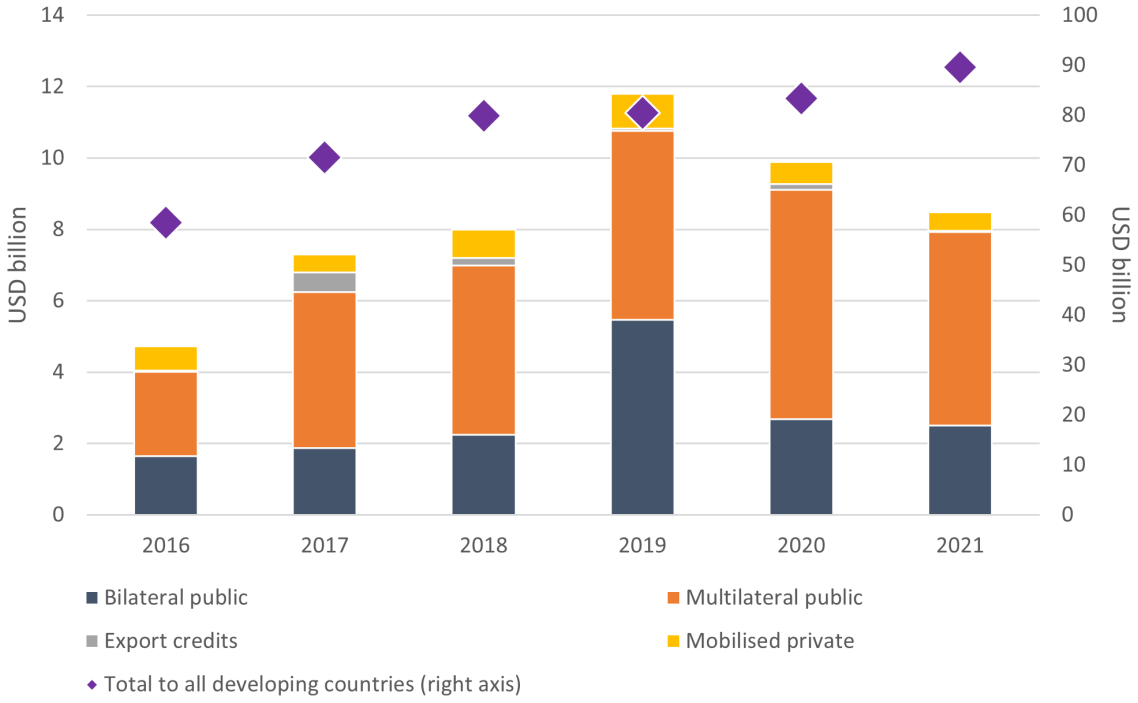
The composition of climate finance flows to LLDCs is also lopsided towards mitigation, such as reducing greenhouse gases, even though they contribute to just 2 per cent of global emissions, rather than to adaptation activities. From 2016 to 2021, 40 per cent of climate finance to LLDCs was allocated to adaptation, while 53 per cent went to mitigation. This skewed distribution misaligns financing with the urgent adaptation needs of LLDCs, which face escalating climate impacts such as extreme weather events, water scarcity, and desertification.

The composition of climate finance for LLDCs also reveals significant challenges. As much as 60 per cent of the public climate finance (bilateral and multilateral) to LLDCs is in the form of loans—double the share provided to low-income countries. This reliance on loans aggravates debt sustainability challenges and the ability of LLDCs to finance urgent climate adaptation needs without exacerbating fiscal vulnerabilities.

Other flows of climate finance to LLDCs remain small. Climate-related export credits, while growing by 50 per cent between 2016 and 2021, remain negligible, comprising only 0.42 per cent of total finance in 2021. Mobilized private climate finance to LLDCs is also small, amounting to just $516 million in 2021—a figure that has yet to recover to pre-2020 levels.

*Figure 18. Climate finance is inadequate in terms of quality and quantity, posing additional challenges to LLDCs*

*Climate finance flows to LLDCs by channel (left axis) and total climate finance to all developing countries (right axis), 2016–2021*




*Source: OHRLLS calculations based on OECD (2023)*

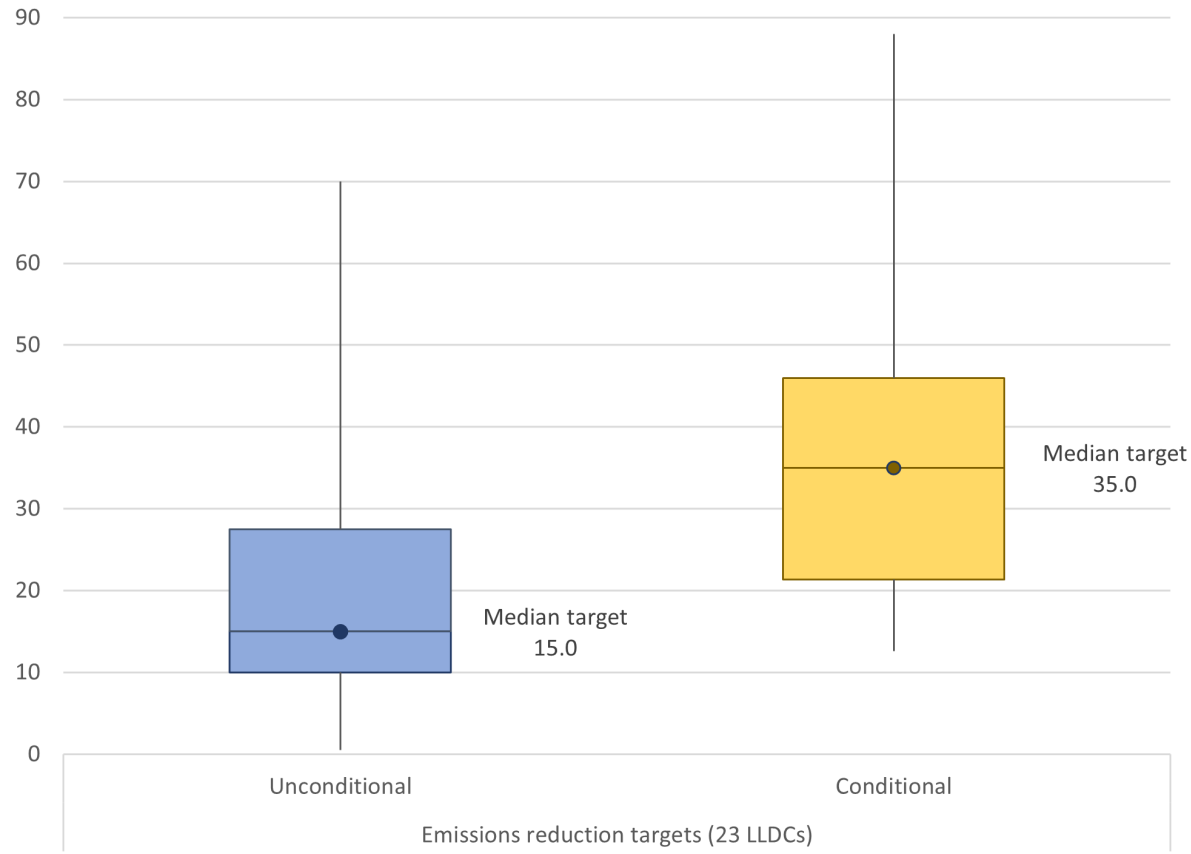
## Ambitious mitigation efforts requiring international support

LLDCs have outlined their nationally determined contributions (NDCs) under the Paris Agreement to reduce national emissions and adapt to the impacts of climate change. The success of these mitigation efforts is largely contingent on international support, particularly in the areas of financing, capacity building and technological assistance. A notable disparity exists between unconditional and conditional reduction targets: the median target increases significantly from 15 per cent (unconditional) to 35 per cent (conditional), depending on the availability of external assistance (Figure 19).

Some LLDCs have set exceptionally ambitious targets. For example, the Republic of Moldova aims for a conditional reduction in emissions of up to 88 per cent, contingent on international support. However, targets must align with the broader priorities of sustainable development and poverty eradication, which remains central to LLDCs' development agendas.

***Figure 19. Emissions reduction targets range across the LLDCs but are highly conditional on international financial and technological support***

***Emissions reduction targets by 2030 by LLDCs, as a percentage relative to business as usual (22 LLDCs) or absolute base year targets (8 LLDCs), as specified in nationally determined contributions***

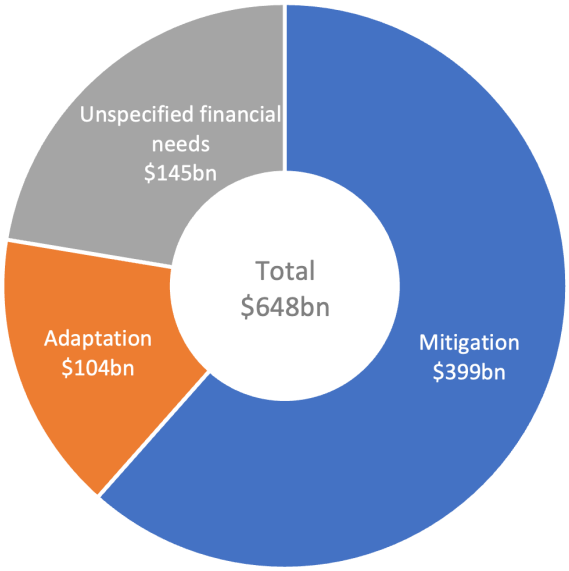



*Source: OHRLLS calculations based on Institute for Global Environmental Strategies (IGES) (2022)*
*Notes: Emissions reduction targets for most (22) LLDCs are determined relative to business-as-usual (BAU) scenarios of the likely emissions trajectory if a country were to take no action to reduce emissions. More ambitious absolute emissions reductions are determined relative to base years ranging from 1990 (Armenia, Azerbaijan Kazakhstan, North Macedonia, Moldova, and Tajikistan) to 2010 (Botswana and Uzbekistan), and 2018 (Chad). Other LLDCs (not shown here) have specified policy based or carbon intensity-based emissions reduction targets.*

With limited domestic resources and a disproportionate burden of climate change impacts, LLDCs require substantial financial assistance to achieve their commitments. Among the 22 LLDCs that have disclosed the investment costs necessary to fulfill their NDCs between 2020 and 2030, the total need amounts to approximately $648 billion (Figure 20). Without scaled-up international support, achieving these ambitious climate goals will remain an enormous challenge for LLDCs.

***Figure 20. The financial needs of 22 LLDCs to meet their commitments as expressed in their Nationally Determined Contributions***

***Disclosed investment costs needed to reach commitments over the implementation period 2020 to 2030, for the 22 LLDCs that have reported their needs.***




*Source: OHRLLS calculations based on IGES (2022)*

*Notes: The implementation period is between 2020 (or 2021) until 2030 for most LLDCs, except Malawi for which it is until 2040. Countries that have not expressed financial needs in the database may require international support but have not assessed its exact amount.*

# 5. Recommendations for reinvigorated partnerships

The frequency, severity and intensity of climate-related challenges facing LLDCs clearly demonstrate the special vulnerability of these countries to climate change. Many LLDCs rank among the countries globally with the highest levels of vulnerability and lowest coping capacities to tackle the effects of climate change. This dual challenge of high exposure and low adaptive capacity positions LLDCs at the forefront of the global climate emergency.

LLDCs also face economic challenges that compound these vulnerabilities. LLDCs as a group experienced a sharp slowdown in economic growth in 2020 and 2021, and by 2023 their combined GDP was 8 per cent lower than the level it would have reached if the pre-pandemic (2010–2019) growth trend had been sustained (UN, 2024). Additionally, the international financial architecture remains ill-equipped to address systemic shocks or mobilize resources at the scale required for LLDCs.

In December 2024, the General Assembly of the United Nations adopted a new Programme of Action (PoA) for the LLDCs for the decade 2024 to 2034. This marks the first time that a PoA for the LLDCs includes a comprehensive mandate to address critical climate-related needs in the areas of adaptation, disaster risk reduction, climate finance, resilient infrastructure development, loss and damage, and biodiversity loss. That expanded scope reflects an enhanced recognition of the unique climate challenges confronting LLDCs and a paradigm shift from its predecessors—the Vienna Programme of Action (2014–2024) and the Almaty Programme of Action (2004–2014)—which lacked a focus on these critical climate issues.

Major discussions and negotiations are unfolding simultaneously on climate action in various global forums such including the United Nations (e.g., the General Assembly, Conference of Parties and Intergovernmental Panel on Climate Change), Group of seven (G7), the G20, regional platforms, and the governing bodies of international financial institutions. These processes directly affect LLDCs, yet they have minimal influence over the decision-making processes that shape global climate action.

Effective implementation of the climate provisions in the new PoA hinge on reinvigorated, systematic and sustained partnerships. The following six key priorities draw from the PoA to form the foundation for a coordinated global response to the climate challenges of LLDCs for the decade ahead:

## A. Establishing the Group of LLDCs within the UNFCCC

***What*** – Establishing the Group of LLDCs as a distinct negotiating group of vulnerable nations under the UNFCCC would create an appropriate institutional framework to effectively articulate and address the specific climate challenges they face. By formally recognizing their unique and severe vulnerabilities as an established group, the LLDCs' agenda can be elevated within global climate discussions, ensuring parity with other vulnerable groups.

***Why*** – As a recognized group, LLDCs would be better positioned to highlight their unique climate-related challenges and advocate for targeted support. This support could include improved access to types of climate finance, assistance with technology transfer, and technical support for specific adaptation and mitigation measures. It would also ensure that their pre-existing economic and social vulnerabilities are better accounted for in the design of global frameworks

of response to climate change. As a recognized group, LLDCs could have improved recourse to specific support and interventions.

***How*** – A precedent for such recognition already exists. Article 4.8(i) of the United Nations Framework Convention on Climate Change (UNFCCC), established in 1992, explicitly calls for actions to meet the specific needs of LLDCs arising from the adverse effects of climate change and the impact of response measures on landlocked and transit countries. Similarly, the Paris Agreement acknowledges the specific "needs and special circumstances of developing countries, especially those that are particularly vulnerable to the adverse effects of climate change," as provided for in the UNFCCC. The Agreement also recognizes the importance of support for and international cooperation on adaptation efforts and the importance of taking into account the needs of developing countries, especially those that are particularly vulnerable to the adverse effects of climate change. These frameworks provide a solid foundation for advancing the case for LLDCs' recognition and corresponding support and assistance within frameworks for addressing climate change, with a particular focus on promoting, facilitating and financing adaptation actions. Once formally recognized under UNFCCC, the Group of LLDCs would have the opportunity to consider options for modalities of operation and secretarial support ensure the effectiveness of the Group.

## B. Support climate adaptation in LLDCs

***What*** – Ensure that all LLDCs have in place national adaptation plans, policies and planning processes by 2025 and to have progressed in implementing them by 2030.

***Why*** – LLDCs face severe climate adaptation challenges in the areas of heat stress, land degradation, glacial melting, and water scarcity, and associated socio-economic implications, including food security and livelihood precarity.

***How*** – Strengthen support for the preparation and implementation of adaptation projects and programmes in landlocked developing countries, in line with the global goal on adaptation and the United Arab Emirates Framework for Global Climate Resilience. Support and implement strategies to reduce climate-induced water scarcity, enhance climate resilient food and agriculture production, reduce climate impacts on livelihoods, and develop domestic value chains for sustainably utilizing critical minerals. The international community also needs to support LLDCs to build their capacity to launch inclusive social protection facilities, weather insurance at household, local and global levels, catastrophe debt drawdowns, debt swaps and other financial securities, disaster reserves and budgets.

## C. Address climate-related disaster risks in LLDCs

***What*** – LLDCs require multi-hazard disaster early warning systems, basic disaster response infrastructure, and effective communication delivery systems to share disaster information with rural communities. The Secretary-General's call for universal coverage by early warning systems against increasingly extreme weather and climate change is particularly relevant to LLDCs.

***Why*** – LLDCs bear a disproportionate burden of climate-related disasters. These events devastate lives and livelihoods, disrupt infrastructure—including transit and energy generation—affect communication routes such as international waterways, and impose significant costs on the transit of goods, people and services through neighbouring countries. This combination of impacts undermines LLDCs' ability to engage in global markets and exacerbates their preexisting economic vulnerabilities.

***How*** – Support the development and strengthening of national and regional platforms and strategies for disaster risk reduction, in line with the targets of the Sendai Framework for Disaster Risk Reduction. Supporting LLDCs to effectively

implement such strategies is crucial for building resilience against future disasters, including through the operationalization of the Loss and Damage Fund with adequate, predictable, and concessional financial arrangements.

## D. Recognize LLDCs in climate finance arrangements

***What*** – Providing targeted, sufficiently flexible, and long-term development finance to LLDCs through increasing the proportion of flexible and concessional forms of climate finance to redress the current imbalance between the demands and availability of mitigation and adaptation finance available under the UNFCCC. At COP29, Parties agreed on a "New Collective Quantified Goal for climate finance" to support developing countries: The new goal calls on developed countries to take the lead to mobilize at least $300 billion annually for developing countries, within the context of a wider goal involving all actors to scale up financing to developing countries to at least $1.3 trillion per year by 2035. While these targets represent a significant increase compared to past commitments, they fall short of the financial needs of developing countries, including LLDCs, and mechanisms for scaling and disbursing funds—especially from private sources—remain unclear. Despite these gaps, the NCQG provides a critical foundation for progress; the agreed goal can form a foundation for scaling up ambition in the coming years.

***Why*** – LLDCs are facing shrinking fiscal space with almost a third of them being in protracted debt crises, which substantially worsens their vulnerabilities and threatens their future resilience and development prospects. Despite their marginal contribution to the climate crisis, they are confronted by large and rising climate costs. Their climate finance needs are growing as the world is lagging far behind in meeting climate finance targets. Prioritizing equitable access to the NCQG and aligning this goal with LLDCs' unique vulnerabilities can accelerate their just transitions and resilience-building efforts.

***How*** – Ensure deeper levels of accountability and transparency in climate finance frameworks and suitable modalities for climate financing needs, particularly adaptation and loss and damage. Given the vulnerabilities of many LLDCs to the impacts of climate change, setting a climate finance target specific to these countries could help reduce the immense funding gap that they face for climate-related investments, in particular for adaptation. Climate finance flow commitments should be distinct from official development assistance (ODA) commitments and funding from multilateral development banks (MDBs). Innovative financing methods can also be considered, including through carbon markets for carbon offsets. Addressing the systemic and interconnected challenges of fiscal space, debt, and climate change in LLDCs will require measures to alleviate the debt distress situation facing many LLDCs. To support the adoption of improved technologies, LLDCs also need capacity building support towards identifying and preparing bankable projects to secure financial resources for climate change adaptation and mitigation needs, and national capacities to monitor the progress that they are making on climate action.

## E. Invest in climate-resilient infrastructure

***What*** – Climate-resilient infrastructure is needed which is planned, designed, built and operated in a way that anticipates, prepares for, and adapts to changing climate conditions. It should be designed to withstand, respond to, and recover rapidly from disruptions caused by these climate conditions and disasters.

***Why*** – LLDCs' access to world markets is critically dependent upon vital transit corridors that are relatively convoluted, complex, and reliant upon effective partnerships with transit countries. When these transit routes and connective infrastructures are undermined, food security, trade and livelihoods are severely constrained. LLDCs are also heavily reliant on hydropower infrastructure for energy generation, which is especially susceptible to climate change.

***How*** – LLDCs require support in building climate-resilient and sustainable infrastructure to reduce the direct losses of disruptions caused by climate change. A dedicated infrastructure funding facility for climate-resilient infrastructure for LLDCs, as outlined in the PoA, would help these countries alongside capacity development support for designing bankable climate-resilient projects. Coordinated regional efforts aimed at strengthening the development of transport corridors that promote decarbonization are also needed.

## F. Support a just and equitable transition

***What*** – A critical aspect of global climate commitments is the achievement of an energy transition that equitably limits future emissions on the basis of common but differentiated responsibilities. LLDCs need a just and equitable energy transition that accounts for their specific transition-related challenges. Many LLDCs have opportunities through their endowment with reserves of metals and minerals, including the critical minerals needed for the clean energy transitions, such as lithium, nickel, cobalt, copper and rare earth elements

***Why*** – Many LLDCs face a difficult transition to lower-carbon economic growth. Fiscal capacities are strained, socio-economic burdens are high, and economies are undiversified and overly dependent on primary commodities, including agricultural products and fuels. Achieving climate-aligned development in LLDCs will thus require structural transformations that shift their production structures towards activities and sectors that contribute to energy and resource security, low-carbon agriculture, climate resilience, food security.

***How*** – LLDCs have committed to ambitious nationally determined contributions, but their implementation is critically contingent on sufficient financial support and technical assistance. LLDCs urgently require access to adequate, predictable, and concessional resources, in addition to better technologies to accelerate their green energy transitions. The scaling-up of technology transfer to LLDCs is needed to assist their adoption of clean and efficient modern technologies as part of their green transition. For resource-rich LLDCs, effective management of extractive industries is a key priority. To maximize revenue from their extractive industries and ensure sustainable resource use, LLDCs should carefully negotiate contracts with mining businesses, strengthen governance and review existing tax and other fiscal incentives. Such measures will not only enhance domestic resource mobilization but also create a stronger financial base to support just transitions and broader development goals.

# References


Bhattacharya A, Songwe V, Soubeyran E and Stern N. 2024. Raising Ambition and Accelerating Delivery of Climate Finance. London: Grantham Research Institute on Climate Change and the Environment, London School of Economics and Political Science.

Bloomberg. 2019. UN Says Damage from Southern African Cyclone May Top $1 Billion. https://www.bloomberg.com/news/articles/2019-03-25/damage-from-southern-african-cyclone-may-top-1-billion-un-says.

Carty T and Kowalzig J. 2022. Climate Finance Short-changed: The real value of the $100 billion commitment in 2019–2020. Briefing Note. Oxford: Oxfam. https://policy-practice.oxfam.org/resources/climate-finance-short-changed-the-real-value-of-the100-billion-commitment-in-2-621426/.

Ember. 2024. Statistical Review of World Energy, Energy Institute (as reported in OurWorldinData.org/energy).

EM-DAT (Emergency Events Database). 2024. Statistical Database, CRED / UCLouvain, 2024, Brussels, Belgium. www.emdat.be.

FAO (Food and Agriculture Organization of the United Nations). 2024a. FAOSTAT Statistical Database, Food and Agriculture Organization of the United Nations.

_____ 2024b. FAO AQUASTAT Core Database, Food and Agriculture Organization of the United Nations.

Global Carbon Project. 2023. Annual $CO_2$ emissions – GCB dataset. Global Carbon Project, Global Carbon Budget

Global SDG Database. 2024. SDG indicator 15.3. Proportion of Land That is Degraded Over Total Land Area in Landlocked Developing Countries (LLDCs) (2019). https://unstats.un.org/UNSDWebsite/undatacommons/sdgs/countries?p=undata-geo%2FG00403000&v=dc%2Ftopic%2Fsdg_15.3.1.

Greenham, S. Workman, R., McPherson, K., Ferati, E., Fisher, R., Mills, S., Street, R., Dora, J., Quinn, A., and Roberts, C. 2023. 'Are transport networks in low-income countries prepared for climate change? Barriers to preparing for climate change in Africa and South Asia', Mitigation and Adaptation Strategies for Global Change.

Hermans, K., Müller, D., O'Byrne, D., Olsson, L., and Stringer, L. 2023. Land degradation and migration. Nat Sustain (2023). https://doi.org/10.1038/s41893-023-01231-4.

IEA. 2023. Greenhouse gas emissions from energy, as referenced in https://unstats.un.org/sdgs/files/report/2023/E_2023_64_Statistical_Annex_I_and_II.pdf.

IGES (Institute for global Environmental Strategies). 2022. IGES NDC Database October 2022 version.

ILO (International Labour Organisation). 2019. Working on a warmer planet. ILO Publications, Geneva.

_____ 2024a. ILOSTAT, Statistical Database.

_____ 2024b. ILO Modelled Estimates, Statistical database.

IMF (International Monetary Fund). 2024. Debt Sustainability Analysis of Low-Income Countries, September 2024.

INFORM. 2024. INFORM Climate Change Risk Index.

IOM. 2019. Climate Change and Migration and Migration in Vulnerable Countries. IOM Publications, Geneva. https://publications.iom.int/books/climate-change-and-migration-vulnerable-countries.

Kose, M. Ayhan, Sergio Kurlat, Franziska Ohnsorge, and Naotaka Sugawara. 2024. "A Cross-Country Database of Fiscal Space." Journal of International Money and Finance 128 (November): 102682.

Mwenda, M. 2023. Power crisis looms in Zambia as world's largest man-made dam dries up, Life, 25 January 2023, https://www.lifegate.com/kariba-dam-power-crisis.

OCHA. 2023. Southern Africa Snapshot of Tropical Cycle Freddy's Impact. https://www.unocha.org/publications/report/malawi/southern-africa-snapshot-tropical-cyclone-freddys-impact-february-march-2023.

OECD (Organization for Economic Cooperation and Development). 2023. Climate Finance Provided and Mobilised by Developed Countries in 2013-2021, https://www.oecd.org/en/publications/2023/11/climate-finance-provided-and-mobilised-by-developed-countries-in-2013-2021_517fec8e.html

OHRLLS. 2015. The Impact of Climate Change, Desertification and Land Degradation on the Development Prospects of Landlocked Developing Countries. UN-OHRLLS, n.p. https://www.un.org/ohrlls/sites/www.un.org.ohrlls/files/lldcs_publications/impact_climate_change_lowres.pdf.

_____ Forthcoming. An assessment of the cost of being landlocked and progress on the priority areas of the Vienna Programme of Action. UN-OHRLLS, n.p.

Opperman, Jeffrey J., Rafael R. Camargo, Ariane Laporte-Bisquit, Christiane Zarfl, and Alexis J. Morgan. 2022. "Using the WWF Water Risk Filter to Screen Existing and Projected Hydropower Projects for Climate and Biodiversity Risks" Water 14, no. 5: 721. https://doi.org/10.3390/w14050721.

Serpell, N. 2020. Learning from the Kariba Dam, The New York Times Magazine, 22 July 2020, https://www.nytimes.com/interactive/2020/07/22/magazine/zambia-kariba-dam.html.

Taylor, C. Robinson, T., Dunning, S., Carr, J., Westoby, M. 2023. 'Glacial lake outburst floods threaten millions globally', Nature Communications 14.

UN. 2014. Report of the Secretary General: Implementation of the Vienna Programme of Action for Landlocked Developing Countries for the decade 2014-2024, A/79/237

UN Statistics Division. 2022a. Renewable Energy Share in the Total Final Energy Consumption in Landlocked Developing Countries (LLDCs). https://unstats.un.org/UNSDWebsite/undatacommons/sdgs/countries?p=undata-geo%2FG00403000&v=dc%2Ftopic%2Fsdg_7.2.1.

_____ 2022b. Proportion of Population with Access to Electricity, by Urban/Rural in Landlocked Developing Countries (LLDCs). https://unstats.un.org/UNSDWebsite/undatacommons/sdgs/countries?p=undata-geo%2FG00403000&v=dc%2Ftopic%2Fsdg_7.1.1.

UNCCD. 2023a. Regional factsheet: Central Asia. https://www.unccd.int/sites/default/files/2023-11/Fact%20sheet%20Central%20Asia%20EN.pdf.

_____ 2023b. The Nexus Between Land Degradation Climate Change, and Migration in Central Asia.

UNCTAD (United Nations Conference on Trade and Development). 2024. UNCTADStat, Statistical database.

UNDRR (United Nations Office for Disaster Risk Reduction). 2022. Global Assessment Report on Disaster Risk Reduction.

UNEP (United Nations Environment Programme). 2023. Adaptation Gap Report 2023. https://www.unep.org/resources/adaptation-gap-report-2023.

UNEP-WCMC. 2007. A spatial analysis approach to the global delineation of dryland areas of relevance to the CBD Programme of Work on Dry and Subhumid Lands. https://resources.unep-wcmc.org/products/789fcac8959943ab9ed7a225e5316f08.

van Vliet, M.T.H.; Wiberg, D.; Leduc, S.; Riahi, K. 2016. Power-Generation System Vulnerability and Adaptation to Changes in Climate and Water Resources. National Climate Change. 6, 375–380.

World Bank. 2021a. Climate Risk Profile: Armenia. https://climateknowledgeportal.worldbank.org/sites/default/files/2021-06/15765-WB_Armenia%20Country%20Profile-WEB_0.pdf.

_____2021b. Country Risk Profile: Azerbaijan. https://www.adb.org/sites/default/files/publication/707466/climate-risk-country-profile-azerbaijan.pdf.

_____ 2023. World Development Indicators.

_____ 2024a. Classification of Fragile and Conflict-Affected Situations. https://www.worldbank.org/en/topic/fragilityconflictviolence/brief/harmonized-list-of-fragile-situations.

_____ 2024b. International debt statistics. https://databank.worldbank.org/data/source/international-debt-statistics.

World Resources Institute. 2015. Aqueduct projected Water Stress Country Rankings. https://www.wri.org/data/aqueduct-projected-water-stress-country-rankings.

## FIND US

@UN-OHRLLS

UN-OHRLLS

@unohrlls

UN-OHRLLS

www.un.org/ohrlls