World Bank Group

COUNTRY CLIMATE AND DEVELOPMENT REPORT

Assessing Vulnerability and Defining Resilience

What is a CCDR?

… a new core, World Band Group diagnostic report

… that focuses on understanding the interplay between development (including growth, poverty reduction, inequality), and climate change and climate policies in the context of the Paris Agreement

… to identify key policy and institutional reforms, and investments needed to strengthen resilience to climate change and promote a low-carbon growth path

… and inform country development strategies and programs and World Bank Group country engagement

Key questions addressed by CCDRs

Climate and Development

- How does climate change threaten poverty eradication and the achievement of development goals in this country?
- Up to 12% GDP losses from climate impacts

Findings from other CCDRs

Adaptation and Resilience

- What are the key policy and institutional reforms and investments needed to adapt and build resilience to climate change?
- 2-5% avoided GDP losses from adaptation

Findings from other CCDRs

Low Carbon Transition

- What are the costs, challenges, and opportunities from climate action to reduce GHG emissions, increase growth, and reduce poverty?
- -0.1-3.3% GDP impacts of transition

Findings from other CCDRs

Financing the Transition

- What are the costs of climate-related investments and how will they be financed? And how to support the involvement of the private sector?
- 8-10% of annual GDP needed for investments

Findings from other CCDRs

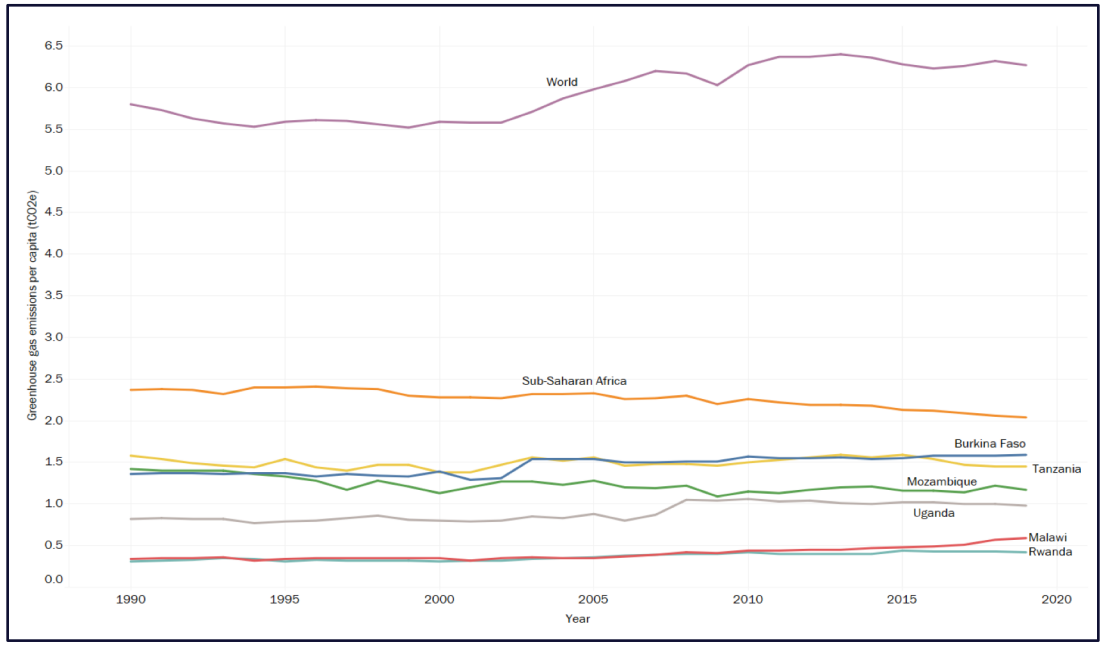
Malawi CCDR

Development in a changing climate

- Climate-related disasters are already compounding Malawi's development challenges
  - Tropical Storm Ana is estimated to have caused damages equivalent to 1.5–2.7 percent of GDP
  - Experiencing a disaster increases the likelihood of households falling into poverty
- Malawi is considered highly vulnerable to climate change, ranking 163rd out of 182 in 2020 on ND-GAIN,
- Climate change will make it harder for the country to achieve its ambitious development vision

- In 2019, Malawi's total GHG emissions were 0.59 tCO_2e per capita, the **lowest** in the world

Per capita annual GHG emissions in Malawi, and other countries



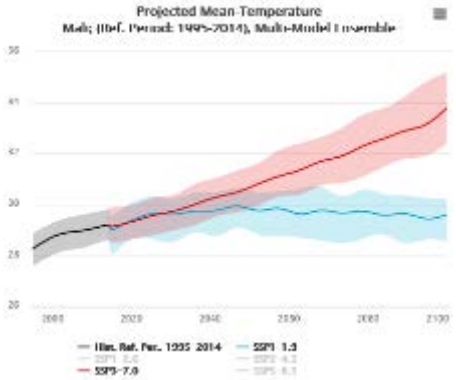
- Any efforts to reduce emissions will have to come as a co-benefit of development

Malawi

Our approach

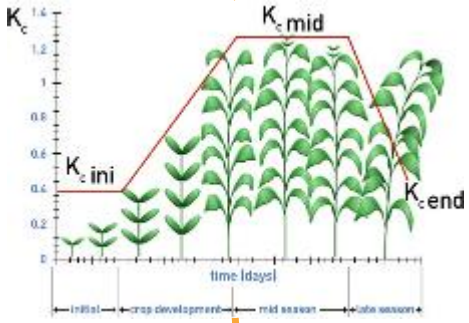
Approach to impact estimation

CLIMATE VARIABLES



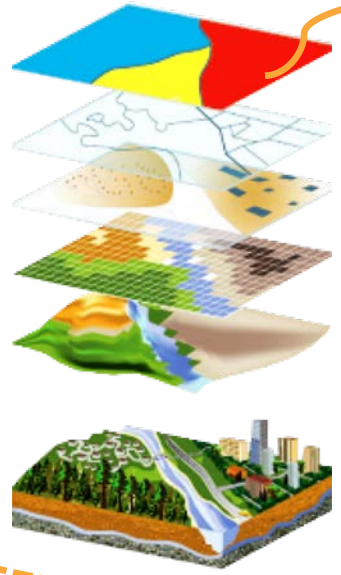
- ½ degree data on precip and temp
- 2020-2050
- Multiple SSP scenarios

BIOPHYSICAL MODELS



- Conversion of climate variables to biophysical effects
- E.g., yields, productivity, flood depths

GEOSPATIAL AGGREGATION

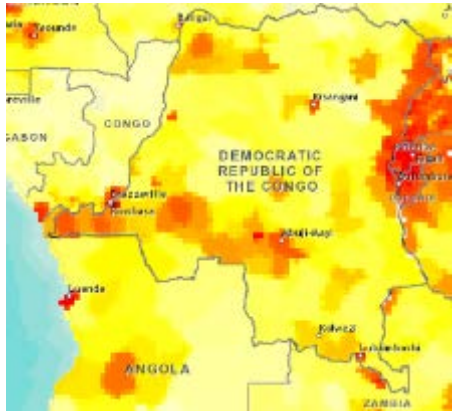


- Aggregation to national scale using weights
- e.g., land cover or population

MACROECONOMIC MODEL

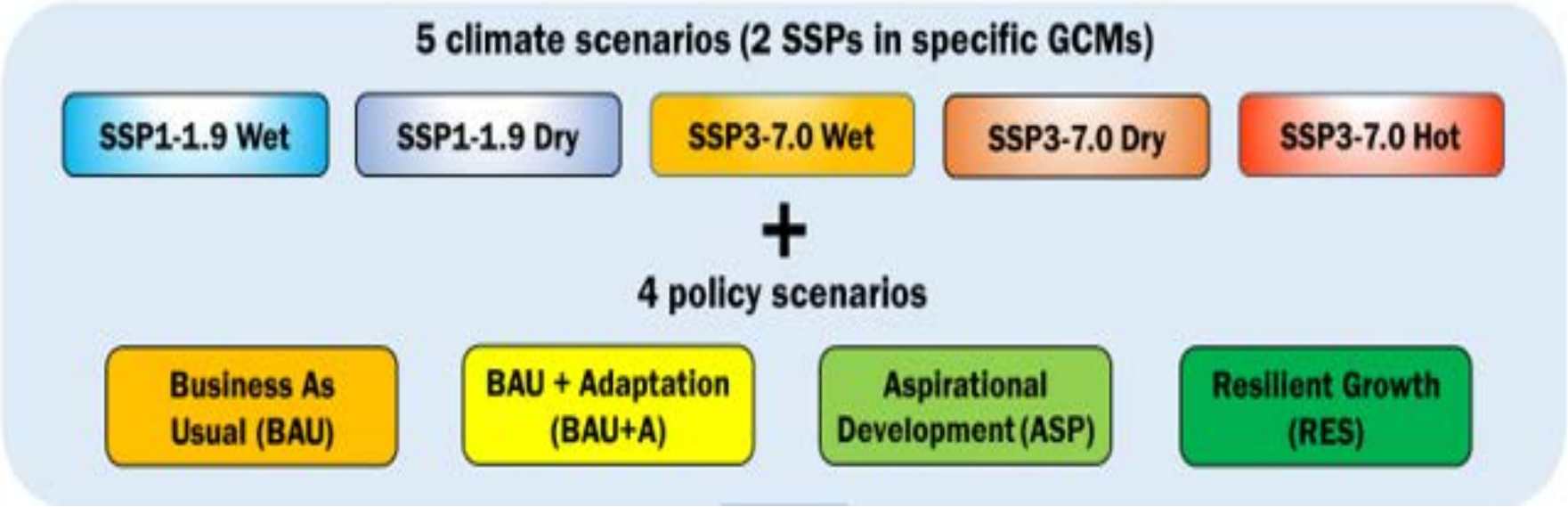
- Shocks to:
  - Sector productivity
  - Labor
  - Capital

POVERTY OUTPUTS



- Spatially disaggregated
- Informed by household survey data

Policy and Climate Scenarios



Damage shocks

CHANNEL OF IMPACT	CCDR						
	Rwanda	Benin (NDC)	Malawi	Mozambique	Pakistan	Sahel	South Africa
Human Health and Development							
Heat and labor productivity	✓	✓	✓	✓	✓	✓	✓
Human health and labor supply	✓	✓	✓	✓	✓	✓	
Fuelwood harvest and clean cooking						✓	
Water supply and sanitation			✓		✓		
Tourism	✓	✓				✓	
Agriculture, Land Use, and Energy							
Crop production	✓	✓	✓	✓		✓	✓
Livestock production			✓	✓	✓	✓	✓
Erosion and land use impacts	✓		✓			✓	
Hydropower production			✓	✓			
Infrastructure							
Inland flooding	✓	✓	✓			✓	✓
Roads and bridges			✓	✓	✓	✓	✓
Urban flooding			✓	✓		✓	
Sea level rise		✓				✓	

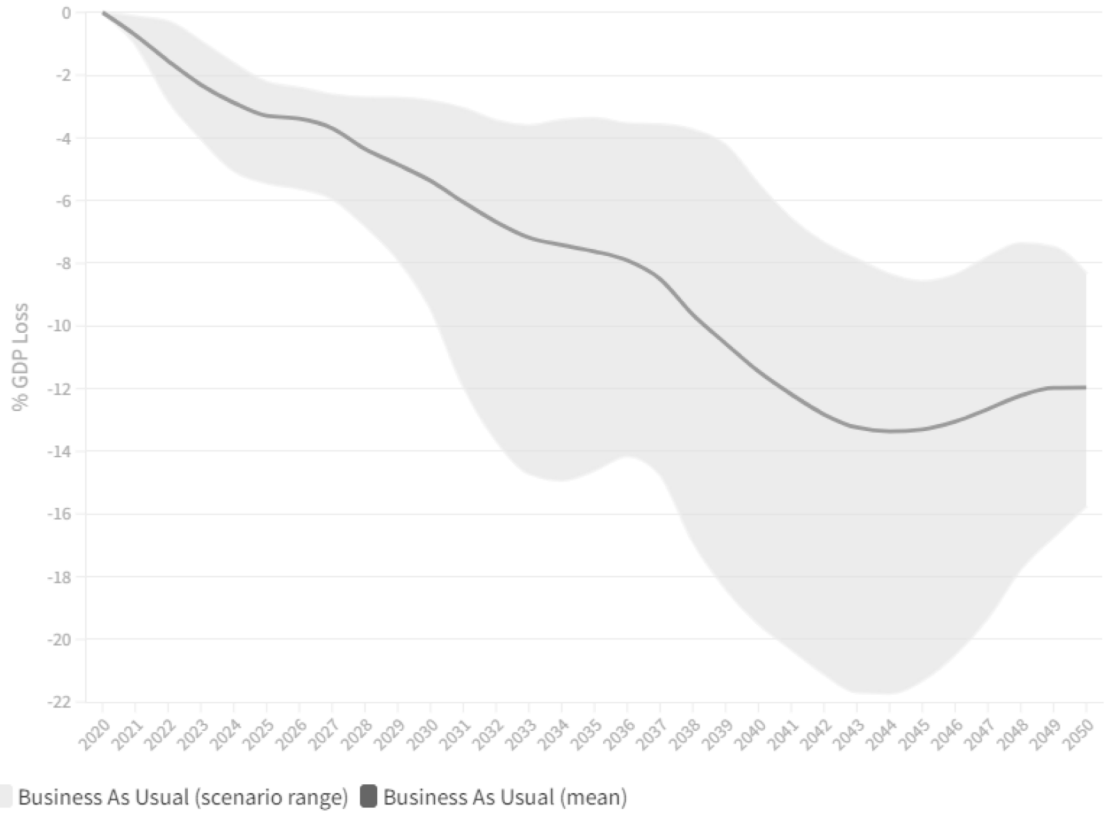
Malawi

Key findings

Climate change will impose large costs, alarmingly so

- On current development path, climate change could reduce GDP by 3–9 percent in 2030, 6–20 percent in 2040, and 8–16 percent by 2050
- Largest impacts are projected to come from damages to infrastructure
- Heat impacts on labor productivity are also significant, compounding shocks on already vulnerable households
- Over the next 10 years, another 2 million people could be pushed into poverty

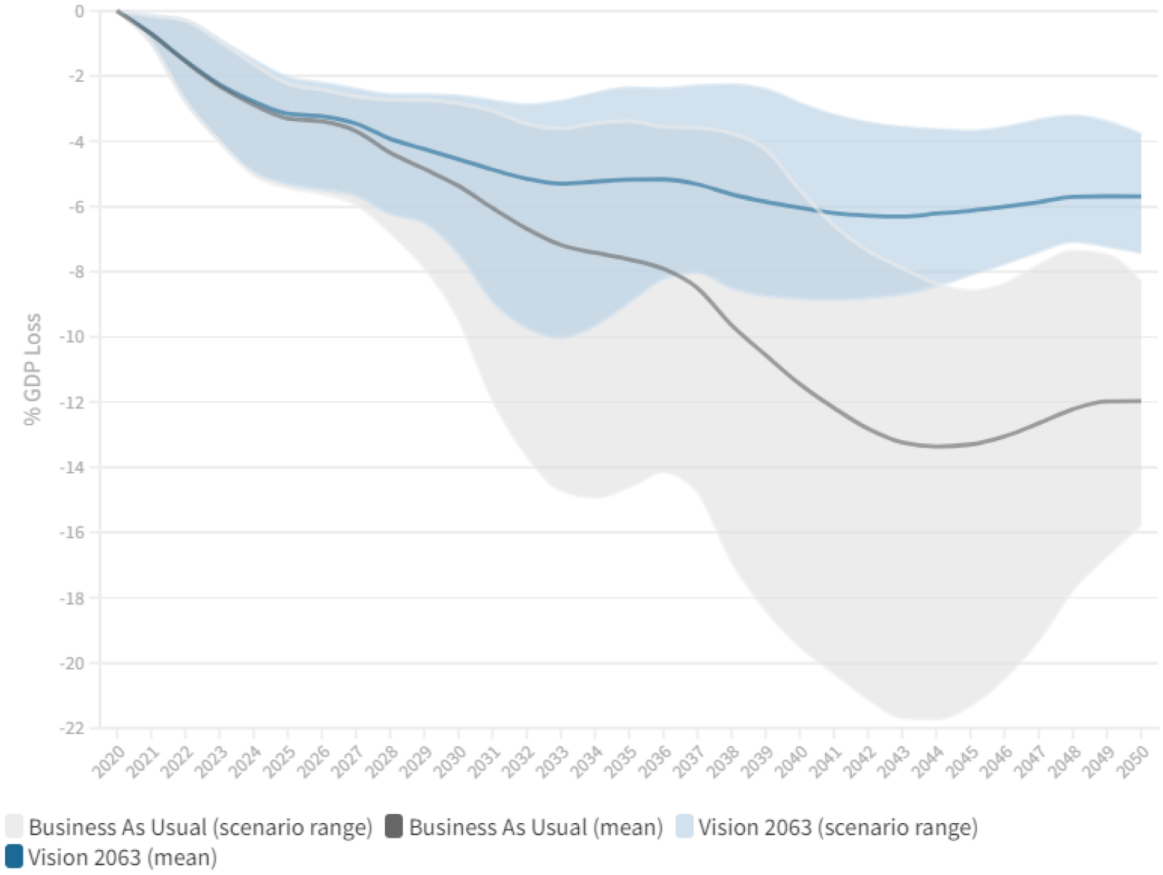
Projected percentage loss in GDP due to climate impacts



Vision 2063 provides a strong basis for strengthening resilience

- Accelerating implementation of Vision 2063, shifting to a higher growth trajectory, would substantially reduce the impacts of climate change
  - Potential reduction in GDP are smaller: 3–7 percent in 2030, 3–9 percent in 2040, and 4–7 percent by 2050
  - 3/4th fewer households would fall into poverty
- Development improves quality of infrastructure and a creates a more diversified economy reducing vulnerability

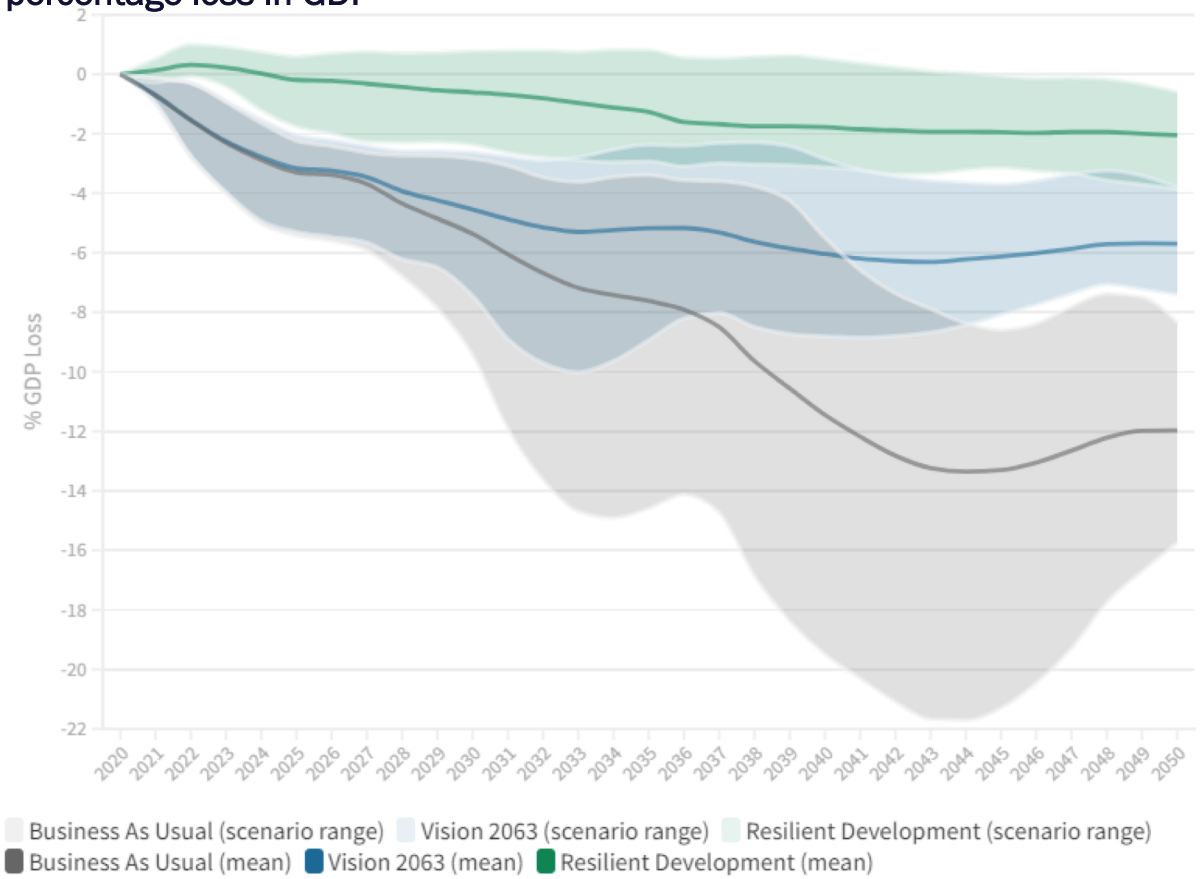
Vision 2063 will significantly reduce the projected percentage loss in GDP



Vision 2063 will not be enough, resilience will require doing different things and things differently

- With additional adaptation measures, losses are much lower and under certain conditions, GDP is higher with climate change and adaptation when compared to the counterfactual with no climate impacts
  - losses range from -1 to 3 percent in 2030 and 2040, and 1 to 4 percent in 2050
  - In infrastructure, loses range from -0.2 to 0.8 percent in 2050 with development and additional adaptation investments, as compared to 5 to 12 precent under business as usual

Additional adaptation investments will further reduce the projected percentage loss in GDP



Sector	Development (Vision 2063) measures that build resilience	Going beyond Development (Vision 2063) to adapt to climate change
Agriculture	Promoting Crop Diversification Investing in Irrigation Development Promoting Mechanization and Digital Technologies Investing in Research, Innovation, and Dissemination Supporting Land Tenure Security	Investments to develop crop varieties and livestock breeds that are resilient to heat stress, droughts, and excessive rainfall Revising design standards of irrigation infrastructure to make it climate resilient Strengthening capacity to manage new pests and diseases
Land	Investment in land restoration to meet commitments under Bonn Challenge and the African Forest Landscape Restoration Initiative Promoting increased access to improved cooking technologies	Improved targeting of land restoration activities to ensure that restoration actions build resilience

Sector	Development (Vision 2063) measures that build resilience	Going beyond Development (Vision 2063) to adapt to climate change
Energy	Investing in large-scale hydropower generation projects and grid-connected solar power projects Promoting regional interconnections for power imports Investing in off-grid renewable energy	Diversification of location of hydropower generation plants within the country Increased regional trade within the Southern Power Pool
Transport	Improved road infrastructure in rural areas Increased the share of passenger transport for road, rail and waterways Expanded rail network	New infrastructure follows a 50-year design standard, instead of a 10-year standard (building wider paved shoulders to improve drainage; using asphalt binders that are more resilient to heat) Promoting output and performance-based road contracts to improve the effectiveness and efficiency of road development and maintenance practices for climate resilience
Digital	Increased connectivity in rural areas Adoption of a data policy that allows interoperability and cross-ministerial data flow, as well as data standards Implementation of cybersecurity and personal data protection measures	Acceleration of investment in climate-resilient digital infrastructure to support sector-specific climate services Adoption of cloud data storage, and a data backup practice Use of digital platforms to support early warning systems and disseminate information on climate-smart agriculture

MALAWI

https://www.worldbank.org/en/publication/country-climate-development-reports

Country Climate and Development Report