

► **Green Employment Diagnostics for Just Transitions: Mozambique**

Pilot report

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Abbreviations

AC	Adaptive Capacity
APS	Announced Pledges Scenario
AQI	Air Quality Index
CBAM	Country Border Adjustment Mechanism
CCAFS	Climate Change, Agriculture and Food Security
CSA	Climate-Smart Agriculture
DFC	Development Finance Corporation
ENAMMC	Mozambique National Strategy for Climate Change
EU	European Union
EU-CBAM	European Union's Country Border Adjustment Mechanism
FAO	Food and Agriculture Organization
GCM	General Circulation Models
GCRI	Global Climate Risk Index
GDP	Gross Domestic Product
GFW	Global Forest Watch
GHG	Greenhouse Gas
HCB	Hidroelectrica de Cahora Bassa
ICRAF	World Agroforestry Center
IDP	Internally Displaced Persons
IEA	International Energy Agency
IFAD	International Fund for Agricultural Development
ILO	International Labour Organization
ILO-GED	International Labour Organization's Green Employment Diagnostics
IMF	International Monetary Fund
INGD	National Institute for Disaster Management
IOM	International Organization for Migration
IPCC	Intergovernmental Panel on Climate Change
JT	Just Transition
LNG	Liquefied Natural Gas
MIREME	Ministry of Mineral Resources and Energy
MZN	Mozambican Metical
ND-GAIN	Notre Dame Global Adaptation Initiative
NDC	Nationally Determined Contribution
NEP	National Employment Policy
NZE	Net Zero Emissions
OFESA	East Africa Forest Observatory
PARP	Poverty Reduction Action Plan
PEDSA	Strategic Plan for the Development of the Agrarian Sector
PES	National Economic and Social Plan
PQG	Five-year Government Program
SCD	Systematic Country Diagnostic
STEPS	Stated Policies Scenario
TCF	Trillion Cubic Feet
TVET	Technical and Vocational Education and Training
UNAC	National Farmers Union
USD	United States Dollars
VSLA	Village Savings and Loan Associations
WEO	World Energy Outlook
WFP	World Food Programme

1 Introduction and key objectives

This report serves as a pilot study of the effects of climate change on Mozambique's economy and labour market and how these may exacerbate poverty and inequality, if left unaddressed. The study was conducted through secondary research and in application of the guidelines set in the International Labour Organization's (ILO) *"Green Employment Diagnostics for Just Transitions"*. These guidelines were designed to augment existing employment diagnostic methodologies, aimed at assisting countries in comprehending and addressing the implications of climate change. Developed in alignment with the ILO's *"Guidelines for Employment Diagnostics in Times of Continuous Change"*, these guidelines provide ILO constituents and personnel with direction for identifying underlying trends, challenges, risks, and opportunities associated with climate change's specific impacts on the labour market. Moreover, they offer insights for formulating policies to attain full and productive employment for all.

By implementing green employment diagnostics, as advised in these guidelines, a reservoir of evidence and insights is generated. This serves as a cornerstone for well-informed discussions with relevant government counterparts, particularly labour ministries. The outcomes of these diagnostic efforts facilitate exchanges between pivotal agencies and pertinent governmental entities, encompassing planning ministries, environmental/climate change ministries, and agencies devoted to climate adaptation and mitigation planning.

Furthermore, these guidelines offer tailored recommendations directed at workers' and employers' organizations, fostering their active involvement in transitioning towards sustainable and environmentally conscious employment practices.

The core objectives of a green employment diagnostic encompass the following:

- A. Gaining insights into the primary challenges posed by climate change, particularly its impact on equitable economic advancement and the creation of high-caliber employment opportunities for all.
- B. Discerning how policy and market responses to climate change and other environmental pressures unveil novel prospects for all-encompassing growth, leading to the generation of quality jobs.
- C. Identifying policies that effectively manage the associated risks and opportunities, including potential constraints to policy implementation, all within the context of national employment strategies.

1.1 Key objectives

The primary objective of this study is to assess the key risks posed by climate change in Mozambique, their impact on various sectors and workers and how to respond to them by ensuring a just transition. As a pilot exercise of the ILO's Green Employment Diagnostics, this study aims to apply the guidelines to the context of Mozambique. By employing the ILO's Green Employment Diagnostics, the study seeks to:

- Identify the vulnerabilities of the most affected industries and occupations in Mozambique to climate-related disruptions.
- Examine the emergence of new green industries with changing skill requirements.

- Understand the economic, labour market, poverty, and inequality implications resulting from these changes.
- Formulate appropriate policies to mitigate negative effects.

1.2 Structure of the study

This study on Mozambique is organized into four main sections. **Chapter 2 outlines the study's approach, methodology, and limitations**, including how the ILO Green Employment Diagnostics were applied. **Chapter 3 provides a profile of Mozambique**, examining its economic, labour market, poverty, and climate-related context, as well as its policy framework in the context of climate adaptation and mitigation, employment, skills development, and social protection. **In Chapter 4, a more detailed assessment is conducted**, delving into the economic, labour market, poverty, and inequality dynamics, considering both the physical impacts of climate change and transition-related risks and opportunities. Lastly, **Chapter 5 offers policy recommendations** for the short, medium, and long term, drawing on insights from the previous sections to highlight areas where policy changes are needed in Mozambique.

2 Overview of the approach, methodology and limitations

2.1 Approach

This country study report on Mozambique follows a comprehensive research-based approach, drawing upon available secondary information and guided by the International Labour Organization's (ILO) Green Employment Diagnostics guidelines. The approach involves a systematic exploration of key climatic, environmental, economic, labour market, and poverty/inequality characteristics of Mozambique, culminating in the identification of short-, medium-, and long-term policy options to promote green employment and sustainable development.

Step I: Profiling Mozambique's Characteristics In the initial step of the approach, we meticulously identify and analyse the fundamental climatic and environmental, economic, labour market, and poverty/inequality characteristics of Mozambique. This comprehensive profiling enables us to establish a solid understanding of the country's unique context and challenges. By highlighting the key characteristics, we lay the groundwork for effective decision-making in subsequent stages. This step serves as a basis for prioritising the questions that will be addressed in the subsequent phases of the study.

Step II: In-depth Analysis of Economic, Labour Market, and Climate Change Dynamics Building upon the insights gained from Step 1, we proceed to delve deeper into Mozambique's economic, labour market, and poverty/inequality dynamics. This analysis is disaggregated by the physical impacts of climate change and emphasises the risks and opportunities presented by the transition to a greener economy. Tailored guiding questions are employed to explore the interplay between economic shifts, labour market transformations, and the effects of climate change. To accomplish this, we draw upon a combination of existing analytical studies, academic research, and country-specific data sources. By understanding the intricate relationships between these variables, we develop a nuanced perspective on the potential pathways to green employment in Mozambique.

Step III: Formulating Short-, Medium-, and Long-term Policy Options In the final step of the approach, the information gleaned from Steps 1 and 2 is leveraged to identify a spectrum of short-, medium-, and long-term policy options. These policy recommendations are tailored to Mozambique's specific context and needs. By assessing the intersections between key climatic, environmental, economic, labour market, and poverty/inequality aspects, we pinpoint areas where new or revised policies are warranted. Moreover, we strategically identify entry points for introducing these policy changes, ensuring their alignment with broader sustainable development goals. This step crystallises our insights into actionable policy interventions that have the potential to promote green employment and contribute to the country's overall socio-economic advancement.

The ILO's Green Employment Diagnostics are organised around four core pillars, three of which are already used in the existing ILO Guidelines for Employment Diagnostics in Times of Continuous Change. These core pillars act as levers around which the assessment is undertaken.

1. **Climate change and environmental pillar** - This refers to the trends, frequency and severity of climate events, the impacts of climate change on the economy and labour market, as well as changes in the economy and labour market due to the transition to a

low-carbon economy, including, for instance, the vulnerability of certain sectors and occupations to climate-related disruptions, and the emergence of new green industries, changing skill requirements. Understanding these dynamics helps assess the key risks faced by Mozambique, their implications for sectors and workers and the formulation of appropriate policies.

2. **Economic pillar** – This pillar sets out how identified climate change impacts and environmental challenges, as well as national and international policy and market response to these challenges, affect the economy, both at the aggregate level and across key sectors.
3. **Labour market pillar** – This pillar focuses on the consequences for the labour market of the economic impacts. It considers employment and productivity across key sectors, as well as changes by gender, age, skills, occupation and location of the workforce. This also helps in identifying the changing skills requirement, and to what extent current policy settings are well-calibrated to address emerging challenges.
4. **Poverty and inequality pillar** - This pillar explores how people's welfare characteristics are impacted by the changes in the labour market. It focuses on poverty and inequality changes, and the extent to which government policy is well set up to address these.

Additionally, the diagnostic framework incorporates key determinants of climate change consequences as cutting across the core pillars 2 - 4, to further inform a structured approach to apply the diagnostic framework. These include:

Physical impacts of climate change: focused on climate risk characteristics.

Transition impacts - risks: based on national and global policy and market response to climate change affecting an economy.

Transition impacts - opportunities: same as above but focused on opportunities through new job creation potential, new skills requirement, gains in sectors through shifts/ innovations, etc.

2.2 Methodology

In accordance with the guidelines set out in the Green Employment Diagnostics, this report develops an understanding of the climate-economy-employment nexus in Mozambique. Our research involved an extensive review of online published reports and studies from reputable international organisations, with a focus on the World Bank's 2019 Mozambique Disaster Risk Profile, 2021 Systematic Country Diagnostic and 2023 Mozambique Economic Update; the ILOSTAT database; the IFAD 2021 Climate Change and Future Crop Suitability in Mozambique.

Complementing our analysis of international reports, we sourced information from reports published by relevant government ministries within Mozambique, including the Ministry of Land and Environment, the Ministry of Economy and Finance, the Ministry of Mineral Resources and Energy, the Ministry of Labour, Employment and Social Security, and the Ministry of Agriculture and Rural Development.

For a detailed methodology, see Annex 1.

2.3 Limitations

While this country study on Mozambique has been conducted with a rigorous and systematic approach, there are certain limitations inherent to the scope and methodology of the study. The findings and conclusions presented in this report heavily rely on the availability of data and information from a variety of sources. In some cases, the lack of comprehensive and up-to-date data may limit the accuracy and depth of the analysis.

Though a workshop was held in Mozambique to present the findings of this report, further consultations would be needed to accurately identify implementation agencies and relevant financial institutions for the proposed policy options.

3 Country profiling

The Republic of Mozambique is located in southeastern Africa and is bordered by Tanzania to the north, Malawi and Zambia to the northwest, Eswatini and South Africa to the southwest, and Zimbabwe to the west. **Its eastern coast is bordered by the Indian Ocean, extending for approximately 2,500 kilometres** with the country encompassing a **total land area of 786,380 square kilometres (World Bank, 2020)**. This geographical positioning grants Mozambique a strategic placement within the African continent, facilitating its interactions and influences with neighbouring nations and the vast Indian Ocean.

1.1 Climate change / Environmental context

Due to its geographic location and relatively long coastline, **Mozambique experiences unique climatic challenges including cyclones, floods and droughts**. The frequency and intensity of these climatic events has been increasing in recent years and the extent of the resulting damages to population, infrastructure, farmland and the overall economy is still being assessed.

Indeed, Mozambique has been experiencing increasingly erratic rainfall patterns, with heavy rains in February 2023 resulting in **large-scale flooding** in the central and southern regions, particularly the provinces of Inhambane, Gaza, Zambezia, Sofala and Tete, Niassa and Manica. Mozambique's National Institute for Disaster Management (INGD) estimates that these floods led to the **displacement of at least 57,481 people and the partial or total destruction of 141,788 houses**¹. The floods also led to the closure of several schools, **affecting many students, teachers and other employees**.

In addition to the destructive floods, Mozambique has been grappling with increasingly frequent cyclones. Most notably, on the 14th of March 2019, **Tropical Cyclone Idai struck the port of Beira**, located in the coastal province of Sofala, and subsequently moved across the region, leaving a trail of destruction to infrastructure. This catastrophic event, considered **the most severe natural disaster to hit southern Africa in at least two decades**, has impacted millions of people in Mozambique and in the neighbouring countries of Malawi and Zimbabwe.

In an unprecedented occurrence, just six weeks later, **Cyclone Kenneth also made landfall in northern Mozambique**. This marks the **first time in recorded history that two powerful tropical cyclones have hit the country within the same season**. The combined devastation caused by these cyclones has resulted in a staggering number of people in urgent need of humanitarian assistance in the affected areas. The estimated count in Mozambique alone was nearly **1.4 million necessitating immediate support**² in areas such as healthcare, nutrition, protection, education, water, and sanitation. The recurring cyclones affect, on average, an estimated 2 million people every year in the coastal regions of the country.

Mozambique was subsequently ranked as the **most climate risk-prone country in the world** by the German Watch's 2021 Global Climate Risk Index (GCRI). This ranking highlights a **high level of vulnerability to extreme weather events** (GCRI, 2021). The Notre Dame Global Adaptation Initiative (ND-GAIN) also ranks Mozambique considerably low in its readiness matrix which measures a country's ability to leverage investments and convert them to adaptation actions. ND-GAIN measures overall readiness by considering three components – economic readiness,

¹ The specific numbers of people and property affected are still being assessed per IOM (2023). [Mozambique - Floods & Tropical Storm Freddy Dashboard, 10 April 2023](#).

² The specific needs and numbers of affected persons are still being assessed per UNICEF (2020). [Cyclone Idai and Kenneth](#).

governance readiness and social readiness. **Mozambique ranked as 171st most ready country in the world out of the 192 countries considered (ND-GAIN, 2020), despite being one of the most vulnerable.**

The International Monetary Fund (IMF) also classifies Mozambique as particularly vulnerable and not prepared or coping with the climate hazards it is exposed to. On the IMF climate change financial and risk indicators, Mozambique scores a **6 in climate-driven hazard and exposure; 7.8 in vulnerability; and 6.2 in lack of coping capacity out of 10.**

In combination with the climatic hazards identified, Mozambique has been experiencing growing deforestation since the turn of the century. The Global Forest Watch (GFW) estimates that **around 14% of total natural tree cover in the country was lost between 2001 - 2022.** The main drivers of this deforestation are unsustainable slash-and-burn agricultural practices, urban expansion and a growing local demand for timber and charcoal. These factors contribute to increased GHG emissions and reduced air quality.

The table 2 below gives an overview of the deforestation and subsequent air quality conditions of Mozambique.

► **Table 2. Key deforestation indicators in Mozambique**

Key indicator	Data	Year
Forest area or green cover as a % of total land area	46.7	2020
Deforestation rate	Primary forest loss: 10% Tree cover loss: 14%	2002-2022 2001-2022
Air Quality Index (AQI) - annual average over past 3 years	22 micrograms/cubic metre	2017

Sources: World Bank, Global Forest Watch

In addition to a considerable natural forest cover, spanning over 34 million hectares and encompassing 43% of its territory, Mozambique is also endowed with ample natural mineral resources. Indeed, Mozambique possesses **valuable mineral deposits, including half of the world's graphite resources, which the World Bank estimates could see its demand increased fivefold to meet growing global demand for clean energy technology**³. There are also important deposits of iron ore, titanium, bauxite, copper, gold, and tantalum which are all used in clean energy technologies globally. Bauxite is used to produce aluminium, which is Mozambique's second largest export after coal.

Additionally, Mozambique discovered considerable reserves of offshore natural gas that redefined its economic growth model to focus on scaling up LNG exports.

1.2 Economic context

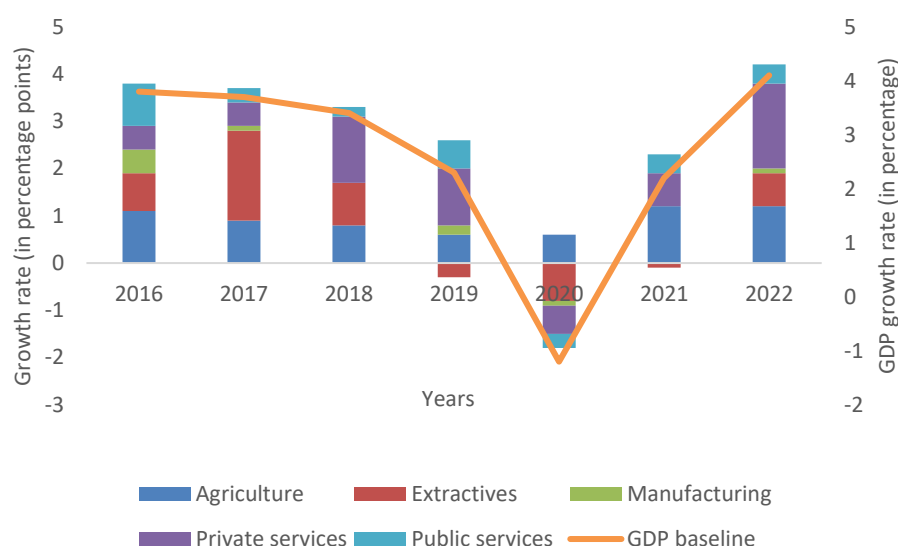
Mozambique is a low-income country with a population of about 32,077.77 million and a population density of 46.1 people per square kilometre of land area (Sq. of land) (World Bank, 2021), and faces various challenges and opportunities in its pursuit of sustainable development. The country experienced a decline in Real GDP of 0.5% in 2020, marking its first contraction in 28 years. The decline was driven by various factors, including a Covid-19-induced slowdown in tourism, construction, and transport, as well as a lower demand for commodity exports. The

³ Mozambique was the world's second largest producer of graphite in 2022 according to the [Graphite Mining Market by Reserves and Production, Assets and Projects, Demand Drivers, Key Players and Forecast, 2022-2026 Report](#).

The World Bank (2023). [Mineral-rich Developing Countries can Drive a Net-Zero Future](#).

ongoing Islamist insurgency in the northern province of Cabo Delgado also had a notable impact. However, Mozambique's economic recovery has shown promise, with a growth rate of 4.1% in 2022 and a GDP per capita growth of 1.3%. The agriculture and services sectors were the primary drivers of this growth, benefiting from increased farm productivity and the resumption of mobility (Figure 1).

► **Figure 1. Sectors driving GDP growth**



Source: 2023 World Bank's Mozambique Economic Update Report

► **Table 3. Sectoral contributions to GDP**

Key indicator	Data	Year
Sectoral contributions (%) to GDP	Services: 41.9 Agriculture: 26.2 Industries: 21.6 Manufacturing: 7.9	2020

Sources: Source: 2023 World Bank's Mozambique Economic Update Report

1.3 Labour market context

According to the National Statistics Institute's (INE) 2022 Family Budget Survey (OIF 2022), the estimated size of **Mozambique's total labour force amounted to 14,360,692 individuals**. Within this labour force, **approximately 18.4% were categorised as unemployed and 8.1% as underemployed**. It is noteworthy that **an estimated 95.7% of labour operated in the informal economy**.

The table 4 below provides an overview of the key labour characteristics of Mozambique.

► **Table 4. Key labour characteristics of Mozambique**

Key indicator	Data	Year
Total size of labour force	14,360,692	2022
Labour force participation rate disaggregated by age and gender (in %)	Men: 78.3 Women: 70.6	2022

Key indicator	Data	Year
Youth unemployment rate (in %)	39	2015
Employment distribution by key economic sectors (in %)	Agriculture: 70.3 Industry: 9.2 Services: 20.5	2021
% of informal labour	95.7	2021
Minimum wage in Metical	4,390	2020

Sources: INE, ILO database, World Bank

Mozambique is faced with the imperative of establishing a new development paradigm that encompasses a diverse range of growth sources, enhanced productivity, and increased job opportunities. **The country anticipates a yearly influx of more than half a million individuals into the labour force.**

Mozambique's present growth strategy exhibits notable limitations in its ability to generate productive employment opportunities. The proportion of employment attributed to agriculture experienced a decline from 84.2% in 1991 to 70.3% in 2021, with the majority of labour shifting towards the services sector, particularly in retail (Table 5). However, the dominance of informal activities within the services sector constrains its potential. To foster sustained, inclusive, and comprehensive growth in the future, it is essential to move beyond a narrow focus on low-productivity agriculture while focusing on strengthening the services sector and encouraging the formalisation of informal enterprises, while concurrently strengthening intersectoral linkages. This is further evidenced by the threat that climate change and climatic events pose to agriculture productivity in Mozambique. Efforts need to be made to increase resilience in agriculture while enhancing productivity within the services sector.

► **Table 5. Key sectoral employment growth in Mozambique**

Sectoral share of employment (%)	1991	2021	Difference (in %age points)
Agriculture	84.2	70.3	-13.9
Industries	2.5	9.2	6.7
Services	13.3	20.5	7.2

Source: World Bank

The primary determinant for reducing poverty lies in the creation of higher-paying jobs and improved remuneration, which are primarily contingent upon the enhancement of labour productivity.

1.4 Poverty and inequality context

Mozambique, categorised as a low-income nation, exhibited a **poverty headcount ratio of 46.1% of the total population at national poverty lines and 64.6% at the international poverty line in 2014**, as indicated by World Bank estimates. Furthermore, the UNDP's 2023 Multidimensional Poverty Index estimates that 61.9% of the Mozambican population is multidimensionally poor.

While the nation has achieved substantial economic growth in recent decades, poverty reduction has been inconsistent and accompanied by a surge in inequality. The benefits of this growth have been primarily concentrated among the higher echelons of the income distribution, as evidenced by the Gini coefficient climbing from 0.47 to 0.56 between 2002 and

2015. This discrepancy can be attributed in part to the **persistently low productivity levels in the agricultural sector—the primary livelihood source for the impoverished population**, as well as the overreliance on the extractive industry, which exhibits limited connections to the broader economy.

In analysing access to essential services, it is notable that **while approximately 73% of the urban population in Mozambique enjoyed access to electricity, only 17% of the rural population had similar access in 2022**. Furthermore, a significant proportion of **approximately 29% of the population, mostly rural, lacked access to clean cooking fuels, relying on traditional biomass for cooking purposes**. These findings emphasise the prevailing disparities between urban and rural areas in terms of electricity provision and clean cooking fuel accessibility, underscoring the need for targeted interventions to address these challenges and promote inclusive development.

1.5 Review of the national policy landscape of the climate-economy-employment nexus

Mozambique became a Party to the Paris Agreement in June 2018, demonstrating a commitment to mitigating its GHG emissions and helping its population adapt to the effects of climate change. As part of this commitment, the country submitted its **First Nationally Determined Contribution (NDC) 2020-2030 in 2018 and an updated version in 2021**.

The NDC 2020-2025 is aimed at making Mozambique more resilient to the impacts of climate change, reducing climate risks to people and goods as much as possible, restoring and ensuring the rational use and protection of natural and built capital. The strategic actions presented in the adaptation component of the NDC are part of the adaptation and climate risk reduction pillar of the Mozambique National Strategy for Climate Change (ENAMMC), which covers the following sectors and/or are - as considered vulnerable to the impacts of climate change: climate risk reduction; water resources; agriculture, fisheries, food security and nutrition; social protection; health; biodiversity; forests; and, infrastructure, urban areas, other settlements and tourist and coastal zones.

With Mozambique being one of the most climate disaster prone countries in the world, **strengthening climate resilience and social safety nets remains imperative to support livelihoods and keep people from falling back into poverty exacerbated by climate change**. The NDC 2020-2025 outlines the commitment to:

- Develop and implement approaches for community-based adaptation through Local Adaptation Plans
- Strengthening basic social protection measures in relation to climate change so that it contributes to the resilience of vulnerable populations.
- Strengthening the capacity for targeting and orientation of the Productive Social Action programme to increase the resilience of vulnerable groups.
- Strengthening links between the social protection system and the natural disaster response system, including linkage with early warning systems.

Regarding the specific contribution on adaptation, the NDC update considered several documents elaborated under the Convention and that have relevant information on vulnerability and adaptation measures, namely, the **Mozambique National Strategy for Climate Change (ENAMMC), Technological Action Plan** (for Adaptation covering agriculture and coastal zones and infrastructure and mitigation the energy and waste sectors), **the Local Adaptation Plans** (123 districts with local adaptation plans formulated by October 2021), **the Second National**

Communication of Mozambique and other strategic documents including consultations with sectors and other relevant entities.

Mozambique also developed a **National Employment Policy (NEP)** that connects the areas of employment, climate and the economy by addressing decent employment, social dialogue and the just transition (see box 1). The policy is in the process of being updated as of 2023.

► **Box 1. Mozambique's National Employment Policy main pillars (NEP 2016)**

Mozambique's National Employment Policy (NEP) addresses decent employment, social dialogue and the just transition through five of its main pillars:

- **Pillar 2: the generation of new jobs.** This includes work areas such as macroeconomic policies, private sector incentives for job creation, measures on investment and local content, and on youth employment.
- **Pillar 3: Harmonisation and Sectoral Policy Prioritization.** This includes work in sectors such as agriculture, manufacturing, minerals, and tourism.
- **Pillar 4: Promotion of Decent, Productive and Sustainable Work.** This includes measures towards non-discrimination, inclusion and decent work, as well as on social dialogue.
- **Pillar 7: Strengthening International Cooperation.**
- **Pillar 8: Cross-cutting issues,** including gender and just transition.

Source: NEP 2016

In order to implement the vision in its long-term development strategy for 2015-2035, Mozambique develops five-year government programmes (PQG) regularly. The current PQG (2020-24) places a particular emphasis on enhancing economic growth, productivity, and employment prospects. It concentrates on fostering inclusive growth and has outlined five key priorities: ensuring peace and sovereignty, developing human and social capital, promoting employment, productivity, and competitiveness, improving economic and social infrastructure, and ensuring sustainable and transparent management of natural resources and the environment.

Mozambique aims to cultivate a more diversified and competitive economy, with a focus on strengthening productive sectors that have the potential to boost income generation and create more job opportunities, particularly for the youth. The five-year program primarily targets critical sectors such as agribusiness, fisheries, tourism, infrastructure-related fields, and extractive industries, aiming to create linkages to these opportunities.

The table below (Table 6) provides an assessment of key national climate, employment, economic and social policies using different colour intensities from dark to light to indicate what policy areas received a higher and lower consideration, respectively, within each policy/strategy.

► Table 6. Policy landscape analysis for Mozambique

Thematic Pillar	Key Policy Determinants	NEP	PQG (2020-2024)	NDC (2020-2025)	Strategic plan for the development of the Agrarian Sector (PEDSA 2011-2020)	National Economic and Social Plan (PES 2021)
Climate/ environmental dynamics	Mitigation strategies					
	Adaptation and resilience strategies					
	Specific mention of 'green jobs' or employment-environment linkages					
Labour market/ employment dynamics	Social protection					
	Sustainable/ Resilient enterprises					
	Skill development					
	Green employment projects/ programmes					
	Social dialogue					

Source: UNFCCC, Ministry of Economy and Finance.

The policy assessment reveals gaps in all key policies across climatic and labour market pillars highlighting a need to formulate policies that effectively address these issues in Mozambique.

From this country narrative, it is identified that the sector of employment most at risk from the physical impact of climate change across the climate, economic, labour market and poverty and inequality pillars is agriculture. The sector most at risk from a global shift to a low-carbon economy is the extractives sector, particularly LNG and coal exports. These are the sectors that need to be focused on for an in-depth analysis of the economic, labour market, and poverty and inequality implications within Mozambique. The analysis will be disaggregated based on the physical impacts of climate change and will consider the risks and opportunities associated with transitional impacts. This will be accomplished by utilising the following guiding questions under each thematic pillar:

► **Table 7. Framework for more in-depth analysis by key focus areas**

Key Thematic Dimensions and Implications Thereof	Key Determinants of Climate Change Consequences	Sub-categories	Key Questions
Economic Implications	Physical climate risks and their effects on the economy	Physical climate risks	• <i>How often do cyclones, floods and droughts occur in Mozambique?</i>
			• <i>What is the expected damage (with a focus on large-scale impact)?</i>
		Economy-wide and sectoral economic consequences	• <i>What are the wider macroeconomic impacts of cyclones, floods and drought?</i>
			• <i>How will the agriculture sector be affected by these impacts? Is it through changes in input costs, a reduction in productivity, asset damage, etc.?</i>
		Domestic implications by regions/ hotspots	• <i>In what parts of Mozambique are agricultural activities concentrated?</i>
			• <i>Are there climate hotspots where the physical risks are expected to be most pronounced?</i>
			• <i>What are the potential economic and social consequences of sectoral climate change impacts on regional development and livelihoods?</i>

Key Thematic Dimensions and Implications Thereof	Key Determinants of Climate Change Consequences	Sub-categories	Key Questions
	Transition risks and heir economic implications	Risks arising from global shifts to low emissions growth	• <i>What is the current economic importance of coal and LNG exports as a%age of total exports?</i>
			• <i>Are there any national plans to increase coal or LNG exports in the future?</i>
			• <i>What is the country's exposure to carbon-border adjustment mechanisms (CBAMs), particularly the EU's CBAM and its possible effects on exports to the EU?</i>
		Risks associated with national commitments to reduce emissions	• <i>Which sectors are expected to drive emissions reductions?</i>
			• <i>How important are these sectors (as % of GDP and % of labour force)?</i>
	Transition opportunities and their economic implications	Unlocking gains as per transition (adaptation and/or mitigation) options	• <i>What are Mozambique's key strengths that can facilitate the exploitation of transition opportunities, such as being a low-cost producer or having a strong skills base?</i>
			• <i>What are the weaknesses or challenges that Mozambique needs to address in order to fully capitalise on transition opportunities, such as the presence and effectiveness of a policy framework?</i>
Labour Market Implications	Physical risks and their labour market implications	Physical climate risks	• <i>What are the specific transmission mechanisms through which cyclones, floods and droughts impact the labour market, such as disruptions to infrastructure, supply chains, or agricultural productivity?</i>
			• <i>What are the specific transmission mechanisms through which these physical risks impact the labour market, such as disruptions to infrastructure, supply chains, or agricultural productivity?</i>
			• <i>What is the potential scale of the impact in terms of the number of people affected?</i>

Key Thematic Dimensions and Implications Thereof	Key Determinants of Climate Change Consequences	Sub-categories	Key Questions
			• Are the labour market impacts more likely to result from a decline in the number of jobs in the agricultural sector or a reduction in the productivity and earnings potential of workers, potentially leading to labour withdrawal?
			• Are there any available estimates or projections on the number of individuals who may be affected by these droughts, floods and cyclones in agriculture?
	Transition risks and their labour market implications	Implications by aggregate, microeconomic and diversity characteristics	• How many people are currently employed in coal mining, aluminium and LNG projects, and what is the estimated number of jobs that may be threatened?
			• What are the potential spillover effects of declining demand in the extractives sectors on other sectors in the Mozambican economy?
			• How are domestic emissions reductions expected to impact the extractives sectors, and what are the potential labour market implications?
	Transition opportunities and their labour market implications	Implications based on scope and skill requirements	• What is the possible or likely occupational and gender profile that can be expected if the transition opportunities are successfully realised?
			• Where are the potential or likely geographic locations of these jobs? Are they concentrated in certain regions? If so, to what extent are these regions in proximity to existing areas of high unemployment and any potential job losses associated with transition or physical risks outlined in previous sections?
			• What are the skills needs associated with realizing these transition opportunities? Are there sufficient numbers of people possessing these skills in Mozambique?
	Physical risks and their poverty and inequality implications	Physical risks - distributional impact	• To what extent are the reductions in employment associated with the realisation of physical climate risks disproportionately experienced by the poorest farmers?

Key Thematic Dimensions and Implications Thereof	Key Determinants of Climate Change Consequences	Sub-categories	Key Questions
Poverty and Inequality Implications			How might impacts on welfare that are not directly related to nominal income and employment be disproportionately affected by climate change, such as the potential increase in prices of goods and services disproportionately consumed by the poorest and most vulnerable, or the reduced availability of critical goods and services provided by ecosystems?
	Transition risks and their poverty and inequality implications	Transition risks - distributional impact	To what extent are the reductions in (nominal) income and/or employment in coal mining, LNG and aluminium projects resulting from transition risks disproportionately affecting individuals at the lower ends of the income distribution or those who are otherwise disadvantaged?
	Transition opportunities and their poverty and inequality implications	Transition opportunities - distributional impact	How do the occupational and geographic profiles of the new jobs created by transition opportunities provide employment opportunities for individuals at the lowest end of the income profile?

4. In-depth assessment of the economic, labour market and poverty and inequality implications

4.1 Economic implications

The economy of Mozambique relies heavily on the growing industries sector, though labour ratios disproportionately favour agriculture despite its low GDP share. This economic model is challenged by both the physical effects of climate change and the risks associated with a global transition to a low-carbon economy.

4.1.1 Physical climate risks and their effects on the economy

Physical climate risks

Due to its geographic location, Mozambique is exposed to and suffers from recurring climate catastrophes that have been increasing in frequency and intensity due to global climate change.

The table below (Table 8) gives an overview of the most significant and recurring climate risks to Mozambique and their estimated frequency.

► **Table 8. Frequency and impact of the main high-risk hazards in Mozambique**

Hazard	Frequency and impact
Flood (river, urban and coastal)	Frequency: According to the Intergovernmental Panel on Climate Change (IPCC, 2013), there is high confidence that extremes in sea level will increase with mean sea level rise, yet there is low confidence in region-specific projections in storm surges. The period of highest flood risk coincides with the rainy season from November to March, with peak flows typically observed in March and April. The situation can be exacerbated by the occurrence of tropical cyclones during this time, as demonstrated by the 2000 floods caused by Cyclone Eline, the 2019 floods associated with Cyclones Idai and Kenneth and the 2023 floods associated with Cyclone Freddy impacting Mozambique. Impact: The property damage of the flooding in 2000 was estimated by the World Banks at \$500 million. In the 2019 World Bank Mozambique Disaster Risk Profile, the modelled impacts demonstrate an estimated \$1 billion damage to buildings alone from floods under a 4% annual probability. The Observed average annual losses in buildings amount to \$500 million.
Cyclone	Frequency: Tropical Cyclone Idai struck the port of Beira in 2019 and moved across the region, leaving a trail of destruction. This catastrophic event, considered the most severe natural disaster to hit southern Africa in at least two decades, has impacted millions of people in Malawi, Mozambique, and Zimbabwe. Six weeks later, Cyclone Kenneth also made landfall in northern Mozambique. This marks the first time in recorded history that two powerful tropical cyclones have hit the country within the same season. Global average tropical cyclone wind speed and rainfall is likely to increase in the future, and the global average frequency of tropical cyclones is likely to decrease or remain unchanged. It is possible that the frequency of the most intense tropical cyclones will increase substantially in some ocean regions (IPCC, 2013). The present hazard level in areas currently affected by tropical cyclones may increase in the long-term, as evidenced by the impacts of the deadly cyclone Idai. Impact: The recurring cyclones affect, on average, an estimated 2 million people every year in the coastal regions of Mozambique. The estimated annual damage to buildings caused by wind and surge amounts to approximately \$70 million each. However, in the case of extreme events, the destruction to the building stock can far exceed \$100 million.⁴
Heatwaves	Frequency: Since 2000, Mozambique has witnessed a drastic shift in its weather patterns. 14 out of the 15 warmest years on record have occurred during this time. Temperatures have risen by 0.6 degrees Celsius from 1960 to 2006, with projections indicating a further increase of 1 to 2.8 degrees Celsius by the 2060s (McSweeney et al., 2010). Continued emissions of greenhouse gases will cause further warming, and it is virtually certain that there will be more frequent hot temperature extremes

⁴ Cyclone Leon-Eline alone was estimated by the World Bank at \$500 million of damage. Per the [Mozambique Disaster Risk Profile \(2019\)](#).

Hazard	Frequency and impact
	over most land areas during the next fifty years. Warming will not be regionally uniform, and the economic impacts of these heat waves is still being assessed. Impact: Most heat-related impacts reported relate to the agricultural sector, including the large number of losses of crops (e.g. maize, beans, horticultural products, cabbage, lettuce) and livestock (mainly laying hens and their eggs). The heatwaves, sometimes in combination with existing water scarcity, were reported to cause heat stress for farmers and food insecurity in the country.
Drought	Frequency: Between 1960 and 2006, average annual rainfall has decreased by 2.5 mm per month, leading to later rainy seasons and longer dry spells. Mozambique has already experienced extreme climate events, such as the El Niño-driven drought in 2015/16, indicating the growing impact of these changes. Mozambique has been experiencing severe droughts since the 1980s. The region of Inhambane faces the highest risk of hydrological drought (water scarcity) with over 0.5 million individuals residing in affected areas. Impact: The socioeconomic and climate scenarios selected in the country's World Bank Disaster Risk Profile indicate a substantial increase in the number of people affected by drought by 2050. Both relative and absolute impacts of drought are expected to rise significantly. The National Statistics Institute (INE, 2017) projected a population growth for 2050 that suggests an increase of approximately 85% to reach around 60 million, with over 3 million people expected to be affected by drought each year. These findings emphasise the pressing need for effective measures to address and mitigate the growing challenges posed by hydrological drought in Inhambane. Based on the World Bank modelling, statistically, Mozambique can anticipate an agricultural income loss of around \$65 million every decade, with the equivalent loss of 4.5 million labour days.
Wildfire	Frequency: From 2001 to 2021, Mozambique lost 40.6kha of tree cover from fires. The year with the most tree cover loss due to fires during this period was 2019 with 5.87kha lost to fires. Modelled projections of future climate identify a likely increase in the frequency of fire weather occurrence in this region, including an increase in temperature and greater variance in rainfall. The full long-term impact of these wildfires is still being assessed. Impact: The annual losses in forest affect both agriculture and forest products used by local communities (e.g. food, energy, medicine, construction materials and furniture). This also threatens existing and potential employment in the forestry sector.

Sources: GFDRR 2023, World Bank 2019, globalforestwatch, UNICEF, INE

Economy-wide and sectoral economic consequences

The identified climatic risks bear significant implications for the overall economy and its key driving sectors. Among these, **the agricultural sector is particularly vulnerable to and impacted by climate events due to its dependence on specific environmental factors, notably regular rainfall patterns, as it is predominantly rainfed.** Merely 2.5% of all cultivated land in Mozambique benefits from irrigation, making droughts a considerable risk. Floods and cyclones also pose significant threats to the sector. As agriculture is the backbone of the Mozambican economy, contributing over 26% to its GDP, it is important to understand the effects that physical climate risks pose on the sector.

The table below (Table 9) provides an overview of the agricultural risks and losses from the identified climate hazards.

► **Table 9. Damages from main climate hazards to agriculture in Mozambique**

Climate hazards	Modelled frequency	Damages/losses (in USD)
Cyclones	1-in-25-year return period ⁵ 1-in-50-year return period 1-in-250-year return period	300 million in crop damage 350 million in crop damage 400 million in crop damage
Floods	Average annual loss 1-in-25-year return period 1-in-50-year return period	15 million in crop damage 35 million in crop damage 45 million in crop damage
Drought	Average annual loss 1-in-10-year return period 1-in-50-year return period 1-in-250-year return period	20 million 65 million 200 million 350 million

Source: World Bank Disaster Risk Profile for Mozambique

In the past two decades, the frequency and intensity of these disasters have escalated, further exacerbated by the impacts of climate change. For instance, the cyclone and floods that struck Mozambique in 2000-2001 resulted in extensive negative impacts on the economy, estimated at USD 600 million, leading to a nearly 6% decline in GDP. Additionally, approximately 100,000 hectares of crops were lost during this period. In 2007, 277,000 hectares of crops were destroyed. In 2015, floods and cyclone Chedza caused an estimated loss of USD 861 million. The country also faced a drought in 2016 due to El Niño, resulting in food insecurity for over 1.5 million people, and in 2017, cyclone Dineo affected nearly 550,000 individuals. Furthermore, in 2019, cyclone Idai led to losses estimated to be at least USD 800 million, with USD 260 million attributed to the agricultural sector (SA-TIED, 2020). These events emphasise the critical need for the development and implementation of effective policies to mitigate and adapt to climate change in Mozambique.

In addition to the direct economic damages resulting from climate-induced damage to agricultural production, there are also direct social impacts to the poor and vulnerable communities in Mozambique. The floods and droughts happening every year damage crops and lead to food insecurity, placing Mozambique at 106 of 116 countries in the 2021 Global Hunger

⁵ 1-in-10-year return period is equivalent to a 10% annual probability; 1-in-25 to a 4% probability; 1-in-50 to a 2% probability; 1-in-200 to a 0.5% probability and 1-in-250 to a 0.4% probability.

Index. Indeed, the World Food Programme estimates that around 3.15 million people in Mozambique are facing high acute food insecurity in 2023 and are in need of assistance.⁶

Domestic implications by regions or hotspots

In 2021, over 60% of Mozambique's population lived in coastal towns along the 2,500 Km-long coastline. This population has borne the brunt of seasonal tropical cyclones and floods. Inland areas, however, have experienced the worst of droughts and heatwaves, especially in the agricultural provinces.

The table below (Table 10) shows the geographic distribution of climate hazards and the crops that each at-risk area produces.

► **Table 10. Geographic distribution of main climate hazards and crops at risk**

Climate hazards	Impacted areas	Relevant crops (in terms of production)
Cyclones	Nampula, Inhambane, Sofala, Zambezia	Corn, rice, nhemba beans, oloko beans, jugo beans, peanut, cassava, cotton, sesame, banana, sorghum, sugar cane, boer beans, soy, sunflower, macadamia, cashew nut (trade).
Floods	Sofala, Tete, Zambezia, Manica	Corn, rice, sorghum, sesame, sugar cane, millet, manteiga beans, boer beans, soy, sunflower, avocado, tobacco, macadamia, cashew nut (trade).
Drought	Manica, Gaza, Zambezia	Corn, avocado, rice, boer beans, soy, sunflower, cassava, macadamia, cashew nut (trade).
High heat/ heat waves	Zambezia, Nampula, Maputo	Corn, rice, boer beans, cassava, soy, sesame, sunflower, macadamia, cashew nut (trade), nhemba beans, oloko beans, jugo beans, peanut, cotton, banana, papaya, sugar cane.
Wildfires	Niassa, Manica, Sofala	Corn, manteiga beans, cotton, tobacco, macadamia, avocado, rice, sorghum, sesame, sugar cane.

Sources: World Bank Disaster Risk Profile (2019), IOM DTM Report (2020), Marghidan et. al. (2023), OFESA (2013), MADER agriculture survey (2020).

Most farms in Mozambique are located in the Zambezia province, which also has the largest land area under agriculture (approximately 1 million ha). The other main agricultural areas are the Nampula and Tete provinces. These three provinces are the most at risk of cyclone, drought and flood damage to agriculture and therefore to the regional economy and farming populations.

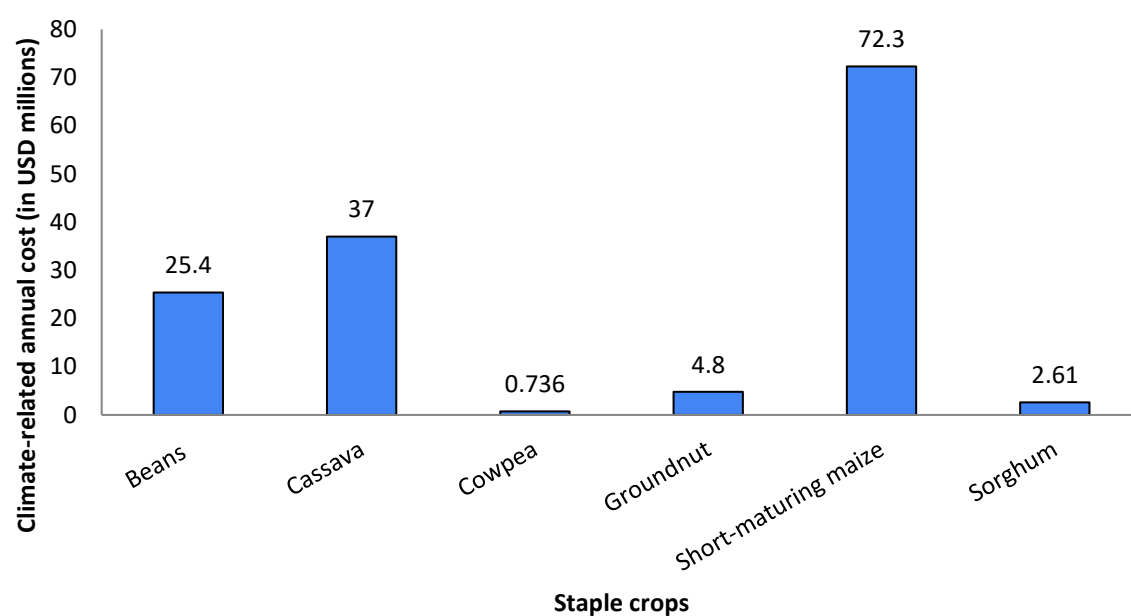
In addition to the general patterns, **it is essential to acknowledge the diverse effects of climate variables and subsequent crop suitability specific to each province. These provincial disparities necessitate the formulation of customised adaptation plans and strategies at the local level to promote agricultural development.** Notably, certain crops within the provinces of Niassa, Cabo Delgado, and Nampula are projected to witness minimal or even favourable changes in terms of crop suitability from the observed and projected increases in mean temperature. Conversely, the arid provinces of Maputo, Gaza, and Inhambane in the south, as well as the northwestern province of Tete, are anticipated to encounter adverse impacts across

⁶ This also accounts for internally displaced persons (IDP) from armed conflicts in the province of Cabo Delgado. As per WFP (2023). [WFP Humanitarian Emergency Response in Northern Mozambique Situation Update - July 2023](#).

almost all crops. These regions are likely to require substantial assistance and capacity-building initiatives to effectively manage the consequences of climate change on agricultural production and food security.

Figure 2 below presents the overall potential annual costs attributed to climate-related impacts on staple crops in Mozambique, as estimated by IFAD's 2020 study on Climate Change and Crop Suitability in Mozambique.

► **Figure 2: Potential annual costs attributed to climate-related loss in staple crops**



Source: IFAD

The vulnerability of farmers to climate-related risks depends on two key factors: the influence of climate change on crop production and the adaptive capacities exhibited by local communities in managing and addressing these risks. Findings from the comprehensive study conducted by the IFAD indicate that the provinces of Maputo, Gaza, and Manica exhibit the highest scores in terms of adaptive capacity (Table 11). These provinces demonstrate significant potential to effectively respond and adapt to the impacts of climate change. Conversely, the provinces of Niassa, Zambezia, and Nampula are projected to possess comparatively lower adaptive capacities, suggesting a greater vulnerability to climate-related risks in these regions.

► **Table 11. Ranked adaptive capacity (AC) indicator scores for all provinces**

Contribution to index	Adoption of improved agricultural practices (%)	Access to alternative income (%)	Access to agricultural information (%)	Education (% literacy rate)	Adaptive capacity score	Adaptive capacity rank
	50%	17%	17%	17%		
Cabo Delgado	3.2	39.9	62.7	22.4	22.4	7
Gaza	5.5	58.5	64.9	18.6	26.4	2
Inhambane	8.5	40.6	63.9	18.9	24.8	5

Contribution to index	Adoption of improved agricultural practices (%)	Access to alternative income (%)	Access to agricultural information (%)	Education (% literacy rate)	Adaptive capacity score	Adaptive capacity rank
	50%	17%	17%	17%		
Manica	10.4	36	69.1	16.2	25.4	3
Maputo	9.2	61.1	91.1	28.6	34.7	1
Nampula	3.3	33.2	61.4	14.9	19.9	10
Niassa	5.4	40.9	57.3	13.3	21.3	8
Sofala	4.1	51.1	60.7	18.6	23.8	6
Tete	14.1	36.4	52.6	18.5	25	4
Zambezia	2.2	37.2	70.4	10.9	20.9	9

Source: IFAD

The assessment of adaptive capacity (AC) scores reveals that smallholder farmers in Maputo, Gaza, and Manica provinces possess the highest overall capacities to effectively respond to the impacts of climate change, ranking 1st, 2nd, and 3rd, respectively. Conversely, Niassa, Zambezia, and Nampula provinces exhibit the lowest overall AC scores, ranking 8th, 9th, and 10th, respectively. Consequently, these provinces are expected to have the least capacity to respond and adapt to the climate change-related impacts that may arise.

4.1.2 Transition risks and their economic implications

In an effort to mitigate the growing impacts of climate change on the country, the Government of Mozambique devised emissions reduction strategies in its updated Nationally Determined Contribution (NDC) 2020-2025. The overall goal of these strategies is to reduce the country's greenhouse gas (GHG) emissions by about 40 million tonnes CO₂ equivalent (tCO₂eq) between 2020 and 2025. These strategies have begun implementation and driven **total GHG emissions down to 81.29 million tonnes CO₂eq in 2021 from 83.23 million tonnes CO₂eq in 2019** (Figure 2).

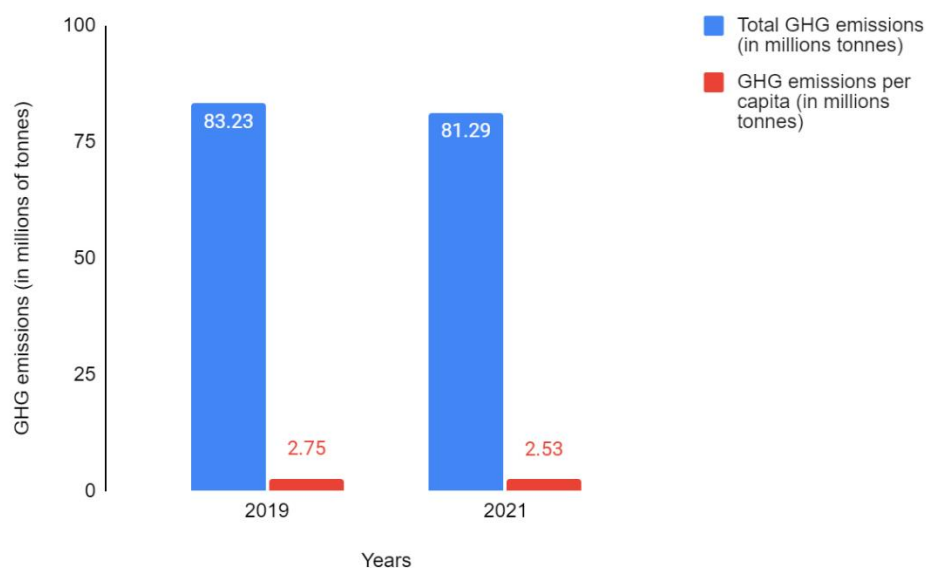
In the NDC, the main sectors expected to drive emissions reduction are Energy and Industrial Processes (including extraction and manufacturing), the latter sector being the backbone of Mozambique's economy and representing approximately 30% of the GDP.

As part of its NDC commitments, Mozambique has highlighted the extractive industry as one of the sub-sectors of interest in its mitigation strategy, emphasising the need to "ensure compliance with regulatory standards for emissions from extractive industry activities" and "encourage investors to evaluate GHG emissions in investment projects". The latter measure, if implemented, might have an impact on investment projects in fossil fuel industries such as the next phase of the multi-billion-dollar LNG project, coal production, aluminium production and other future investments.

The NDC does not, however, offer specific measures to directly address the emissions from the agriculture sector, which is the second largest contributor to national GHG emissions (Figure 3). The mitigative measure addressing the sector includes application and expansion of agricultural

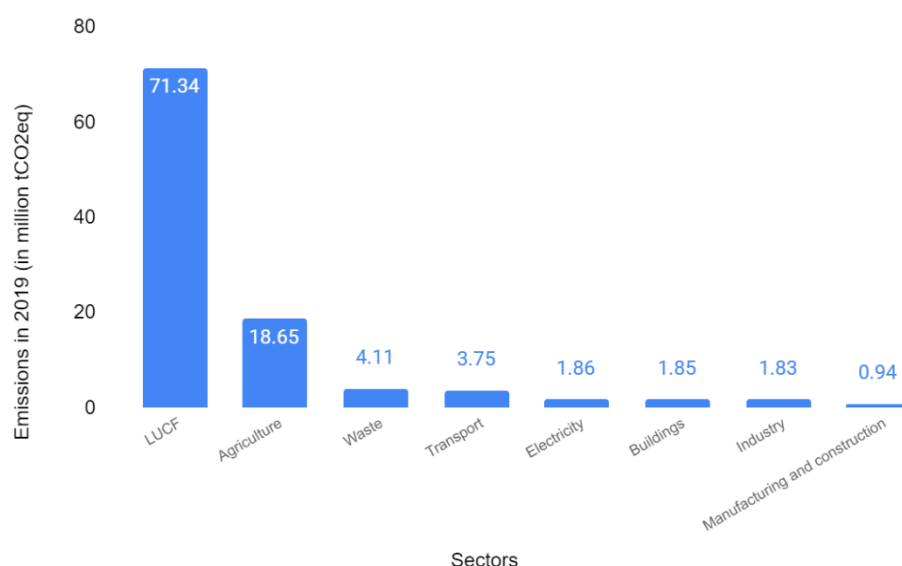
production techniques of a conservationist and soil protection nature, such as the use of direct planting.

► **Figure 2. GHG emissions in Mozambique (in millions tCO₂eq.)**



Sources: Our World in Data, 2022

► **Figure 3. GHG emissions per sector in Mozambique in 2019**



Sources: Our World in Data, 2022

Risks arising from global shifts to low emissions growth

In order to mitigate the growing effects of climate change globally, policies and strategies are constantly devised and implemented. This global shift to a low carbon development model carries risks to countries like Mozambique that rely on fossil fuel exports for their economic growth. On the IMF preparedness index, which assesses countries' varying degrees of preparedness for turning the risks of a low-carbon transition into opportunities for robust growth, **Mozambique**

scored a high 0.351 in exposure and a low 0.926 in preparedness. This high exposure is due to the country's over-reliance on LNG, coal and aluminium export.

Liquefied Natural Gas

Mozambique's economy is gearing up to be dominated by the extractives sector, particularly the oil and gas sector. The recent discovery of over 180 trillion cubic feet (TCF) of natural gas reserves in the Rovuma basin in the northern provinces of the country set in motion a new economic model based on liquefied natural gas (LNG) exports. In 2022, fossil fuels accounted for almost 50% of total exports from Mozambique⁷ and could soon account for considerably more as **the country is preparing to scale up its production and exports of LNG to Europe, having already begun exploiting the newly discovered LNG reserves.** These reserves are spread in two concessions: Area 1 and Area 4. The U.S. Export-Import Bank has pledged to provide a loan of \$4.7 billion of the \$24 billion investment into the Area 1 Mozambique LNG project led by TotalEnergies, while the Development Finance Corporation (DFC) has extended \$1.5 billion in sovereign risk insurance to Exxon Mobil's Area 4 Rovuma LNG project, collectively representing **the U.S. Government's largest investments on the African continent. Mozambique is expected to make an estimated USD 96 billion in revenues over the lifetime of the Rovuma gas reserves.**

Though the LNG project is expected to reach full capacity by 2024, producing 43 million tonnes and boosting GDP growth to 8% in the same year, its long-term viability is at risk. The European Union (EU), the main market for the LNG project, has been facing energy supply constraints due to the Russo-Ukrainian War and is expected to scale up its LNG imports from Mozambique as a substitute for the Russia-imported gas it had been relying on. This would be, in the short term, a positive development for Mozambique's economy. However, a declaration from the Council of the EU in March 2023 states that ***"The EU will systematically promote and call for a global move towards energy systems free of unabated fossil fuels well ahead of 2050"***. This move could potentially jeopardise Mozambique's LNG exports in the long term, with the International Energy Agency (IEA)'s World Energy Outlook (WEO) 2022 estimating a 15% decline in global demand for LNG by 2050 based on the Stated Policies Scenario (STEPS), which shows the trajectory based on current government policy and those under development. Global LNG demand, under the **Announced Pledges Scenario (APS), is expected to fall 10% lower than 2021 levels by 2030. In the Net Zero Emissions by 2050 (NZE) Scenario, demand falls by 20% to 2030, and is 75% lower than 2021 by 2050.**

Coal

Coal is the main export commodity of Mozambique, of which the country holds some of the world's largest untapped deposits. This represents an area of considerable prospective economic importance for Mozambique. The total coal reserves, mainly found in Tete province, were estimated by the Ministry of Mineral Resources and Energy (MIREME) to be around 38 billion tonnes in 2020. **The total exports were about 7.3 million tonnes in the same period, equivalent to 835 million MZN⁸.** This economic importance is at risk from global shifts to low emissions, however.

The WEO 2022's projections of lower global demand for fossil fuels estimate a 9% decline in demand for coal by 2030 and a 30% decline by 2050, under the STEPS. This decline is also expected to be much faster in advanced economies.

⁷ Fossil fuel exports from Mozambique in 2022 amounted to USD 4.2 billion out of a total export of USD 8.26 billion. As per [TrendEconomy \(2022\)](#).

⁸ 1 MZN (Mozambican Metical) = 0.016 USD on 10/08/2023.

Global coal demand, under the **Announced Pledges Scenario (APS)**, is expected to fall by 20% to 2030 and by 70% to 2050. Demand in advanced economies would decline by 65% to 2030 as coal use in the power and industry sectors falls rapidly. **In the NZE Scenario, global coal demand falls by 45% to 2030, with a 75% decline in advanced economies and a 40% decline in emerging market and developing economies.** Unabated coal use drops by 99% between 2021 and 2050.

Aluminium

Mozambique's second largest export is aluminium, for which it exported approximately 278,000 tonnes metric in 2022, equivalent to USD 1.46 billion, making Mozambique the world's 13th largest exporter of aluminium. **This economic model could be at risk of the European Union's Carbon Measure Adjustment Mechanism (EU-CBAM), however. The CBAM applies to EU imports of aluminium, which is one of Mozambique's largest exports to Europe. The continent is also the main destination for Mozambique's aluminium export, making it a key player in the economic model.**

Though Mozambique's aluminium production is powered by clean energy, this clean model could change in the near future. Mozambique's aluminium production, carried out by the smelter Mozal, is currently powered by hydropower from the Hidroelétrica de Cahora Bassa (HCB) hydroelectric power generator through South Africa's utility giant Eskom. However, Mozal's reliance on electricity transmitted from HCB via Eskom poses a challenge, as Eskom mostly generates electricity from coal.

Despite using clean energy for now, Mozal faces uncertainty in its power supply due to its contract with Eskom expiring in 2026. This coincides with increasing demand for green energy in the region, potentially leading to competition for HCB's hydropower. Additionally, Mozambique's growing gas industry, including Total's plans for a gas power plant near Mozal, could threaten its clean energy reputation and potentially result in higher taxes on exports to Europe under the EU-CBAM.

Risks associated with national commitments to reduce emissions

As a Party to the Paris Agreement, Mozambique has introduced its own national commitments to reduce emissions in its updated NDC. In this document, the national mitigation goal is a reduction of GHG emissions by 40 million tonnes CO₂ equivalent (tCO₂eq) between 2020 and 2025. The main sectors expected to drive this emissions reduction are Energy and Industrial Processes.

The NDC does not, however, offer specific measures to directly address the emissions from the agriculture sector, which is the second largest contributor to national GHG emissions. The main mitigative measure addressing the sector is the application and expansion of agricultural production techniques of a conservationist and soil protection nature, such as the use of direct planting.

4.1.3 Transition opportunities and their economic implications

Green mining

The extractive industry has played a significant role in driving economic growth; however, its linkages to other sectors have proven to be weak, and its contribution to formal employment has been limited. Despite initial expectations that the demand generated by megaprojects such as the LNG project would stimulate domestic manufacturing, a substantial portion of this demand was met through imports. Consequently, the manufacturing sector experienced a decline in its share of output, dropping from 13% in 1997 to 8% in 2019, which is below the Sub-Saharan African average of 10%.

With the growing global demand for clean energy technologies and the EU's commitment to phasing out fossil fuels, Mozambique is in a unique position to benefit from this transition due to its considerable reserves of the natural resources used in the construction of those clean energy technologies. Indeed, Mozambique is already one of the leading countries in the exports of aluminium, an important component of solar panels and wind turbines, which is made from bauxite -of which Mozambique holds some of the largest deposits. Mozambique is also estimated to hold almost half of the world's reserves of graphite, a commodity for which demand is expected to increase fivefold to meet growing global demand. Graphite is used in batteries necessary for energy storage.

Mozambique is already experienced in mining these resources and has an established, albeit relatively small, skills base. The sectoral growth from global demand could transform the country's economic landscape.

However, the manufacturing sector has not been a great creator of job opportunities, accounting for only approximately 5% of total employment. The lack of strong intersectoral linkages between the extractive industry and other sectors has imposed limitations on its broader economic impact. These limitations can be attributed in part to inadequate infrastructure and significant geographical distances, particularly between regions with high agricultural potential and population density (centre and north) and regions with substantial consumer demand (urban south). These factors have hindered the establishment of robust connections and hindered the industry's ability to contribute more effectively to the overall economy.

Coffee agro-processing

While the industries and services sectors are concentrated in the southern region, the central and northern regions are still dominated by agriculture. It is estimated that over half of the Mozambican population will still be living in rural areas by 2040, making agriculture the main sector of employment for most of the population for decades to come. In order to increase productivity in the sector, Mozambique has recognised through its NDC the need to promote integrated agroforestry systems to restore degraded areas affected by shifting cultivation. Agroforestry represents a dimension of improving agricultural productivity through the national commitment to lower emissions as it serves both a climate mitigating purpose and an economic prospect. This provides the rationale for the economy of Mozambique to increase agricultural productivity by diversifying the sector through agro-processing.

A promising area that combines both economic aspirations and environmental concerns is the growing coffee sector. Indeed, coffee farmers in Mozambique have been adopting agroforestry as they intercrop the coffee trees with native hardwood trees to give coffee the shade it needs to grow. The Gorongosa National Park reported in 2021 that around 50,000 rainforest trees are planted every year on Mount Gorongosa by the farmers as part of their agroforestry practise. This increases productivity and forest cover while ensuring that land is not lost to agriculture but instead farming is incorporated into a fully functional ecosystem.

The agro-processing sector for coffee encompasses a range of activities involved in the conversion of coffee from its raw state into value-added products. This sector involves multiple stages, including farming, cleaning, sorting, roasting, grinding, packaging, and quality control. **Agro-processing plays a crucial role in enhancing the value of coffee beans, thereby improving their marketability and creating opportunities for diversification and economic growth within the coffee value chain.** The participation of various stakeholders, such as smallholder farmers, cooperatives, private sector entities, and supporting institutions, is integral to the functioning of this sector.

The demand for coffee is anticipated to experience consistent growth in the upcoming years, driven by both domestic consumption and international markets. Particularly, **the global**

demand for specialty and high-quality coffee is on the rise, presenting an opportunity for Mozambican coffee to expand its market share. Leveraging its sustainable and environmentally friendly coffee production practices, Mozambique can further differentiate its coffee offerings in the market. This distinction allows companies to position themselves as responsible and attractive suppliers in the global market.

Sustainable forest products

Mozambique, a nation boasting substantial forest coverage, faces a critical juncture due to unsustainable practices endangering this invaluable resource. At the heart of the challenge lies the intricate interplay between forest preservation, wood processing, and the burgeoning green construction sector within the forestry industry.

The nexus between forest coverage and the burgeoning wood processing sectors offers a compelling avenue for sustainable development. While plantation forests predominantly supply the raw material for wood processing, there is an emerging potential to engage smallholders in this process, amplifying economic opportunities within local communities. **However, the pressing concern of rampant logging executed without proper planning, regulation, or management threatens the delicate equilibrium of these ecosystems.** This unfettered exploitation not only exerts undue pressure on protected species but also **renders vast expanses susceptible to fires, amplifying environmental hazards.**

Intrinsically linked to Mozambique's GDP, the forest sector contributed approximately \$330 million in 2011, providing employment to over 22,000 individuals. Beyond mere economic figures, forests play a pivotal role in furnishing local communities with essentials such as sustenance, energy, medicine, and construction materials. **Miombo woodlands, for instance, are indispensable, contributing nearly 20% of household cash income and 40% of subsistence income in certain rural areas.**

The quest for sustainable forest management hinges on a paradigm shift in land use behaviour, necessitating substantial investments to encourage holistic, long-term practices over short-term gains. A conspicuous challenge stems from the discord between customary land rights and official land allocations, resulting in conflicts between communities and forestry operators. This land rights quagmire has not only dented community involvement but also eroded foreign investment prospects, thus fostering mistrust and insecurity.

The trajectory to sustainable forest management and responsible wood processing entails collaborative efforts among national stakeholders, policymakers, and local communities. Integrating community voices in land acquisition processes, bolstering consultation during land rights-granting, and harmonizing customary and official land rights are pivotal steps to mitigate conflicts and engender trust. Embracing a holistic approach, underpinned by sound regulation, strategic planning, and targeted financing, holds the potential to safeguard Mozambique's forests, fortify its green construction endeavours, and foster a harmonious relationship between economic growth and environmental conservation.

Mozambique's pioneering achievement as the **first recipient of payments from The Forest Carbon Partnership Facility (FCPF)** reflects its proactive stance against deforestation and efforts towards afforestation. **The potential receipt of up to \$50 million holds the promise of enabling the reduction of an impactful 10 million tons of CO₂ emissions in the ecologically significant Zambezia Province by 2024.**

Domestic market demand for higher value uses of wood products supplied by plantation forestry—such as timber, artisanal construction beams, and value-added products such as treated utility poles—is currently modest. However, demand for these products is projected to

grow rapidly: **Industrial roundwood (i.e., logs) use in Mozambique is expected to increase from 2.4 million m³ in 2014 to 6.3 million m³ in 2040** (World Bank 2016).

The nation's **competitive edge in labour and land costs**, considerably lower than that of South Africa, Brazil, and Uganda, positions Mozambique as an **enticing investment hub for domestic and international investment**. However, Mozambique's forestry progress faces hurdles stemming from the muted growth of tree volume due to climate-induced deforestation and soil degradation. This has raised the cost of production, necessitating an integrated approach that harmonizes economic aspirations with environmental concerns.

4.2 Labour market implications

4.2.1 Physical climate risks and their effects on the labour market

The agriculture sector is Mozambique's largest employer and the most threatened by climatic events. **With over 70% of the country's labour force, including 80% of the total female labour force, being employed in the agriculture sector, the physical climate risks to the sector have a direct impact on the labour market.** From cyclones and floods alone since 2001, hundreds of thousands of hectares of crops have been destroyed, directly affecting the mostly smallholder farmers. A total estimated 4.04 million farmers working in Mozambique are increasingly at risk, though the full number is difficult to accurately assess due to the informality of the sector. The INE's 2021 Mozambique Informal Market Survey (IMI) estimated that about 95.7% of the total labour force worked in the informal economy, mostly in agriculture.

Productivity has also been impacted by climate change, particularly the increasingly frequent droughts which lead to reductions in yield, undermining the livelihoods of farmers and exacerbating existing socio-economic disparities in the country.

The need for adaptation is evident and measures have been identified to address the labour market impacts in the sectors, as outlined in the NDC, particularly:

- Dissemination of improved technologies for agricultural production, agroforestry systems, natural resource management, conservation agriculture, irrigation, vaccinations, artificial insemination, reduction of post-harvest losses and processing of plant and animal products, and food and nutrition education.
- Promotion of the use of integrated agroforestry systems to recover areas degraded by shifting cultivation.

In addition to damage to crops, there have also been damage to transport networks- particularly roads which are essential in connecting the labour market. The International Organisation for Migration (IOM) estimates in its 2020 Mozambique Disaster risk assessment that as much as 57% of localities in Mozambique might become inaccessible in the event of a natural disaster due to transport network damage, further isolating farmers from markets.

The table below (Table 12) provides an overview of the damages to transport networks (roads, railways and bridges) from the main climate hazards.

► **Table 12. Damages from main climate hazards to transport networks in Mozambique**

Climate hazards	Modelled frequency	Damages/losses (in USD)
Cyclones	1-in-25-year return period ⁹ 1-in-50-year return period 1-in-250-year return period	1,500 km exposed 3,500 km exposed 8,500 km exposed
Floods	Average annual loss 1-in-25-year return period 1-in-50-year return period	300 km exposed 650 km exposed 1,000 km exposed

Source: World Bank Disaster Risk Profile for Mozambique

4.2.2 Transition risks and their labour market implications

In addition to the impact of climate change on the labour market, a global and national transition to a low-carbon economy carries significant implications for the labour market in Mozambique. The country's second fastest growing employment sector after the services sector is the industries sector (9.2% of the total labour force) which is gearing up to be the largest contributor to Mozambique's GDP and the driving force behind its economic future. This economic growth is due to the reliance on the extractive industry, particularly the LNG project, which could see its growth halted as the world moves to phase out fossil fuels.

The EU's move to phase out fossil fuels by 2050 would jeopardise the growth of the extractive industry and its labour market, especially since the sectoral growth would indicate higher employment opportunities. There are thousands of prospective jobs threatened by the transition, including the 35,000 Mozambicans being trained by LNG project developers TotalEnergies as part of their commitment to providing training and employment to local communities in Northern Mozambique. TotalEnergies also boasts an 83% representation of Mozambicans in the project workforce.

In terms of employment in the extractives sector, it is difficult to obtain accurate and up-to-date information. In 2020, an information collection form was issued to extracting companies operating in Mozambique and a total of 10,852 people were employed, of which 9,999 were in the mining sector and the remaining 853 in the hydrocarbon sector. An estimate 76% of the employed were men and 24% women, and it should be noted that three large companies (the companies Africa Great Wall Mining Development Company, Lda, Cimento Nacional, Lda and Empresa Moçambicana de Exploração Mineira, S.A) did not present data relating to employment.

There were also an estimated 1,344,522 people formally and informally working in the industries sector at large in Mozambique in 2021, of which an estimated 730,719 were employed to varying degrees in manufacturing. Since the extractives sector linkages to other sectors have proven to be weak, the potential spillover effects of declining demand to other sectors of employment in Mozambique is limited.

4.2.3 Transition opportunities and their labour market implications

Sustainable forest products

As women are often underrepresented in the forestry sector (including wood processing and manufacturing), most jobs created in the sector are likely to be filled by men. The labour force

⁹ 1-in-10 year return period is equivalent to a 10% annual probability; 1-in-25 to a 4% probability; 1-in-50 to a 2% probability; 1-in-200 to a 0.5% probability and 1-in-250 to a 0.4% probability.

employed (mostly men) are also likely to be those already engaged in illegal/unregulated logging. They represent a labour force that may be equipped with the necessary skills that can be transferred to sustainable exploitation of forest resources for processing and manufacturing.

The skills needed to realise this opportunity are in logging, sawmilling, veneer production, furniture and construction material manufacturing, carpentry, and other related activities such as transforming wood waste and biomass to other items. Up-skilling workers in the necessary skills can lead to higher wages due to the value-added nature of the work. The logging/sourcing of sustainable forest products would also be codified and formalised. This makes the jobs created for the production/delivery of sustainable forest products (from wood processing and manufacturing) likely to be formalised, higher paid and better protected.

Coffee agro-processing

The coffee sector also presents potential for generating and expanding green jobs, utilising organic farming methods, promoting agroforestry, implementing water conservation techniques, and investing in renewable energy for processing facilities. Coffee processing plays a crucial role in enhancing climate change adaptation and mitigation efforts by incorporating shade trees and practising agroforestry, which sequesters carbon, reduces deforestation, and enhances biodiversity. Moreover, coffee production contributes to building resilience against climate change impacts through the adoption of climate-smart agricultural practices, diversification of coffee varieties, improvement of soil health, moisture retention, and crop resilience, enabling farmers to better withstand adverse weather conditions.

While the coffee sector in Mozambique is currently in its early stages, it holds tremendous potential for rural households to transition from low-productivity agriculture to high-value cash crops. Transitioning smallholder farmers into activities connected to larger producers in agribusiness value chains through contract-grower schemes shows great promise for improving their productivity. The sector presently employs only a few thousand farmers, primarily concentrated in Sofala, Manica, Niassa, and Cabo Delgado, where coffee production potential is highest and historically prevalent (particularly in Manica along the border with Zimbabwe). **Coffee production predominantly follows inter-cropping practices, where farmers incorporate coffee as a value-added crop alongside existing ones, resulting in increased incomes and soil nutrition benefits. In order to adapt to drought, farmers could introduce the varieties Liberica and excelsa, both capable of growing in warmer conditions than the arabica and robusta varieties.** These climate-resilient varieties would offer an alternative to farmers in a changing climate and follow the country's commitment to promoting integrated agroforestry systems to restore degraded areas affected by shifting cultivation, as articulated in the NDC.

However, notable limitations include the lack of adequate agriculture and business skills among farmers, as well as their limited access to financing. Smallholder farmers face significant constraints in accessing essential services, impeding their productivity and integration into value chains. The World Bank's estimation in 2020 revealed that out of the 4.3 million small and medium-sized farms in Mozambique, only a small fraction received technical advice or extension services, had access to price information, or were able to obtain credit. Overcoming these limitations requires comprehensive solutions across different value chains, including the facilitation of supporting services. Such services encompass access to pertinent production, processing, and marketing information, as well as training and inputs.

A notable opportunity for sustainable growth in the labour market is the inclusion of women. **To promote more inclusive economic growth in Mozambique, it is crucial to prioritise regional, sectoral, and gender-focused initiatives aimed at accelerating job transitions in high-potential labour-intensive industries.** While progress has been achieved in the country's job

transformation process, the majority of advancements have been concentrated in the capital city and its surrounding province. This concentration of employment opportunities has resulted in significant disparities in poverty indicators across regions, highlighting the need for strong measures to develop secondary cities and establish economic links with rural areas. Additionally, efforts must be made to ensure the inclusion of more women in the jobs transformation process, as they have disproportionately benefited less than men. The UN 2021 Common Country Analysis (UN-CCA) of Mozambique found that women are less likely than men to work in the small formal sector and are paid less. Overall, in the 12% of workers that receive a wage, 80% are men while the female-to-male wage ratio is 64%. Women are also more prevalent in the informal sector, making up 59% of informal workers.

In Mozambique, underemployment is high among rural women, who are more likely to be engaged in smallholder agriculture than men. Women are poorly represented in non-agricultural jobs, partly due to their lower levels of education. Achieving a more inclusive jobs transformation for women necessitates various measures, including improving access to appropriate education, challenging social norms and stereotypes surrounding gender roles, implementing training interventions specifically targeted at women, establishing a better jobs matching mechanism, and enhancing soft skills development.

► **Box 2. Coffee agro-processing in creating employment and empowering communities: case study from Vietnam**

In northwestern Vietnam, collaboration between women's unions from nine provinces and local NGOs has empowered women and supported 65 Village Savings and Loan Associations engaged in coffee production and marketing. This initiative involves over 10,000 farmers and has the potential to sequester 1 Mt of carbon across 20,000 hectares, benefiting approximately 350,000 indirect beneficiaries, with 50% being ethnic minority women.

Additionally, transitioning from traditional monocultural coffee farming to coffee-based agroforestry systems has the potential to improve coffee quality, regulate the microclimate for climate adaptation, and sequester carbon both above and below ground. The World Agroforestry Center (ICRAF) and CARE International, in collaboration with government and non-governmental entities in Vietnam, have empowered women through training in gender education, financial literacy, and coffee agroforestry practices.

ICRAF's innovative "Training for Trainers Materials" incorporate indigenous knowledge and climate change adaptation strategies into coffee-based agroforestry. These materials cover the establishment of agroforestry systems, climate-smart techniques, and comprehensive guidance on coffee harvesting, processing, storage, and marketing, with the aim of reducing gender disparities.

While women are significant players in Vietnam's coffee industry, their participation in coffee markets is limited compared to men. Enhancing women's involvement in agroforestry-based coffee production and market participation aims to empower them, improve their livelihoods, and contribute to climate change mitigation and adaptation. The introduction of shade trees in coffee production creates a more favourable microclimate, reduces irrigation reliance, fosters carbon sequestration, and provides employment opportunities, particularly for women.

Source: CGIAR CGSpace 2021

In the extractives sector, green mining is expected to be an area of global focus as the demand for graphite and other minerals used in clean technology is predicted to increase fivefold. With Mozambique having considerable natural reserves of these minerals, a scaling up of green mining, specifically graphite and aluminium production, could lead to higher employment opportunities for the local population.

In order to capitalise on the upcoming opportunities in green mining and related processing, it is imperative to enhance the skills of Mozambique's labour force. Currently, there is a mismatch between the skills imparted by Mozambique's education system and the skills required by firms in these fast-growing sectors. Although there has been an increase in the proportion of students enrolled in sciences, engineering, agriculture, and health programs in public institutions from 18% to 26% over the past decade, this is insufficient to meet the evolving needs of the country. In private higher education institutions, which account for approximately 40% of total higher education enrolment, only 5% of students are enrolled in engineering and related disciplines.

Several barriers hinder the development of a skill mix that is more suitable for Mozambique's evolving development needs. One key barrier identified in the 2021 World Bank Mozambique jobs diagnostic is the limited capacity of Mozambique's technical and vocational education and training (TVET) system to produce enough workers with the requisite skills demanded by firms. This is partly due to the traditional, publicly delivered, supply-driven approaches followed by TVET institutions. As noted in the Mozambique Systematic Country Diagnostic (SCD), in 2016, less than 1% of all students in the national education system were enrolled in TVET institutions. Furthermore, Mozambique's public expenditure on TVET, accounting for only 3.5% of the government's total education budget, is one of the lowest in the Sub-Saharan African region. Given the country's tight fiscal situation, there is limited scope for expanding the public provision of TVET services, highlighting the need to rely more on private sector delivery systems.

The lack of specialised skills poses a constraint for firms in Mozambique, with close to 40% of enterprises employing at least five workers relying on foreign managers or professionals. This is particularly evident in the extractives, retail, and other service sectors, where more than half of the firms have foreigners in management or mid-level professional roles. Larger firms, when hiring, often express dissatisfaction with the skills of applicants. On average, firms face nearly nine weeks of vacancy for managerial positions and approximately eight weeks for mid-level professional positions.

Mozambique has initiated a major reform program in its technical and vocational training system, which has the potential to address these shortcomings. Experiences from TVET programs elsewhere indicate that such programs are more likely to succeed when there is a stronger alignment with firms' demand for skilled labour. A key aspect is identifying a training approach that incorporates practical training or internships within the industry or the utilisation of apprenticeship models in collaboration with experienced firms. Testing the market relevance can be achieved by placing trainees in paid jobs. With more foreign companies being expected to enter the green mining market in Mozambique, the Mining Act stipulates that an awarded mining contract must contain clauses concerning local employment and technical vocational training plan, which would positively impact the local labour market.

4.3 Poverty and inequality implications

4.3.1 Physical risks and their poverty and inequality implications

As the poorest and those at the lowest end of the income distribution in Mozambique are informally employed in the agriculture sector, the losses in productivity directly affect them the most. This segment of the population, representing the majority of Mozambique's rural

population, consists of smallholder farmers who mostly engage in subsistence farming. **This population experiences the brunt of food price hikes which result from climate-induced low productivity.** Following the cyclones that hit Mozambique in 2021-2022 and the severe drought conditions in central and southern provinces, the World Food Programme (WFP) conducted research on local food prices in April and May 2022 and found an increase in the prices of staple foods directly following the climatic events.¹⁰

While prices typically decrease during this period with the incoming harvest, the combined impact of these events resulted in mixed price trends across different commodities and provinces in Mozambique.

The overall price of four main food commodities - rice, cassava, vegetable oil, and brown sugar - exhibited an increase of nearly 4% compared to April 2022. Furthermore, with the exception of white maize and groundnut, all commodities experienced price spikes when compared to prices recorded in December 2021.

While the price of white maize showed a decreasing trend in the months prior to May, likely due to higher availability during this season, it remained significantly higher than in May of the previous year, with a notable increase of 42%. Vegetable oil prices continued to rise, with an overall increase of 42% compared to May 2021 and a 27% increase compared to December 2021. Cabo Delgado experienced the highest increase in vegetable oil prices (161%), followed by Zambezia, Niassa, Tete, Sofala, and Gaza provinces, respectively. Additionally, the price of local brown sugar increased in Zambezia, Inhambane, and Gaza provinces compared to December 2021.

Niassa, Cabo Delgado, Zambezia, Manica, and Tete provinces exhibited higher variations in prices for the main food commodities compared to other provinces, indicating greater volatility in those regions.

Overall, the combined impact of cyclones and drought resulted in an intricate price landscape for various food commodities across the provinces of Mozambique, disproportionately affecting the poorest. Agriculture is the main source of income for rural households, but most remain net food consumers. Though the rural poorest farm largely for self-consumption, they remain net food consumers, meaning that increases in food prices affect them negatively.

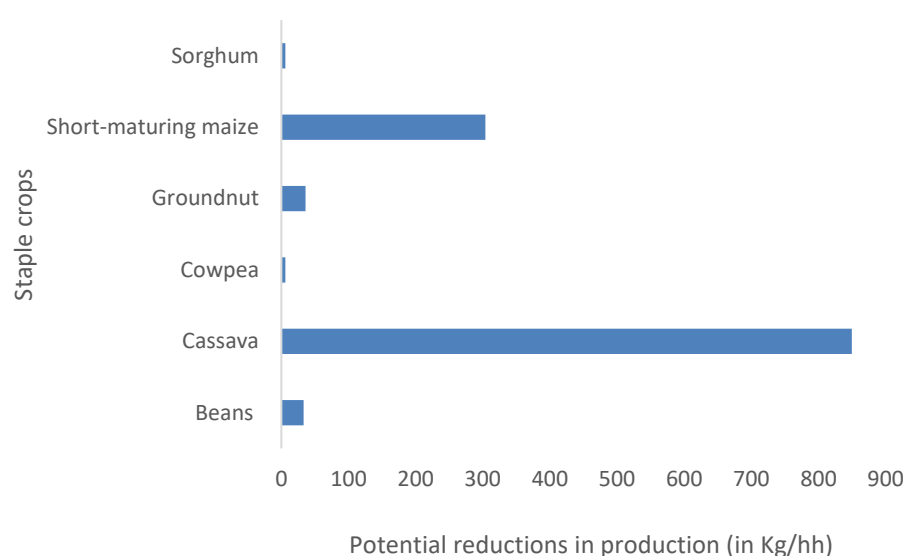
In terms of the household-level impact of climate-induced reductions in productivity of staple crops, the IFAD study on Climate change and future crop suitability in Mozambique identifies how the country's farming community is expected to suffer, disaggregated by region and staple food. With the **average household making an estimated USD\$ 49.84¹¹ on average in 2015 from agricultural trading, any loss in productivity is likely to exacerbate the existing poverty and contribute to food insecurity.**

Figures 3 and 4 below present the potential climate-related changes in annual household production of staple crops and the potential costs associated with reduced production, respectively.

¹⁰ This study also takes into account the effects of the war in Ukraine which may have also contributed to the price increases.

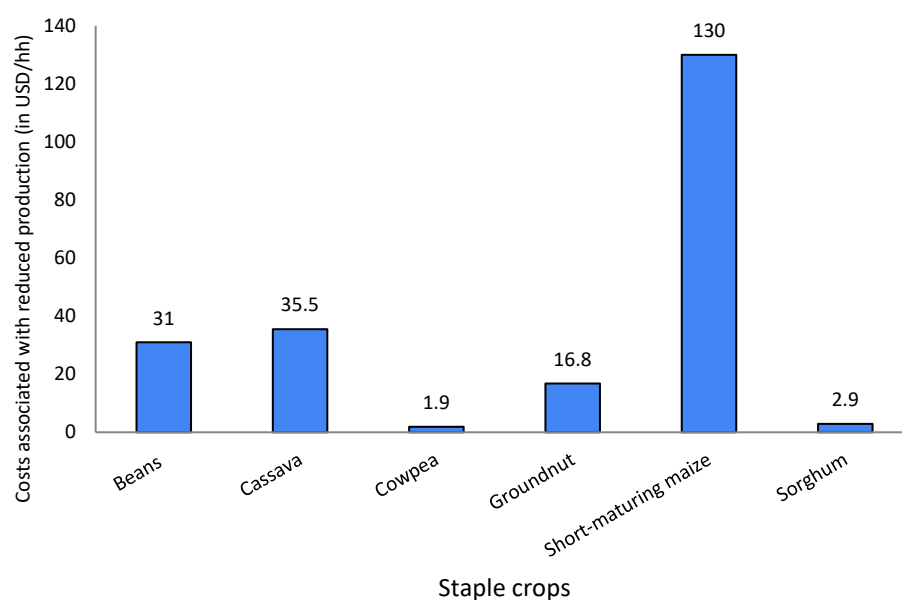
¹¹ This gross income is based on 2015 figures in 2015 USD PPP.

► **Figure 3: Potential changes in annual household production of staple crops**



Source: IFAD (2020). Climate Change and Future Crop Suitability in Mozambique

► **Figure 4: Potential costs associated with reduced production of staple crops**



Further considerable risks associated with a national low-emissions transition affect the agricultural sector, the sector in which those at the lower end of the income distribution are employed. **As climate-smart agriculture (CSA) has not been mainstreamed in the sector, most farmers still engage in traditional unsustainable slash-and-burn agricultural practices.** There is little knowledge of CSA practices such as intercropping, mulching, direct seeding and manure/livestock waste management. These farmers contribute to the high GHG emissions from the sector, the second highest sectoral emissions in the country.

Most of these farmers are impoverished small-scale farmers who primarily produce for subsistence and face significant challenges in accessing productive assets, agricultural finance, new technologies, and markets, which are essential for enhancing productivity and increasing incomes. Insufficient mechanisation and reliance on traditional tools further

hinder production and productivity, with most farmers relying on hand hoes or ox-drawn implements for their daily farming activities.

Furthermore, the adoption of fertilisers, pesticides, improved crop varieties, and other purchased inputs remains low due to high costs, limited availability in local markets, and inadequate knowledge about their benefits and proper usage. Fertiliser and pesticide usage, as well as irrigation practices, are concentrated in the central and southern regions, primarily for sugarcane production, while most agricultural activities (80%) are concentrated in northern and central regions. This reliance on rainfed methods renders them highly vulnerable to weather and climate-related risks.

Access to formal extension services by farmers has been limited, with no more than 15% estimated to have received such services annually between 2000 and 2008, and a mere 8.6% in 2009/10. In 2018, the country had a total of 2,875 public and private extension workers, significantly below the optimal number required for effective service provision. **This inadequacy restricts farmers' access to technical advice on implementing new technologies and best practices that could substantially improve productivity.** The

Access to agricultural credit services is also low, particularly in rural farming communities, which inhibits investments in new technologies and the maintenance of capital-intensive practices.

There are national policies that aim to address the issues faced by the farmers, such as the Strategic Plan for the Development of the Agriculture Sector (PEDSA) 2011-2020, which aims to enhance the competitiveness of the agriculture sector.

4.3.2 Transition risks and their poverty and inequality implications

Though not being among the largest sectors of employment, the sectors at risk from a shift to a low emissions development pathway are still employing some of the poorest in Mozambique. Indeed, the extractives sectors have been training and employing local labour and their decline would threaten these employment opportunities. **Most mines are located in the northern and central provinces and employ the rural population of those areas, particularly in Cabo Delgado, Nampula, Tete and Zambezia. These are also ranked as the poorest provinces in the country.**

The most relied on yet at-risk sub-sector of the extractives is the LNG project located mostly in the northern province of Cabo Delgado, which is also the poorest province in Mozambique, a level of poverty that was exacerbated by the ongoing terrorist insurgency in the region. **The impoverished population of Cabo Delgado would suffer disproportionately from any loss of employment in the growing LNG project.**

4.3.3 Transition opportunities and their poverty and inequality implications

Sustainable forest products

Most prospective employees needed to exploit this opportunity would be rural farmers and plantation workers. As most of the forest coverage is in the rural areas where most of the poorest live, wood processing and manufacturing of sustainable forest products provide employment opportunities that may be better than traditional agriculture they would otherwise engage in.

While plantation forests predominantly supply the raw material for wood processing, there is an emerging potential to engage smallholders in this process, amplifying economic opportunities within local communities. However, a notable hurdle arises from the divergence between traditional land rights and formal allocations, leading to clashes between local communities and

forestry operators. This complex land rights issue has not only hindered community engagement but also undermined prospects for foreign investment, intensifying distrust and instability.

The trajectory to sustainable forest management and responsible wood processing entails collaborative efforts among national stakeholders, policymakers, and local communities. Integrating community voices in land acquisition processes, bolstering consultation during land rights-granting, and harmonizing customary and official land rights are pivotal steps to mitigate conflicts.

Agroforestry and coffee agro-processing

The World Bank estimated in 2022 that agricultural growth would decrease poverty and inequality over three times faster than growth in any of the other sectors in Mozambique. An increase in productivity would serve the double function of improving food security and providing farmers with higher income. In a developing nation undergoing a transition, it becomes crucial to identify strategies that foster sustainable agricultural improvement while addressing the challenges posed by climate change, particularly for the vulnerable agriculture sector. Mozambique, in its NDC, has emphasised the necessity of promoting integrated agroforestry systems to restore degraded areas affected by shifting cultivation. Scaling up agroforestry endeavours can prove highly advantageous, especially for the most impoverished communities in the country.

Agroforestry systems offer numerous benefits, particularly to smallholder farmers, including significant positive impacts on women in this sector. By adopting diversified cropping practices and integrating tree planting, farmers can enhance their income and food security while reducing their reliance on increasingly costly inputs such as fertilisers and pesticides.

Furthermore, agroforestry systems play a pivotal role in biodiversity conservation. Introducing native trees amidst coffee crops fosters the growth of diverse plant species and creates habitats for various animals, including endangered species. Additionally, these systems contribute to climate change mitigation by sequestering carbon in the soil and reducing greenhouse gas emissions. Trees effectively absorb carbon dioxide from the atmosphere, storing it in the soil, thus not only mitigating climate change but also enhancing soil fertility and overall productivity.

Coffee presents a substantial opportunity for rural households to transition from low-productivity agriculture to high productivity and lucrative cash crops. The sector holds the potential to have a significant impact on impoverished rural households, particularly in the northern and central regions where the majority of farmers are located. **By engaging in coffee cultivation, processing, and trading, households can gain access to global markets, thereby increasing their incomes and improving their living standards.**

Engaging in the coffee sector provides opportunities for value addition and diversification within the agricultural sector. This, in turn, leads to increased economic activity and facilitates further development of skills and higher incomes, particularly in rural areas. Farmers in Mozambique are already familiarised with many of the techniques required for agroforestry and are well-positioned to acquire skills in agro-processing, which remains in their sector of employment. While the employment generated may not always be in formal sectors, it acts as a steppingstone towards poverty reduction. By leveraging the potential of coffee, rural households can enhance their economic prospects and improve their livelihoods.

Green mining

The transition opportunities offered by green mining carry potential for significant implications for poverty alleviation in Mozambique. Indeed, the Mining Law of 2014 mandates that a portion of the mining revenues be directed towards community development in the project areas. These funds must be allocated to priority projects in collaboration with the Locality Consultative Councils, Provincial Directorate of Planning and Finance, and District Service. The District

Secretariat holds responsibility for managing and ensuring the appropriate utilisation of these allocated resources to:

- Education (classrooms and their equipment)
- Health (posts, health centres and their equipment)
- Agriculture (community irrigations/enterprises)
- Forestry (community forests)

Additionally, employment generation and social dialogue have the potential to positively affect the concerned communities. In the mining sector, paragraphs (c), (e), (f) and (h) in No 2 of Article 8 of the Mining Act stipulate that an awarded mining contract must contain clauses concerning:

- Local employment and technical vocational training plan
- Actions to be taken by the holder in the framework of social responsibility
- Memorandum of understanding between government, company and communities; and
- The extent to which communities in the mining area are involved in and benefit from the initiatives.

4.4 Key takeaways

Broadly speaking, there are two main avenues for increasing labour productivity, especially in the context of a just transition. The first approach entails greater investments and innovations, leading to elevated capital-labour ratios and accelerated total factor productivity growth. This, in turn, enhances the productivity of workers in their current employment activities. The second approach involves reallocating workers from sectors characterised by low productivity to sectors with higher productivity. In terms of sectors, this primarily entails the **transfer of labour from agriculture, which traditionally exhibits lower labour productivity levels, to the more productive industry and services sectors. Such a shift raises the overall average labour productivity and promotes equality in marginal labour productivity across sectors, thereby fostering inclusive growth.**

The main sub-sector of industry in Mozambique towards which such a shift can occur is currently the rapidly growing extractives sub-sector. **This includes a shift to green mineral extraction (graphite, bauxite, iron ore) from unsustainable coal mining and oil and gas production – particularly the growing Liquefied Natural Gas (LNG) production.**

Facilitating the process of structural transformation also necessitates agricultural reforms, as agriculture currently employs the largest share of the labour force in Mozambique and is also the most endangered sector by the effects of climate change. **It is imperative to enhance labour productivity within the agricultural sector, which involves both the creation of new and improved jobs in the industry and services sectors, including agro-processing through agroforestry, as well as advancements in the productivity of existing agricultural jobs.** This also ties into opportunities presented by the sustainable exploitation of forest resources, as an increase in the practice of agroforestry would support Mozambique's reforestation and afforestation efforts.

By pursuing these measures, Mozambique can effectively embark on a path of structural transformation, generating higher-quality employment opportunities while simultaneously boosting productivity in the agricultural sector.

5 Identifying policy recommendations

In this section, a review of the policies identified in the scoping of the national policy landscape and the extent to which they address the issues identified in chapter 3 and 4 is conducted. This review follows the guidelines of the Green Employment Diagnostic and is achieved through:

- The identification of policy level intervention needs through insights derived from the in-depth analysis in chapter 4. These needs are grouped into six key policy categories identified in the Green Employment Diagnostics, namely job-loss and social protection; labour market integration; labour-oriented adaptation; reskilling and training; job creation and economic diversification and strengthening. The six key policy categories capture the critical areas that would need attention in the context of climate change impacts on, and the transition of, Mozambique's economy.
- The identification of existing national policies which support these needs, through baseline insights derived from the Mozambique national policy landscape assessment.
- The assessment of gaps in these policies to be filled or built on for the formulation of relevant policies in the short, medium and long-term (Table 13).

Conducting consultations with the key stakeholders in Mozambique for the identification of policies is essential. These consultations are necessary for a comprehensive evaluation of the significance of policy options for future development, the strength and effectiveness of current policies, and the examination of their implementation status and viability. In-country consultations play a pivotal role in determining the priority of policies, pinpointing areas for improvement, and ascertaining the feasibility of proposed strategies.

An in-country workshop was held on the 31st of August 2023, where insights from key stakeholders were garnered for the validation of the proposed policy options below. There would be need for further engagement to facilitate the identification of pertinent entities responsible for implementation, relevant financial institutions, and the establishment of suitable monitoring mechanisms to gauge the progress and hurdles in executing the recommended policies.

► **Table 13. Identification of policy intervention needs in Mozambique**

Key policy categories	Key findings and intervention needs	What are the existing policies to support these areas?	Specific gaps/ shortcomings in existing policies
Job loss and social protection	- Agriculture, the main sector of employment, is threatened by climate change. Farmers are vulnerable and have low adaptive capacity. Policies are needed to help farmers increase productivity through CSA and/or transition into complementary forms of employment such as agro-processing. -In addition to social protection, active labour market policies (ALMPs) are needed to facilitate this transition.	The updated Nationally Determined Contribution (NDC) 2020-2030; the five-year government program (PQG 2020-2024); the National Employment Policy (NEP 2016); the National Economic and Social Plan (PES 2021).	- These policies do not comprehensively address the issue of social protection in a global and national transition. - The policies mention job loss protection but do not identify explicit measures/actions that are adapted to the Mozambican context, except for the NEP. - The NEP from 2016 is due to be updated to reflect the current post-covid labour market.
Labour-oriented adaptation	- Temperatures are increasing and are likely to affect farmers who work outdoors in rural areas. It is important to train workers and supervisors on how to control heat stress and to recognize symptoms of heat illness.	The NDC, the PEDSA, the PQG, the PES.	- Only these policies address the issue of labour-oriented adaptation. Besides the NDC, they do not present concrete measures/actions concerning farmers' adaptation.
Labour market integration	- A considerable number of roads in Mozambique have experienced and are predicted to experience further damage from extreme climatic events. This affects the labour market by limiting access to markets for rural farmers and complicating the delivery of extension services. There is a need for policies that address transport network rehabilitation/strengthening.	The PQG, the NEP	- Only these policies mention the issue of labour market integration and do not present enough concrete measures/actions to address it. They also do not address prospective climate change-induced migrations.
Job creation	- Jobs in the extractives sector are threatened by the global transition to a low-carbon environment. There is a need to create green employment in the extractives sector through green mining. - Investing in CSA would increase agricultural productivity. This includes agroforestry and policies are needed to stimulate job creation in complementary agricultural activities such as coffee	The NDC, the NEP, the PQG, the PES.	- The policies do not explicitly address green job creation.

Key policy categories	Key findings and intervention needs	What are the existing policies to support these areas?	Specific gaps/ shortcomings in existing policies
	agro-processing.		
Reskilling and training	- Jobs in the extractives sector are threatened by the global transition to a low-carbon development. There is a need for reskilling in green mining to avoid job loss. - Most farmers practise unsustainable traditional slash-and-burn agriculture. These farmers need to be trained in CSA.	The NEP, the PQG, the PES, the PEDSA.	- Though the policies address the need for training in the extractives, they do not address reskilling in green mining. They also fail to articulate specific measures/actions that address agroforestry in a significant way.
Economic diversification and strengthening	- Though its current economic development plans rest on fossil fuel exports, Mozambique is in an advantageous position as it holds considerable deposits of minerals used in clean energy technology. There is a need to formulate policies around the economic and employment opportunities both in the service sector and in industry and agro-processing.	The NDC, the NEP, the PQG, the PES	- The policies do not effectively address the scaling up of green mining as an alternative to the oil and gas and the coal mining that are exposed to transition risks.

5.1 Short-term policies

In Mozambique, the sector of employment most threatened by the physical risks of climate change is the agricultural sector, which suffers from low productivity. The sector most threatened by transition risks is the industrial sector, particularly the extractives sub-sector which could see its demand diminish in the long term as a result of the global shift to phase out fossil fuels.

It is important to identify areas for policy intervention that would help mitigate these issues and take advantage of the transition opportunities in the short term. **Although the NDC (2020-2025), NEP, PEDSA (2011-2020), PQG and PES 2020 address some of the needs in Mozambique, they do not specifically cater to the transition risks in the extractives sector and do not present policy options that take advantage of the opportunities in green mining.**

Policy options

Given the critical importance of the agricultural sector in Mozambique, especially in the context of climate change threats and its role as the largest employer, **short-term policies should be implemented to address skills development and improve productivity.** The goal is to support the livelihoods of agricultural workers and stabilise the sector during challenging times. The following policy options are recommended:

A. Job loss and social protection

- Partner with agricultural associations and unions such as NCBA CLUSA and the National Farmers Union – UNAC to identify specifically vulnerable farms and small-scale producers facing difficulties due to climate change impacts or other challenges.
- Offer CSA training in agroforestry and upskilling programs in agro-processing in the form of train-the-trainer courses for agricultural workers to enhance their productivity and adaptability to changing agricultural practices.
- Extend the Insurance, Finance and Climate Resilience Project (CLINFREDEP) to more provinces than Maputo City, Inhambane and Gaza (specifically in the north and center, where most agricultural activities are concentrated). This would increase the country's resilience and response to climate shocks, consolidating financial protection against climate-related catastrophes.

Potential entry point: Land policy, Forestry policy.

B. Re-skilling and training

- Establish short-term training programs focused on developing skills in agroforestry for women. These programmes can quickly equip women in agriculture with the necessary knowledge and expertise for agro-processing. This can increase their productivity and adaptability to changing agricultural practices.
- Supporting farmers with coffee yield-enhancing technology: The adoption of coffee yield-enhancing technical efficiency is key to improving productivity and quality of coffee. The widespread adoption of yield enhancing technology and training of farmers in its utilisation would result in higher yields for the growing sector.
- Offer courses on sustainable land management practices to farmers and plantation workers to improve their understanding of the sustainable exploitation of forests (for logging, etc.). Collaborating with forestry experts, NGOs, and vocational institutions, the program would offer specialized training focusing on sustainable forest management, reforestation, and related skills such as agroforestry and non-timber forest product processing. The program would also emphasize community involvement by collaborating with local leaders and representatives to identify suitable candidates for training. This

approach ensures that the program meets the needs of the communities and contributes to their socio-economic development. As part of the training, participants would receive education on the importance of sustainable forestry practices, the impact of deforestation, and ways to mitigate climate change. This educational component helps create a workforce that is not only skilled but also environmentally conscious.

Potential entry point: PEDSA, NDC, NEP

C. Job creation

Green Jobs Training and Placement Programme in the extractives (PGAL): The main objective of this PGAL is to align job creation in the mining sector with sustainability, while addressing the issue of unemployment and improving the skills of the local workforce. In collaboration with mining experts, NGOs and vocational training institutions, the programme would offer specialised training to unemployed individuals, focusing on the extraction and processing of 'green' minerals such as bauxite, iron ore, graphite, etc.

Potential entry point: NEP, NDC, PES

D. Economic diversification and strengthening

Promotion of Sustainable Forest Products for Economic Diversification and Strengthening in Mozambique: This policy aims to promote the responsible extraction, processing and use of forest resources in Mozambique. This can be achieved by strengthening and enforcing regulations for sustainable forest management practices, ensuring that extraction rates do not exceed regeneration capacities. There would also be provisions to implement monitoring systems to monitor the use of forest resources and prevent illegal logging.

Potential entry point: NEP, forest policy, PES, PQG

5.2 Medium- to-long-term policies (1-5 years and above)

In order to capitalise on the upcoming opportunities in developing backward links to the Oil and Gas sector and green mining, it is imperative to enhance the skills of Mozambique's labour force. **Currently, there is a mismatch between the skills imparted by Mozambique's education system and the skills required by firms in these fast-growing sectors.** Although there has been an increase in the proportion of students enrolled in sciences, engineering, agriculture, and health programs in public institutions from 18% to 26% over the past decade, this is insufficient to meet the evolving needs of the country. In private higher education institutions, which account for approximately 40% of total higher education enrolment, only 5% of students are enrolled in engineering and related disciplines.

In the agriculture sector, access to credit and formal extension services by farmers has been limited. **This inadequacy has restricted farmers' access to technical advice on implementing new technologies and best practices that could substantially improve productivity.**

It is important to develop policies that address these skills gaps in the medium and long term.

A. Job loss and social protection

- Enhance existing social protection systems to ensure that workers in the extractives sub-sector have access to adequate support during the transition, as the sub-sector is most at risk from global low-carbon commitments. This can include extending unemployment benefits, providing retraining allowances, and improving job placement services, particularly towards green mining.

- Strengthen/improve social dialogue on land rights between rural communities, local administration and forestry operators in order to avoid disputes over customary land rights and official land allocations.
- Improve access to finance and credit for farmers, particularly women and smallholders, to invest in modern agricultural equipment and inputs.

Potential entry point: NEP, Land policy, Forestry policy

Potential implementation agency: National Confederation of Free and Independent Labour Unions of Mozambique (CONSILMO), The Mozambique Workers' Organization (OTM), The Confederation of Economic Associations of Mozambique (CTA).

B. Job creation

- Identifying a training approach that involves practical training/internships in industry or the use of apprenticeship models in partnership with experienced mining firms (one way of testing that link is by targeting the placement of trainees in paid jobs as a test of market relevance).
- Foster an enabling environment for green entrepreneurship and start-ups through access to finance, business incubation programs, and supportive regulatory frameworks. As evidenced by the coffee-based agroforestry project in Vietnam (Box 2), access to finance and a supportive regulatory framework can encourage the emergence of localised agribusiness. Agro-processing in Mozambique would contribute to rural job creation and the green economy.

C. Labour market integration

- Provide job-search support in the industrial and service sector for farmers willing to leave the low-productivity sector. This would involve training in online and in-person job applications and preparation for job interviews.
- Focusing on rebuilding and reinforcing the damaged transport networks to enhance their resilience against extreme climatic events. This includes repairing and upgrading roads, bridges, and transportation systems to withstand the impact of cyclones and other severe weather events. This helps rural farmers, plantation workers and miners to have reliable access to markets for their products (better transport networks reduce transport costs) as well as access to better employment opportunities in other areas.

Potential entry point: National Programme to Industrialize Mozambique (PRONAI), PES, NEP

Potential implementation agency: Ministry of Public Works, Housing and Water Resources (MOPHRH), Ministry of Transport and Communications (MTC).

D. Labour-oriented adaptation

- Develop a national heat health alert system to initiate acute public health interventions aimed at reducing the impact of heat stress on human health during extreme heat conditions.
- Scaling up the electronic voucher scheme: Financed by the European Commission and the Mozambican government, the FAO initiated an electronic voucher program in the beginning of the 2015/2016 agricultural season. Its primary objectives are to facilitate access to agricultural inputs within the market and enhance the distribution of high-quality agricultural products by engaging agro-dealers. This initiative targeted two key beneficiary groups: small emerging farmers and subsistence farmers, with a particular focus on rural women and female heads of households.

- The voucher serves as a financial credit for the purchase of inputs (e.g. seeds and fertilizers), from quality-monitored agro-dealers and is co-financed by the beneficiary. Facilitating farmers' access to improved agricultural inputs can increase production, know-how, food security, revenue, as well as the development of marketing and distribution sectors.

Potential entry point: NDC, PEDSA

The relevant implementation agencies are not identified for all the proposed short, medium and long-term policies in this report. These agencies would be identified through more extensive stakeholder consultations. The identification of implementing agencies would be required for policy formulations in more extensive country studies.

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Annex: Methodology

The first step of the guidelines (the country profiling), presented in Chapter 3 of this report, was conducted through the collection of quantitative and semi-quantitative data according to the key indicators suggested in the guidelines across economic, environmental and climate, labour market and poverty and inequality pillars. These indicators include identifying the main climate hazards in Mozambique, the greenhouse gas (GHG) emissions disaggregated by sector, degree of preparedness of Mozambique for a low-carbon transition, and GDP growth disaggregated by sector and population size and density. Further indicators included are labour market indicators such as total size of labour force, unemployment rate disaggregated by gender and age, and poverty and inequality indicators such as the poverty headcount ratio and the Gini coefficient. The data sources consulted to obtain this information were the secondary sources presented in the guidelines, which include the ILO database, the World Bank database, the International Energy Agency (IEA), the International Monetary Fund (IMF) indicators and national statistics on demographic trends in Mozambique.

To further inform the appraisal of Mozambique's context, we reviewed the existing national policy landscape at the nexus of environment-employment-economic dynamics. This was undertaken by at first sourcing relevant policies/ development strategies applicable for Mozambique and compiling information on the different national policies/ strategies against key determinants of the ILO Green Employment Diagnostic's policy-related needs. The key determinants include Mitigation strategies, Adaptation and resilience strategies, Green jobs / environment-employment, sustainable social protection strategies / community-based protection, Risk reduction / disaster response, Sustainable/ Resilient enterprises, Skill development / green skills / capacity building, Green employment projects/ programmes /, just transition and Social dialogue.

The key policies reviewed are the updated Nationally Determined Contribution (NDC) 2020-2030, the Mozambique National Strategy for Climate Change (ENAMMC), the National Employment Policy (NEP), the Strategic Plan for the Development of the Agrarian Sector (PEDSA 2011-2020), the National Economic and Social Plan (PES 2021) and the five-year government program (PQG 2020-2024). The idea is to assess whether the key determinants (or 'key words') are recognised in each of these policies/ strategies, in which case, different colour intensities are used to indicate which key determinant has received a higher/lower consideration within each policy/strategy. This also facilitates the identification of just transition policy areas which are well mainstreamed into the national policy framework and highlights potential main gaps and entry points which can be further explored according to Step II and Step III of the ILO-GED. The following table highlights this colour code.

► **Table 1. Policy landscape analysis signalling criteria (indicative)**

Signalling Criteria / Conditions Applied	Corresponding Colour	Corresponding Inference / Insight
Count of occurrence is between 0 and 25		Minimal inclusion and prevalence of thematic determinant in policy/ strategy and requires major changes/ updates in the policy / strategy
Count of occurrence is between 26 and 100		Moderate inclusion and prevalence of thematic determinant in policy/ strategy and requires some changes/ updates in the policy / strategy
Count of occurrence is greater than or equal to 101		Significant inclusion and prevalence of thematic determinant in policy/ strategy and requires limited changes/ updates in the policy / strategy and can be leveraged further to inform the climate-employment nexus

The application of Step II of the guidelines (in-depth analysis) is presented in this report in Chapter 4. In conducting this in-depth study on Mozambique for the pilot project on Green Employment, we employed a rigorous and comprehensive research methodology that relies on secondary sources of information. The methodology is designed to ensure the accuracy, reliability, and relevance of the findings while addressing the specific dimensions of socio-economic, labour market, environmental, and climate change contexts. Our research involved an extensive review of online published reports and studies from reputable international organisations, with a focus on the following key sources:

- **International Labour Organization (ILO):** We leveraged ILO publications to gain insights into Mozambique's labour market dynamics, employment trends, and relevant policy frameworks. We especially relied on insights developed by the MozTrabalha Phase 2 project, including key viable green employment opportunities
- **World Bank:** We accessed and analysed a range of World Bank reports pertinent to Mozambique, covering topics related to economic development, poverty reduction, and environmental sustainability. This includes the 2019 Mozambique Disaster Risk Profile, the 2021 Systematic Country Diagnostic, the 2023 Mozambique Economic Update and the various relevant indicators in the World Bank database.
- **International Fund for Agricultural Development (IFAD):** IFAD reports were consulted to gather information on agricultural and rural development, with an emphasis on sustainable livelihoods. The main report referenced is the 2021 Climate Change and Future Crop Suitability in Mozambique.
- **Food and Agriculture Organization (FAO):** FAO resources were utilised to understand Mozambique's agricultural landscape, food security, and sustainable land use practices.
- **World Food Programme (WFP):** WFP reports informed our understanding of the food insecurity context and vulnerability assessment in Mozambique, including the 2022 Mozambique Food Price Bulletin.

Complementing our analysis of international reports, we sourced information from reports published by relevant government ministries within Mozambique, including the Ministry of Land and Environment, the Ministry of Economy and Finance, the Ministry of Mineral Resources and Energy, the Ministry of Labour, Employment and Social Security, and the Ministry of Agriculture

and Rural Development. These national reports provided a local perspective on policy initiatives, regulatory frameworks, and ongoing programs related to green employment, socio-economic development, labour market dynamics, and environmental protection. These reports also provided valuable insights into trade commodities, particularly in the extractives industry, as well as agricultural developments.

Furthermore, an assessment of the repercussions of climate change on crops at the household level in Mozambique, detailed in subsection 4.3.1 of the Poverty and Inequality Implications section of this report, was based on the methodology used in the IFAD's 2021 Climate Change and Future Crop Suitability in Mozambique. Assessing the effects of climate change on crops involved a two-fold process: projecting potential future changes in Mozambique's climate and then analysing the repercussions of these projected climate shifts on staple crops.

Initially, the prospective alterations in Mozambique's climate were determined using an analysis of 29 General Circulation Models (GCMs) sourced from the AgMERRA dataset, following the methodology outlined by Ramirez-Villegas et al (2013). These future climate changes were computed under the 'RCP 8.5' scenario, denoting one of four hypothetical trajectories for future global greenhouse gas emissions established by the Intergovernmental Panel on Climate Change (IPCC). The outcome of this analysis generated forecasts regarding the impact of climate change throughout Mozambique, contrasting the historical baseline (average climate during 1980–2010) with the Mid-Century future (2050, average climate for 2040–2069). Specifically, this examination focused on climatic variables including Mean Monthly Precipitation (average monthly rainfall), Monthly Mean Temperature, and Monthly Minimum Temperature (Tmin).

To gauge the suitability of current and future crops, the Food and Agriculture Organization's EcoCrop Suitability model was utilised, coupled with the most recent available data on annual crop production and demographic statistics in Mozambique. The EcoCrop model evaluates the adaptability of specific crops to defined environmental conditions, based on the established preferences of each crop, encompassing factors such as minimum, optimum, and maximum temperature; minimum, optimum, and maximum monthly rainfall; and the minimum and maximum growing period. This evaluation culminates in the estimation of costs associated with the observed and projected reductions in productivity based on the interaction between rainfall and temperature.

The application of Step III of the guidelines (policy recommendations) is presented in this report in Chapter 5. In this chapter, a review of the policies identified in the scoping of the national policy landscape and the extent to which they address the issues identified in chapters 3 and 4 was conducted, as well as an understanding of the extent to which these policies/ strategies embed the ILO Just Transition (JT) Principles. This policy review and the subsequent recommendations were achieved through:

- The identification of policy level intervention needs through insights derived from the in-depth analysis in chapter 4. These needs were grouped into six key policy categories identified in the Green Employment Diagnostics, namely job-loss protection and social safety nets; labour market integration; labour-oriented adaptation; reskilling and training; job creation and economic diversification and strengthening. The six key policy categories captured the critical areas that would need attention in the context of climate change impacts on, and the transition of, Mozambique's economy.
- The identification of existing national policies which support these needs, through baseline insights derived from the Mozambique national policy landscape assessment.

The assessment of gaps in these policies was filled or built on for the formulation of relevant policies in the short, medium and long-term.

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