MIDDLE EAST AND
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West Bank and Gaza

World Bank Group

COUNTRY CLIMATE AND DEVELOPMENT REPORT

September 2023

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This report, including its analytics, assessments, and policy recommendations, was finalized prior to October 2023 and does not take into account the impact of the current conflict.

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List of Acronyms

BAU	Business As Usual
CCDR	Country Climate and Development Report
CO2	Carbon Dioxide
CSA	Climate-Smart Agriculture
DRF	Disaster Risk Finance
DRM	Disaster Risk Management
EPCGF	the European Palestinian Credit Guarantee Fund
EQA	Environment Quality Authority
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GHI	Government Health Insurance
MCM	Million Cubic Meters
MENA	Middle East and North Africa
MIGA	Multilateral Investment Guarantee Agency
MRV	Monitoring, Reporting, Verification
NAP	National Adaptation Plan
NBS	Nature-Based Solutions
NCCC	National Committee on Climate Change
NCTP	National Cash Transfer Program
NDC	Nationally Determined Contribution
NDP	Palestinian National Development Plan
MOSD	Ministry of Social Development
PA	Palestinian Authority
PADRRIF	Palestinian Disaster Risk Reduction and Insurance Fund
PALDRM	The National Disaster Risk Management Center in Palestine
PCBS	Palestinian Central Bureau of Statistics
PENRA	Palestinian Energy and Natural Resources Authority
PFM	Public Financial Management
PMA	The Palestine Monetary Authority
PMMS	Palestinian Military Medical Services
PMOH	Palestinian Ministry of Health
PPP	Public-Private Partnership
PV	Photovoltaics
RBCF	Results-based climate finance
RCP	Representative Concentration Pathway
RE	Renewable Energy
SCALE	World Bank's Scaling Climate Action by Lowering Emissions Fund
SME	Small and Medium Enterprise
tCO2e	Tons of carbon dioxide equivalent
UNFCCC	United Nations Framework Convention on Climate Change
UNRWA	The United Nations Relief and Works Agency for Palestine Refugees in the Near East
WEF	Water-energy-food nexus
WFP	World Food Program

Gaza City © Abed Zaqout / World Bank

EXECUTIVE SUMMARY

In the West Bank and Gaza, drivers of fragility, development constraints, and vulnerability to climate change are closely interconnected. For decades, the fragmentation of land, restrictions on the movement of people and goods, recurrent episodes of violent conflict, persistent political and policy uncertainty, and the lack of sovereign control over critical natural resources like water and land have hindered development and slowed economic growth. In parallel, unplanned urban development and weak service provision have increased the exposure of Palestinian households to climate risks while undermining their capacity to cope with shocks. In the West Bank and especially in Gaza, a chronic shortage of basic services, high levels of poverty, and widespread unemployment are exacerbated by the destruction and deterioration of critical infrastructure, leaving millions exposed to the severe and unpredictable effects of climate change.

Climate change is reducing the availability of water, food, and energy, inhibiting private-sector activity, undermining human capital formation, and diminishing economic opportunities, yet the Palestinian Authority (PA) has very few policy tools to address these challenges. Model projections show that water scarcity will be more prevalent in Gaza, while flood risk will rise fastest in the eastern part of the West Bank. Increased rainfall variability, rising sea levels, and saltwater intrusion will negatively affect aquifers and groundwater quality in Gaza. Both in the West Bank and Gaza, poverty rates tend to be highest in the areas most susceptible to climate shocks and stresses. Cities are also highly exposed to climate change given their large populations and densely concentrated physical assets. As the Palestinian population is growing by about 3.4 percent each year, the need for water

and energy will continue to increase, leaving the West Bank and Gaza ever more dependent on Israel to provide basic services. Population growth will also intensify pressures on public services, natural resources, and urban housing, with negative implications for human development. Because many Palestinian firms rely heavily on water, decreased water availability poses an especially serious risk to employment and growth.

The borderless nature of climate change highlights the intertwined destinies of the Palestinians and Israelis. Left unaddressed or tackled only by one side, the negative impacts of climate change will spill across borders and impacts on both Palestinian and Israeli lives and livelihood. Climate-change-induced water scarcity could intensify competition over shared resources and exacerbate cross-border tensions. Diminished access to water will also undercut economic returns in many sectors of the Palestinian economy, potentially exacerbating unemployment, increasing dependence on Israel for livelihoods, and weakening social and economic resilience. The lack of adequate wastewater treatment systems on the Palestinian side is already affecting the environment on both sides of the border, and its impact will intensify as water use increases. Restrictions imposed by the Government of Israel (GoI)[1] significantly limit the policy instruments and public investment opportunities available to the PA to address climate challenges. However, it tackled jointly, the positive impact of climate action can accrue to both people.

This Country Climate and Development Report (CCDR) for the West Bank and Gaza examines the social and macroeconomic impacts of climate change under three alternative scenarios that reflect different levels of climate action and divergent economic growth trajectories. The scenario analysis builds on sector-level assessments focused on the water-energy-food nexus, urban development, and the macroeconomic framework and is informed by extensive stakeholder consultations and the stated climate priorities of the PA. The health and social-protection sectors are treated as cross-cutting factors in this analysis, reflecting the critical importance of service provision and human capital in a fragile context like the West Bank and Gaza. The three CCDR scenarios are:

- ***"Continued Fragility":*** This scenario presents the most pessimistic case, in which the inaction of all parties increases the social and economic costs of climate change while exacerbating its impact on existing drivers of fragility. The scenario is marked by (i) elevated levels of water insecurity, (ii) diminished access to basic services, especially in Gaza, (iii) increased exposure to extreme weather events and other disasters, and (iv) persistently weak economic growth.

- ***"Increased Resilience":*** This scenario assumes continued GoI restrictions related to the occupation but also optimized climate action by the PA in line with the updated Nationally Determined Contribution (NDC) for the West Bank and Gaza. The selection of specific climate policies and infrastructure investment actions is based on their potential to address urgent development needs and promote resilience to protect human capital and infrastructure, maintain the provision of basic services, and enhance urban livelihoods.

- ***"Toward Sustainability":*** This scenario highlights the potential to unlock growth and expand opportunities for climate action by (i) removing GoI-imposed restrictions on access to water, energy, land, and other natural resources, and (ii) expanding access to finance, including via increasing the PA's own-source revenue.

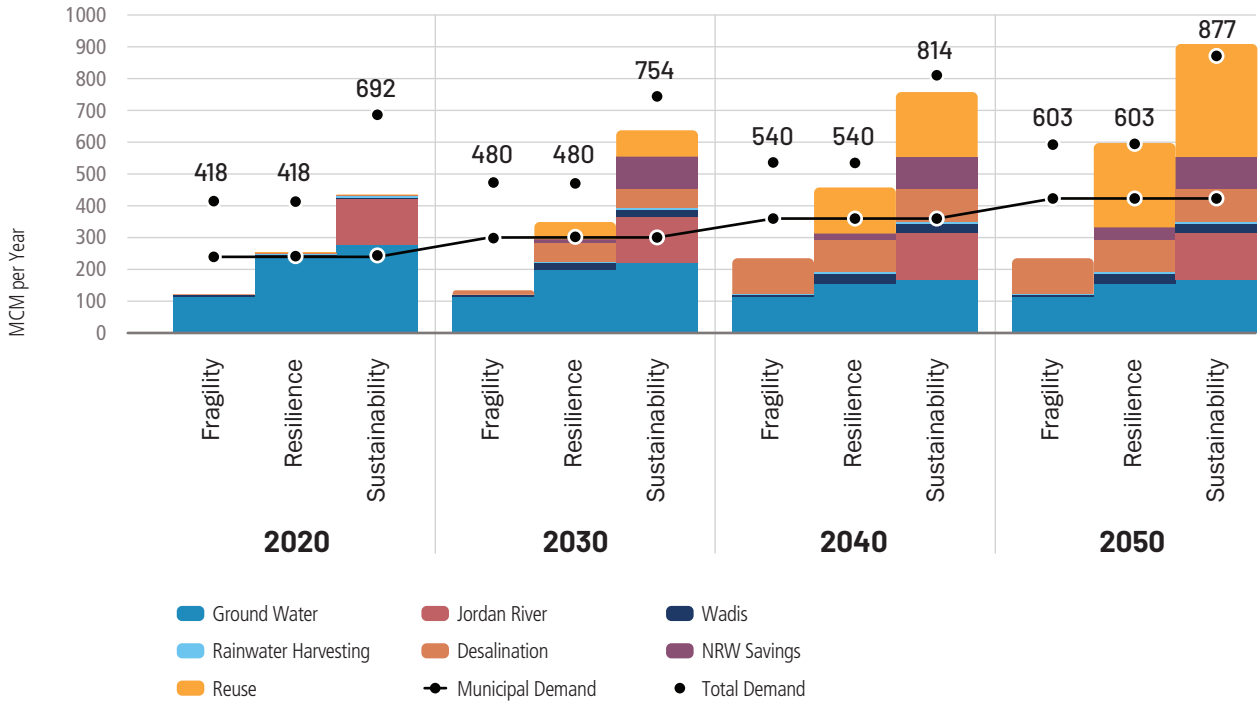
The outcomes of these three scenarios should not be interpreted as economic forecasts but rather as representations of potential development paths. The scenarios include numerous assumptions related to climate risk, policy measures, access to finance, economic growth, and the geopolitical context. Nevertheless, the risks highlighted by the ***Continued Fragility*** scenario demonstrate the urgent need for action by both the Palestinians and the Israelis. On their own, the Palestinians can build ***Increased Resilience*** to climate change. However, only if the GoI eases constraints on Palestinian access to resources and alleviates key drivers of fragility will the West Bank and Gaza be able to move ***Toward Sustainability***.

The analysis yields **four key messages:**

Message 1: Under a scenario marked by inaction and Continued Fragility, climate change impacts would increase supply gaps in water and energy, escalate urban exposure to hazards, and further undermine growth, imposing unsustainable costs on society and exacerbating fragility.

Under the Continued Fragility scenario, the gap between water demand and supply is large and growing, and estimated at nearly 300 million cubic meters per year. This gap would be met through a combination of unsustainable strategies, including over-abstraction of groundwater resources, the use of private suppliers (water tankers, desalination plants, etc.), and imports from Israel (**Figure ES1**). Increasing pressure on land and water resources in the West Bank, coupled with deteriorating water availability and quality in Gaza, will continue to undermine the agriculture sector's potential and slow overall economic growth.

Figure ES1: Water Supply and Demand in the West Bank and Gaza under Different Scenarios[2]



Source: Authors' elaboration based on World Bank data

Without climate action, the extent of built-up area exposed to climate hazards, in the seven city clusters analyzed in this report, would increase by as much as 48 percent, putting an additional 225,000 people at risk by 2035.[3] Under all five shared socioeconomic pathways (SSP),[4] urban sprawl would lead to an increase in the total built-up area exposed to climate hazards. The absence of climate-risk-informed physical planning hinders the ability of policymakers to strengthen the resilience of Palestinian cities against climate shocks and stresses. At present, just 3 percent of municipal solid waste is recovered and recycled, primarily by the informal sector. Over 65 percent of waste ends up in landfills, and 32 percent is dumped illegally, often in areas subject to flooding. Based on current trends, the waste collection rate could decline from 90 to 60 percent by 2035 as waste production continues to rise. Public transportation services are fragmented and rely on suboptimal infrastructure, primarily due to geopolitical factors. A heavy reliance on private cars increases congestion, pollution, and greenhouse gas (GHG) emissions, undermining the resilience of cities and posing a grave threat to the delicate balance between the built and natural environments.

Under the *Continued Fragility* scenario, estimated annual climate damages would represent around 4-6 percent of GDP per year over the period 2022-2040, equivalent to over US$803 million per year from 2022 to 2025 and nearing US$1 billion per year by 2040. In the absence of other internal or external shocks, climate damages would lower annual real GDP growth to an average of about 3.0 percent per year during 2022-2030 and 2.9 percent per year during 2030-2040, pushing per capita GDP growth to about 1.0 percent—0.4 percentage points below the baseline and close to stagnation. As a result, by 2040 real per capita GDP would be 12 percent lower than in a baseline scenario that assumes no impact from climate change. Under the *Continued Fragility* scenario, the economy of the West Bank and Gaza would remain unable to create enough jobs for new entrants joining the labor market, and it would fall far short of generating the revenue necessary to make much-needed high-return investments in fixed infrastructure and human capital while also ensuring long-term fiscal and debt sustainability. The limited and reactive policy response to climate-related hazards envisaged in the scenario, with investments in reconstruction equal to only 10 percent of the damage incurred, would further erode physical and human capital in the West Bank and Gaza.

Message 2: Under a scenario focused on Increased Resilience, strategic interventions along the water-energy-food nexus and investments in green and resilient urban development aligned with NDC targets can help curb vulnerability to climate risks and stimulate growth, though this entails significant costs.

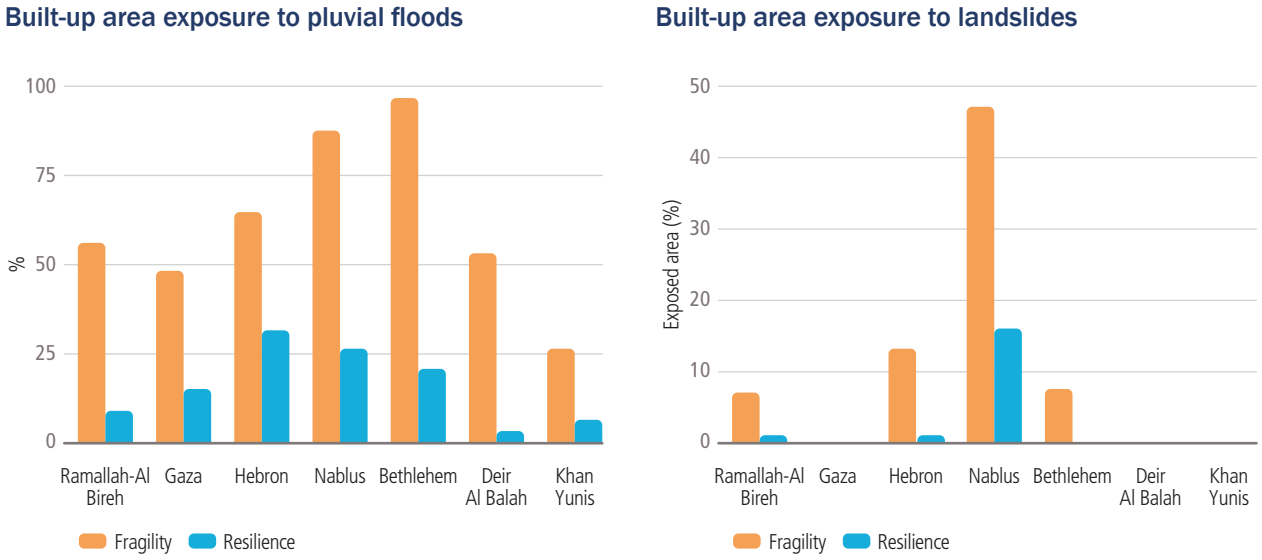
Under the Increased Resilience scenario, the PA would need to rely on costly non-conventional water sources, campaigns to reduce consumer demand, and savings from improvements in non-revenue water to bridge the widening gap between supply and demand, supplemented by increased imports from Israel. Access to arable land would remain restricted, but investments in wastewater re-use and rainwater harvesting would increase usable water resources in the West Bank and help improve water quality in Gaza, with greater desalination allowing for aquifer recharge. These measures would require an increase in the energy supply, while investments in the water sector could bolster growth and contribute to improved food security, especially in Gaza.

The expansion of wastewater treatment plants and desalination facilities would increase the water sector's energy demand both in the West Bank and Gaza. The water sector is projected to account for one-third of total energy demand in Gaza (~140 MW per year) by 2030, of which half would come from desalination plants and one-third would come from wastewater treatment plants. Without investments to boost the energy supply, these plants would be unable to operate at full capacity. In addition to affecting

the water supply, an unaddressed energy shortage would further compromise the delivery of basic services like health and education. Alleviating the energy deficit would require investments in distributed renewable energy resources, increased energy imports, and demand-side interventions designed to increase energy efficiency.

Investing in climate resilience across the seven city clusters could reduce their exposure to pluvial flooding and landslides by over 50 percent while mitigating urban heat and reducing GHG emissions, pollution, and energy consumption. To build resilience to climate-induced shocks and stresses, existing development gaps must be addressed. The authorities should prioritize measures to strengthen the enforcement of building safety codes, improve the quality and coverage of the road network, install proper drainage systems, expand green space in cities, enhance solid-waste management, and broaden the coverage of the disaster risk management (DRM) system. Policymakers should embrace climate-informed urban planning and adaptive land use while striving to steer growth away from hazardous areas. In parallel, addressing risks and hazards in vulnerable built-up areas and expansion zones will require spatially targeted nature-based solutions (NBS) such as permeable surfaces, and the adoption of modular infrastructure. Open green spaces, terraces and slopes, urban forests, green corridors, and urban farming can reduce the risk of floods, landslides, and extreme urban heat while yielding improvements in the wellbeing of urban populations (**Figure ES2**). Finally, promoting mixed-use and transport-oriented development, enhancing the use of distributed renewable-energy technologies, and investing in energy efficiency in buildings can reduce GHG emissions, ease congestion, and improve air quality. Leveraging synergies between development goals and climate action is crucial to achieve sustainable and resilient outcomes.

Figure ES2: Exposure to Pluvial Floods and Landslides under Alternative Scenarios

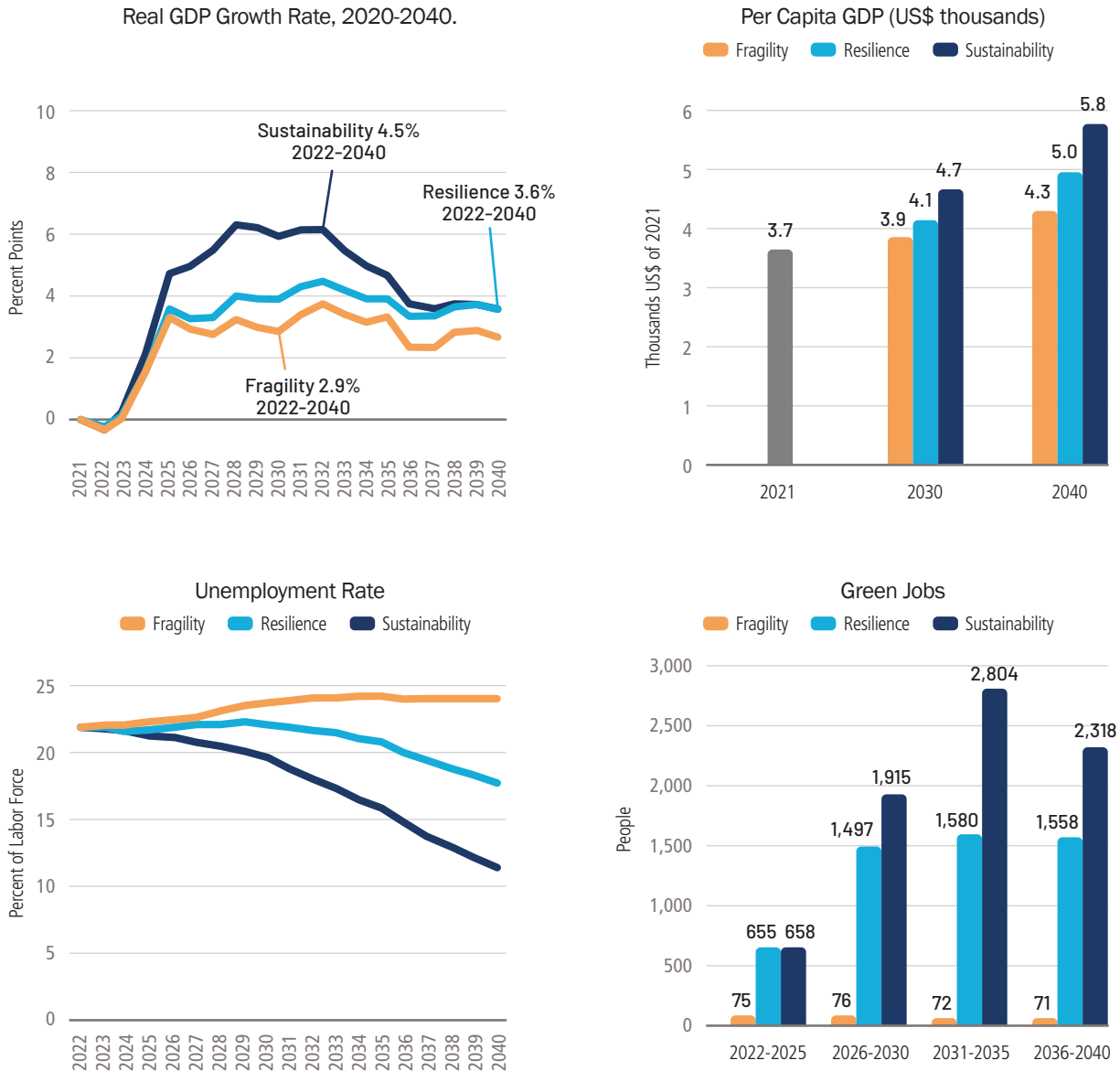


Note: Exposure to pluvial floods and landslides diminishes across all cities in the Increased Resilience scenario. Landslides only affect urban areas in the West Bank

Source: Authors' elaboration based on World Bank data

Under the *Increased Resilience* scenario, the West Bank and Gaza can reduce—but not eliminate—the socioeconomic costs and damages caused by floods, droughts, waterborne diseases, extreme heat, and other climate hazards. Interventions by the PA can help mitigate climate-related damage by strengthening the water-energy-food nexus, enhancing urban resilience, and boosting economic output. Under this scenario, real GDP would increase at an annual rate of 3.6 percent between 2022 and 2040, or 1.6 percent in per capita terms. Relative to the *Continued Fragility* scenario, the average real GDP growth rate would be about 0.7 percentage points higher over the projection period, resulting in a 13 percent differential by 2040 (**Figure ES3**).

Figure ES3: Selected Macroeconomic Indicators under Alternative Scenarios



Source: Authors' elaboration based on World Bank data.

Message 3: Under a scenario that charts an aspirational path *Toward Sustainability*, the expansion of access to resources and the spatial integration of all areas of the West Bank would drive a surge in economic activity, boost adaptive capacity, and reinforce societal resilience.

Under the Toward Sustainability scenario, the lifting of restrictions on access to the West Bank's water, energy and land resources would enable sustainable development and unlock the growth potential of the Palestinian economy. Giving the PA control over water, energy, and land resources in Area C would help ensure that the water supply will be sufficient to meet growing municipal demand through 2050. Agriculture could become a thriving sector and engine of job creation, generating additional economic activity estimated at 4.7 percentage points of GDP or US$850 million in 2021 prices. Access to land, energy, and water resources, especially in the fertile Jordan Valley, coupled with the increased reuse of wastewater, improvements in irrigation efficiency, increased rainwater harvesting, the development of larger-scale storage, distributed electricity generation through solar technology, and enhanced energy efficiency in water infrastructure, would drive the acceleration in economic growth. Deploying utility-scale solar plants in Area C would yield the additional energy necessary to bolster the resilience of the West Bank's water, agriculture, and food systems.

The removal of restrictions on access to Area C could enable substantial productivity gains while enhancing the sustainability of Palestinian cities. Restrictions on access to resources, particularly in Area C, have severely constrained private investment and economic activity in the West Bank. Area C covers roughly 61 percent of the West Bank and is under Israeli civil and security control. Palestinians have very limited access to economic opportunities in Area C, and the continued expansion of Israeli settlements has significantly reduced the amount of land available for use by the Palestinian private sector. Even if some land does eventually come under the PA's control, continued restrictions on access in Area C would severely undermine prospects for a contiguous Palestinian state. Area C is the only contiguous territory in the West Bank, whereas Areas A and B consist of 227 isolated enclaves. Consequently, Area C plays an essential role in the movement of goods and people within the West Bank, and it is vital to the development of infrastructure networks. Removing restrictions on access to Area C would yield enormous efficiency gains, eliminate price distortions in the land and housing markets, and enable the development of a regional public transport system. It would also allow cities and regions to choose well-located, low-risk areas for expansion while leveraging the resources available in Area C to meet the associated additional energy and water needs. Increasing accessibility and connectivity could enable Palestinian cities to realize their full economic potential and generate the financial resources needed to drive sustainable development and resilience to climate change and other risks. Moreover, unrestricted access would reduce uncertainty and help municipal governments make informed decisions and implement infrastructure projects that promote sustainability, connectivity, productivity growth, and resilience.

Under the *Toward Sustainability* scenario, the GDP growth rate would accelerate to an annual average of 4.5 percent over 2022-2040, or 2.4 percent in per capita terms. The average annual GDP growth rate would be 1.4 percentage points higher relative to the *Continued Fragility* scenario (**Figure ES3**), and by 2040 per capita income would be nearly 30 percent higher. Climate-related damage as a share of GDP would be lower than in the *Increased Resilience* scenario, though this outcome assumes that the PA would strengthen its climate-resilience policies and increase investments in resilience given the larger population and asset base that would be exposed to hazards. Due to the acceleration of economic growth, energy demand is higher in the *Toward Sustainability* scenario and would require the further expansion of power-generation capacity. Area C holds significant untapped energy resources, especially potential solar power. Faster economic

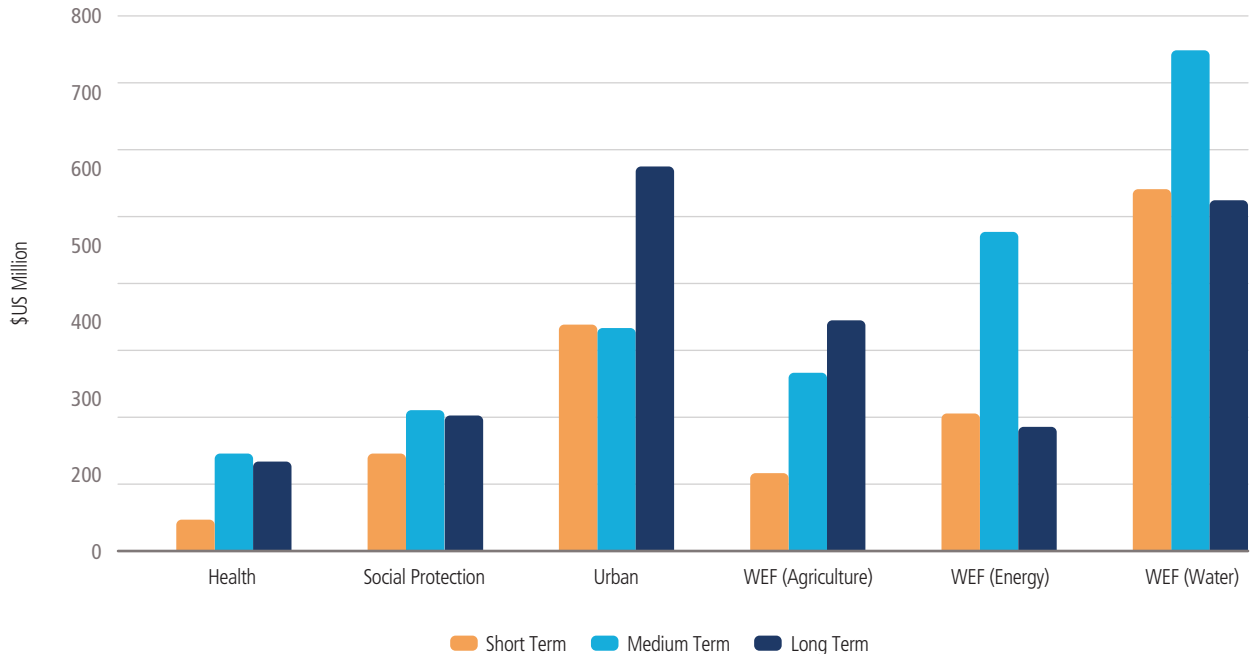
growth under this scenario would also lead to more waste, greater water use, and rising demand for other inputs. However, GHG emissions relative to GDP would be lower in this scenario, and mitigation and resilience policies would more than compensate for the increase in total emissions generated by accelerating economic activity.

Message 4: Fostering resilience and promoting sustainability calls for a whole-of-government and whole-of-society approach underpinned by expanded access to finance and dynamic private-sector participation.

Across all scenarios, stronger health and social protection systems will be necessary to support citizens during and after climate shocks. Policy and institutional reforms are the first step toward building the public sector's planning capacity and disaster preparedness. Improving coordination between stakeholders is also critical, and the authorities must collaboratively develop a health sector investment plan that supports the transition to a climate-resilient health system and an adaptive social protection framework. Interventions ranging from strengthening disease-surveillance systems to improving the granularity in the social registry on climate risk exposure will be necessary to build capacity across the health and social protection systems. Improving early warning and preparedness systems, upskilling staff, investing in prevention and care services, and strengthening infrastructure to overcome chronic electricity shortages and poor water quality are all vital elements of climate resilience. Adopting a whole-of-society and people-centric approach would also involve outreach efforts designed to promote awareness of climate risks and mitigation measures and encourage municipal governments, communities, and civil society groups to develop innovative solutions tailored to the local context. Support from the government and its development partners should target groups that are most vulnerable to the effects of climate change, including women, children, informal workers, and persons with disabilities. Increased financing will be needed to improve service quality and meet the growing demand for health and social protection as climate change continues to accelerate. More predictable financing for social safety nets and programs to maintain business continuity will help limit economic losses and preserve human capital during climate shocks and other disasters.

The CCDR estimates the need for climate financing in the West Bank and Gaza between now and 2050 at US$5.5 billion, far exceeding the government's capacity for public investment. Given the size of the projected shortfall, engaging the private sector will be vital to bridge the financing gap. Of the estimated US$5.5 billion required to strengthen climate resilience, US$1.4 billion will be needed over the next five years (Figure ES4), US$2.2 billion over the following 5-to-10 years, and US$1.9 billion from about 2040 to 2050. These amounts represent just under 5 percent of the PA's budget. Additionally, the actions necessary to achieve the NDCs by 2040 are estimated to cost US$5.9 billion, with a funding gap of 46 percent. Reforming fuel subsidies could free up fiscal space to invest in climate resilience, among other strategic priorities. However, given the PA's severe fiscal constraints and the downward trend in external aid, engaging the private sector will be vital to mobilize the necessary financing. If the government can create an enabling environment, the Palestinian financial sector could utilize 43 percent of its lending capacity to close the financing gap. De-risking mechanisms such as the European Palestinian Credit Guarantee Fund, which to date has guaranteed more than 15,000 loans totaling US$395 million, will be crucial to foster private investment and remove barriers to climate finance among small and medium enterprises. Given the right mix of policies, incentives, and technical capacity, the West Bank and Gaza have significant potential to expand green finance across multiple sectors.

Figure ES4: Climate Resilience: Investment Needs by Sector



Source: Authors' elaboration based on World Bank data

The West Bank and Gaza lack an integrated institutional framework for climate action. The National Climate Change Committee (NCCC), which is chaired by Environment Quality Authority (EQA) and comprises various line ministries and sectoral entities, meets on an ad hoc basis and generally at the request of international partners. A review of the NCCC's membership and coordination mechanism would help identify under-represented stakeholder groups (e.g., the private sector, women, informal workers, etc.) and provide recommendations to enhance its impact. Encouragingly, the EQA recognizes the need to engage a broader range of stakeholders by strengthening collaboration with the Ministry of Local Government, local government units, the Palestinian Monetary Authority, local financial institutions, and civil society. However, additional efforts are needed to raise the profile of the EQA and provide a clear executive mandate to the General Directorate for Climate Change and Disaster Risk Mitigation by implementing the new three-tiered organizational structure approved by the Council of Ministers.[5] The PA has yet to identify climate-related fiscal risks or screen public investments for climate resilience. Reviewing the sectoral strategies currently being prepared and implementing the recommendations emerging from this CCDR could advance the PA's climate agenda. For example, policy recommendations from the CCDR could be integrated into the new draft Social Sector Development Strategy and Energy Sector Strategy. Moreover, while meeting the challenges posed by climate change will require a whole-of-society approach, no formal policies are in place to engage civil society in climate action. Finally, improved data collection will be necessary to better understand climate threats and enable evidence-based policymaking.

Conclusions and Policy Recommendations:

Given the intertwined destinies of the Palestinians and Israelis in the face of climate change, enhanced regional cooperation would enable the Palestinians to achieve higher level of resilience and yield mutual benefits. Over the coming decades, neither climate change itself nor its escalating impact on Palestinian lives and livelihoods will remain confined to one side of the border. As outlined in the *Toward Sustainability* scenario, enhanced cooperation by the GoI to reduce the fragmentation of Palestinian areas, remove or ease restrictions on the movement of people and goods, and increase access to water, land, and other natural resources could enable the Palestinians to achieve much greater levels of adaptive capacity and resilience and prevent spillovers that will affect communities on both sides of the border.

Although the *Toward Sustainability* scenario is aspirational amid the current geopolitical context, it remains an achievable option, albeit one that requires strong political will on both sides. However, given the uncertain timeline connected to this along with the rapidly increasing risks and the cost of inaction, the PA needs to prioritize climate actions that are within its control, as outlined under the *Increased Resilience* scenario. It represents an actionable way forward that would allow the PA to mitigate the socioeconomic cost of climate change through investments in innovative solutions that bridge development gaps while recognizing that only removing the restrictions would allow the Palestinian to move *Toward Sustainability*. Moreover, the actions described under the *Increased Resilience* scenario would leave the West Bank and Gaza better positioned to seize the advantages of the *Toward Sustainability* scenario as cooperation takes up steam. However, the scale and cost of the required reforms will necessitate the support of the private sector, the international community, and regional neighbors across a broad set of policy areas.

This CCDR advances a set of policy recommendations designed to support the shift from a development pathway marked by *Continued Fragility* to one characterized by *Increased Resilience*. These recommendations are based on extensive consultations with line ministries, public institutions, and civil society. Improving climate resilience will require interventions along the water-energy-food nexus and in urban development, requiring a whole-of-society and whole-of-government approach that emphasizes human capital formation and private sector development. Throughout this process, particular attention must be devoted to strengthening institutions and implementing priority reforms set forth in the national sector strategies. Additional actions could be defined and prioritized through multi-stakeholder consultations held in the context of the ongoing updates to the national sector strategies.

Table ES1: Summary of Policy Recommendations

	Policy Levers
Improving Resilience Along the Water-Food-Energy Nexus	• Strengthen institutions and align the policy framework to enhance regulatory oversight • Invest in water development and conservation • Promote energy efficiency and renewable energy • Support sustainable and climate-smart agriculture
Integrated Solutions for Green and Resilient Cities	• Promote climate-informed urban planning and adaptive land use • Invest in resilient infrastructure and nature-based solutions • Improve resource efficiency and advance circular-economy solutions • Strengthen the enforcement of regulations and invest in operations and maintenance • Enhance DRM governance
Building Resilient Human Capital	• Build institutional capacity and improve coordination to enhance disease surveillance and strengthen emergency preparedness • Invest in DRM systems • Enhance data collection, transparency, monitoring, and integration • Provide targeted support for service delivery and social protection among groups that are most vulnerable to the impacts of climate change (e.g., women, children, agricultural workers, persons with disabilities, the elderly, etc.)
Mobilizing the Private-Sector and Increasing Green Financing	• Support private-sector engagement through improved climate awareness, coordination, and incentives • Expand the financial sector's capacity for green finance • Support sector ministries' access to multilateral climate funds
Adopting a Whole-of-Society and Whole-of-Government Approach	• Enhance the national regulatory framework for climate change • Strengthen the National Climate Change Committee and EQA's Climate Change and Disaster Risk Mitigation directorate • Conduct targeted awareness-raising efforts on climate change; develop a strategy for engaging civil society; and scale up local climate change initiatives in collaboration with communities, local governments, and other stakeholders

Note: More detailed recommendations are presented in Table 3 in Chapter 7.

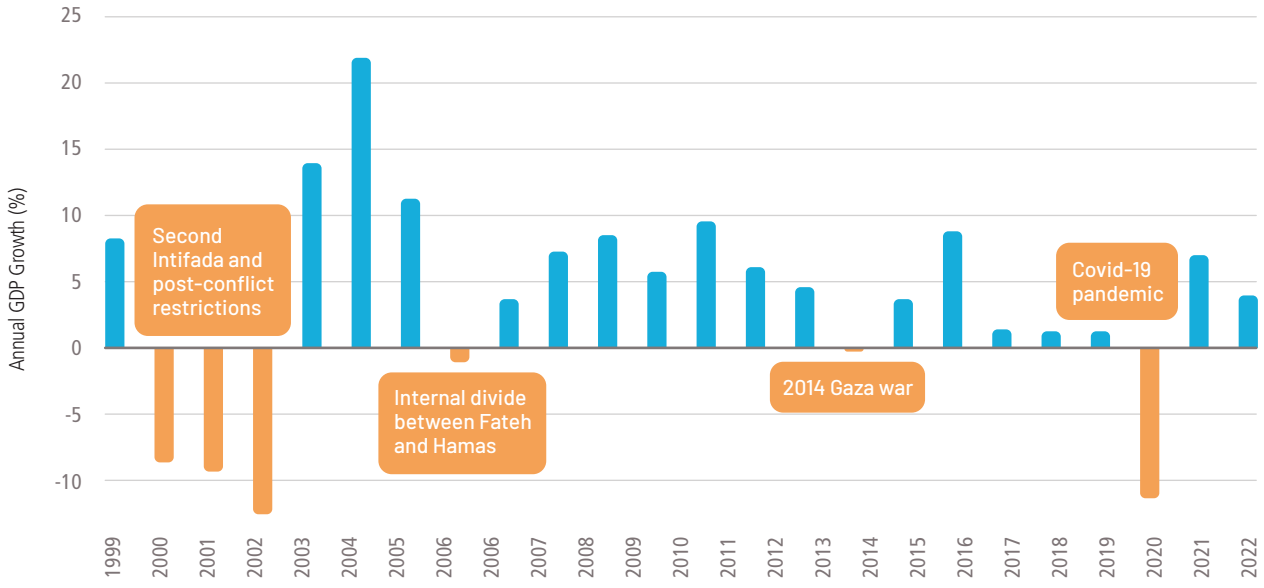
Gaza City © Mohammed alsdudi/Shutterstock

1. Development and Climate Context

1.1 Fragile and Constrained Development

For over three decades, a combination of geographic fragmentation, severe restrictions on the movement of people and goods, frequent outbreaks of violent conflict, and high levels of political and policy uncertainty has sharply constrained economic development in the West Bank and Gaza. The limited policy measures available to the Palestinian Authority (PA) and its lack of sovereign control over natural resources exacerbate these challenges. The GDP per capita of the West Bank and Gaza more than tripled between the signing of the Oslo accords in 1993 and 2021, but since the early 2000s a series of mostly conflict-related shocks has significantly impacted the Palestinian economy. The negative effects of these shocks have been intensified by the increasingly harsh restrictions[6] imposed by the Government of Israel (GoI) as part of its occupation of the West Bank and Gaza. In Gaza, a near-total blockade severely limits the flow of people and goods, including essential humanitarian aid, and severe power and water shortages have resulted in very low levels of basic service delivery while undermining human capital development and slowing economic growth (**Figure 1**). Contractions in the Palestinian economy are correlated with conflict, while most expansions are linked to recovery-related inflows of donor aid. However, following a precipitous decline in donor assistance in recent years, and with few domestic sources of sustainable growth, real per capita GDP is expected to stagnate from 2023 onward.

Figure 1: Annual GDP Growth Rates in the West Bank and Gaza (%)



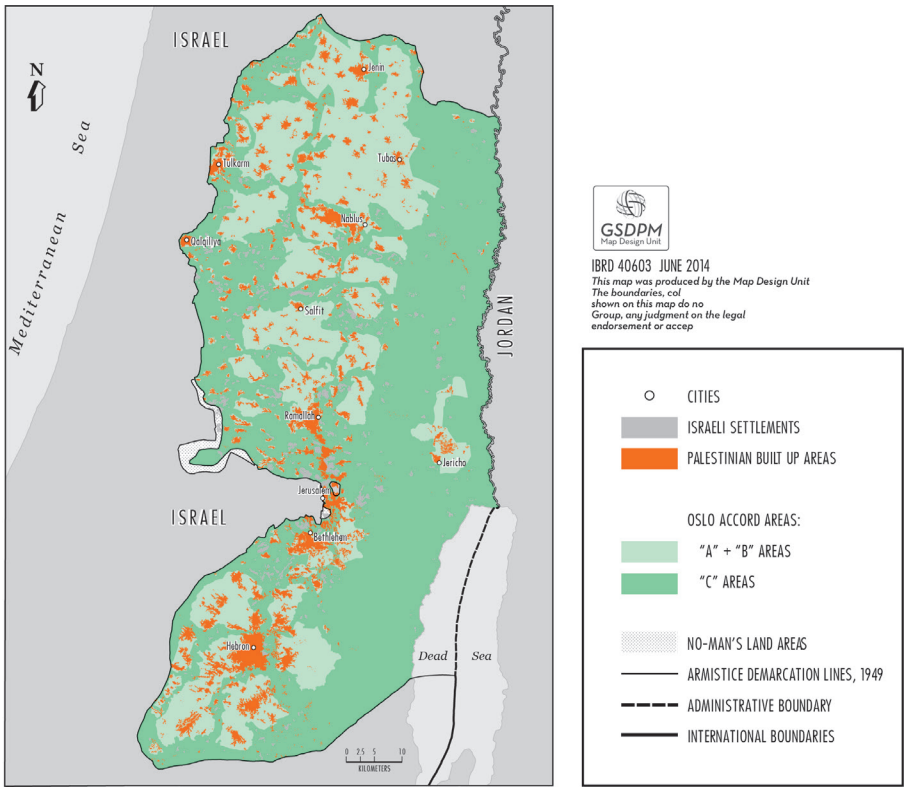
Source: Authors' elaboration based on World Bank data.

Highly volatile growth, low economic resilience, and recurring economic and conflict-related shocks have resulted in persistently high levels of poverty and vulnerability. Despite national commitments to reduce poverty and improve social protection, poverty and vulnerability indicators in the West Bank and Gaza remain high due to mutually reinforcing drivers of fragility, including GoI-imposed movement restrictions, territorial fragmentation, and policy uncertainty. According to official statistics, the poverty rate rose from an estimated 20.3 percent in 1998 to 22 percent in 2017.[7] The latest estimates, which are based on trends in real per capita GDP growth,

suggest that the poverty rate reached a pandemic-induced peak of 26.5 percent in 2020, then declined to a still high 24.5 percent in 2022.[8] Driven by a steady increase in GDP per capita, poverty rates in the West Bank have fallen, while the situation in Gaza remains dire. Moreover, a large share of non-poor Palestinian households remain vulnerable to income shocks. Recent global inflationary trends further undermine the resilience of poor and vulnerable Palestinians, and the spike in fuel and food prices caused by Russia's invasion of Ukraine have had a disproportionately negative effect on import-dependent economies of the West Bank and Gaza.

Territorial fragmentation and restrictions on land use have significantly hampered resilient economic development in the West Bank and Gaza. Gaza covers 365 km^2 along the Mediterranean coast, while the West Bank encompasses a much larger area of 5,655 km^2 west of the Jordan river. The two areas are not continuous, and the West Bank is divided into hundreds of isolated enclaves. The Interim Agreement concluded under the Oslo Accords separated the West Bank into three areas, A, B, and C, with the latter composing over 60 percent of the total territory (**Figure 2**). In the absence of a final status agreement, Israel retains responsibility for providing security in Area C and holds authority over certain civil affairs, including land administration and planning. As a result, the PA cannot access Area C's significant land and water resources and is unable to realize its economy's potential.[9]

Figure 2: Territorial Categorization in the West Bank



Source: World Bank (2014). Area C and the Future of the Palestinian Economy.

Lacking sovereignty over natural resources has left the Palestinians highly dependent on Israel for access to water. The Palestinian territories and neighboring countries are naturally water-scarce. Without sovereign control over their water resources, and in the face of increasing demand, the Palestinians rely on bulk water purchases from Israel to supply about two-thirds of their drinking water. The annual

share of renewable internal freshwater resources is less than 200 m^3 per capita, well below the World Health Organization's water-scarcity threshold of 500 m^3 per capita.[10] Groundwater in the West Bank and Gaza is being over-extracted at alarming rates, leading to diminishing output and deteriorating water quality. Climate change is magnifying threats to land and marine ecosystems, limiting their ability to provide critical services to the economy and communities.

The West Bank and Gaza also depend heavily on Israel for energy generation. The Israeli Electric Company (IEC) currently provides about 95 percent of the 1300 MW of electricity consumed in the West Bank. Most of this electricity is generated using fossil fuel, with 69 percent coming from natural gas, 23 percent from coal, and only 7-8 percent from solar power.[11] Domestic power generation in the West Bank also relies heavily on fossil fuels, with only 80MW currently being generated from solar power. Municipal water and electricity bills often go unpaid due to the weak financial position of local government units (LGUs). The GoI then deducts unpaid amounts from the "clearance revenues," mostly customs and value added tax (VAT), that it collects on behalf of the PA and transfers monthly. These deductions contribute to so-called "net lending"[12] and are only partially recovered by the PA from the LGUs. This practice drains resources from the PA, further undermining its fiscal position, and degrades the quality of vital public services, exacerbating fragility.

The West Bank and Gaza have a densely distributed and growing population that is highly vulnerable to climate shocks. Population growth and climate change are exacerbating existing socioeconomic challenges around the water-energy-food nexus. Gaza has one of the highest population densities in the world, with 5,203 people per km^2, and a large share of households are below the poverty line.[13] The West Bank and Gaza's combined population is projected to double to 8.8 million by 2050,[14] and urbanization levels are at 77 percent and predicted to rise further. Densely concentrated and rapidly growing populations increase environmental stress and heighten exposure to climate change, while GoI-imposed restrictions prevent cities from reaping the benefits of a growing urban population and threaten to worsen living conditions.

Limited access to natural resources and a shrinking natural resource base decrease the returns to critical economic activities and strain service delivery. Disruptions in the supply of water and other basic services disproportionately impact women and low-income households, increasing the burden of domestic labor and the challenge of working productively in the informal sector[15]. About 90 percent of arable land is in the West Bank, and just 10 percent is in Gaza, which has little vegetation cover. An estimated 100,000 Palestinians depend on the fishery sector for their livelihoods, and fish is an important food source both in the West Bank and Gaza, but rising water temperatures and the acidification of the Mediterranean Sea will negatively impact the fish catch along the Gaza coast. Land degradation, habitat fragmentation, soil erosion, water contamination, and overfishing have already led to a significant decrease in natural capital, which declined by an estimated 8 percent from 1995 to 2018 due to the degradation of the natural resource base.[16]

The global economic slowdown and dwindling foreign aid are exacerbating the PA's fiscal crisis, negatively impacting the quality of service delivery and weakening prospects for economic growth. In 2022, donor financing totaled US$350 million, or 1.8 percent of GDP, down sharply from the US$2 billion, or 27 percent of GDP, received in 2008.[17] Unpredictable deductions from clearance revenues by the GoI further destabilize the PA's fiscal position. In recent years, donor support has played a vital role in supporting the PA's progress on fiscal and public financial management (PFM) reforms and provided critical resources for growth-inducing public investment. While the PA is actively pursuing policy reform and fiscal consolidation, its efforts are highly vulnerable to exogenous shocks. Economic growth and the fiscal and external balances are also highly sensitive to the political context and dependent on the GoI's cooperation.

Private firms in the West Bank and Gaza, especially small and medium enterprises, struggle under the weight of restrictions on trade and labor mobility, and unreliable energy and water services further erode their competitiveness. Frequent power outages, particularly in Gaza, force businesses to rely on costly and highly polluting diesel generators and other standalone power sources.[18] Moreover, the private sector in the West Bank and Gaza must navigate two different legal and regulatory systems and overcome restrictions on trade. Imports and the movement of goods must be approved by Israeli authorities and are subject to Israeli customs and national regulations, weakening the private sector's ability to maintain a steady flow of goods and services and make long-term decisions. Restrictions on land and resources also impede growth at the firm level. Amid these challenges, the information technology (IT) services sector in the West Bank and Gaza offers opportunities to overcome physical restrictions and drive growth.

Socioeconomic conditions in Gaza are significantly worse than in the West Bank. Gaza has a greater population density, higher unemployment rates, and higher poverty rates, and a near-total blockade has been in place since 2007, Highly destructive recurrent conflicts[19] have pushed Gaza into a fragility trap marked by anemic growth, very poor service delivery, extreme levels of poverty, pervasive joblessness, widespread food insecurity and deep social exclusion. The West Bank hosts about 870,000 Palestinian refugees, while Gaza is home to over 1.5 million.[20] Poverty and unemployment in Gaza are at an all-time high and affect nearly half of the opulartion. Despite having a smaller population than the West Bank, Gaza houses 71 percent[21] of the combined poor population. Over half of Gazans live below the national poverty line, compared to 14 percent in the West Bank.[22] In 2021, the unemployment rate was 45.1 percent in Gaza (reaching 91.1 percent among young women[23]) but just 14.6 percent in the West Bank.[24]

1.2 Climate Change and Fragility

The drivers of fragility affecting the Palestinian territories are further exacerbated by climate change, decreasing adaptive capacity and resilience. High levels of political and policy uncertainty, restrictions on movement and access, recurrent conflict, and very tight fiscal space limit the PA's capacity to respond to crop failures, food insecurity, major floods, or other climate-related challenges. Weak adaptive capacity also increases the West Bank and Gaza's vulnerability to escalations in the conflict, increased restrictions, and external economic shocks.

1.2.1. Historical Trends and Future Projections

In the West Bank and Gaza, climate change is already increasing the frequency and intensity of extreme weather events, especially droughts, heat, and floods. Average temperatures in the West Bank and Gaza have broadly increased since the 1960s, but with a sharp upward trend observed since the 1990s. The average annual mean temperature increased by 1°C between 1960-1991 and 1991-2020. Drought episodes have repeatedly disrupted agricultural output in recent years. In 2005, a severe drought significantly affected crop yields in rainfed farming communities in Hebron. In 2010, heat waves contributed to a 20 percent reduction in olive production, a key crop in the region.[25] Droughts negatively impact economic resilience by increasing import dependence, depleting household savings, and intensifying food insecurity. Over the past 50 years, average rainfall has decreased slightly, while annual rainfall has become much more volatile. Flash flooding caused by heavy rains and altered natural infiltration processes poses an increasing threat to the West Bank, about 65 percent of which is at medium or high risk of flooding, especially in the northwest.[26]

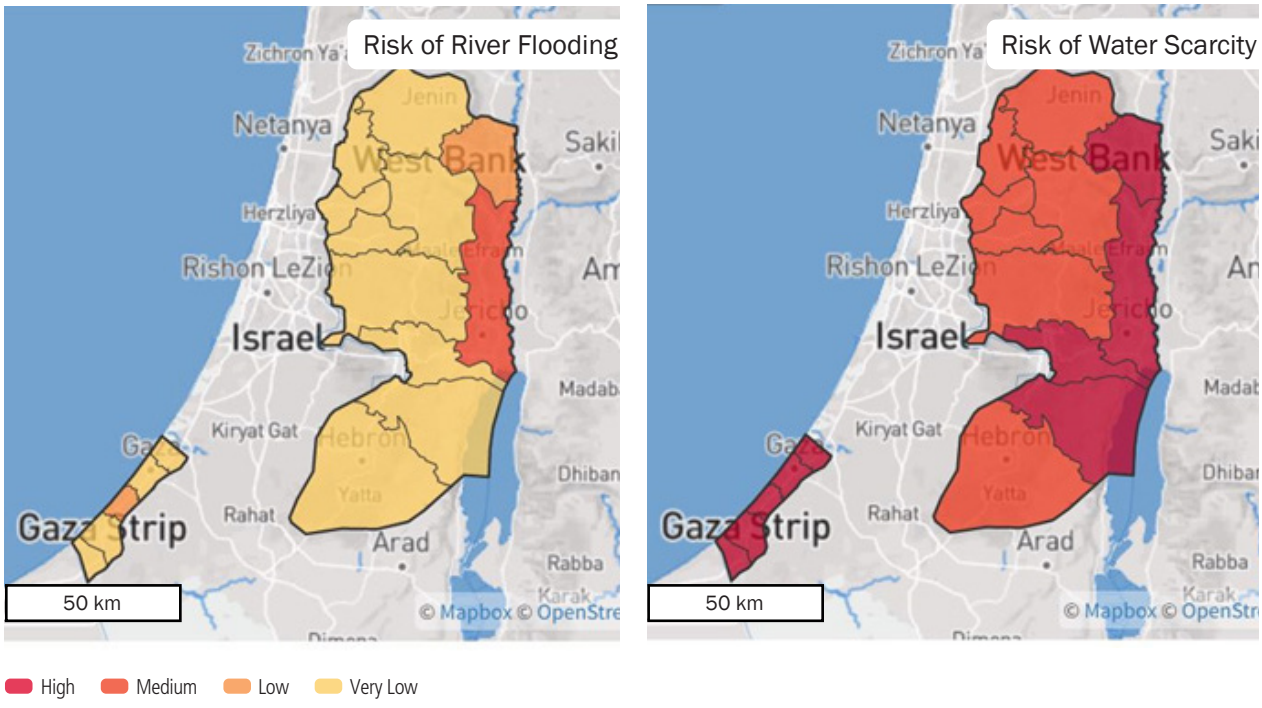
By the middle of this century, the West Bank and Gaza will likely experience hotter temperatures, more frequent weather shocks, and more volatile precipitation. Climate projections for the West Bank and Gaza based on the shared socioeconomic pathway (SSP) scenarios used by the Intergovernmental Panel on Climate Change show a likely temperature increase of approximately 2°C by 2055 and

approximately 3°C by 2090.[27] Across all global emissions scenarios,[28] average temperatures are expected to increase until the end of the century, with extreme increases projected under the higher-emissions scenarios.[29] Extreme weather events are also expected to be more frequent and intense. Droughts are expected to worsen, especially towards the end of the century and in the southern regions of the West Bank and Gaza. Rising temperatures will likely cause more heat-related diseases, further degrade air quality, and worsen water scarcity. In Gaza, the cities of Deir el Balah, Gaza City, and Khan Yunis are projected to experience a 10 mm increase in annual precipitation under the low-emissions scenario (SSP1) but about a 10 mm decrease under the higher-emissions scenarios (SSP2 and SSP3).[30] Cities in the West Bank are expected to experience little change in precipitation under the low-emissions scenario, but their average rainfall could decline by more than 20 mm under the higher-emissions scenarios. Reduced rainfall, rising sea levels, and salt-water intrusion will negatively affect the aquifer and groundwater quality in Gaza and will slow groundwater recharge in the West Bank. A 10 percent decline in average rainfall could reduce aquifer recharge by 14 to 24 percent, while a 15 percent decline in rainfall could reduce recharge by 28 to 50 percent.[31] Together, these trends are likely to further increase the West Bank and Gaza's dependence on Israel for water, heightening their vulnerability to changes in Israeli policy.

1.2.2. Climate Change Risks and Vulnerabilities

The impact of climate change will vary across the West Bank and Gaza. While both areas are highly vulnerable to flooding and drought (**Figure 3**), water scarcity will be more prevalent in Gaza, while flooding risk will be highest in the eastern West Bank. The number of days in which temperatures exceed 35°C is expected to increase in all Palestinian cities. Bethlehem, Jerusalem, and Hebron will likely experience more hot days than other governorates by the middle of the century, especially under a high-emissions scenario.

Figure 3: Risk of River Flooding and Water Scarcity in the West Bank and Gaza



Summers are projected to become hotter, with temperature spikes affecting labor productivity and heat-related diseases straining public health systems. By the middle of the century, the West Bank and Gaza are expected to reach daily maximum temperatures in the high 30s and low 40s from April through October. The maximum number of consecutive days with less than 1 mm of precipitation each year will exceed 300 in all major Palestinian cities, increasing by 3-11 days relative to the 1995-2014 average. An extended dry season will reduce agricultural productivity, water availability, and economic resilience. In Gaza, approximately 25 percent of the year will be categorized as hot days under a high-emissions scenario (SSP3). Agricultural workers and other outdoor laborers, as well as highly vulnerable communities such as the elderly, the very young, and those with cardiovascular disease, will be especially vulnerable to extreme heat, which will strain health systems and degrade the quality of life in homes and businesses without access to active cooling.

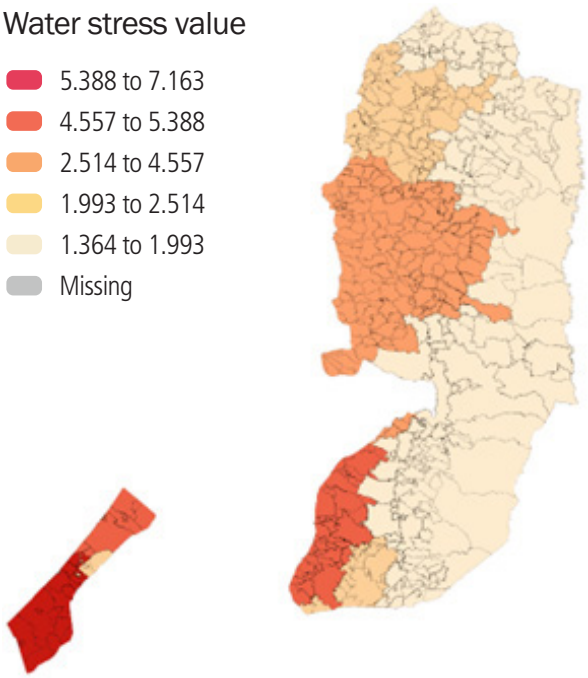
Climate change will impact the availability of water resources and negatively affect export, growth driving sectors, and food security. Small-scale rainfall-reliant family farming is the dominant form of agriculture in the West Bank and Gaza, and almost 90 percent of households derive at least part of their livelihoods from the agricultural sector. The share of water-dependent economic activities in the West Bank and Gaza is estimated at close to 30 percent.[32] Construction, crop production, and livestock production employ a large share of the Palestinian population while also consuming large amounts of water. Many Palestinian exports come from water-intensive sectors, including cut stone, gravel, wood crates, olive oil, and tropical fruits. As agricultural yields decline, food insecurity will rise. One in three women in the West Bank and Gaza already experiences moderate or severe food insecurity,[33] and the international literature shows that women worldwide are systematically more exposed to hunger and food insecurity due to climate-induced shocks.

Mounting electricity demand for air conditioning and water desalination will further strain the energy system. Room-based air conditioning consumed 130 GWh of electricity in 2020, and consumption is projected to rise to 248 GWh by 2030 under a business-as-usual scenario.[34] Similarly, demand for electricity to support water desalination in Gaza will grow as new desalination plants are built to address water shortages and aquifer depletion. Increased demand on the electricity grid will further strain the overburdened energy system, which already experiences frequent outages. In the absence of domestic solutions to power production, the West Bank and Gaza will become even more dependent on Israel for energy, further exacerbating their fragility.

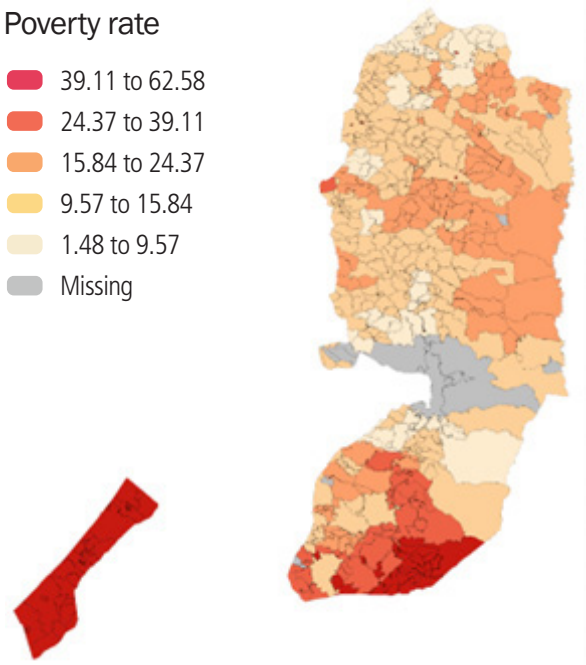
Beyond the risks associated with rising temperatures, given the absence of adequate drainage systems climate change is expected to increase pluvial flooding risk in major Palestinian cities. Currently, 78 percent of road segments in Nablus are in potential flood zones. Urban expansion will further increase the extent of built-up area in flood zones, especially under the highest-emissions scenario (SSP3). Floods could hit wastewater pumping stations, landfills, and other infrastructure, damaging equipment and facilities and creating public health risks. Flooding will reduce the economic resilience of urban communities and the Palestinian public and private sector, while restrictions on goods imports could slow reconstruction efforts and further increase fragility.

Climate change will disproportionally affect poor households, as areas with high concentrations of poverty are also very susceptible to climate shocks and stresses. Poor populations living under severe water stress are particularly concentrated in Gaza (**Figure 4**). Most of the localities that are projected to suffer the greatest water stress are in Deir al Balah, Rafah, and Khan Yunis in Gaza and in the Hebron governorate in the West Bank. In these communities, which are already highly sensitive to shocks, climate change is likely to compound multidimensional vulnerability and worsen social exclusion. The long-term effects of climactic shocks and stresses will also have different implications for women and men, as gender influences the capacity of individuals to adapt to climate change.

Figure 4: (a) Populations Experiencing Water Stress; (b) Poverty Rates



Source: World Resources Institute data and projections



Source: World Bank 2019

Climate change poses serious risks to the Palestinian private sector. About 10 percent of firms in the West Bank and Gaza report having already experienced monetary losses due to extreme weather events such as storms, floods, droughts, and landslides.[35] Reported losses were more common among medium and large firms (15 and 14 percent, respectively), compared to small firms and microenterprises (9 and 10 percent, respectively). As large firms are more effective job creators, climate hazards could have especially negative implications for employment. Moreover, a lack of suitable storage facilities means that a large share of goods such as food (particularly frozen and refrigerated products), textiles, furniture, cosmetics, and cleaning products are exposed to climate hazards.

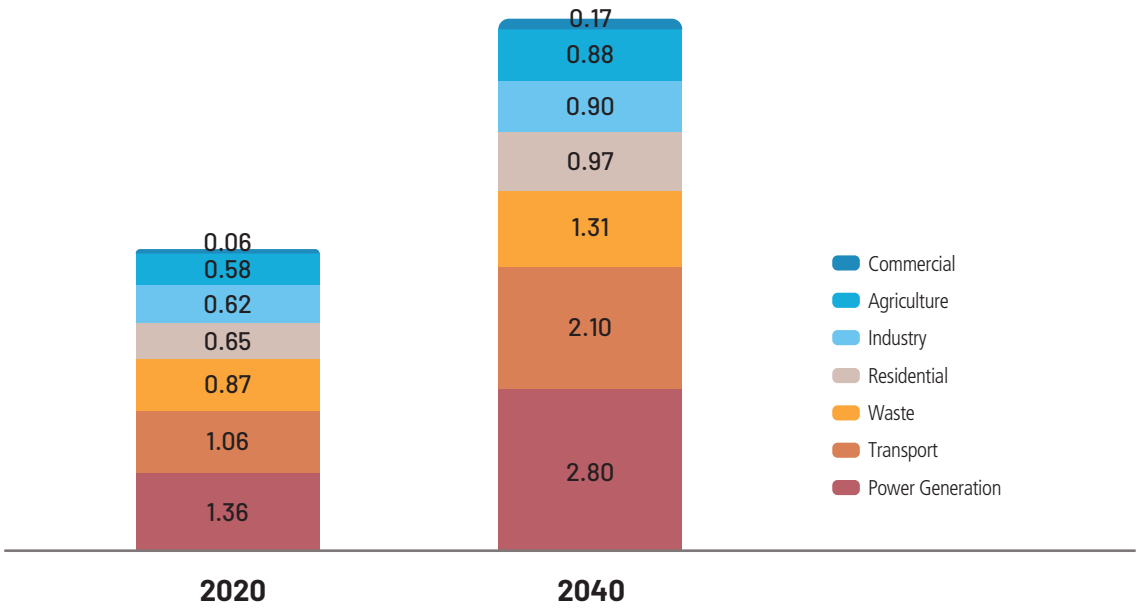
1.3. Pathways toward Increased Resilience and Sustainability

The borderless nature of climate change highlights the intertwined destinies of the Palestinians and Israelis. Left unaddressed or tackled only by one side, the negative impacts of climate change will spill across borders and impacts on both Palestinian and Israeli live and livelihoods. Climate-change-induced water scarcity could intensify competition over shared resources and exacerbate cross-border tensions. Diminished access to water will also undercut economic returns in many sectors of the Palestinian economy, potentially worsening unemployment, increasing dependence on Israel for livelihoods, and weakening social and economic resilience. The lack of adequate wastewater treatment systems on the Palestinian side is already affecting the environment on both sides of the border, and its impact will intensify as water use increases. Restrictions imposed by the GoI significantly limit the policy instruments and public investment opportunities available to the PA to address climate challenges. However, it tackled jointly, the positive impact of climate action can accrue to both people.

The lifting of restrictions on access to resources and on the movement of people and goods would unlock opportunities for economic development and climate action in the West Bank and Gaza, yielding benefits on both sides of the border. Recognizing the mutually reinforcing and externally imposed drivers of fragility in the West Bank and Gaza, this analysis treats climate action as only one element of strategic resilience, along with the free movement of people and goods, the restoration of peace and security, increased political stability and policy predictability, greater territorial consolidation, and increased access to and control over natural resources. These drivers of resilience can help improve the reliability of basic services, reduce poverty, boost employment, mitigate social exclusion, and diminish exposure to economic shocks. Actions by the GoI that reduce the fragility of the West Bank and Gaza will generate mutual benefits by attenuating shared climate-related risks and increasing regional stability.

Although it faces considerable challenges, the PA has important opportunities to advance its development agenda while strengthening resilience and moving towards sustainability. The PA can maximize the impact of its limited resources by: (i) addressing water scarcity and its implications for energy and food, and (ii) rethinking urban development through a resilient, green lens. Actions in these two focus areas can be complemented by investing in human capital development and expanding the private sector's engagement in the development and climate agenda. While improving resilience is a top priority of this CCDR, the analysis also highlights opportunities to lower GHG emissions in line with the PA's NDC commitments. Carbon emissions in the West Bank and Gaza have increased over the years, driven by economic and population growth, and overall GHG emissions rose by 47 percent between 2010 and 2020 (Figure 5).[36] However, because the West Bank and Gaza are almost entirely dependent on electricity imports, the per capita emissions reported in the NDCs are far below the global average. Under a business-as-usual scenario, total emissions are expected to triple between 2015 and 2040, led by the energy, transportation, and waste-management sectors.[37] Investments in mitigation should target areas with substantial development co-benefits, such as air quality, energy security, fuel costs, infrastructure costs, or employment creation.

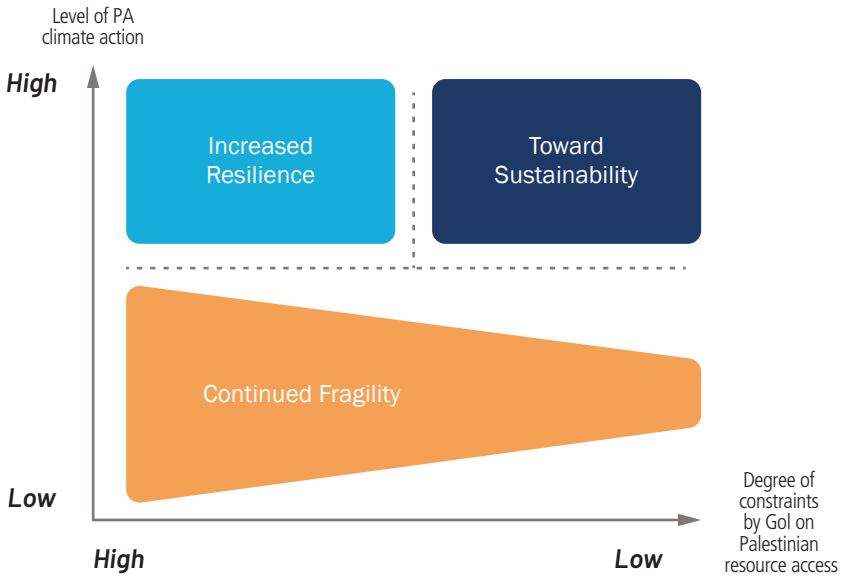
Figure 5: Projected GHG Emissions by Sector in the West Bank and Gaza in 2020 and 2040 under the Business-as-Usual Scenario Used in the 2021 Nationally Determined Contributions (MtCO2e)[38]



Source: Palestinian Authority (2021). Nationally Determined Contributions

This CCDR provides an appraisal of the social and macroeconomic impacts of climate change in the West Bank and Gaza under three alternative scenarios. The analysis builds on previous assessments of the macroeconomic framework, the social protection system, urban development, and the health, water, energy, and food sectors, and it is informed by the PA's stated climate priorities.[39] The three scenarios are: (i) Continued Fragility, in which a lack of climate action exacerbates the costs of climate change and magnifies its impact on existing drivers of fragility in the West Bank and Gaza, (ii) Increased Resilience, which assumes continued restrictions due to the occupation but optimized climate action broadly aligned with the NDC commitments , and (iii) Toward Sustainability, an aspirational scenario in which the PA assumes full control over the areas defined in the Oslo Accords, including land and natural resources. The analysis demonstrates that local control over land, water, and other resources, combined with strong climate action by the PA, could put the West Bank and Gaza on a more climate-resilient path, increasing socioeconomic stability and reducing risks on both sides of the border.

Figure 6: Schematic of the CCDR's scenario



Note: While decreased restrictions by the GoI can mitigate fragility in the Palestinian territories, only if combined with strong climate action by the PA will it help put the West Bank and Gaza on a more climate-resilient path

Source: Authors' elaboration

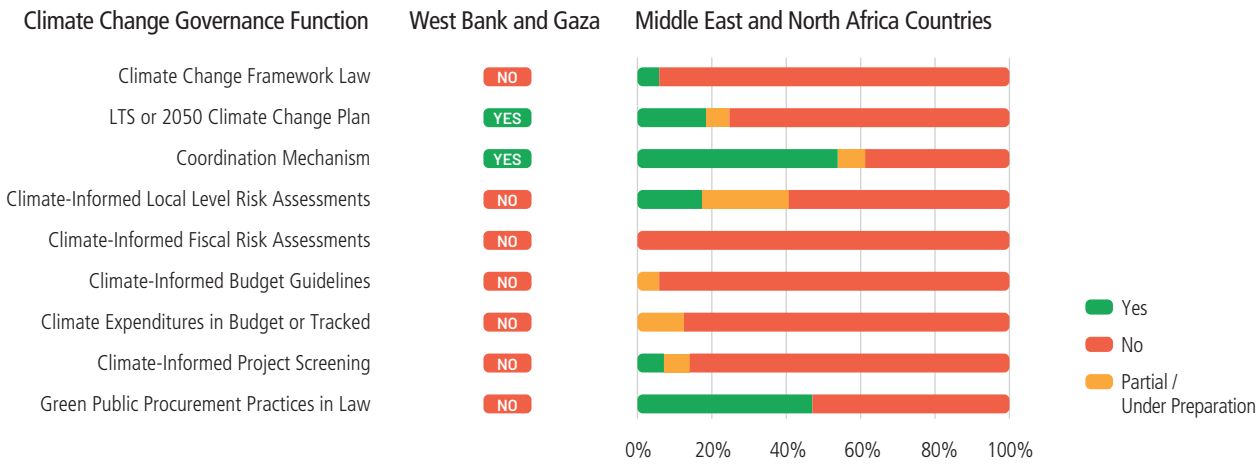
2. Climate Commitments, Policies, and Capabilities

2.1 Climate Commitments and Policies

The PA is committed to making climate change a national priority, and the recently updated NDCs focus on climate adaptation and resilience. The updated NDC document (2021) states that the PA's key climate goal is to reduce vulnerability, primarily by increasing the adaptability and resilience of the national public sector and local communities. Although all NDC actions hinge on international aid, the updated NDC includes detailed implementation plans for six of the 12 most vulnerable elements in the West Bank and Gaza. These sectors, which were identified in the 2016 NAP, include agriculture, energy, health, transportation, waste management, water resources, the coastal and marine economy, food production, industry, terrestrial ecosystems, tourism, and urban infrastructure. In addition, the updated NDC emissions-reduction targets are also more ambitious: while the first NDC aimed to cut GHG emissions by 12.8 percent by 2040 relative to a business-as-usual baseline, the updated NDC aims for a 17.5 percent reduction. The updated NDC also identifies climate empowerment as an opportunity to engage youth, women, and other vulnerable groups in implementing the NDCs.

While the PA's capacity to implement climate policy is severely constrained, additional steps can be taken to embed climate commitments into policies, processes, and systems. The PA lacks full autonomy over core government functions such as taxation and public-sector hiring, and it has limited control over natural resources, especially land and water. The prevalence of net lending has long disrupted budgeting and financial planning while undermining fiscal discipline among LGUs and reducing the PA's fiscal space. The government operates under severe fiscal stress, with a shrinking investment budget; the need to manage immediate crises impedes progress on longer-term priorities; and weaknesses in PFM negatively impact service delivery. More can be done to mainstream climate change into the PA's policies, processes, and systems (**Figure 7**). For example, the PA has yet to identify climate-related fiscal risks or screen public investments through a climate-change lens. There is limited legislation or guidance on the institutionalization of climate policy beyond the coordinating role of the Environment Quality Authority (EQA), and few practical mechanisms are in place for adopting a whole-of-society approach to motivate and enable stakeholders.

Figure 7: The Public Sector's Climate-Change Governance Functions in the West Bank and Gaza and in the Middle East and North Africa



Source: WB climate change governance indicators

The environment protection law was amended in October 2021 by a Presidential decree, reflecting the PA's increased focus on climate change. The amendments were aimed at institutionalizing the climate agenda and including new climate adaptation and mitigation regulations and standards. The amendments also introduced measures to (i) strengthen the public sector's capacity to cope with climate change, (ii) establish the NCCC, and (iii) create new standards for environmental protection and sustainable development. With support from the World Bank, the EQA is working to launch a Measurement, Reporting, and Verification (MRV) system that will draw on data collected from relevant ministries. The EQA is also responsible for convening the multi-stakeholder NCCC. The NCCC's mandate includes developing a national vision for climate change, monitoring and evaluating the implementation of programs and action plans, forming task forces to collect data, and conducting awareness campaigns and scientific research. However, improving coordination across government agencies and levels of government remains a challenge, and the EQA lacks the staff to fulfill its coordinating role. The EQA has begun revising the current environmental law and relevant regulations as part of its efforts to facilitate the achievement of the NDCs.

The PA's National Development Plan (NDP) for 2021-2023 also emphasizes the importance of supporting a green and inclusive approach to development. The NDP includes a pillar on sustainable development that focuses on environmental quality, climate change adaptation, and reducing GHG emissions. However, further efforts are needed to integrate climate considerations into other pillars and mainstream them in the sectoral development plans currently being updated for 2024-29.

No formal approaches have been established for engaging civil society on climate change. Awareness-raising campaigns, participatory policymaking geared toward a just and inclusive transition, and collaborative efforts to implement mitigation and adaptation measures and monitor operational and financial performance are vital to a whole-of-society approach to climate action. In the 2021-22 Arab Public Opinion Survey on Climate Change, 77 percent of respondents reported that a lack of public awareness has contributed to environmental challenges in the West Bank and Gaza, while 67 percent cited inadequate government initiatives as a contributing factor. Consultations with civil society organizations in the West Bank and Gaza confirmed their key role in climate action and the green transition and highlighted the importance of changing public attitudes, behavior, and actions towards climate change and environmental issues, particularly with regard to water and electricity use and waste-disposal practices.

2.1.1. The Adaptation–Mitigation Nexus

The NDCs for the West Bank and Gaza recognize the need to approach climate adaptation and mitigation simultaneously to increase community resilience. The updated 2021 NDCs approach adaptation and mitigation through a context- and needs-driven lens that accounts for local climate vulnerabilities and risks, and actions focus on the water-food-energy nexus. The NDC implementation action plan emphasizes reusing treated wastewater in large-scale wastewater treatment plants, reducing non-revenue water in the West Bank, and financing the construction of the Gaza Central Desalination Plant, which will provide 55 million m^3 of drinking water (**Figure 8**). Currently, the PA is supporting the adaptation of irrigation networks to climate change in Gaza by increasing the availability of alternative water resources through the Green Climate Fund (GCF), financed by the French Development Agency and Irish Aid. The PA is also preparing projects that use nature-based solutions (NBS) and agricultural water management to improve water security in a changing climate.[40] However, the pipeline of projects ready for green finance in the West Bank and Gaza remains small, inhibited by a weak enabling environment and the relatively limited engagement of financial institutions. Climate-smart agriculture and climate-resilient land planning and management feature prominently in the NDC, along with energy distribution, demand-side energy efficiency, and renewable energy production, all of which would yield significant

adaptation co-benefits. The updated NDCs also emphasize improving the adaptive capacity of the health sector and raising awareness about climate-linked diseases by training health professionals in disease prevention; increasing awareness, particularly among women, on preventing diseases related to water, sanitation, and food; and improving the capacity of the Ministry of Health to monitor the safety of water, wastewater, and food.

Figure 8: Key Sectors and Climate Actions Highlighted in the West Bank and Gaza's Updated NDCs

Proposed **17.5** GHG emission reduction compared to BAU

By **2040**

Estimated Total Cost: **USD 5.93 bn** (Funding gap of 2.74 bn)

West Bank and Gaza NDC: Key Sectors and Proposed Action

Energy

- Upgrade of the electricity grid to enable distribution of renewable energy, primarly from solar photovoltaic (PV), by 2030.
- Improve energy efficiency by 20% (versus business as usual) across all sectors by 2035.
- 20-33% of electricity to be generated from renewable energy by 2040, primarly from solar PV.

Health

- Improve adaptive capacity by training 300 health professionals in disease prevention by 2025.
- At least a 30% increase in the awareness of people, particularly women, by 2030 about measures that they can take to help prevent major diseases related to water, sanitation and food.
- By 2030, the capacity of the Ministry of Health to monitor the safety of water, food and sanitation increases by at least 50% from the situation in 2020.

Transport

- Reducing the emissions of the passenger vehicle fleet by 8% by 2030, and 24% by 2040.
- Scrapping 60% of vehicles older than 20 years by 2030 and scrapping all vehicles older than 20 years by 2040.
- Consucting statutory tests on 30% of on-road vehicles by 2030, and 60% by 2040.
- 20% of all small transit vehicles are replaced with larger capacity buses by 2030, and 40% by 2040.
- The overall number of vehicles is reduced by 20% by 2030, and 40% by 2040.

Waste

- Reduce the volume of leachate by 50% by 2030 from suitable landfill sites.
- Reduce the amount of waste for final disposal in landfill sites by 30% by 2030 and by 50% by 2040.
- Increase the amount of waste re-used or recycled by 30% by 2030 and by 40% by 2040.
- Increase the amount of waste collected to 90% by 2030 and to 100% by 2040.
- 30% reduction of methane emissions from landfill sites by 2030 and 70% reduction by 2040.

Agriculture

- 50% of farms apply gender-sensitive CSA by 2040.
- An annual increase of 2% until 2040 in the total area of forest land, rangeland and upland rehabilitated and sustainably managed.

Water

- 70% of the rteated wastewater reuse by 2023.
- 15% reduction in non-revenue ware in the West Bank by 2032.
- Construction of the Gaza Central Sesalination Plant provides 55 million m^3 by 2025.

Source: Authors' elaboration based on information from Palestinian Authority (2021) Nationally Determined Contributions.

In addition to the sector-specific policies linked to the NDCs, other sectoral strategies are organically connected to climate action along the water-energy-food nexus. For example, the current strategy for the agricultural sector includes resilience-related objectives such as the efficient and sustainable management of natural resources, as well as enhanced agriculture production, productivity, and competitiveness. Similarly, both the Water Sector Strategy and Water Sector Reform Plan include the effects of climate change and propose demand management and strategic planning to address water-security challenges. The National Renewable Energy Action Plan (NREAP) for 2020-2030 aims for 10 percent of electricity generation to come from renewable sources, of which 80 percent would be from solar photovoltaic (PV), 10 percent from wind, and 10 percent from biogas/biomass. To meet this strategic target, 500 MW of renewable energy will need to be installed by 2030.

Despite increasing awareness among policymakers, the West Bank and Gaza still lack a regulatory framework that integrates climate considerations in sectoral investments and policies. Effective climate action will require mainstreaming into the policy process measures designed to achieve the NDC targets. Institutional capacity-building is also necessary to strengthen the ability of sectoral and ministerial institutions to gather data, monitor and report climate-change indicators to the EQA, and formulate plans for further action for mitigation and adaptation measures. The EQA aims to integrate environmental protection and climate change as cross-cutting requirements in all upcoming national strategies.

2.1.2. Disaster Risk Management and Social Resilience

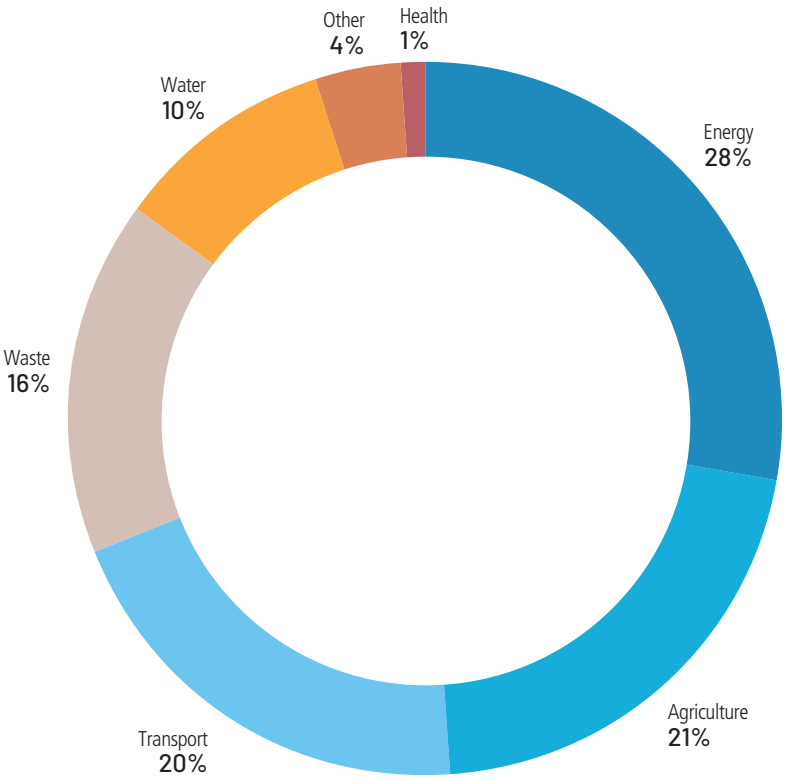
The PA has recently established a disaster risk management system, but its implementing legislation is still inadequate. National institutions also need to be strengthened and geared towards a more proactive and anticipatory approach to disaster risk management. In addition to the risk of earthquakes, landslides, and droughts, which represent the greatest natural threats in the West Bank and Gaza, other hazards like flash floods and dust storms are becoming increasingly frequent and intense, with adverse effects on public health and economic output. No financing is earmarked for shock response, and no national disaster risk financing strategy or policy is in place. Consequently, all support to help households cope with climate shocks relies on budget reallocation and external assistance.[41]

Public policy in the West Bank and Gaza does not prioritize investments that build the people's resiliency. The health sector is included in the NDC framework and is part of new disaster risk management and emergency preparedness efforts.[42] However, the PA relies on financial support from international partners to finance health and social protection, and the updated NDCs do not call for climate-specific social protection strategies. Additional analytical work on previous natural shocks and current financing arrangements is needed to understand the scale and scope of the funding gap arising from climate-related natural disasters and should help inform the development of disaster risk financing and insurance strategy.

2.2 Budget and Investments

Implementing the actions necessary to achieve the NDCs by 2040 will cost US$5.9 billion, with a projected funding gap of 46 percent. Financing needs are greatest in the transport, energy, and agricultural sectors. All the NDC-related actions require international aid and are at risk from the recent decline in donor support. Consequently, meeting the climate-change targets will require innovative financing strategies, including measures to attract investment from the private sector (**Figure 9**).

Figure 9: The West Bank and Gaza's US$2.7bn NDC Funding Gap by Sector



Source: Palestinian Authority (2021) Nationally Determined Contributions.

Targeted projects and partner-funded technical assistance are aligned with NDC priority sectors and cover many relevant actions, but donor support falls far short of the total cost of achieving the NDCs. The World Bank is contributing to climate resilience and mitigation through projects in water, energy, urban/local government, and solid-waste management. The CCDR and country climate commitments should inform subsequent assistance strategies. Other donors are also supporting NDC-aligned sectors. For example, a solid-waste management project in Gaza focuses on special and medical waste, strengthening capacity and institutional knowledge, and engaging local communities and the private sector in reducing waste[43]. Another project focuses on improving water resources management, water services, and treated-water reuse for irrigation through the North Gaza Wastewater Management Facilities.

3. Building Resilience Along the Water-Energy-Food Nexus

Increasing resilience in the face of the cascading effects of climate change on the water-energy-food nexus will be critical to improve the lives of the Palestinian people. The water-energy-food nexus is a powerful framework for identifying synergies and managing risks that arise from these linkages, which is especially crucial in a context like the West Bank and Gaza, where restrictions on access to natural resources create additional complexity. This chapter shows how the water-energy-food nexus interacts with climate change, using water as the entry point for examining integrated water management solutions and supply options.

3.1 The Water Challenge in the WEF Nexus

The unique characteristics of water, energy, and food in the West Bank and Gaza have important implications for climate-change adaptation and mitigation. The development of desalination, water distribution, and wastewater collection and treatment infrastructure requires reliable sources of energy. Similarly, agriculture relies on energy for irrigation systems, water pumping, and heating and cooling. Water scarcity and its negative impact on agriculture reduces consumption and incomes in the West Bank and Gaza and may adversely affect the wellbeing of future generations. Poor water, sanitation, and hygiene systems magnify the threat posed by waterborne diseases and could increase malnutrition and reverse recent progress on reducing the stunting rate, which currently stands at 7.8 percent.[44]

In the West Bank and Gaza, a lack of sovereign control over water resources results in highly restricted access. The two major sources of surface and ground water are both transboundary; the Coastal Aquifer, that extends along the eastern Mediterranean coast from the northern Sinai Peninsula in Egypt, along the Gaza Strip and Israel, and the Mountain Aquifer, that has historically been the major source of water for the West Bank and one of the main sources of freshwater for Israel. Access to these resources is limited, while the entitlements to the water resources of the Jordan River, shared between Israel, Jordan, Lebanon and Syria, have become unavailable to the Palestinians as Israeli irrigation projects have diverted the lion's share of the river's flow. These restrictions impose significant constraints on economic growth and development and limit the ability of households and firms to adapt to a changing climate context.

Lack of access to water resources has rendered the West Bank and Gaza among the most water-scarce areas in the world. While estimates suggest that renewable internal water resources are just under 200 m3 per capita,[45] effective internal resources (excluding imports) in 2020 amounted to less than 50 m^3 per capita, far below the 500 m^3 per capita threshold for absolute scarcity. These water resources come from a range of diverse sources, with the total water available to the West Bank and Gaza estimated to be less than 400 million m^3 in 2020, excluding imports from Israel. Groundwater accounts for over 90 percent of the water supply if imports from Israel are excluded. Insufficient to meet demand, these resources are increasingly being supplemented through non-conventional sources such as desalination, wastewater reuse, and rainwater harvesting, as well as by imports from Israel. Nevertheless, groundwater resources are being abstracted much faster than they are being replenished, leading to persistent groundwater depletion.

Poor water quality compounds the scarcity of water available for domestic consumption and productive purposes. The main sources of pollution include the discharge of untreated wastewater from domestic and industrial sources, agricultural activities, and non-engineered landfill sites. These challenges are

accentuated in some areas by the GoI's ban on the importation of water-treatment chemicals that it identified as dual-use goods, particularly in industrial areas such as Hebron.[46] As a result, groundwater resources are supplemented by short-term, low-volume desalination plants and imports from Israel, while an estimated 97 percent of the population relies on water from expensive and unregulated small-scall private providers.

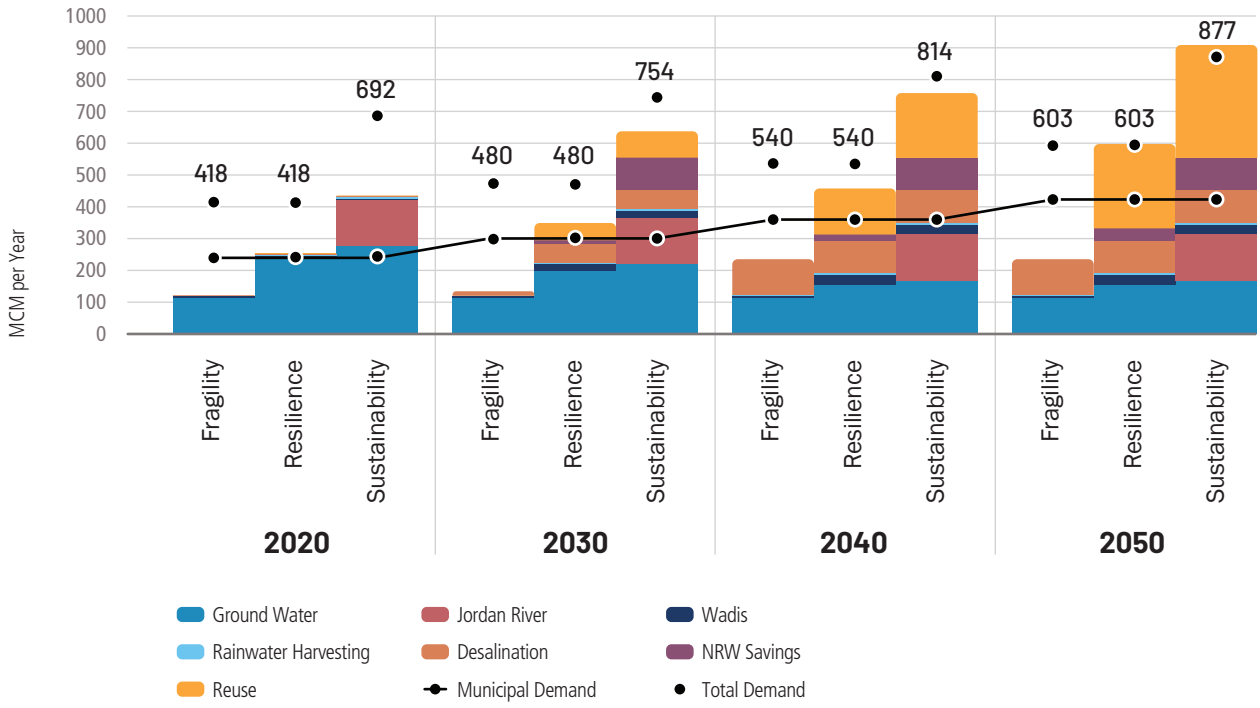
While the unique geopolitical context complicates efforts to forecast future water demand in the West Bank and Gaza, the gap between the demand for water and the available supply is large and projected to increase. Recognizing the principles of the Oslo Accords pertaining to the coordination and management of water resources, and using the assumptions articulated in the National Water and Wastewater Policy and Strategy, future water demand is estimated to be over 600 million m^3 per year by 2050.[47] However, unpredictable geopolitical variables influence access to water resources and the development and maintenance of water-related infrastructure. The gap between water supply and demand is widening. Municipal demand in 2020 was estimated at 242.4 million m^3 per year (144.7 million in the West Bank and 97.7 million in Gaza).[48] Agricultural demand is estimated at 175.8 million m^3 per year, pushing total demand above 400 million m^3 per year.[49] The resulting gap between demand and supply is exacerbated by non-revenue water, which is estimated to account for an average of about 40 percent of total water. As a result, per capita consumption is typically well below international standards, averaging 86.3 liters per day but reaching as low as 26 liters in areas such as Dura and Yatta in Hebron.[50]

The three scenarios outlined earlier in the report account for varying global emissions trajectories and different levels of local access to water resources. The *Continued Fragility* scenario assumes restrictions on access to resources in Area C remain in place, no progress is made on adaptation or mitigation, and access to groundwater remains constrained. The *Increased Resilience* scenario assumes that the over-abstraction of groundwater resources will be used to bridge the gap before falling to sustainable limits as the PA pursues its NDC commitments by investing in desalination, the reuse of treated wastewater, and the reduction of non-revenue water. The third scenario, *Toward Sustainability*, assumes effective cooperation with neighboring countries and Palestinian access to resources within Area C, including allocations equivalent to entitlements from the Jordan River. These scenarios are used to identify alternative trajectories for water supply and demand.[51]

Constraints on access to water resources in the West Bank and Gaza sharply restrict social and economic opportunities. Under the *Continued Fragility* scenario, where access to water is limited to the interim agreement under the Oslo Accords (118 million m^3 of groundwater in the West Bank) and groundwater yields in Gaza are kept at a sustainable level (55 million m^3), the gap between demand and supply is estimated at nearly 300 million m^3 per year. This is based on the basic human right of 120 liters per capita per day, but the gap narrows to around 200 million m^3 if per capita consumption is reduced to the current actual consumption level of 80 liters per capita per day. Under both scenarios, the gap between supply and demand is closed through a combination of strategies, including over-abstraction of groundwater resources, purchases from private suppliers (water tankers, short-term, low-volume desalination plants, etc.), and imports from Israel. Under the *Toward Resilience* scenario, the over-abstraction of groundwater resources is sufficient to meet a demand of 80 liters per capita per day. However, if per capita consumption is assumed at the level considered a basic human right (120 liters per day) and irrigation requirements are met, a gap of roughly 40 percent remains between demand and supply. This gap is met through imports from Israel. If the desalination plants in Gaza become operational by 2050, additional storage is developed, and the West Bank increases wastewater reuse and reduces non-revenue water, supply

would be sufficient to meet agricultural demand. However, a projected deficit in municipal demand of nearly 100 million m³ per year would remain and would need to be supplied through imports from Israel estimated at about US$96 million per year.

Figure 10: Water Supply by Source and Demand in the West Bank and Gaza under Different Scenarios



Source: Authors' elaboration based on World Bank data

While water resources are highly constrained, the PA has options to bridge the water-availability gap through demand management and investments in non-conventional supply. Under the *Toward Sustainability* scenario, in which restrictions on movement and access are lifted and the PA has complete access to water resources in Area C, the available water supply would be sufficient to meet the additional municipal demand until 2050. The increased opportunities afforded to expanding irrigation under this scenario due to access to Area C would result in initial unmet demand in the West Bank of roughly 100 million m³ per year. This agricultural demand gap could be bridged by 2050 through the increased reuse of wastewater coupled with improved irrigation efficiency, increased rainwater harvesting, and the development of large-scale storage. In Gaza, the projected increase in municipal demand would require an additional 83.5 million m3 by 2050, which could be met through reducing non-revenue water, managing groundwater more effectively, artificially recharging aquifers, increasing wastewater reuse, and investing in desalination, with two phases projected to provide 55 million m³ by 2030 and another 55 million m³ by 2040. The first phase is under preparation at an estimated cost of US$590–US$620 million for the desalination plant and associated infrastructure, along with a dedicated power station estimated at around US$320 million. Construction has not yet started, but the plant is expected to be commissioned before 2030. If access to water resources within Area C remains restricted, the PA would need to rely on non-conventional resources, increased

consumer awareness to reduce demand, savings from improvements in non-revenue water, and increased imports from Israel to bridge the widening gap between supply and demand. Given the scale of the investments needed under the *Increased Resilience* scenario, the PA will need to focus on implementing the water-sector reform agenda, strengthening sectoral institutions, and enhancing the operational and financial efficiency of service providers.

3.2 Food Security, Agriculture and Linkages to Water and Energy

Climate change will further strain the already fragile food systems of the West Bank and especially Gaza. The World Food Program (WFP) estimates that 63 percent of Palestinians (1.84 million) were food insecure as of April 2023. Of the 1.1 million people defined as severely food insecure, 90 percent lived in Gaza, making up about 50 percent of the local population. Due to limited arable land and water resources, as well as restrictions on movement and access to markets, Gaza's food system depends heavily on imports from Israel. The near-total blockade imposed by Israel has severely impacted the availability and affordability of food, leading to high levels of food insecurity and malnutrition. By contrast, the West Bank, while also highly dependent on imports, has a more diversified food system with a higher proportion of locally produced food and greater access to markets.

The agri-food sector continues to play a significant economic and social role both in the West Bank and Gaza. Historically, the agri-food sector was the backbone of the Palestinian economy and a thriving export sector with high-value specialty products such as olive oil, cheeses, spices, and confections. In 2019, prior to the COVID-19 pandemic and outbreaks of conflict in Gaza in 2020 and 2021, primary agricultural production contributed about 10 percent to GDP, and this share rises to 15 percent when agri-food value chains are included. The sector currently generates about 13 percent of formal employment at the production level, while processing, packaging, transport and retail support livelihoods and informal employment for over 90 percent of the population,[52] with a multiplier effect on supporting sectors such as logistics, services, and banking. The agricultural sector also accounts for the largest share of exports, representing 14 percent in 2020.[53]

Climate change will imperil the viability of rainfall-reliant agricultural systems centered on olive and livestock production. Temperature increases, rainfall variability, and more frequent droughts are negatively affecting the growing season and reducing olive output and quality. Similarly, in the livestock sector, rising temperatures and reduced water availability adversely affect the quality and quantity of forage, weakening animal health, productivity, and reproduction. CCDR consultations with civil society suggested that agricultural extension programs and early warning systems fail to help farmers to take precautionary measures against extreme weather conditions.

Along with restrictions on access to land, water scarcity—exacerbated by climate change—is the main challenge facing irrigated agriculture in the West Bank and Gaza. Irrigated agriculture in the West Bank and Gaza is characterized by groundwater-based irrigation systems of varying efficiency, high energy costs for irrigation, and restrictions on the development of agricultural infrastructure in Area C. Only about 75 percent of the estimated irrigation-water demand by the agriculture sector is available, and illegal groundwater abstraction is common.[54]

While agriculture will need to become more water efficient under all scenarios, growth opportunities and sectoral resilience differ greatly. Under the *Continued Fragility* scenario, diminishing access to land and water resources in the West Bank and deteriorating water availability and quality in Gaza stifle the growth of agriculture. Under the *Increased Resilience* scenario, access to land remains restricted, but access to water resources increases as additional water sources such as treated

wastewater and harvested rainwater become available in the West Bank and water quality improves in Gaza. The agricultural sector could likely achieve modest growth and contribute to improved food security, especially in Gaza, under this scenario. Under the *Toward Sustainability* scenario, agriculture could become a thriving sector and engine of job creation, boosting annual economic activity by US$850 million in 2021 prices, or 4.7 percent of GDP (**Box 1**). The expansion of agriculture would be made possible by access to ample land and water resources, including the Jordan Valley, with its fertile soils and uniquely advantageous agro-climatic conditions.

Box 2. Agricultural Potential in Area C

In 2014, the World Bank published a report highlighting the significant potential for agricultural development in Area C that could be realized if restrictions on access were lifted. Access to all parts of Area C, excluding Israeli settlements, could add an estimated US$704 million in value to the Palestinian economy—equivalent to 7 percent of 2011 GDP—and this potential remains largely unchanged. However, fully developing the agricultural sector in Area C would require approximately 189 million m^3 of water per year. While climate change is undermining production, its negative effects are balanced by the increasing availability of climate-smart agriculture technologies such as adapted varietals, drip irrigation, and hydro- and aquaponics, which can produce higher yields on less land and with less water.

Maintaining agricultural production and livelihoods while reducing freshwater use is a complex challenge that requires a systems-based approach. Over the past 20 years, the agricultural sector's share in overall water use has declined from two-thirds to less than half. Production has shifted away from cereals toward more water-efficient crops, and the penetration of drip irrigation systems has reached 56 percent. Further efficiency gains are possible but will become increasingly challenging. Experience elsewhere in the region shows that integrated approaches are necessary and will require significant institutional capacity.

The reuse of treated wastewater for irrigation and changes in agricultural technologies and cropping systems have the potential to transform water scarcity challenges into sustainable development opportunities. Realizing this potential will require targeted investments in advanced wastewater treatment facilities and distribution networks, an updated regulatory framework, and monitoring systems to ensure safe use. Additionally, farmers need training and capacity building to adopt new irrigation methods and technologies, including sensor-based systems, as well as crop-management practices consistent with wastewater irrigation. Embracing drought-tolerant and less water-intensive crops; adopting varieties with shorter growing seasons; shifting towards higher-value crops; and increasing the use of cover for vegetable production could help maximize the value of reused water.

Addressing the linkages between agriculture and energy is crucial to build sustainable agricultural systems and transition to cleaner and more efficient energy sources. Integrating renewable energy technologies into agriculture through solar PV power, solar irrigation pumps, and biogas digesters can provide on-site renewable energy for agricultural farms, reducing reliance on fossil fuels and lowering GHG emissions while making them more resilient to electricity supply disruptions and price spikes. In

some cases, renewable energy installations on farmland can also provide additional revenue streams for farmers. Policies promoting renewable energy deployment, energy efficiency, and carbon pricing can incentivize sustainable farming practices, support the development of bioenergy, and drive the adoption of clean technologies in agriculture.

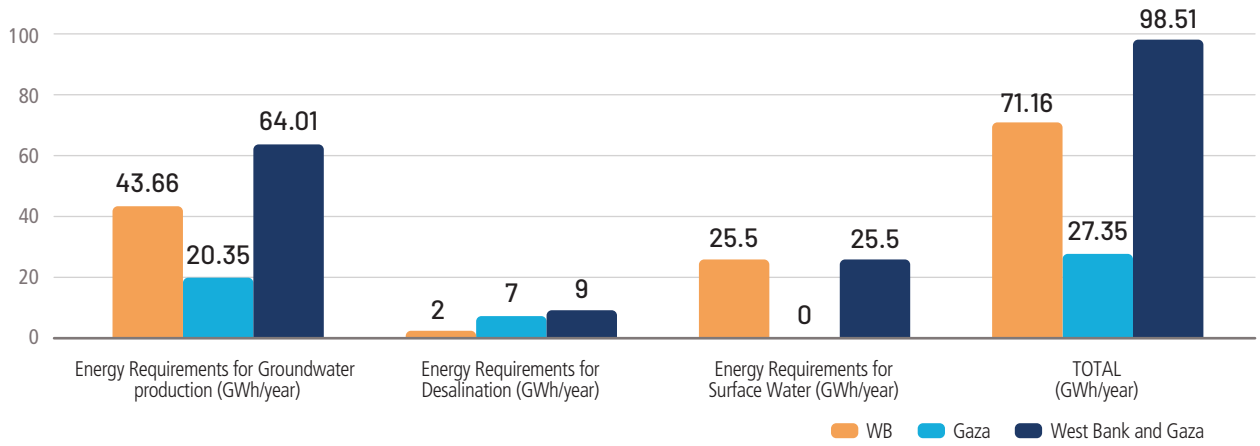
3.3 Energy Sector Realities and Implications for Water Availability

The energy sector in the West Bank and Gaza is characterized by unmet demand and a heavy reliance on imports. Many areas of the West Bank, and especially Gaza, suffer from electricity supply shortages, with increased incidences of load-shedding and poor quality of power. The chronic energy shortages in the West Bank and Gaza stem in part from Israel's role in the sector. The West Bank and Gaza not only imports most of its electricity from Israel but also utilizes much of the same transmission infrastructure. In the West Bank, electricity peak demand has grown to close to 1,300 MW, with over 95 percent provided by Israeli imports. Localized power interruptions are common, as technical challenges are exacerbated by constraints on transmission and distribution. In Gaza, electricity peak (suppressed) demand routinely exceeds 500 MW, while supply is typically 180-200 MW. Gaza's domestic electricity supply is provided primarily from the diesel-fired Gaza Power Plant, which has a capacity of 140 MW but normally operates at 60-80 MW due to constraints on the fuel supply from Israel, which stops altogether during conflict episodes, and through imports of up to 120 MW from the IEC. This results in electricity being available for only 5-15 hours per day. According to the data collected by the Italian Electrical and Technical Experimental Center (*Centro Elettrotecnico Sperimentale Italiano*, CESI) for the West Bank Master Plan supported under the World Bank-funded ESPIP Project, the total energy demand for the West Bank in 2022 was 4,985 GWh, while forecasted demand for 2035 is expected to be 8,779 GWh. As for Gaza, CESI's Gaza Master Plan shows that demand in 2017 was 2,650 GWh (peak load of 550 MW), and this estimate remained unchanged in 2022. According to the load-forecast data (based on the medium-scale prediction or estimation approach), the total demand for Gaza is expected to reach 6050 GWh (peak load of 1063 MW) in 2035.

Renewable energy sources, particularly solar, have the potential to play a significant role in addressing the power-supply gap while increasing energy security and reducing the cost of generation. The West Bank and Gaza receive about 3,000 hours of sunshine every year, averaging 8.2 hours per day, which makes the area highly suitable for solar energy.[55] The technical potential in the West Bank is estimated to be around 530 MW of rooftop solar PV, and at least 100 MW of utility scale solar in Areas A and B. In contrast, there is vast solar potential in Area C (**Box 2**).

Land, water, and energy issues are closely linked. In Gaza, desalination facilities and large water-treatment plants are responsible for most water-related energy consumption. Gaza's water and wastewater facilities required approximately 34MW of electricity in 2014, and by 2030 their demand is expected to increase to 127 MW as additional desalination and wastewater treatment plants come online.[56] In the West Bank, given that water is mostly imported from Israel, energy consumption for water processing is lower and more fragmented (**Figure 11**). In Gaza, the water sector is projected to account for one-third of the energy demand, or 137.8 MW, by 2030.[57] Desalination plants along the coastline will account for 50 percent of the water sector's projected energy demand, while 33 percent will come from wastewater treatment plants, though an inadequate energy supply will keep them working below capacity. By 2019, the energy supply deficit had been partly compensated by on-site diesel generators, while solar PV systems met 21 percent of the total energy needs. However, the water sector's energy demand in Gaza is set to increase due to the expansion of wastewater treatment plants and desalination facilities.

Figure 11: Energy Consumed for Water Supply and Wastewater Treatment Services, 2020

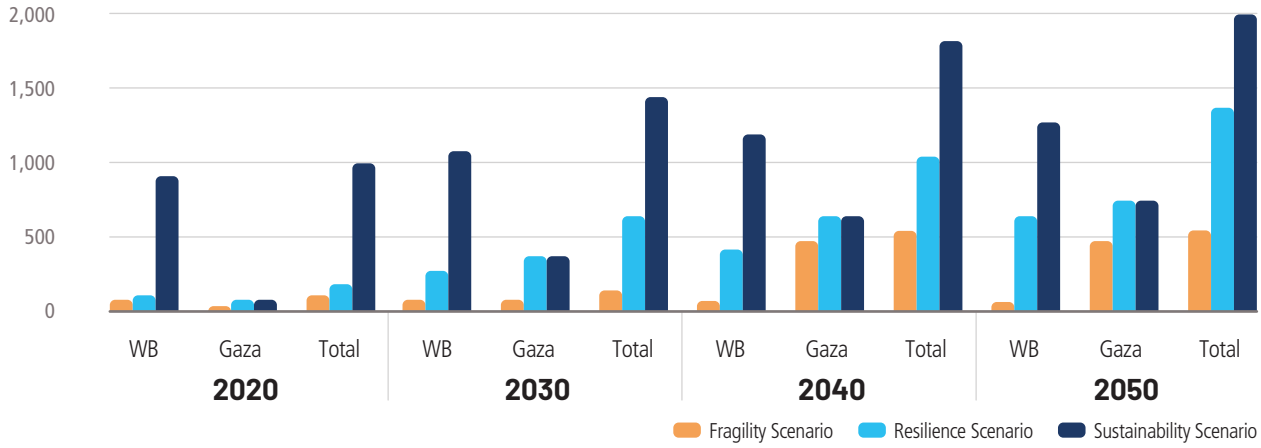


Note: Baseline data refers to Fragility Scenario
Source: Authors' elaboration based on World Bank data.

In 2020, the water sector's total energy demand reached nearly 100 GWh. Demand is expected to continue to increase, driven by demographic changes, economic growth, and geopolitical circumstances. The modelling exercise projects different trajectories for energy demand growth under different scenarios for the water sector (**Figure 12**). In the Continued Fragility scenario, treated water is not reused, but in the Increased Resilience and Toward Sustainability scenarios wastewater treatment increases the water supply.

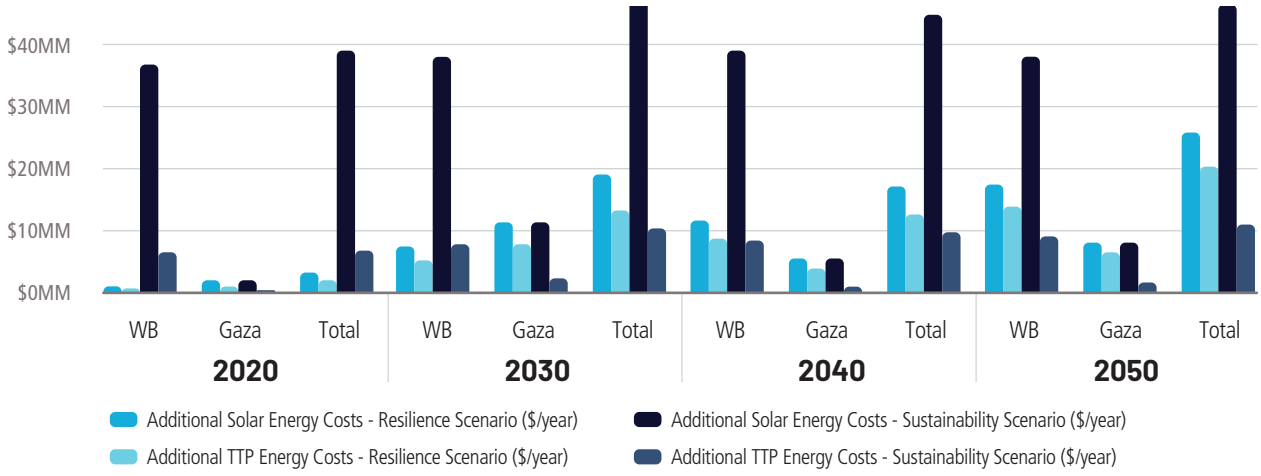
In the *Continued Fragility* scenario, in which water demand is most constrained, no additional electricity generation capacity is needed beyond what has been programmed in the electricity sector masterplan to meet the demand from the water sector. However, in the *Increased Resilience* and *Toward Sustainability* scenarios the growing water supply in both the West Bank and Gaza will greatly increase demand for electricity (**Figure 12**). Under the *Toward Sustainability* scenario, the combined energy gap could reach 1,460 GWh by 2050. Additional generation capacity will be needed to meet the rising energy demand of the water sector, and according to the West Bank and Gaza electricity sector master plans the most cost-effective combination of generation technologies would be a combination of solar PV and thermal power (**Figure 13**).[58, 59]

Figure 12: Additional Energy Demand for Water and Wastewater Treatment, Projections under Alternative Scenarios (GWh/year)



Source: Authors' elaboration based on World Bank data.

Figure 13: Costs of Additional Energy Supply for Water Sector Resilience – projection towards 2050 under different scenarios (US$/year)



Source: Authors' elaboration based on World Bank data.

In addition to utility-scale solar power generation, distributed renewable energy can play a crucial role in the West Bank and Gaza by providing reliable and affordable access to electricity, promoting economic development, and enhancing resilience. Limited infrastructure, political instability, and weak governance can hinder the development of more traditional centralized energy systems. In the West Bank and Gaza, distributed renewable energy infrastructure such as solar mini grids and microgrids, off-grid rooftop solar PV, and solar-home systems can rapidly expand energy access in remote and underserved communities, easing their reliance on expensive and often unreliable imports of electricity from Israel. The PA should encourage the development of off-grid renewable energy systems, promote local energy generation, support investments in energy storage to protect the power supply during crises, incentivize private-sector participation and capital investment, and establish a regulatory framework for the large-scale deployment of renewable energy technologies. These issues should also be discussed with civil society organizations and other grassroots actors, small firms and microenterprises, and consumers. Distributed renewable energy projects and improved demand-side energy efficiency in buildings, industries, and utilities can stimulate economic growth and job creation across the local manufacturing, installation, operation, and maintenance value chains of the clean-energy transition.

Closing the energy deficit will require a combination of renewable energy and demand-side energy efficiency interventions. Water facilities could achieve significant cost savings and increase the resilience of the electricity supply by increasing their use of renewable energy, raising the efficiency of their electrical and mechanical equipment, and engaging in demand-side management, for example by shifting energy use away from peak hours. An assessment of pumping-station energy efficiency in Jenin[60] suggested that significant improvements could be made to well-pump energy efficiency. Raising efficiency to the industry standard would yield a minimum savings of 1.6 MWh per year, or US$163,760 per year in operating costs. The analysis excluded booster pumps, but if inefficiencies affect the booster-pump systems, the potential savings would at least double. Stakeholder consultations produced various recommendations for improving efficiency, including enhancing the policy framework for the energy transition by updating the Law on Renewable Energy to include co-generation and auto generation and establishing energy-efficiency requirements for buildings.

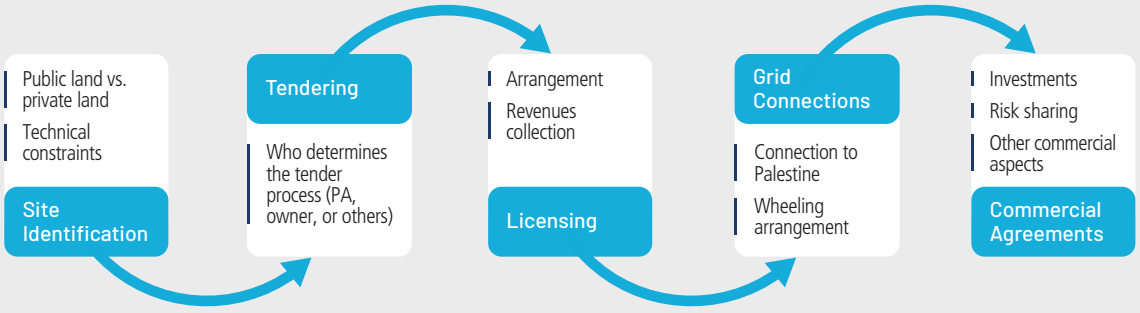
Box 2. Unlocking the Renewable Energy Potential of Area C

Enhanced regional cooperation could unlock Area C's vast potential for solar energy development. Over 3,000 MW of generating capacity could be built on just 3 percent of the land in Area C, while Areas A and B have the technical potential to generate about 530 MW from rooftop solar panels and at least 100 MW from utility-scale solar plants. Area C's terrain is also flatter than in Areas A and B, making it suitable for medium scale 3-10 MW ground-mounted solar PV generation. Nevertheless, the significant political challenges associated with securing Israeli approvals, permits, and clearances from the design through the construction stages inhibit investment in solar and other infrastructure projects in Area C that would increase the independence, diversification, and security of the Palestinian energy sector.

In 2022, the PA submitted a permit application for a number of solar PV sites located in Area C. Around the same time, a GoI survey identified 23 sites in Area C that would be viable for Israeli use, including use by the Israeli settlements in Area C. The uncertain and lengthy processing times for PA permit applications, combined with Israel's intention to exploit Area C's energy resources, poses a serious threat to the water-energy-food nexus in the West Bank.

Following a practical and scalable approach would help to identify and address project-specific challenges. The draft International Community Common Position Paper for Developing the Renewable Energy Sector in the West Bank proposes a set of parameters for investment projects. However, this approach does not deal with the more binding higher-level challenges involving regulations and permitting, highlighting the crucial importance of dialogue and negotiations.

Parameters for a Practical and Scalable Approach at the Project Level



Source: International Community Common Position Paper for Developing the Renewable Energy Sector in the West Bank (Draft 2023)

4. Green and Resilient Urban Development

4.1 The Constrained Urban Landscape and Climate Risks

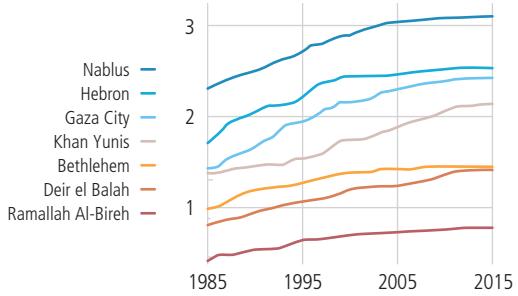
Urban expansion and infrastructure development in Palestinian cities have devoted insufficient attention to environmental degradation and climate risks, increasing the fragility of built-up areas. Urban land expansion with limited green space and hardly any permeable surfaces exacerbates the risk of flooding and landslides, while also leading to higher urban temperatures. The lack of climate-risk-informed physical plans impedes the ability to protect Palestinian cities against climate shocks and stresses. Public transportation suffers from fragmentation and suboptimal infrastructure, mainly due to geopolitical factors. As a result, private cars are the primary mode of transportation, leading to congestion, air pollution, and higher levels of GHG emissions. Inefficient solid-waste management in cities contributes to environmental degradation, worsening water, land, and air pollution while increasing GHG emissions. While the waste-collection rate exceeds 90 percent, service quality, reliability, and efficiency remain suboptimal. Currently, 65 percent of solid waste is disposed of in six controlled landfills in West Bank and Gaza, while 32 percent is illegally dumped, and just 3 percent is recovered and recycled, mainly by the informal sector. Overall, more than 95 percent of waste ends up in landfills or dumpsites. Most landfills are operating beyond their capacity, and without efforts to recycle and treat waste before disposal, the situation will worsen. The expanding footprint of landfills and dumpsites raises public health concerns, including air pollution from open waste burning, emissions from waste-collection and transfer vehicles, and groundwater contamination due to mismanagement and flooding. Dumpsites in Ramallah-Al-Bireh and Nablus are at an especially high risk of flooding, with 33 percent and 25 percent of their areas, respectively, located in flood zones, amplifying health and sanitation risks.

Urban areas in the West Bank and Gaza are increasingly exposed to risks associated with climate change and environmental degradation, including floods, landslides, heat waves, and air pollution. A climate risk assessment of seven urban areas (Bethlehem, Gaza, Hebron, Nablus, Ramallah-Al-Bireh, Deir El Balah, and Khan Yunis) revealed that the surface temperature during the hottest months consistently exceeded 40 degrees Celsius between 2013 and 2021, posing a threat to residents' health and labor productivity. Between 1985 and 2015, the amount of built-up area exposed to pluvial flood hazards expanded by 55 percent, triggering landslides in the hilly regions of the West Bank with recovery periods ranging from 50 to nearly 300 years. Environmental degradation in and around cities[61] worsens pollution and results in the loss of green space. These factors interact with climate change through feedback loops, increasing vulnerability to future hazards. All seven cities are subject to very high pollution levels due to improper solid waste disposal and treatment, emissions from the transportation sector, and slurries generated by stonecutting factories in the West Bank. Small particulate (PM2.5) air pollution exceeds 10 $\mu g/m^3$, a threshold that the WHO has linked with an 8 percent increase in long-term mortality. The failure to mainstream climate and environmental considerations in urban planning, development, and DRM systems has severe and compounding consequences for households, assets, economies, and ecosystems both in the West Bank and Gaza.

Figure 14: Flooding, Heat Waves, Landslides, and Air Pollution in Palestinian Cities

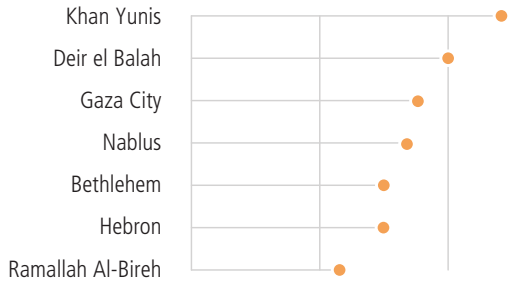
Pluvial Flooding[62]

Growth of built-up area exposed to pluvial flood hazards (sq km)



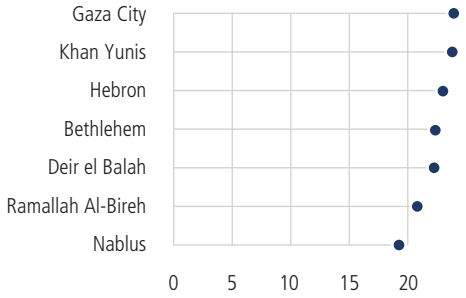
Heat[63]

Mean surface temperature during the hottest months 2013-2021



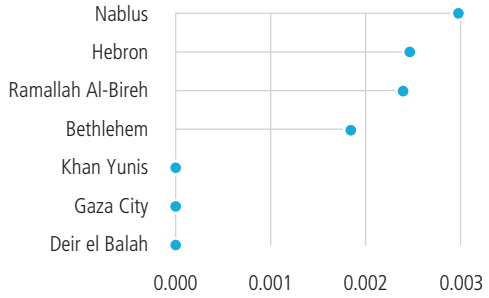
Air Pollution[64]

Average PM2.5 Concentration in 2019 (µg/m3)



Landslides[65]

City-wide average annual frequency of rainfall-triggered landslide 1980-2018



Source: Authors' elaboration based on listed global datasets.[66]

Gaps in DRM, municipal finance systems, and data management hinder the ability of local governments to effectively mitigate climate risks. While efforts have been made to establish institutions with DRM mandates, the current system lacks comprehensive coverage of the DRM cycle and fails to provide a cohesive policy and institutional framework that is vertically and horizontally integrated. Furthermore, local governments have a limited capacity to invest in resilience measures, DRM systems, and response mechanisms. Their institutional capabilities are moderate, and there is a need to strengthen data-driven decision-making. Shrinking budgets resulting from declining revenues and recurrent economic crises exacerbate the challenges that local governments face in addressing these issues.

4.2 Aligning Urban Development and Climate Action

4.2.1. The Heavy Toll of Inaction

Under the *Continued Fragility* scenario, urban sprawl leads to an increase in built-up areas exposed to hazards by 2050. An urban growth scenario analysis[67] prepared for seven urban areas (Bethlehem, Gaza, Hebron, Nablus, Ramallah-Al-Bireh, Deir El Balah, and Khan Yunis) reveals that their increased exposure is primarily a result of the increase in total built-up area rather than the direction of urban expansion. Each urban area also

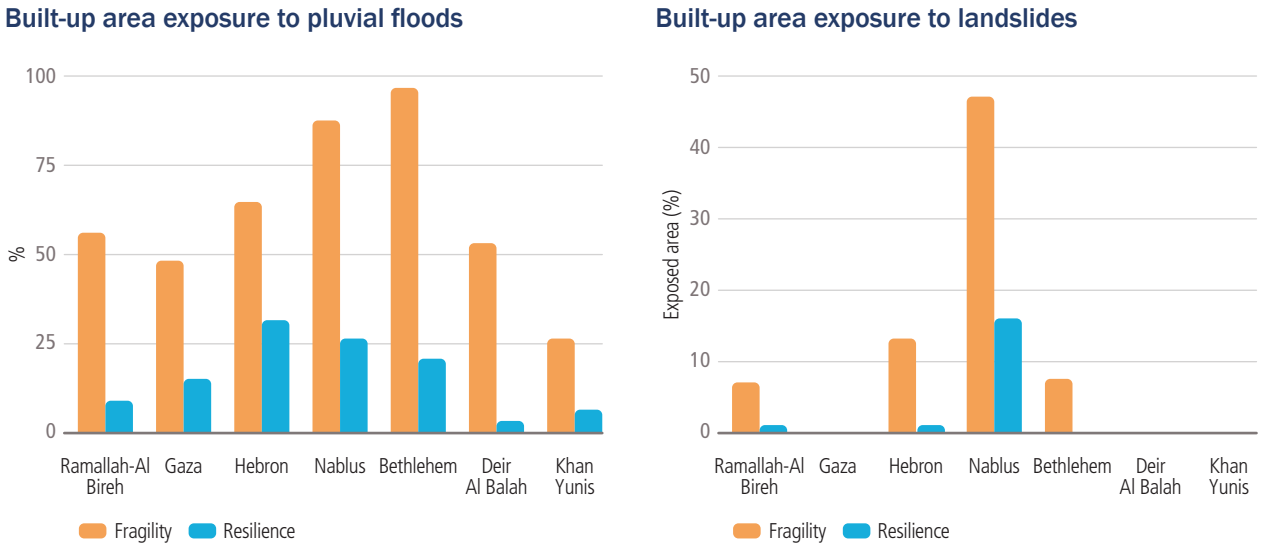
faces its own unique challenges. For example, Nablus is at risk of connectivity issues because citywide road segments are exposed to flooding. In the Ramallah-Al-Bireh urban area a lack of climate-informed planning and expansion into unsafe areas would increase exposure to hazards by 32 percent. Under the *Continued Fragility* scenario, the built-up areas exposed to climate hazards in the seven city clusters would expand by up to 48 percent by 2035, putting an additional 225,000 people at risk.

4.2.2. Opportunities for Building Urban Resilience and Greening Cities

Efforts to build urban resilience to climate-induced shocks and stresses in the West Bank and Gaza must begin by addressing existing development gaps. Sustainable urban planning that promotes social equity, supports economic growth, and maintains the balance between the built and natural environments is the foundation for cities' social, economic, and environmental resilience. An estimated 25-30 percent of buildings in the West Bank and Gaza are considered unsafe, and enforcing site and building safety codes will reduce vulnerability to multiple hazards, including those induced by climate change. Boosting the quality and coverage of the road network by installing proper drainage systems will improve stormwater management and reduce disruptions caused by extreme weather. Similarly, expanding green space in cities in strategic locations can help reduce heat, absorb stormwater, and provide recreational areas that promote public health and wellbeing. Action in these areas is essential to combat the effects of climate change.

Shielding urban areas against the effects of climate change and enhancing the resilience of infrastructure and services will require climate-informed planning and adaptive land use. The PA and municipal governments can guide growth away from hazardous areas, promote mixed-use neighborhoods and transport-oriented development to reduce commuting time, and embrace flexible and modular infrastructure. The simulation results[68] show that deploying climate action across seven urban areas could reduce exposure to pluvial flooding and landslides by over 50 percent in the Increased Resilience scenario. Integrating climate awareness into planning processes is crucial for cities to mitigate risks and enhance resilience.

Figure 15: Exposure to Pluvial Floods and Landslides in Alternative Scenarios

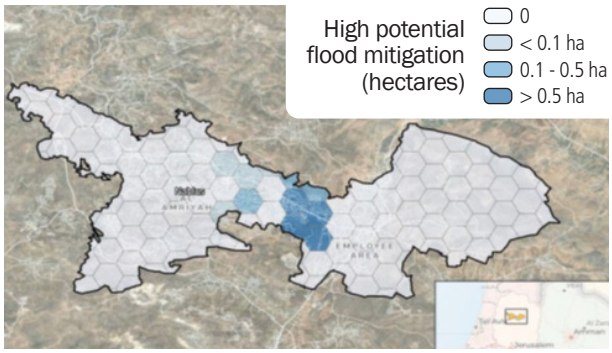


Note: Exposure to pluvial floods and landslides decreases across all cities in the Resilience Scenario that utilizes climate-informed planning, adaptive land uses, and nature-based solutions.
Source: Authors' elaboration based on World Bank data

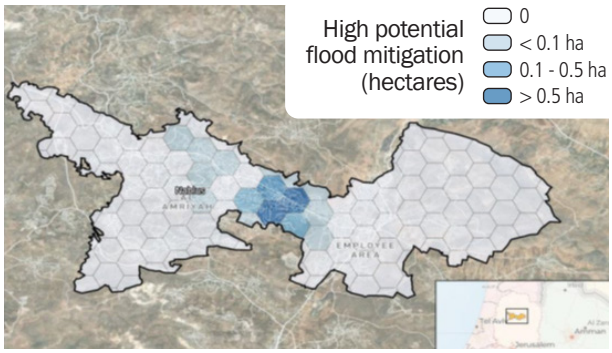
The targeted use of NBS can help address risks and mitigate hazards in vulnerable built-up areas and expansion zones. The 300 consecutive dry days projected in all seven cities by 2040-2059 pose a challenge, as dry soil is less pervious, increasing the risk of pluvial flooding and landslides. Integrating green infrastructure technologies such as permeable pavements with resilient grey infrastructure could improve stormwater management and ease the risk of flooding. An assessment of NBS opportunities conducted for selected cities in the West Bank and Gaza shows that open green spaces, terraces and slopes, urban forests, green corridors, and urban farming can address flooding, landslide, and heat risks while yielding numerous added benefits. Feedback from civil society underscores the importance of strategic NBS interventions such as scaling up urban agriculture in collaboration with communities, civil society groups, and NGOs, especially in Gaza. Under the *Increased Resilience* scenario, avoiding urban development in flood-prone areas and implementing NBS in up to 80 percent of areas vulnerable to flooding risks in all assessed cities could reduce the population's exposure to flooding by as high as 90 percent by 2035.

Figure 16: NBS Opportunities for Flood Mitigation in Nablus City

Suitable areas for terraces and slopes



Suitable areas for green corridors

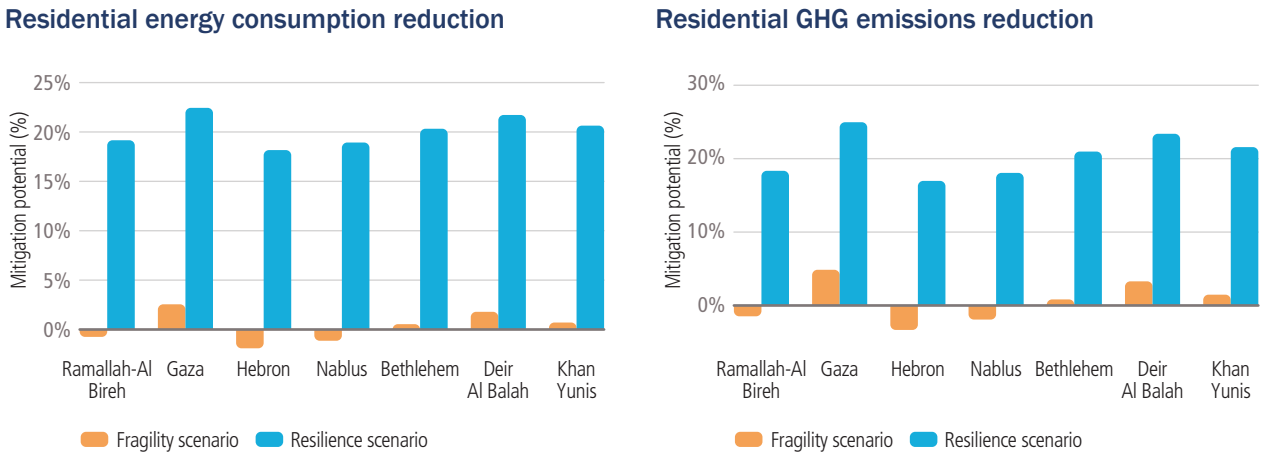


Source: Authors' elaboration based on World Bank data

To effectively address the evolving hazards facing Palestinian cities, climate change impacts must be mainstreamed into risk assessments and DRM systems. In the West Bank and Gaza, enhancing DRM requires improving vertical and horizontal integration, expanding hazard profiles to include climate-change-related risks, and integrating risk assessments into planning and decision-making processes. Enforcing rules and regulations is vital to ensure the effective implementation of climate policies.

Measures to improve climate resilience in the West Bank and Gaza can also bring mitigation co-benefits, positioning the economy more favorably in global climate discussions and preparing it for entry into carbon-credit and green-finance markets. Mainstreaming water and energy efficiency in building regulations can improve resilience by decreasing dependence on scarce resources. These measures can also reduce GHG emissions resulting from energy generation and building operations. Urban growth modeling indicates that a 20 percent reduction in energy use in residential and commercial buildings in the West Bank and Gaza could lead to a 21 percent reduction in their GHG emissions. Similarly, adopting sustainable waste-management practices based on the principle of the circular economy can build resilience by reducing ground, air, and water pollution while accelerating the transition to low-carbon development. Compact cities designed around multimodal transport systems that prioritize walking, cycling, and efficient public transportation can reduce travel times, alleviating congestion and minimizing air pollution and GHG emissions. A previous analysis has demonstrated that using vacant land near public transportation and employment hubs for urban development, instead of development in expansion areas, can achieve a 33 percent energy saving and a 12 percent GHG reduction. Measures that prioritize water and energy efficiency, sustainable waste management, and compact cities with efficient transport systems can enhance urban resilience and promote low-carbon development.

Figure 17: Reducing Energy Consumption and GHG Emissions in New Buildings



Note: A reduction in energy use in residential buildings can lead to a similar reduction in GHG emissions from these buildings.
Source: Authors' elaboration based on World Bank data.

Urban solid-waste management plays a vital role in addressing pollution, fostering a circular economy, and mitigating GHG emissions. Improving urban solid-waste management requires a comprehensive approach that includes waste reduction, efficient collection and sorting, and improved landfill practices. Strengthening institutional systems and policy frameworks is essential to support these efforts. Under the *Continued Fragility* scenario, the waste-collection rate could decline from 90 percent to 60 percent by 2035 as waste generation continues to increase. However, embracing circular-economy principles can mitigate environmental degradation, drive economic diversification, and enhance resilience.

Reinforcing urban climate resilience in the West Bank and Gaza will require a concentrated effort to boost institutional capacity, enhance data capabilities, and establish effective financing mechanisms. While climate goals are clearly outlined in the updated NDCs, translating them into comprehensive city plans and establishing supportive governance structures remains a challenge. Strengthening the PA's capacity to develop and enforce climate policies is crucial, and robust data collection and analysis is vital to understand climate risks and inform decision-making. Integrated digital information systems can play a key role in improving planning and resource allocation. Exploring land-value capture instruments and other innovative financing options can facilitate investment in resilient infrastructure.

4.2.3. Unlocking Productivity Gains and Enhancing Sustainability

The *Towards Sustainability* scenario highlights the immense potential productivity gains and sustainability benefits that could be realized by removing restrictions on access to Area C. Facilitating the movement of goods and people, eliminating distortions in the land and housing market, enabling the development of a regional public transport system, and allowing cities and regions to choose well-located, low-risk areas for expansion would all contribute greater efficiency and increased economic activity. By expanding accessibility and connectivity, cities can fully harness their economic potential and generate the financial resources needed to drive sustainable development and cope with climate change and other challenges. Unrestricted access to Area C would also empower cities to make informed decisions and implement measures that foster long-term sustainability, promote inter- and intra-city connectivity, and lay the foundation for a prosperous and resilient future.

5. Macroeconomic Perspective

5.1 Methodological Framework and Climate Scenarios

The scenario analysis presented in this CCDR is informed by the unique socio-economic characteristics and geo-political circumstances of the West Bank and Gaza. Key factors include the entrenched fragility of the political and economic environment and the PA's limited scope to define and implement public policies. Wherever possible, the scenario analysis differentiates between conditions in the West Bank and Gaza and between areas within each territory. It pays particular attention to the unique relationship between the PA and GoI, reflects the structural characteristics of key sectors, and explicitly defines the channels through which climate change will affect social and economic activity.

5.1.1. Empirical Tools and Modelled Scenarios

The macro-fiscal assessment presented in this CCDR combines insights into the macroeconomic repercussions of climate-related shocks and mitigation measures by adapting a conventional framework to include an innovative approach for representing complex relationships between climate impacts, biophysical systems, and socioeconomic outcomes. This approach seeks to combine tools from mainstream macroeconomic analysis with methods that account for the specific effects of climate change and environmental degradation within the context of fragility that characterizes the West Bank and Gaza. The projections under alternative scenarios are informed by assessments of the urban, energy, food, and water sector. The scenario analysis combines three modeling exercises:

i. **CGE model:** An integrated macro-representation of the West Bank and Gaza using a version of the MANAGE general equilibrium framework tailored to the context of the West Bank and Gaza;

ii. A system-thinking-based **green economy model** (GEM) for the West Bank and Gaza; and

iii. **Spatial analysis** that include dynamic scenarios focused on land use, run-off retention, urban temperature changes, and water yields based on InVEST tools.

This methodology yields projections for three scenarios, each of which is based on a set of specific assumptions (Table 1).

Table 1: Description of Macroeconomic Scenarios

Macroeconomic Scenario	Scenario Assumptions
Continued Fragility	Assumes no adaptation and mitigation interventions beyond historical trends and includes corresponding climate-change damages.[69] Dependence on imported electricity persists, water access declines, and food security deteriorates. Reconstruction efforts following climate disasters are equivalent to 10 percent of the computed damages.[70]

Macroeconomic Scenario	Scenario Assumptions
Increased Resilience	Assumes the implementation of climate-resilience actions aligned with NDC objectives and a GHG emissions path consistent with the NDC "status quo" scenario. Reconstruction efforts following climate disasters are equivalent to 50 percent of the value of the computed damages. The PA invests in desalination, wastewater reuse, and measures to reduce non-revenue water in line with NDC commitments and is able to eliminate the water supply gap by 2030. Increased domestic electricity generation reduces imports from Israel, and domestic renewable energy meets 20 percent of demand by 2040, in line with the NDCs. Limited improvements in transmission and distribution infrastructure contribute to a 20 percent increase in demand-side energy efficiency by 2040. The PA implements climate-sensitive urban planning, NBS, circular economy approaches, sustainable agriculture, green transportation, and wastewater interventions.
Towards Sustainability	Uses the same assumptions as the Increased *Resilience scenario* and assumes that restrictions on access to land and resources in Area C are progressively lifted over 30 years beginning in 2024, and the PA's expanding control over Area C boosts economic growth and factor productivity.[71] In parallel, improvements in the business climate increase domestic and foreign investment. The PA's control over water resources in Area C helps minimize water shocks and enables the expansion of irrigated agriculture. Electricity imports from Israel decline as investments in solar power increase the share of domestic renewable energy to 48 percent in the West Bank and 38 percent in Gaza by 2040, while a 20 percent improvement in energy efficiency complements the expansion of transmission and distribution infrastructure. The climate resilience and reconstruction efforts described in the *Increased Resilience* scenario become more expensive as control over Area C increases the amount of land and resources exposed to climate damage.

The macroeconomic analysis incorporates a broad but not comprehensive array of climate impacts based on the findings of Chapters 3 and 4. These include water shocks, changes in crop yields and livestock production, damage to roads and other infrastructure, and effects on labor productivity. The various parameters and assumptions used to estimate climate damages, trends in energy supply and demand, and adaptation and mitigation interventions are defined in Annex B.

The outcomes of these three scenarios should not be interpreted as economic forecasts but rather as representations of potential development paths. Many unpredictable elements will also influence the socioeconomic performance of the West Bank and Gaza. Given the sizable investments needs to reduce the water and energy demand gap in the context of a growing population, very limited fiscal space, and competing development needs, the analysis assumes that investments under all scenarios will be financed primarily by donor support and other external resources.

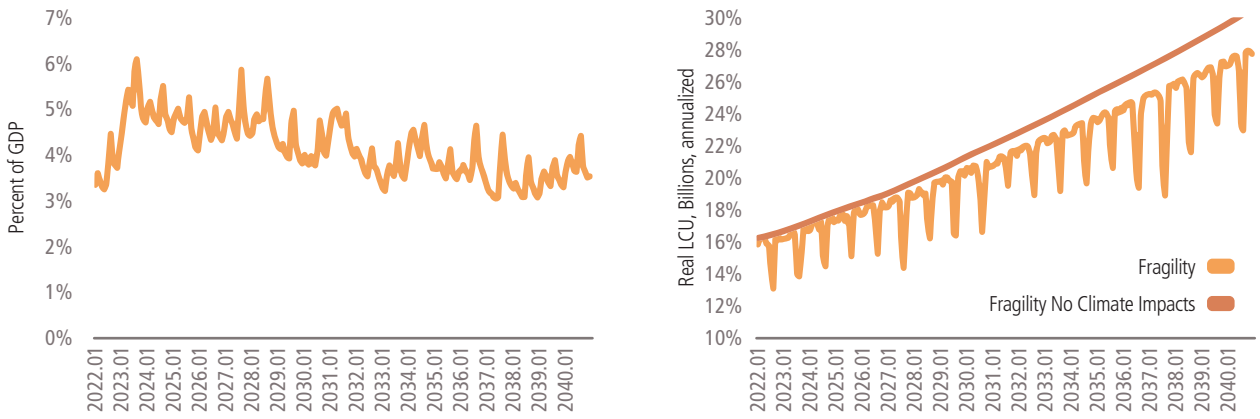
5.2 Results from Scenario Analysis

5.2.1. Socioeconomic Performance under the Continued Fragility Scenario

Outcomes under the Continued Fragility scenario are strongly influenced by the costs of climate damage. Annual climate damages under this scenario represent around 4-6 percent of GDP per year during 2022-2040, rising from about US$803 million per year in 2022-25 to almost US$1 billion per year by 2040 (Figure 18a).[72] With power generation capacity increasing slightly from around 300 MW in 2023

to 370 MW in 2030 (120 MW in West Bank and 250 MW in Gaza) and remaining broadly unchanged through 2040, the West Bank and Gaza continue to rely heavily on electricity imports from Israel. Under the Continued Fragility scenario, low-carbon investments continue to average US$20 million per year over the forecast period. In the absence of other internal or external shocks, these factors contribute to an annual real GDP growth rate of 3.0 percent over 2022-2030 and 2.9 percent over 2030-2040—or 1.0 percent per year in per capita terms, about 0.4 percentage points below a counterfactual in which no climate impacts occur. By 2040, per capita GDP is about 12 percent lower than in the counterfactual (Figure 18b). Under the Continued Fragility scenario, the economy of the West Bank and Gaza remains structurally unable to achieve the growth rates that are required to (i) create sufficient jobs for new labor-market entrants, (ii) generate adequate domestic revenues to finance high-return investments in fixed assets and human capital, or (iii) ensure long-term fiscal and debt sustainability. With reconstruction efforts representing only 10 percent of damage values, the limited response to climate-related hazards further erodes physical and human capital.

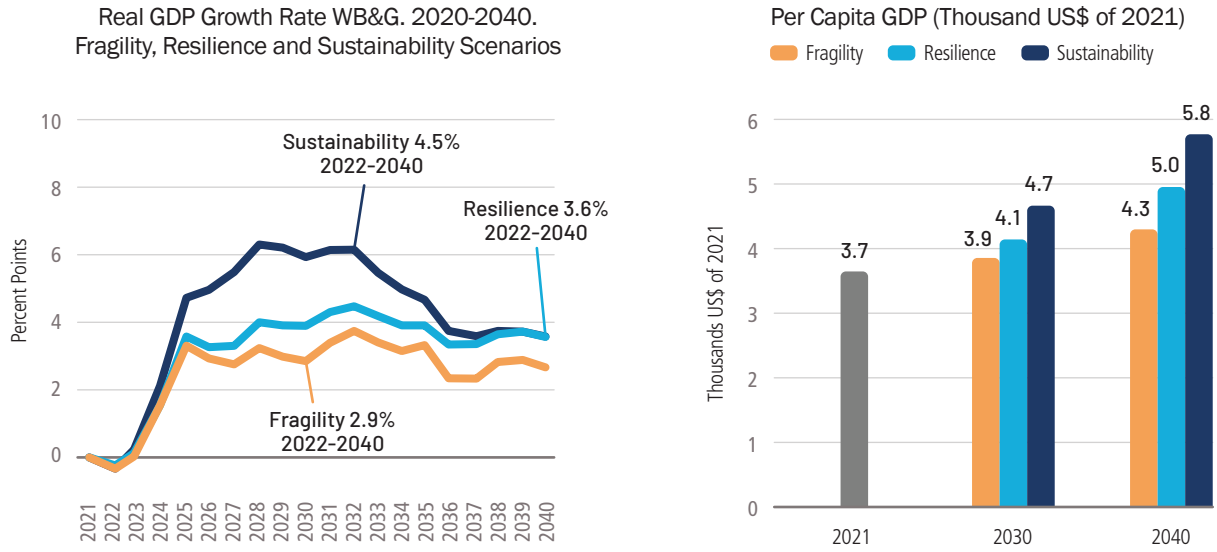
Figure 18: Under the Continued Fragility Scenario, (a) Climate Damage (water scarcity, heat, and floods) in the West Bank and Gaza, 2022-2040; (b) Real GDP, 2022-2040 (monthly estimates)



Source: West Bank and Gaza CCDR estimates

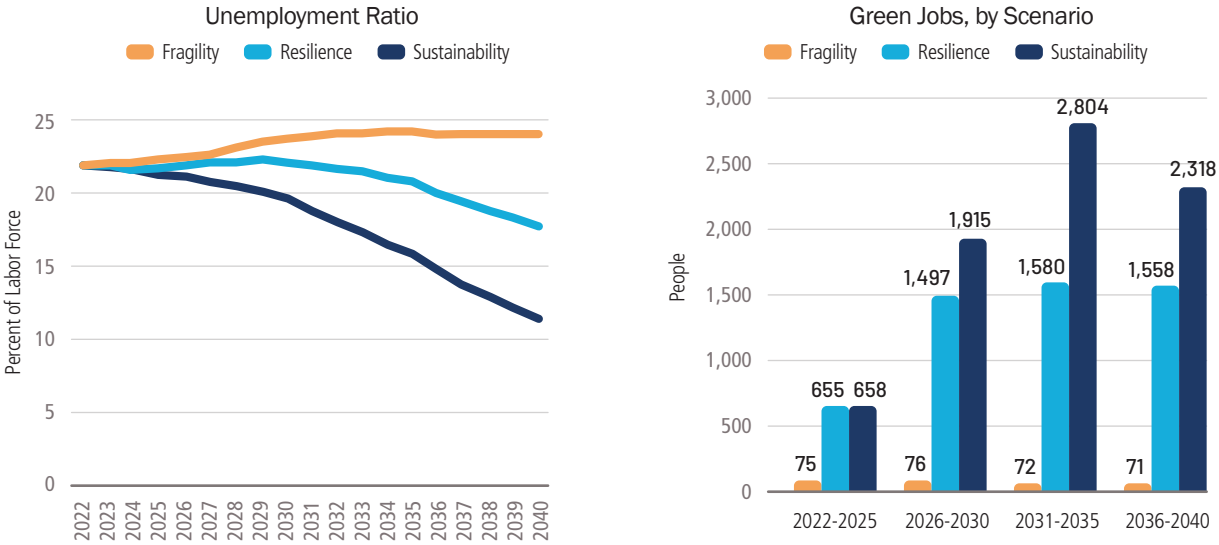
Very low rates in per-capita real GDP growth combined with trends in the working-age population and the labor-force participation rate result in higher unemployment. While sustaining slightly positive per capita real GDP growth contributes to reaching upper-middle-income status by 2023-24 (**Figure 19**),[73] such growth would not yield substantial structural transformation in the West Bank and Gaza. In this scenario, and based on the CGE (MANAGE) analysis, the share of agriculture in total output would decline from around 7.5 percent in 2022 to 7.1 percent in 2040. The share of industrial production would also fall slightly from 23.5 percent of GDP in 2022 to 22.5 percent in 2040, while the share of services would rise from 68.9 percent of GDP in 2022 to 70.4 percent in 2040. The total size of the labor force is projected to increase by 43.0 percent during 2022-2040. Under the *Continued Fragility* scenario, insufficient job creation would push the unemployment rate to 24.4 percent by 2040 (**Figure 20**).

Figure 19: Under Alternative Scenarios, (a) Real GDP Growth and (b) per Capita GDP



Source: Authors' elaboration based on World Bank data

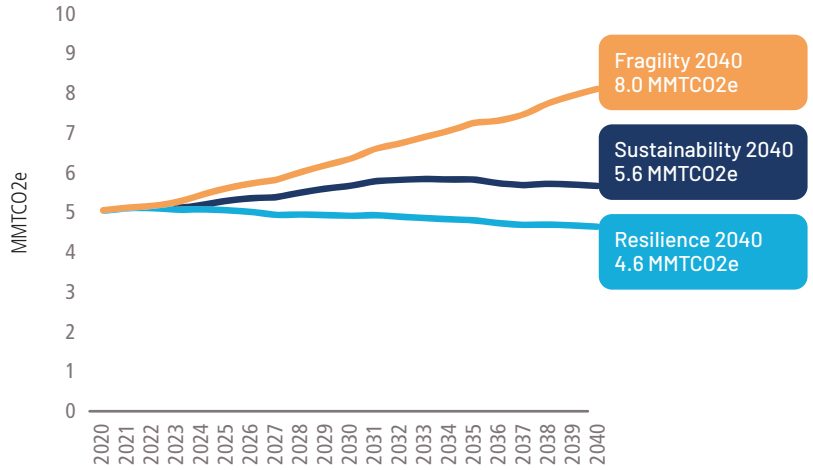
Figure 20: Under Alternative Scenarios, (a) Unemployment Rate and (b) Green Jobs



Source: Authors' elaboration based on World Bank data

In the absence of large-scale development-oriented climate resilience and mitigation policies, economic and population growth will drive a sustained increase in energy demand over the next two decades. With modest efficiency gains both at domestic and industrial level, total demand is projected to increase at a pace consistent with population and per capita GDP growth. Under this scenario, demand is satisfied by fossil fuels and imported electricity, with very small additions to power-generation capacity—mainly gas and solar technologies.[74] With no major investments in renewable energy, GHG emissions increase steadily over the projection period (**Figure 21**).

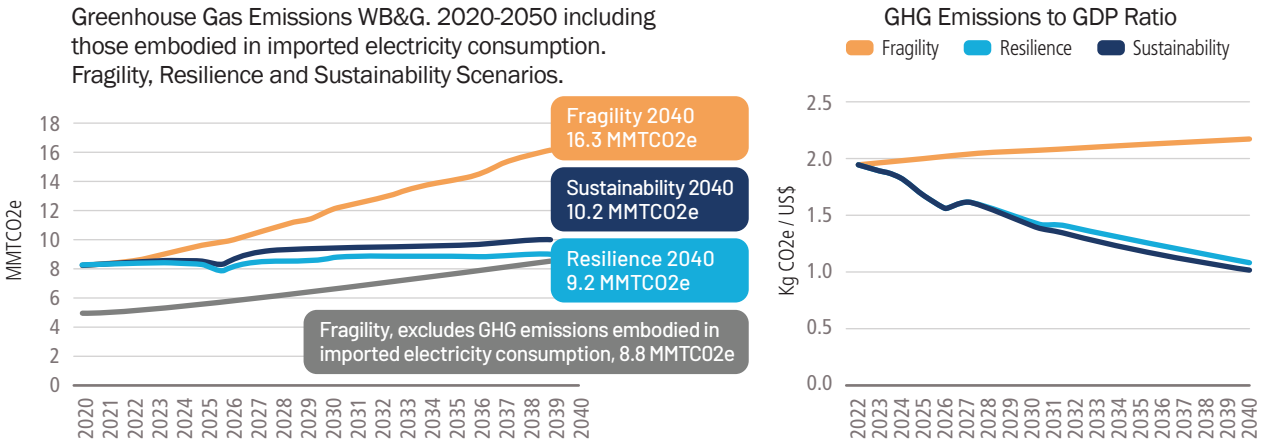
Figure 21: GHG Emissions in the West Bank and Gaza under Alternative Scenarios, 2020-2050



Source: Authors' elaboration based on World Bank data

Under the Continued Fragility scenario, GHG emissions would increase by nearly 225 percent between 2022 and 2040, rising from 8.6 million metric tons of CO2 equivalent (MMTCO2e) to 16.3 MMTCO2e. To be consistent with GHG emissions reported in the West Bank and Gaza's updated NDCs, this analysis includes emissions generated in the West Bank and Gaza plus those resulting from the consumption of electricity imported from Israel[75] (**Figure 22** and **Table 2**).[76]

Figure 22: GHG Emissions in the West Bank and Gaza under Alternative Scenarios, 2020-2050



Source: Authors' elaboration based on World Bank data

Table 2: GHG Emissions in the West Bank and Gaza, Including Imported Electricity, and GDP Growth under Alternative Scenarios

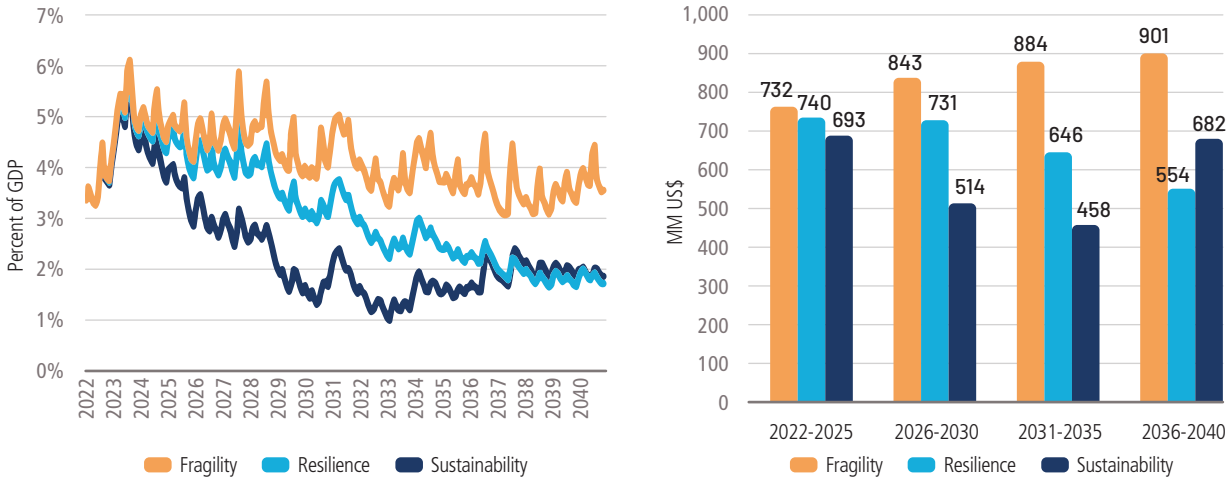
	CCDR		
Scenarios	**GHG Emissions 2040 (MMTCO2e)**	**% Chg. Vs Fragility**	**GDP growth 2020 2040**
Fragility	16.3		2.9
Resilience	9.2	-43.7	3.6
Sustainability	10.2	-37.7	4.5

Source: World Bank staff elaboration based on GEM data

5.2.2. Socioeconomic Performance under the Increased Resilience Scenario

Under this scenario, the West Bank and Gaza reduce, but do not eliminate, damage from floods, droughts, waterborne diseases, extreme heat, and other climate-related hazards. Advancing climate resilience and mitigation interventions aligned with the updated NDCs helps reduce climate-related damages, strengthen the water-energy-food nexus, and boost economic output through accelerated human and physical capital accumulation, enhanced access to primary resources, and improved factor productivity. Real GDP increases under this scenario at an annual rate of 3.6 percent between 2022 and 2040, or 1.6 percent in per capita terms. Relative to the *Continued Fragility* scenario, real GDP growth is about 0.7 percent points higher on average over the estimation period, resulting in a 13 percent difference by 2040 (**Figure 23**).

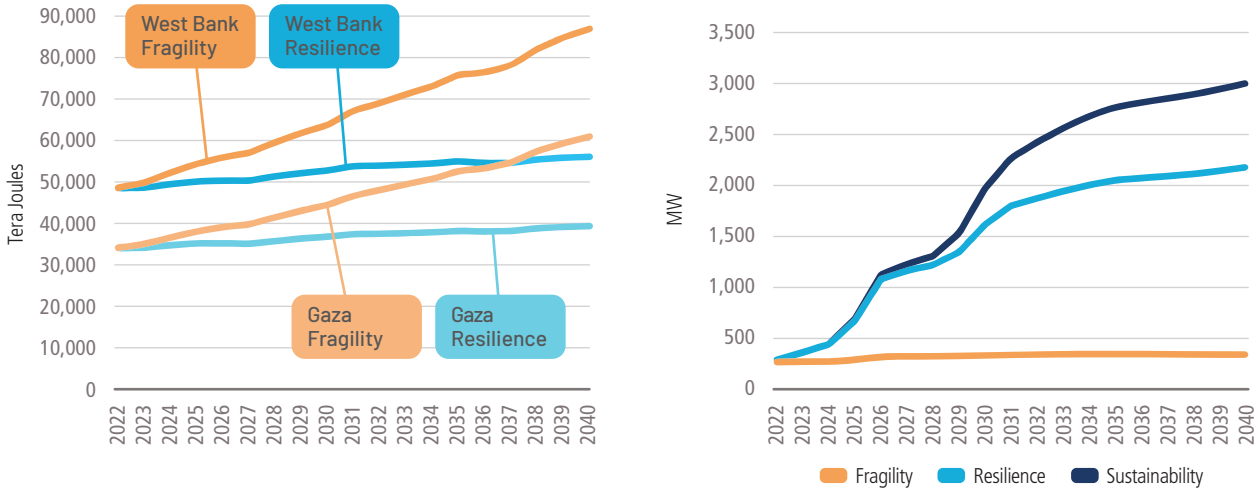
Figure 23: Under Alternative Scenarios, (a) Annual Climate Damage Relative to Economic Output and (b) Average Annual Climate Damage in Nominal Terms



Source: World Bank staff elaboration based on GEM data.[77]

Mitigation policies with significant development co-benefits allow for a 43.7 reduction in GHG emissions by 2040 relative to the *Continued Fragility* scenario. This differential is much larger than that in the NDC status quo scenario, which estimates a 17.5 reduction in GHG versus the NDC baseline, due to the substantial co-benefits associated with interventions in the water, energy, transportation, urban development, and sustainable-agriculture sectors. These interventions increase value addition while generating employment and boosting fiscal revenue. Under the *Increased Resilience* scenario, the unemployment rate remains largely stable through 2030 before dropping under 20 percent by 2040, implying that job creation is consistent with the growth of the labor supply, and over 3,000 new direct green jobs are created by 2040. Due to gains in energy efficiency, continued economic and population growth increase energy demand only slightly, reducing the need for new generation capacity (**Figure 24**) and opening fiscal space for other development expenditures. Climate mitigation policies contribute to widespread savings for the public sector, firms, and households by reducing the costs associated with climate hazards.

Figure 24: Under Alternative Scenarios, (a) Total Energy Demand and (b) Total Energy Generation Capacity



Source: Authors' elaboration based on World Bank data.

Based on the CGE analysis conducted by this report, the tax-revenue-to-GDP ratio would decline by 0.2 percent points between 2022 and 2040. Total government revenue, overall, would fall from 28.2 percent of GDP in 2022 to 26.6 percent in 2040, nearly 3.5 percentage points lower than in the *Continued Fragility* scenario. The fiscal balances slightly improve over time in the *Increased Resilience* scenario, with the deficit narrowing from 2.2 percent of GDP in 2022 to 0.3 percent in 2040 and the debt stock falling from nearly 59 percent of GDP in 2022 to about 50 percent in 2040. The *Increased Resilience* scenario does not include the use of carbon markets to help drive a shift to low-carbon growth, though such mechanisms could significantly increase fiscal revenue.

5.2.3. Socioeconomic Performance under the Towards Sustainability Scenario

Under the *Towards Sustainability* scenario, expanded access to land and other resources would boost economic activity over the forecast period. As the PA progressively assumes control over Area C, the real GDP growth rate would accelerate to an annual average 4.5 percent in the period 2022-2040, or

2.4 percent in per capita terms, 1.4 percentage points higher than in the *Continued Fragility* scenario.[78] As a result, per capita income would be nearly 30 percent higher by the end of the forecast period.

Under this scenario, greater investment in climate resilience reduces the ratio of climate damage to GDP relative to the *Increased Resilience* scenario. However, substantial climate damage could still occur. Moreover, due to rising economic activity under the *Towards Sustainability* scenario GHG emissions reach 10.2 MMTCO2e by 2040, higher than in the *Increased Resilience* scenario but 37.7 percent below the level of the *Continued Fragility* scenario. Under the *Towards Sustainability* scenario, faster economic growth boosts energy demand, requiring greater power generation capacity, and increasing waste production, water use, and demand for productive inputs. However, the ratio of GHG emissions to GDP is lower in this scenario, as climate adaptation and mitigation policies more than compensate for the increase in emissions due to expanded economic activity. The *Towards Sustainability* scenario also delivers large employment gains driven by expanded access to land and resources in Area C, and the unemployment rate reaches single digits by 2040.

6. Key Enablers of Resilience

Fostering resilience and promoting sustainability calls for increased access to finance, dynamic private-sector participation, and a whole-of-government and whole-of-society approach to climate action. The scenario analysis reveals three critical priorities: (i) investing in more responsive health and social protection systems to support citizens during and after climate shocks; (ii) increasing access to climate financing from partners and the private sector to overcome the PA's limited capacity for public investment; and (iii) leveraging coordinated action among stakeholders in the public sector and civil society.

6.1 Adaptive Health and Social Protection Systems

Climate change is expected to worsen human development outcomes in the West Bank and Gaza. Climate-related risks to human development include injury and death due to natural hazards, increased food insecurity and poor nutrition outcomes due to diminished agricultural years, increasing rates of vector- and waterborne diseases due to rising temperatures and flood risks, and declining cardiovascular and respiratory health due to air pollution and extreme heat.[79] Groups identified as being highly exposed to climate change include farmers, especially small producers relying on rainfed agriculture and livestock; poor households in general and female-headed households in particular; pregnant women and nursing mothers; persons with disabilities; the elderly; and children, especially young girls. Households near or below the poverty line lack savings that could help them cope with energy- and food-price shocks or recover from property destruction.

6.1.1. Climate Resilience in the Health Sector

While the West Bank and Gaza's updated NDCs identify building climate resilience in the health sector as a key intervention, the PA is not currently implementing any programs in this area. Due to the PA's tight financial constraints, health priorities tend to focus on urgent short-term needs. The PA is coordinating with its international partners to fund several actions identified in the NDCs, with total financing estimated at US$23 million. To build the capacity of the Palestinian Ministry of Health (PMOH) to monitor the safety of water, food, and sanitation, the EQA and the PMOH submitted to the Green Climate Fund a proposal to build and equip a new public health laboratory. The existing disease-surveillance system in the West Bank does not provide information on sources of infections or contamination following positive laboratory test results, and the existing database does not include historical data on waterborne diseases. A broader upgrade of the health system's infrastructure will be necessary to respond to the increased disease burden due to climate change.

The Palestinian health system faces unique challenges due to the protracted conflict and import restrictions on medical supplies and other inputs. The political and security context in West Bank and Gaza severely constrains the PA's ability to deliver high-quality health services to its population.[80] Since the beginning of 2022, 187 attacks on healthcare facilities in the West Bank and Gaza have resulted in five deaths and 123 injuries, as well as substantial disruptions in the delivery of essential services.[81] Continuing restrictions on the movement of people and goods, ongoing fiscal pressure, and periodic outbreaks of conflict have weakened the health system and compromised its ability to deliver quality healthcare services.

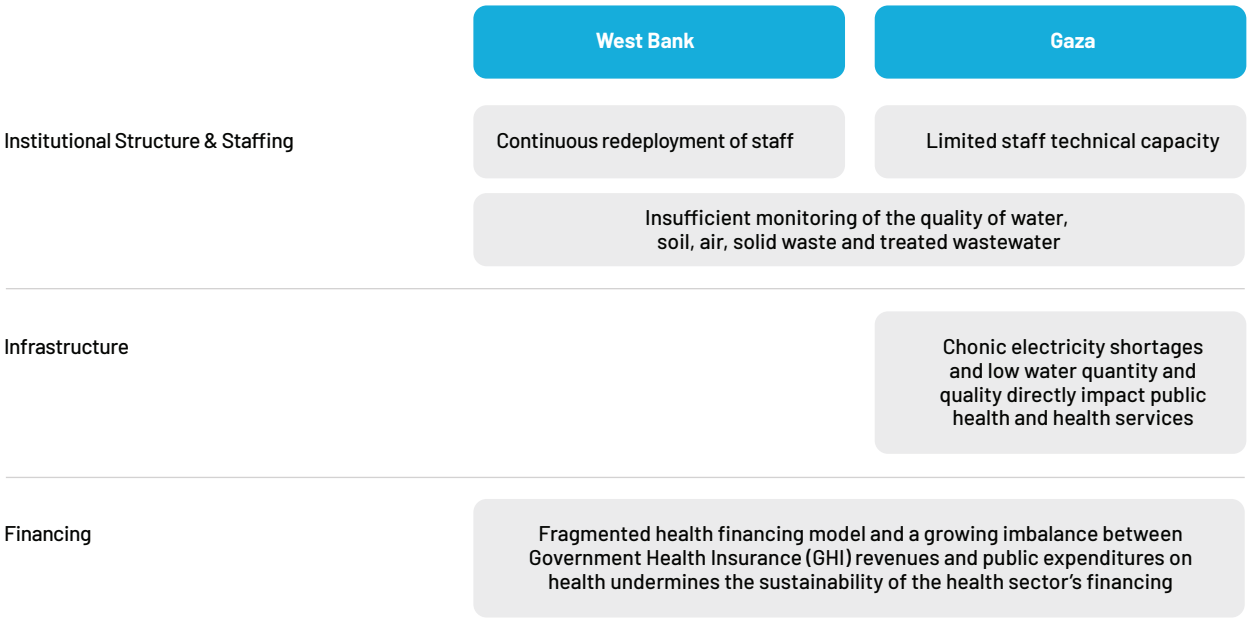
Electricity shortages affect access to health services, and climate change will aggravate disruptions in the energy supply. Chronic electricity shortages have created an enormous challenge for the health sector in Gaza, putting the lives of the most vulnerable patients at risk. In 2023, Gaza's electricity supply is expected to meet just 39.6 percent of demand, down from 43.7 percent in 2022.[82] Electricity shortages will directly impact intensive care units, in which the bed occupancy rate is 84 percent, as well as the average of 923 dialysis patients who use 131 dialysis machines each month.[83] Power outages also affect operating theatres and pharmaceutical and vaccine storage facilities. Hospitals in Gaza rely on backup generators to sustain critical lifesaving services when electricity from the grid is unavailable.

Poor water quality and increased scarcity further erode the quality of health services. While data and analysis are limited, the PMOH should regard water shortages and the low quality of water resources in Gaza as an important health priority. Although 94.7 percent of Gaza households use piped water as their main source for domestic purposes, only 3.2 percent report drinking piped water, indicating that it is generally unsafe for consumption.[84] However, weak surveillance capacity precludes an accurate estimate of how many cases of waterborne diseases are caused by the low quality of the piped water network. The 2023 Humanitarian Response Plan listed Gaza as a priority due to its numerous flood-prone areas, areas with limited access to water and sanitation services, and areas exposed to public and environmental health risks. In the West Bank, the multi-stakeholder water and sanitation cluster will focus on Area C, including areas affected by the Barrier, restrictions, Israeli settlements and demolition orders, Areas A and B, East Jerusalem, and H2 in Hebron.[85]

System fragmentation, limited capacity, and the lack of adequate financing mechanisms to monitor and tackle climate-related health outcomes and disease burdens weaken the resilience of the health sector. Existing institutional mandates and coordination mechanisms among climate specialists impede the establishment of integrated climate and health policies. Within the PMOH framework, frequent staff transfers within sectors compromise the consistent accumulation of knowledge and hinder the dissemination of best practices. Expanding the technical capacity of staff, especially in Gaza, requires enhanced support. Although the PMOH effectively manages the health cluster, collaboration with local authorities remains limited, especially in terms of monitoring and assessing issues related to water, soil, air quality, solid waste, and treated wastewater. Nevertheless, the PMOH is working to establish agreements with other government entities to address intersecting climate, environmental, and health risks. Key areas of concern include institutional architecture, infrastructure, and financing (**Figure 25**).

The financing landscape has become more complex due to reduced donor contributions and a widening fiscal imbalance in the health sector. With declining external support coupled with tax-revenue deductions by the GoI,[86] the PA mainly focuses on sustaining basic services, including in the health sector. The disjointed health-financing framework, combined with a growing disparity between Government Health Insurance (GHI) revenues and public health expenditures, threatens the sustainability of sectoral financing.

Figure 25: Challenges at the Intersection between Climate Change and the Health Sector

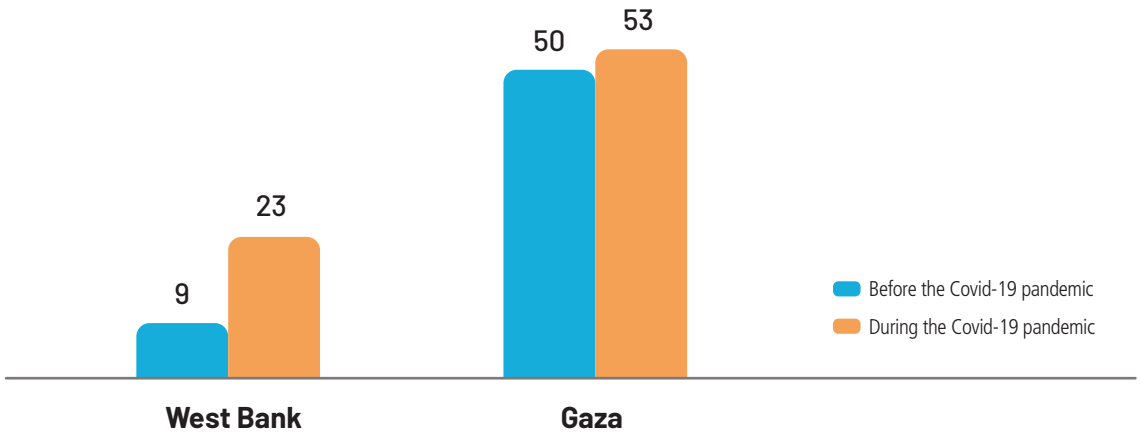


Source: Authors' elaboration

6.1.2. Social Protection

Certain groups in the West Bank and Gaza are especially vulnerable to income shocks and have a limited ability to cope with the loss of income.[87] Recent short-term shocks, including outbreaks of armed conflict and the COVID-19 pandemic, have compounded the precarious situation of many Palestinian households (Figure 24). Those most affected included households that were near or below the poverty line, that had vulnerable members such as elderly persons and persons with disabilities, that relied on informal workers or workers employed in the service sector, or that depended on small enterprises and home-based businesses.[88] The ongoing global food crisis is further increasing the vulnerability of Palestinian households.

Figure 26: Share of Food-Insecure Households before and during the COVID-19 Pandemic (%)



Source: World Bank calculations in Becerra et al. (2021).[89]

Poor and marginalized households are often especially exposed to climate change. Households with low housing quality are vulnerable to extreme weather, and poor communities often live in flood-prone areas. Rising temperatures, variable precipitation patterns, and shifting seasonality pose an especially serious threat to smallholder farmers and agricultural workers, particularly in areas at high risk of flooding such as Khan Yunis and the Jordan Valley, agricultural hubs like Jenin and Tubas, and water-scarce areas like Hebron.[90]

In the social protection sector, challenges toward climate-sensitive social support extend far beyond the lack of a policy framework. The West Bank and Gaza's primary social safety net is the National Cash Transfer Program (NCTP), which provides quarterly cash payments to 115,000 poor and vulnerable households. The NCTP is complemented by longstanding UN programs. The PA also provides health insurance to 112,000 households and school-fee exemptions for 110,000 students. However, these social protection systems reached just under half of all poor households in 2019.[91]

Policy and institutional frameworks that outline the role of social protection in responding to climate shocks are not yet in place. Emergency response is currently not well coordinated across government. The Ministry of Social Development (MoSD) is formally tasked with leading social protection efforts and associated emergency responses, including establishing local emergency committees and providing cash assistance during emergencies. However, it has pursued its mandate in an ad hoc manner and on a case-by-case basis. The MoSD has a range of tools that can be leveraged to deliver cash and in-kind assistance to households experiencing the impacts of climate change, but it lacks a coherent and comprehensive approach to emergency response.

The foundational elements of the social protection systems offer a basis for shock responsiveness, yet they warrant enhancement. The NCTP possesses a strong social registry that aids its operation and could help it respond to future shocks. During the COVID-19 pandemic, the MoSD swiftly expanded the NCTP using the pre-existing registration process to create a "waiting list" within the Social Registry. Despite capturing data on households from many disaster-prone areas of the West Bank and Gaza, the registry currently omits numerous non-beneficiary households that are vulnerable to climate shocks. The NCTP's payment infrastructure is well-prepared to respond to shocks. It sends digital payments directly to beneficiary bank accounts, offering adaptability during crises. However, the transfer amounts, which are derived from regular consumption patterns, may prove inadequate during emergencies. Communications tools are currently limited, and the MoSD requires a comprehensive strategy for public outreach during crises.

The West Bank and Gaza lack a national disaster-risk financing strategy and have no dedicated funds for shock response. The PA's options to boost shock-response financing are constrained by the absence of contingency provisions within the MoSD or the national budget. The NCTP's reliance on external funds, combined with fluctuating government allocations not embedded in a legal or overarching financial framework, leaves the program susceptible to funding instability. A significant obstacle to expanding the social registry is the dearth of detailed data on the populations most likely to be affected by climate-induced shocks. Comprehensive information on the locations and potential impacts of these shocks on impoverished and vulnerable households is scarce, complicating the identification process for inclusion in the Social Registry. While early warning systems for climate disruptions exist, they remain underdeveloped and disconnected from shock-responsive social protection measures.

6.1.3. Toward Resilient Human Capital

Targeted actions and investments could bolster the resilience of the health and social protection systems, enabling them to more effectively protect and build human capital in the face of climate change. During the COVID-19 pandemic, the PA and its development partners were able to respond quickly and effectively to a multidimensional shock. The social protection system was scaled up to provide a one-time emergency cash transfer to 90,000 households, an almost 80 percent increase in the cash-transfer program's beneficiaries. Similar expansions in the capacity of social protection systems could bolster their capacity to respond to climate-related shocks and longer-term climate trends. Specific interventions designed to enhance the resilience of human capital development in the West Bank and Gaza are presented in **Table 3** (**Chapter 7**).

Box 3. Education and Climate Change

The adverse impacts of climate change will negatively affect learning in West Bank and Gaza. As urban areas are increasingly exposed to more frequent and intense natural hazards, the number of days spent in school may also decrease. Extreme heat and rising disease rates could also adversely affect school attendance. In addition, economic shocks linked to climate change may lead parents to invest less in their children's education. These disruptions in human capital accumulation early in life can have a lasting impact on lifetime earnings.

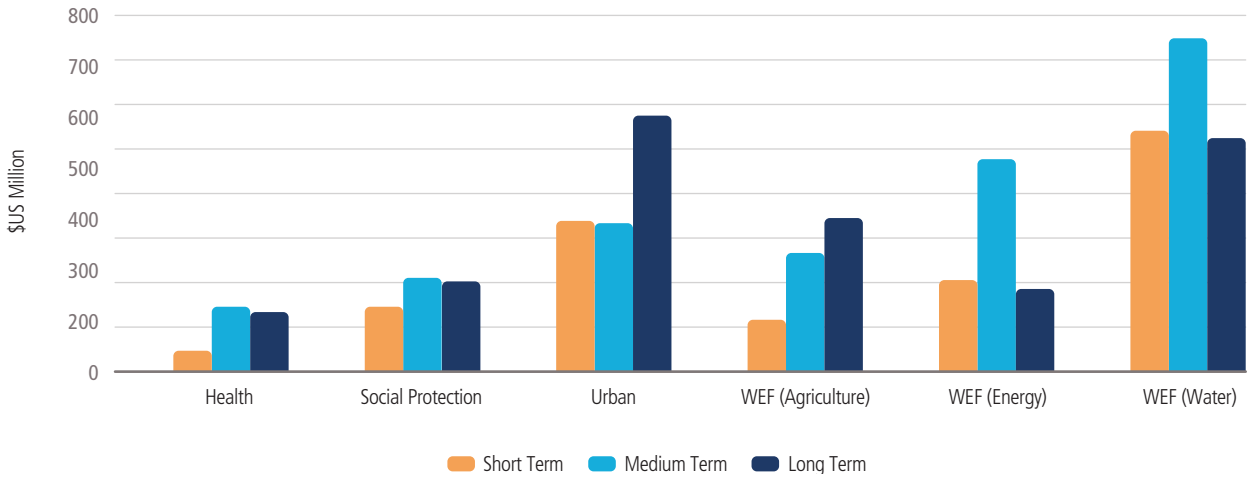
Education can facilitate climate-change mitigation and adaptation. As part of a whole-of-society approach to climate action, investing in an effective and resilient education system is critical to effect behavioral change and enable the West Bank and Gaza to achieve their updated NDC commitments. Specialized curricula and collaborations between the private sector and higher education institutions can play an important role in meeting the increasing demand for green skills from industries focused on renewable energies and related areas.

6.2 Private Sector and Mobilization of Green Finance

6.2.1. Investment Needs of the West Bank and Gaza's CCDR package

Addressing development needs and building resilience in the water-energy-food nexus, urban development, and human capital will require US$5.5 billion in investment by 2050. Of this, US$1.4 billion will be needed over the next five years, US$2.2 billion over the subsequent 5-10 years, and US$1.9 billion between 2040 and 2050 (**Figure 27**). These investment needs represent about 5 percent of the PA's budget. A detailed investment plan is presented in Annex A. Additionally, implementing the priority actions identified in the updated NDCs by 2040 will cost an estimated US$5.9 billion, with a funding gap of 46 percent.

Figure 27: Investments Needs by Sector



Source: West Bank and Gaza CCDR investment package

Improving climate resilience in the water-energy-food nexus requires a diverse range of investments and policy interventions. Investing in desalinization plants, rainwater harvesting and storage, wastewater reuse, expanded irrigation systems, climate-smart crops, logistical networks, and renewable energy facilities can help to improve food security, increase the availability of water and energy, and reduce dependence on imported resources. Under the Increased Resilience scenario, the total investments needed through 2050 would be about US$1.8 billion for water, US$717 million for agriculture, and US$860 million for energy.

Pivoting towards green and resilient cities entails simultaneous and coordinated investments in policy, strategy, infrastructure, and capacity development, along with institutional coordination and sectoral integration. It is crucial to develop climate action plans and integrate climate considerations into master planning and disaster risk management systems. Reforms to strengthen urban resilience should focus on sustainable growth, climate-sensitive regulations, improved energy and safety codes, resilient infrastructure, efficient solid-waste management, and the promotion of mixed-use and transit-oriented development. Infrastructure investment should prioritize NBS and circular-economy solutions. Effective decision-making will require investments in digital information systems that consolidate data on land use, buildings, infrastructure, services, and potential hazards. Under the Increased Resilience scenario, the investments needed for the seven cities assessed would total just over US$1.2 billion by 2050.[92]

Adequately funding routine social assistance is vital to protect human capital. The estimated investment needed to build a resilient health sector and social protection system in the West Bank and Gaza would amount to US$864 million by 2050. About US$20 million per year would be required to close this funding gap. The health sector will require US$14.5 million to expand the testing capacities of the PMOH's public health laboratories, especially in Gaza. An additional US$7 million will be needed to establish an early warning system for climate shocks.

Box 4. Results of a Green Finance and Climate Risk Survey of West Bank and Gaza Financial Institutions

During May and June of 2023, a survey was conducted covering nine microfinance institutions (MFIs) and 13 banks. The survey focused on five areas: (i) climate-related and environmental risks; (ii) green finance; (iii) governance; (iv) disclosure and reporting; and (v) capacity-building and awareness-raising. The survey found that 44 percent of MFIs and 62 percent of banks reported providing financing for green purposes, such as solar energy, climate-smart agriculture, and transportation. More than half of banks would consider issuing green bonds as one their funding instruments, and more than 80 percent of all financial institutions agreed that establishing a dedicated green credit guarantee program could significantly increase the flows of green finance. Inadequate technical capacity to assess green finance projects, a lack of qualified staff; the absence of green-finance guarantee schemes, and a dearth of bankable green projects were identified as the biggest challenges to expanding green finance activities.

Of the financial institutions surveyed, over 60 percent believe that the physical and transition risks posed by climate change on their clients would be high or moderate. Over half agree that prudential requirements should incorporate climate-related and environmental risk factors. However, 67 percent of MFIs and 54 percent of banks do not incorporate these risks into their strategic planning, and almost no financial institutions include these risks in stress-testing and sensitivity analysis. The primary challenges faced by financial institutions in addressing climate-related and environmental risks are: (i) lack of technical tools and models, (ii) absence of guidelines from the financial regulator, and (iii) data insufficiencies. The most significant physical risk identified was increasing water scarcity.

Four financial institutions reported having staff dedicated, at least partially, to climate-related risk and green finance. However, only one reported forming a sustainability department. Additionally, while four financial institutions have procedures for assessing green finance applications, these are largely still in development. No respondents are members of international organizations focused on green finance or climate risk management. Overall, governance for green finance and climate risk management is still at a nascent stage among the West Bank and Gaza's financial institutions.

A mere 14 percent of financial institutions publicly disclose climate-related and environmental data. The primary obstacles to enhanced disclosure include: data unavailability, integration challenges in traditional reporting, expertise and capacity deficiencies, and a lack of consistent, mandatory requirements and regulatory guidance. Notably, 95 percent of financial institutions lack an internal classification system ("taxonomy") for green finance or climate risks. Meanwhile, 56 percent of MFIs and 85 percent of banks favor mandatory corporate disclosure of environmental impact and climate risks. Nearly 70 percent of financial institutions perceive low awareness among their peers regarding climate-related and green finance to be a serious concern. However, about one-third of these institutions have facilitated capacity-building events for staff in these areas.

6.2.2. Mobilizing Climate Finance

Tight fiscal space, weak private investment and declining donor support complicate the financing of climate action in the West Bank and Gaza. Over the last 10 years, net foreign direct investment has been negative, while domestic private investment has focused on low-productivity sectors. Between 2000 and 2020, about 97 percent of all climate-related development finance in the West Bank and Gaza was in the form of grants. Total climate financing in this period amounted to about US$1.7 billion. The overall decline in financial aid will likely affect the flows of climate-related financial resources, which, coupled with a tense macro-fiscal situation, may increase the risk that climate-responsive investments receive less attention in the short and medium term.

Reforming fuel subsidies could generate additional fiscal gains of around US$100 million per year to address poverty and contribute to climate action. The PA typically spends about 1 percent of GDP subsidizing fuel each year. Fuel subsidies divert funding from the climate agenda and may crowd out spending in critical areas such as education and social protection. Moreover, fuel subsidies are an inefficient means of reducing poverty, as richer households capture a larger share of the subsidy due to their higher rates of fuel consumption. The amount of the total fuel subsidy accruing to the wealthiest decile is about four times higher than the amount accruing to the poorest decile. Reducing fuel subsidies by 50 percent would yield savings of over US$100 million each year, which could be redirected into social spending as well as climate action policies. The PA could also promote green procurement in its capital investment projects while increasing overall spending efficiency by reducing unnecessary purchasing, improving energy efficiency, limiting the carbon footprint of procurement activities, promoting efficient water use, reducing the use of toxic materials, minimizing streams, and investing in zero-net-energy and green buildings.

However, the PA's fiscal space will remain tight, and it will be critical for West Bank and Gaza to explore new and additional sources of climate financing to support its green and resiliency goals. Given that the public sector has limited fiscal space for climate action, the role of the private and financial sector is critical. Access to finance will remain a significant challenge for the private sector, particularly for small and medium enterprises, given the high upfront cost of most climate investments. Establishing access to green financing will require robust low-carbon programs and adaptation policies and national commitments to incentivize the financial and private sectors.

6.2.3. The Banking Sector's Role in Mobilizing Climate Finance

Covering the financing needs identified in this report would require about 50% of the banking sector's lending capacity.[93] Banks could become a very powerful source of climate finance given robust climate policies both for the financial and private sector. The transition to a carbon-neutral and climate-resilient economy provides local banks with green finance opportunities, but unlocking those opportunities will require addressing green finance demand- and supply-side issues.

Interviews with firms and financial-sector stakeholders conducted for this CCDR indicate that adopting a national strategy for greening the financial sector would help promote the growth of green finance. The Palestine Monetary Authority (PMA) and Palestine Capital Market Authority (PCMA) can play a key role in developing the green finance ecosystem by adopting climate-responsive strategies and policy measures. The PMA is already working to promote sustainable finance and climate action in the banking sector,[94] and it aims to launch an initiative to encourage banks to adopt sustainable practices and incorporate environmental and social risks into their lending and investment decisions. In May and June 2023, the PMA, with support from the World Bank, conducted a comprehensive green finance survey of banks and micro-finance institutions. This survey will provide important information on the status of green financing and climate risk management, laying the groundwork for further efforts to green the financial sector.

Despite the limited uptake of green finance in the West Bank and Gaza, successful local initiatives highlight the effectiveness of combining financing with targeted technical assistance. In interviews, stakeholders often cited a lack of technical capacity to assess and monitor green projects as among the most important barriers

to expanding green finance. Reflecting this lack of capacity, the existing green finance programs in the West Bank and Gaza are led by development partners and combine financing with targeted technical assistance to financial institutions, their loan officers, and end users.

Stakeholders also cite the weak bankability of green projects and the relatively low risk appetite of banks as key obstacles. The banking sector's high liquidity indicates the presence of constraints on bank lending to the private sector. Several factors may affect the risk appetite of banks, including a volatile geo-political context and numerous local risks.

Going forward, green finance has significant potential to expand to other areas and sectors beyond solar energy. Key opportunities include the development and implementation of water management and other clean-tech solutions, the implementation of green growth plans, and the development of nature-based tourism and other sectors that rely on natural capital.

6.2.4. Additional Approaches to Mobilizing Climate Finance

The ongoing development of capital markets in the West Bank and Gaza presents opportunities to mainstream climate considerations in investment decisions. The Palestine Investment Fund, for example, concentrates its investments in energy, agriculture, health, and infrastructure while supporting entrepreneurship. The fund could explicitly incorporate climate co-benefits into its investment decisions, boosting support for energy efficiency and fostering green and resilience-oriented innovations. A focus on climate co-benefits would align with the fund's existing commitment to financing young entrepreneurs. Furthermore, venture capital funds emphasize environmental, social, and governance criteria in their investments. The authorities could explore the possibility of introducing a specialized green financing platform to back affordable green ventures, including small-scale renewable energy initiatives catering to marginalized communities.

As the effects of climate change intensify, introducing climate insurance products will be crucial to bolster resilience, especially in vulnerable segments of the economy. The insurance market in the West Bank and Gaza is relatively underdeveloped and largely focuses on vehicle insurance. The Palestinian Agricultural Disaster Risk Reduction and Insurance Fund could catalyze the growth of a climate-sensitive insurance market and ultimately provide the basis for a comprehensive disaster-risk financing framework.

De-risking tools are vital to catalyze green private investment. Instruments such as the political risk insurance offered by the Multilateral Investment Guarantee Agency (MIGA), help build confidence among international investors. In 2017, MIGA extended a guarantee of US$6.93 million for a 7 MWp rooftop solar PV energy project in Gaza. Similar de-risking mechanisms can be applied across diverse sectors to attract foreign direct investment and unlock new opportunities for climate finance. The Investment Promotion and Industrial Estates Agency remains a pivotal actor in this area (**Figure 28**).

Consultations with stakeholders highlight that the framework for public-private partnerships (PPPs) is not yet mature and that the PPP pipeline needs to be strengthened. A weak PPP pipeline is common among countries with a challenging geopolitical environment that constrains private-sector development. Stakeholders emphasize that project financing is limited in the West Bank and Gaza due to high macro-financial and political risks and the limited capacity of financial institutions. In the longer term, developing and supporting PPP projects could enable climate-responsive investments in the West Bank and Gaza. However, given the tight fiscal space, these PPPs must be well-managed and underpinned by a robust legal framework. The PA's difficult fiscal situation also underscores the risks of contingent liabilities arising from PPPs.

Although the West Bank and Gaza are minor GHG emitters, initiatives to reduce emissions could become a source of additional climate financing. About 95 percent of international public climate finance is provided upfront before a project is operational. Results-based climate finance (RBCF), by contrast, is paid when

either interim or final targets have been achieved. Ensuring that these targets have been met requires verifying that GHG emission reductions have occurred and would not have occurred otherwise. The West Bank and Gaza could attract RBCF to reduce emissions and invest in adaptation. The potential sources of RBCF are expanding and include the Scaling Climate Action by Lowering Emissions program, which will bring together all of the World Bank's current RBCF initiatives. To effectively engage in RBCF, the PA will need to enhance its capacity for measurement, reporting, and verification of emissions-related data.

Figure 28: Selected Entry Points to Facilitate Green Finance Mobilization in the West Bank and Gaza

Source: Authors' elaboration

6.2.5. Climate Change Action and Private-Sector Opportunities

Climate action can help enhance private-sector resilience and ease preexisting constraints on growth. Measures that could generate the most immediate climate co-benefits and contribute to private sector growth include investments in energy efficiency and renewable energy. Energy insecurity and high costs are among the main constraints faced by firms in the West Bank and Gaza. Outreach efforts can inform managers of the benefits of climate-responsive business practices. Efficiency gains can also improve energy security by reducing reliance on external energy sources, strengthening economic resilience. Digital and technology-enabled sectors also present a unique opportunity for resilient and climate sensitive growth, as they have lower climate impacts and higher resilience to climate effects than many traditional sectors and are well positioned to overcome the restrictions and reinforce the resilience of the domestic economy.

However, private-sector awareness of climate-friendly business practices and their potential benefits is limited and concentrated among medium and large enterprises. The World Bank's 2019 Enterprise Survey found that no micro or small enterprises consider environmental and climate-change issues in their strategic objectives. This share is 15 and 26 percent, respectively, among medium and large companies. Three of four firms that did not adopt any climate-friendly measures reported having other investment priorities, while 15 percent reported not having enough financing. The share of firms indicating access to finance as a barrier to implementing climate-responsive measures was highest among micro and small companies.

6.3 Adopting a Whole-of-Society and Whole-of-Government Approach

The PA can overcome many of its constraints by adopting a whole-of-society and whole-of-government approach to tackling climate change. Vertical and horizontal coordination mechanisms on climate change issues exist but are limited and informal, and the NCCC meets on an ad-hoc basis. Reviewing NCCC membership through a climate lens could help identify important sectors and stakeholders that are not yet included, such as the Ministry of Social Development. No formal intergovernmental institutional arrangements, including among subnational governments and state-owned enterprises, are in place to address local and national climate objectives. Encouragingly, the EQA recognizes the need to engage a broader range of stakeholders by strengthening collaboration with the Ministry of Local Government, local government units, the PMA, local financial institutions, and civil society. However, additional efforts are needed to raise the profile of the EQA and provide a clear executive mandate to the General Directorate for Climate Change and Disaster Risk Mitigation by implementing the new three-tiered organizational structure approved by the Council of Ministers.[95] The PA has yet to identify climate-related fiscal risks or screen public investments for climate resilience. Reviewing the sectoral strategies currently being prepared and implementing the recommendations emerging from this CCDR could advance the PA's climate agenda. For example, policy recommendations from the CCDR could be integrated into the new draft Social Sector Development Strategy and Energy Sector Strategy. Moreover, while meeting the challenges posed by climate change will require a whole-of-society approach, no formal policies are in place to engage civil society in climate action. Finally, improved data collection will be necessary to better understand climate threats and enable evidence-based policymaking.

A whole-of-society approach to climate action recognizes that all citizens and civil society organizations have a critical role to play in meeting mitigation and resilience targets. Adopting a whole-of-society approach would involve empowering citizens to: (i) hold the government accountable for progress toward climate commitments by fostering transparency and accountability in the allocation and utilization of resources; (ii) ensure that the government and the private sector collaborate with citizens on the development of climate policies, strategies, and programs with the support of international partners; and (iii) take direct action in mobilizing their communities to reduce carbon emissions and strengthen local resilience.

Effective climate action can help close gender gaps. The adverse impact of climate change on the health system in the West Bank and Gaza[96] is likely to increase the demands on women and girls to perform unpaid care work, while pregnant women may face elevated health risks.[97] Water shortages and water quality issues, electricity outages, and overcrowded landfills also increase the burden of unpaid domestic work, which falls disproportionately on women and girls.[98] Lost income can prevent small-scale farmers from meeting their family's needs, creating tension within the household, and research conducted among farmers in Gaza found that chronic economic vulnerability due to climate change appears to be positively correlated with incidents of gender-based violence.[99] Globally, women are more likely than men to work in the informal sector and to own assets that are at higher risk of loss or damage due to natural hazards like flooding.[100] Women who work in the agricultural sector appear to experience discrimination in access to water for their land and confront more barriers when attempting to accessing the information, training, technology, and other resources needed to adapt to climate change.[101]In addition to addressing the disproportionate costs that climate change imposes on women and girls, climate action offers new opportunities for transformational change. Job creation, the expansion of sustainable urban infrastructure, and the adoption of climate-smart agricultural practices represent entry points for increasing women's economic inclusion and empowerment. The implementation action plans already developed for priority sectors under the updated NDCs for the West Bank and Gaza highlight opportunities to engage women in new roles or to expand their presence in sectors and activities where they have long been underrepresented.[102]

7. The Need for Action

Although the *Toward Sustainability* scenario is aspirational in the current context, it remains achievable, provided there is political will to support it. The removal of restrictions on movement and access in the West Bank would strengthen climate resilience and yield benefits on both sides of the border. However, as progress toward alleviating those restrictions remains uncertain, and given the rapidly increasing risks and cost of inaction, the PA must prioritize climate actions that are fully within its control, as outlined under the *Increased Resilience* scenario. This scenario represents a way forward for the PA that mitigates the socioeconomic cost of climate change through investments in innovative solutions that bridge development gaps and increase resilience while recognizing that it will be insufficient to achieve complete resilience given the occupation. However, the scale and cost of the required reforms will necessitate the support of the private sector and the international community.

This West Bank and Gaza CCDR presents a set of policy recommendations and investments designed to support the shift from a scenario of *Continued Fragility* to one of *Increased Resilience*. The recommendations and investment priorities, based on extensive consultations with line ministries, public institutions, stakeholders and civil society, have been specifically selected to support the PA chart a resilient growth trajectory. The CCDR estimates the need for climate financing in the West Bank and Gaza between now and 2050 at US$5.5 billion, and the policy recommendations presented in Table 3 are tailored to support the necessary investments and ensure their effectiveness.

Coordinating these efforts in line with the Ad Hoc Liaison Committee dialogue will be important to ensure that resources, expertise, and assistance are allocated efficiently and effectively. Coordination would help avoid the duplication of efforts and contribute to a reform program that is comprehensive, well-targeted, and appropriately prioritized. The Ad Hoc Liaison Committee provides an important platform for technical and diplomatic engagement between the PA and GoI, and it brings together several key donor countries to ensure that external financial support is aligned with the scope and ambition of climate action policies.

Table 3: Policy Recommendations

	Policy Instruments
Improving Resilience along the Water–Food–Energy Nexus	• **Institutional strengthening and policy development** through (1) a series of reforms to improve institutional alignment around the water-energy-food nexus; (2) the implementation of reforms creating an enabling environment for the water sector and strengthening regulatory oversight; (3) improved data collection; (4) enhanced groundwater management. • **Water sector development and conservation** through (1) investments in reducing non-revenue water; (2) the development and rehabilitation of wells; (3) the construction and upgrading of stormwater systems; (4) increased storage capacity; (5) increased wastewater reuse; (6) increased desalination capacity; (7) the expansion of sustainable rainwater harvesting; and (8) targeted awareness-raising efforts to encourage rationalization of water use in line with climate goals. • **Promote energy efficiency and renewable energy** through (1) the dissemination of water and wastewater treatment technologies; (2) improved water-pressure management; (3) investments in water-pressure reduction stations; (4) the use of solar pumps for irrigation; (5) investments in energy-efficient agricultural pumps; (6) the use of off-grid distributed solar power among farms; and (7) engagement and feedback from low-income consumers and small firms and microenterprises. • **Support sustainable, climate-smart agriculture** through (1) a shift toward drought-tolerant crops; (2) the adoption of early-maturing varieties; (3) an increased focus on high-value crops; (4) greater crop diversification; (5) changes in planting and harvesting dates; (6) sustainable rangeland management; (7) sustainable fisheries and aquaculture; and (8) increased investments in aquaponics systems.

	Policy Instruments
Integrated Solutions for Green and Resilient Cities	• **Promote climate-informed urban planning and adaptive land uses** through (1) climate risk mapping integrated into urban planning; (2) participatory climate action plans; and (3) adaptive land-use policies, including growth management, green-space allocation, and mixed-use and transport-oriented development. • **Invest in resilient infrastructure and nature-based solutions**, including (1) flexible and modular infrastructure; (2) resilient road systems; (3) walking, cycling, green spaces, and nature-based solutions, and (4) integrated coastal zone management. • **Improve resource efficiency and embrace circular economy solutions** through (1) improved water and energy efficiency standards; (2) investments in renewable energy; and (3) circular-economy approaches to solid-waste management. • **Strengthen regulatory enforcement and operations and maintenance** through (1) improved enforcement of building and infrastructure safety regulations and engineering standards; and (2) the establishment of an enhanced asset-management system. • **Strengthen disaster risk management** by (1) approving the Draft DRM law to establish a comprehensive legal, policy, and institutional framework for DRM; (2) developing and implementing appropriate early warning systems to alert at-risk communities; (3) utilizing climate-risk mapping; and (4) strengthening the social protection system.
Building a Resilient Human Capital	• **Improve institutional capacity and coordination** by (1) investing in disease-surveillance systems and emergency preparedness; (2) training health professionals and PMOH staff; (3) strengthening collaboration and coordination between the PMOH and local authorities; and (4) clarifying the institutional and legal mandates for addressing climate-related health impacts. • **Provide targeted support for service delivery and social protection among groups that are most vulnerable to the impacts of climate change,** including women, children, agricultural workers, persons with disabilities, and the elderly. • **Invest in systems for effective disaster risk management and shock response** through (1) strengthening existing testing and early warning systems and integrating them with climate, weather and environmental data; (2) reinforcing the NCTP to ensure that routine transfers are not adversely affected during shocks; and (3) preparing the NCTP delivery system to accommodate temporary expansions in response to future shocks. • **Enhance data collection, transparency, monitoring and integration** by (1) increasing the capacity to identify climate-related risks and assess the impact of climate shocks; (2) integrating data from different sectors to monitor and understand climate-related health risks and impacts; (3) potentially adding climate-change modules to household poverty assessment forms, and (4) publishing accessible, comprehensive, and timely information on climate change in open-data formats.

	Policy Instruments
Mobilizing Private Investment and Catalyzing the Growth of Green Financing	• **Support the private sector** by (1) developing and implementing targeted awareness-raising programs that present the business case for climate-friendly practices in different sectors; (2) launching a green innovation hub to facilitate the growth of a green entrepreneurship ecosystem; and (3) providing incentives to the private sector to scale up climate-friendly business practices. • **Expand green-finance capacity** through (1) applying for the PMA or PCMA to become a member of at least one international network focusing on sustainable finance; (2) conducting a PMA survey of financial institutions to assess the baseline level of green finance; (3) establishing a national climate finance platform that involves the existing NCCC; and (4) adopting a PMA strategy for greening the financial sector. • **Mobilize climate finance through** (1) having the PMA and PCMA include green financial instruments as an integral part of their strategic plan to encourage the development of new products and services that address climate risks and opportunities; (2) exploring the potential for results-based climate financing and developing the necessary monitoring and verification capacity; (3) having the PCMA promote the development of climate insurance and catastrophe insurance products; (4) considering expanding the Palestine Investment Fund's mandate to explicitly include climate co-benefits, energy efficiency, and green entrepreneurship projects among its priority investments; (5) evaluating the possibility of launching a dedicated credit guarantee scheme for green finance projects, (6) supporting sector ministries' efforts to access multilateral climate funds, and (7) expanding access to green finance programs and services among members of vulnerable groups.
Adopt a Whole-of-Society and Whole-of-Government Approach to Climate Action	• **Enhance the institutional and regulatory framework for climate change** by (1) strengthening the National Climate Change Committee and (2) fully staffing the EQA's Climate Change and Disaster Risk Mitigation directorate, review its role and building its capacity. • **Mobilizing foundational efforts for the "whole-of-society" approach** through (1) targeted and iterative outreach efforts focused on climate-change impacts, adaptation, and mitigation, (2) ensuring consistent support from the PA, development partners, and the private sector to support civil society's efforts to engage in collaboration and support accountability for climate action, (3) fostering and scaling up local climate initiatives in collaboration with communities, local governments, and other stakeholders, and (4) adopting policy reforms designed to create an enabling environment for a whole-of-society approach to climate resilience and environmental sustainability.

Annex A: West Bank and Gaza CCDR – Detailed Investment Plan

Water–Energy–Food Nexus

Interventions	Timeframe*	Type of intervention	Geographical scope	Cost (US$)	Entity responsible
Non-revenue water (15% reduction)	Short Term	Investment	West Bank	75,000,000	
Non-revenue water (15% reduction)	Short Term	Investment	Gaza	150,000,000	
Rainwater harvesting	Short Term	Investment	West Bank	6,300,000	PWA
Agricultural ponds	Short Term	Investment	West Bank	750,000	PWA
Agricultural ponds	Short Term	Investment	Gaza	750,000	PWA
Storage	Short Term	Technical assistance	West Bank	4,000,000	PWA
Desalination	Short Term	Investment	Gaza	25,000,000	PWA
Wastewater reuse – upgrading treatment plants	Short Term	Investment	West Bank	40,000,000	PWA
Wastewater reuse – upgrading treatment plants	Short Term	Investment	Gaza	15,000,000	PWA
Wastewater reuse – new treatment plants	Short Term	Investment	West Bank	85,000,000	PWA
Wastewater reuse – new treatment plants	Short Term	Investment	Gaza	58,000,000	PWA
Improved groundwater management practices	Short Term	Policy reform	West Bank & Gaza	1,200,000	PWA
Rehabilitation of existing groundwater wells	Short Term	Investment	West Bank	4,000,000	PWA
Rehabilitation of existing groundwater wells	Short Term	Investment	Gaza	4,000,000	PWA
Development of new groundwater wells	Short Term	Investment	West Bank	6,000,000	PWA
Construction of stormwater systems	Short Term	Investment	West Bank	18,000,000	PWA
Construction of stormwater systems	Short Term	Investment	Gaza	18,000,000	
Upgrading of stormwater systems	Short Term	Investment	West Bank	4,000,000	PWA
Upgrading of stormwater systems	Short Term	Investment	Gaza	4,000,000	PWA
Updated water and wastewater policy and strategy	Short Term	Technical assistance	West Bank & Gaza	300,000	PWA
Transboundary capacity-building and negotiations	Short Term	Technical assistance	West Bank & Gaza	300,000	PWA Ministry of foreign Affairs, WSRC
Institutional reform	Short Term	Policy reform	West Bank & Gaza	18,000,000	PWA, NWC, WSRC and SPs, in brief, the PA
Demand-side interventions: community outrreach related to water conservation, payment for public services, and tariff reform	Short Term	Technical assistance	West Bank & Gaza	2,000,000	PWA
Nonrevenue water	Medium Term	Investment	West Bank	TBD	
Nonrevenue water	Medium Term	Investment	Gaza	TBD	
Rainwater harvesting	Medium Term	Investment	West Bank	20,000,000	PWA
Rainwater harvesting	Medium Term	Investment	Gaza	20,000,000	PWA
Rainwater harvesting	Medium Term	Investment	West Bank	10,000,000	PWA
Storage	Medium Term	Technical assistance	West Bank & Gaza	5,000,000	PWA/Ministry of Agriculture
Storage	Medium Term	Investment	West Bank	TBD	
Desalination phase 2	Medium Term	Investment	Gaza	305,000,000	
Wastewater reuse – upgrading treatment plants	Medium Term	Investment	West Bank	20,000,000	PWA
Wastewater reuse – upgrading treatment plants	Medium Term	Investment	Gaza	20,000,000	PWA
Wastewater reuse – new treatment plants	Medium Term	Investment	West Bank	180,000,000	
Wastewater reuse – new treatment plants	Medium Term	Investment	Gaza	45,000,000	
Improved groundwater management practices	Medium Term	Policy reform	West Bank & Gaza	10,000,000	PWA
Rehabilitation of existing groundwater wells	Medium Term	Investment	West Bank	20,000,000	
Rehabilitation of existing groundwater wells	Medium Term	Investment	Gaza	20,000,000	
Development of new groundwater wells	Medium Term	Investment	West Bank	8,250,000	PWA
Development of new groundwater wells	Medium Term	Investment	Gaza	8,250,000	PWA
Construction of stormwater systems	Medium Term	Investment	West Bank	11,000,000	PWA
Construction of stormwater systems	Medium Term	Investment	Gaza	11,000,000	PWA
Construction of stormwater systems	Medium Term	Investment	West Bank	11,000,000	PWA
Upgrading of stormwater systems	Medium Term	Investment	West Bank	3,000,000	
Upgrading of stormwater systems	Medium Term	Investment	Gaza	3,000,000	
Transboundary capacity building and negotiations	Medium Term	Technical assistance	West Bank & Gaza	6,000,000	PA
Institutional reform	Medium Term	Technical assistance	West Bank & Gaza	10,000,000	PWA, NWC, WSRC and SPs, in brief, the PA
Non-Revenue Water	Long Term	Investment	West Bank	TBD	
Non-Revenue Water	Long Term	Investment	Gaza	TBD	
Rainwater Harvesting	Long Term	Investment	West Bank	21,000,000	PWA
Rainwater Harvesting	Long Term	Investment	Gaza	21,000,000	PWA
Rainwater Harvesting	Long Term	Investment	West Bank	21,000,000	PWA

Interventions	Timeframe*	Type of intervention	Geographical scope	Cost (US$)	Entity responsible
Storage	Long Term	Technical assistance	West Bank & Gaza	TBD	
Storage	Long Term	Investment	West Bank	TBD	
Wastewater re-use – upgrading treatment plants	Long Term	Investment	West Bank & Gaza	50,000,000	PWA
Wastewater re-use – new treatment plants	Long Term	Investment	West Bank	179,000,000	
Wastewater re-use – new treatment plants	Long Term	Investment	Gaza	132,000,000	
Improved groundwater management practices	Long Term	Technical assistance	West Bank	6,000,000	PWA
Improved groundwater management practices	Long Term	Technical assistance	Gaza	6,000,000	PWA
Rehabilitation of existing groundwater wells	Long Term	Investment	West Bank		
Rehabilitation of existing groundwater wells	Long Term	Investment	Gaza		
Development of new groundwater wells	Long Term	Investment	West Bank	20,500,000	PWA
Development of new groundwater wells	Long Term	Investment	Gaza	20,500,000	PWA
Construction and upgrading of stormwater systems	Long Term	Investment	West Bank & Gaza	40,000,000	PWA
Transboundary capacity building and negotiations	Long Term	Technical assistance	West Bank & Gaza	6,000,000	
Jordan river	Long Term	Policy reform	West Bank	800,000	
Climate-smart agriculture (crops & livestock)	Short Term	Investment	West Bank & Gaza	111,106,000	MoA
Climate-smart agriculture (crops & livestock)	Medium Term	Investment	West Bank & Gaza	262,543,000	MoA
Climate-smart agriculture (crops & livestock)	Long Term	Investment	West Bank & Gaza	341,591,000	MoA
Increase solar PV supply	Short Term	Investment	West Bank & Gaza	203,441,000	PENRA
Increase solar PV supply	Medium Term	Investment	West Bank & Gaza	290,630,000	PENRA
Increase baseload supply (e.g. thermal power plant capacity)	Medium Term	Investment	West Bank & Gaza	182,930,000	PENRA
Increase baseload supply (e.g. thermal power plant capacity)	Long Term	Investment	West Bank & Gaza	182,930,000	PENRA

* Short Term (2023-2030) - Medium Term (2031-40) - Long Term (2041-2050)

Green and Resilient Urban Development

Interventions	Timeframe*	Type of intervention	Geographical scope	Cost (US$)	Entity responsible
Climate action plans	Short Term	policy reform/strategy development	West Bank (2 Urban Areas)	500,000	MoLG
Climate action plans	Short Term	policy reform/strategy development	Gaza (2 Urban Areas)	500,000	MoLG
Integration of climate change response into the spatial and development planning	Short Term	policy reform/strategy development	West Bank (4 Urban Areas)	600,000	MoLG
Integration of climate change response into the spatial and development planning	Short Term	policy reform/strategy development	Gaza (3 Urban Areas)	450,000	MoLG
Land-use policy reform (growth management, subdivision regulations, and mixed-use, TOD development)	Short Term	policy reform/strategy development	West Bank (4 Urban Areas)	2,000,000	MoLG/municipalities
Land-use policy reform (growth management, subdivision regulations, and mixed-use, TOD development)	Short Term	policy reform/strategy development	Gaza (3 Urban Areas)	1,500,000	MoLG/municipalities
Pedestrian infrastructure (phase I)	Short Term	Investment	West Bank (4 Urban Areas)	4,272,000	MoLG/MDLF/municipalities
Pedestrian infrastructure (phase I)	Short Term	Investment	Gaza (3 Urban Areas)	3,780,000	MoLG/MDLF/municipalities
Cycling infrastructure (phase I)	Short Term	Investment	West Bank (4 Urban Areas)	1,970,910	MoLG/MDLF/municipalities
Cycling infrastructure (phase I)	Short Term	Investment	Gaza (3 Urban Areas)	1,864,374	MoLG/MDLF/municipalities
Rehabilitation of landslide-prone areas	Short Term	Investment	West Bank (4 Urban Areas)	389,200	MoLG/MDLF/municipalities
Implementation of NBS in flood-prone areas -urban green areas- (phase I)	Short Term	Investment	West Bank (4 Urban Areas)	20,352,000	MoLG/MDLF/municipalities
Implementation of NBS in flood-prone areas -urban green areas- (phase I)	Short Term	Investment	Gaza (3 Urban Areas)	12,288,000	MoLG/MDLF/municipalities
Retrofitting of streets in flood-prone areas (rainwater drainage system)	Short Term	Investment	West Bank (4 Urban Areas)	24,737,003	MoLG/MDLF/municipalities
Retrofitting of streets in flood-prone areas (rainwater drainage system)	Short Term	Investment	Gaza (3 Urban Areas)	52,506,502	MoLG/MDLF/municipalities
Policy reform and capacity building in NBS	Short Term	Policy reform/capacity building	National	1,000,000	MoLG/MDLF/municipalities/ APLA
Modernization of the solid waste collection system - New collection trucks (phase I)	Short Term	Investment	West Bank (4 Urban Areas)	16,000,000	MoLG/JSC
Modernization of the solid waste collection system - New collection trucks (phase I)	Short Term	Investment	Gaza (3 Urban Areas)	7,840,000	MoLG/JSC
Gaza landfill (Juhr Al Deek)	Short Term	Investment	Gaza	29,300,000	MoLG/JSC
SWM policy reform and institutional strengthening	Short Term	Policy reform/capacity building	National	1,000,000	MoLG/JSC

Interventions	Timeframe*	Type of intervention	Geographical scope	Cost (US$)	Entity responsible
Green retrofitting in existing public buildings (phase I)	Short Term	Investment	West Bank (4 Urban Areas)	4,290,202	MoLG + MDLF
Green retrofitting in existing public buildings (phase I)	Short Term	Investment	Gaza (3 Urban Areas)	808,282	MoLG
Elaboration of the water efficiency code	Short Term	Policy reform	National	350,000	MoLG
Dissemination campaign of the safety code	Short Term	Policy reform/ Dissemination	West Bank (4 Urban Areas)	1,029,504	MoLG/APLA
Dissemination campaign of the safety code	Short Term	Policy reform/ Dissemination	Gaza (3 Urban Areas)	772,128	MoLG/APLA
Dissemination campaign of the energy efficiency code	Short Term	Policy reform/ Dissemination	West Bank (4 Urban Areas)	1,029,504	MoLG/APLA
Dissemination campaign of the energy efficiency code	Short Term	Policy reform/ Dissemination	Gaza (3 Urban Areas)	772,128	MoLG/APLA
Dissemination campaign of the water efficiency code	Short Term	Policy reform/ Dissemination	West Bank (4 Urban Areas)	1,029,504	MoLG/APLA
Dissemination campaign of the water efficiency code	Short Term	Policy reform/ Dissemination	Gaza (3 Urban Areas)	772,128	MoLG/APLA
Inspection of the safety code	Short Term	policy reform/code enforcement	West Bank (4 Urban Areas)	11,520,000	MoLG
Inspection of the safety code	Short Term	policy reform/code enforcement	Gaza (3 Urban Areas)	8,640,000	MoLG
Inspection of the energy efficiency code (phase I)	Short Term	policy reform/code enforcement	West Bank (4 Urban Areas)	4,608,000	MoLG
Inspection of the energy efficiency code (phase I)	Short Term	policy reform/code enforcement	Gaza (3 Urban Areas)	3,456,000	MoLG
Inspection of the water efficiency code (phase I)	Short Term	policy reform/code enforcement	West Bank (4 Urban Areas)	4,608,000	MoLG
Inspection of the water efficiency code (phase I)	Short Term	policy reform/code enforcement	Gaza (3 Urban Areas)	3,456,000	MoLG
Integration of climate change risk mapping into the DRM plans	Short Term	policy reform/stratgy development	West Bank (4 Urban Areas)	800,000	NDRMC/MoLG/MDLF/ municipalities
Integration of climate change risk mapping into the DRM plans	Short Term	policy reform/stratgy development	Gaza (3 Urban Areas)	600,000	NDRMC/MoLG/MDLF/ municipalities
Develop early warning system and hydromet (phase I)	Short Term	Policy reform/stratgy development	West Bank (4 Urban Areas)	1,600,000	NDRMC/PMD*/MoA/PWA/ Civil Defence
Develop early warning system (phase I)	Short Term	Policy reform/stratgy development	Gaza (3 urban areas)	1,200,000	NDRMC/PMD*/MoA/PWA/ Civil Defence
Reform the DRM system to cover the full cycle	Short Term	Policy reform/stratgy development	National	1,000,000	NDRMC/PMD*/MoA/PWA/ Civil Defence
Institutional strengthening and capacity building (phase I)	Short Term	Capacity-building	West Bank (4 urban areas)	4,800,000	NDRMC/MoLG/MDLF/ APLA/municipalities
Institutional strengthening and capacity building (phase I)	Short Term	capacity-building	Gaza (3 urban areas)	3,600,000	NDRMC/MoLG/MDLF/ APLA/municipalities
BRT (Ramallah) Phase I: Infrastructure	Short Term	Investment	West Bank (Ramallah urban area)	93,426,321	MDLF
Assessment of the status of Gaza's coastal zone that identifies challenges and opportunities for an integrated management approach.	Short Term	Technical assistance	Gaza	250,000	EQA/MDLF
Pedestrian infrastructure (phase II)	Medium Term	Investment	West Bank (4 Urban Areas)	6,408,000	MoLG/MDLF/municipalities
Pedestrian infrastructure (phase II)	Medium Term	Investment	Gaza (3 Urban Areas)	5,670,000	MoLG/MDLF/municipalities
Cycling infrastructure (phase II)	Medium Term	Investment	West Bank (4 Urban Areas)	2,956,365	MoLG/MDLF/municipalities
Cycling infrastructure (phase II)	Medium Term	Investment	Gaza (3 Urban Areas)	2,796,562	MoLG/MDLF/municipalities
Implementation of NBS in flood-prone areas - urban green areas- (phase II)	Medium Term	Investment	West Bank (4 Urban Areas)	30,528,000	MoLG/MDLF/municipalities
Implementation of NBS in flood-prone areas - urban green areas- (phase II)	Medium Term	Investment	Gaza (3 Urban Areas)	18,432,000	MoLG/MDLF/municipalities
Retrofitting of streets in flood-prone areas (rainwater drainage system)	Medium Term	Investment	West Bank (4 Urban Areas)	24,737,003	MoLG/MDLF/municipalities
Retrofitting of streets in flood-prone areas (rainwater drainage system)	Medium Term	Investment	Gaza (3 Urban Areas)	52,506,502	MoLG/MDLF/municipalities
Building new resilient roads in flood-prone areas (building new roads with rainwater drainage system)	Medium Term	Investment	West Bank (4 Urban Areas)	74,836,732	MoLG/MDLF/municipalities
Building new resilient roads in flood-prone areas (building new roads with rainwater drainage system)	Medium Term	Investment	Gaza (3 Urban Areas)	17,722,057	MoLG/MDLF/municipalities
Modernization of the solid waste collection system-Waste-to-energy project or similar (phase II)	Medium Term	Investment	West Bank (4 Urban Areas)	9,715,545	MoLG/JSC
Modernization of the solid waste collection system-Waste-to-energy project or similar (phase II)	Medium Term	Investment	Gaza (3 Urban Areas)	9,054,009	MoLG/JSC
Green retrofitting in existing public buildings (phase II)	Medium Term	Investment	West Bank (4 Urban Areas)	17,160,806	MoLG
Green retrofitting in existing public buildings (phase II)	Medium Term	Investment	Gaza (3 Urban Areas)	3,233,126	MoLG

Interventions	Timeframe*	Type of intervention	Geographical scope	Cost (US$)	Entity responsible
Inspection of the energy efficiency code (phase II)	Medium Term	policy reform/code enforcement	West Bank (4 Urban Areas)	6,912,000	MoLG
Inspection of the energy efficiency code (phase II)	Medium Term	policy reform/code enforcement	Gaza (3 Urban Areas)	5,184,000	MoLG
Inspection of the water efficiency code (phase II)	Medium Term	policy reform/code enforcement	West Bank (4 Urban Areas)	6,912,000	MoLG
Inspection of the water efficiency code (phase II)	Medium Term	policy reform/code enforcement	Gaza (3 Urban Areas)	5,184,000	MoLG
Develop early warning system (phase II)	Medium Term	Policy reform/stratgy development	West Bank (4 urban areas)	2,400,000	NDRMC/PMD*/MoA/PWA/ Civil Defence
Develop early warning system (phase II)	Medium Term	Policy reform/stratgy development	Gaza (3 urban areas)	1,800,000	NDRMC/PMD*/MoA/PWA/ Civil Defence
Institutional strengthening and capacity building (phase II)	Medium Term	capacity-building	West Bank (4 urban areas)	7,200,000	NDRMC/MoLG/MDLF/ APLA/municipalities
Institutional strengthening and capacity building (phase II)	Medium Term	capacity-building	Gaza (3 urban areas)	7,200,000	NDRMC/MoLG/MDLF/ APLA/municipalities
BRT (Ramallah) Phase II: Implementation	Medium Term	Investment	West Bank (Ramallah urban area)	13,330,000	MDLF
Smart Data platform- city level (part I)	Medium Term	Investment	West Bank (4 Urban Areas)	900,000	Municipalities/MDLF
Smart Data platform- city level (part I)	Medium Term	Investment	Gaza (3 Urban Areas)	675,000	Municipalities/MDLF
Retrofitting of streets in flood-prone areas (rainwater drainage system)	Long Term	Investment	West Bank (4 Urban Areas)	24,737,003	MoLG/MDLF/ municipalities
Retrofitting of streets in flood-prone areas (rainwater drainage system)	Long Term	Investment	Gaza (3 Urban Areas)	52,506,502	MoLG/MDLF/ municipalities
Building new resilient roads in flood-prone areas (building new roads with rainwater drainage system)	Long Term	Investment	West Bank (4 Urban Areas)	174,619,041	MoLG/MDLF/ municipalities
BRT for other cities (Hebron, Nablus, Bethlehem) Phase II: Implementation	Long Term	Investment	West Bank (Nablus, Hebron, Bethlehem urban area)	320,268,963	MDLF

* Short Term (2023-2030) - Medium Term (2031-40) - Long Term (2041-2050)

Adaptive Health and Social Protection

Interventions	Timeframe*	Type of intervention	Geographical scope	Cost (US$)	Entity responsible
Incorporate climate considerations in the upcoming health sector strategy (2024-2029)	Short Term	Policy reform	West Bank & Gaza	20,000	PMOH
Assess the climate vulnerability of healthcare facilities	Short Term	Policy reform	West Bank & Gaza	30,000	PMOH and donors
Develop a health-sector investment plan aligned with the assessed/projected impact of climate change	Short Term	Policy reform	West Bank & Gaza	30,000	PMOH and donors
Assess and improve institutional and legal mandates for addressing climate related health impacts	Short Term	Policy reform	West Bank & Gaza	60,000	PMOH and donors
Enhance PMOH capacities to identify climate-related health risks and assure funding of priority interventions	Short Term	Technical assistance	West Bank & Gaza	25,000	PMOH and donors
Enhance health professionals' capacity to provide disease prevention and care even during extreme events	Short Term	Technical assistance	West Bank & Gaza	25,000	PMOH and donors
Strengthen collaboration between the PMOH and local authorities to improve monitoring of water, air, soil, solid waste, and treated wastewater quality	Short Term	Technical assistance	West Bank & Gaza	100,000	PMOH, EQA, Water Authority, Ministry of Local Government, Association of Palestinian Local Authorities (APLA)
Improve the quality, functionality, and reporting capacity of the existing monitoring and surveillance systems	Short Term	Technical assistance	West Bank & Gaza	150,000	PMOH and donors
Develop the capacity for effective mobilization for pandemic prevention, preparedness and response (PPR)	Short Term	Investment	West Bank & Gaza	45,000,000	PMOH, Ministry of Agriculture, and donors
Integrate various sources of data from different sectors, and utilize the information to monitor and understand climate-related health risks and impacts and inform adaptation interventions	Medium Term	Investment	West Bank & Gaza	400,000	PMO, PMOH, EQA, PalDRM
Improve the resiliency of the health sector through investment in renewable sources of power for health facility operation, electric vehicles, energy efficient equipment, PPR, and medical waste management	Medium Term	Investment	West Bank & Gaza	140,000,000	PMOH and donors
Improve the resiliency of the health sector through investment in renewable sources of power for health facility operation, electric vehicles, energy efficient equipment, PPR, and medical-waste management	Long Term	Investment	West Bank & Gaza	130,000,000	PMOH and donors
Establish a national institutional coordination framework for shock-responsive social protection that brings together relevant government actors, including the Ministries of Social Protection, Agriculture, and Labor, and local governments	Short Term	Policy reform	West Bank & Gaza	200,000	MosD

Interventions	Timeframe*	Type of intervention	Geographical scope	Cost (US$)	Entity responsible
Create cross-sectoral policy linkages between social protection and diaster risk management. Incorporate social protection considerations into the inaugural Disaster Risk Plan and disaster risk management considerations into the upcoming Social Development Sector Strategy (2024-2029), both with costed and prioritized implementation plans	Short Term	Policy reform	West Bank & Gaza	150,000	MosD
Establish coherent frameworks that link the humanitarian sector's parallel systems and activities with national social protection systems.	Short Term	Policy reform	West Bank & Gaza	100,000	MosD
Prepare the National Cash Transfer Program for future shocks by ensuring routine operations can be maintained and identifying how the delivery chain can accommodate temporary expansion. This effort includes institutionalizing shock-response functions into routine planning and developing a comprehensive communication strategy.	Short Term	Policy reform	West Bank & Gaza	200,000	MosD
Expand the social registry by registering households that are at risk of being affected by climate shocks.	Short Term	Policy reform	West Bank & Gaza	400,000	MosD
Enhance the predictability of funding for routine social assistanceby closing the 50% funding gap in quarterly EU cash transfers.	Short Term	Investment	West Bank & Gaza	140,000,000	MosD
Enhance capacity to identify climate-related risks and assess the impact of climate shocks by: (i) generating and analyzing granular information on geographic areas and population groups impacted by climate shocks; and (ii) conducting vulnerability and risk assessments to assess the impact of climate shocks.	Medium Term	Technical assistance	West Bank & Gaza	400,000	MosD
Enhance the predictability of funding for routine social assistance by closing the 50% funding gap in quarterly EU cash transfers.	Medium Term	Investment	West Bank & Gaza	200,000,000	MosD
Build and institutionalize an early warning system for climate shocks.	Medium Term	Investment	West Bank & Gaza	7,000,000	MosD
Develop a disaster risk financing strategy that estimates the costs associated with responding to climate shocks and identifies appropriate instruments to cover those costs.	Medium Term	Technical assistance	West Bank & Gaza	100,000	MosD
Enhance the predictability of funding for routine social assistance by closing the 50% funding gap in quarterly EU cash transfers.	Long Term	Investment	West Bank & Gaza	200,000,000	MosD

* Short Term (2023-2030) - Medium Term (2031-40) - Long Term (2041-2050)

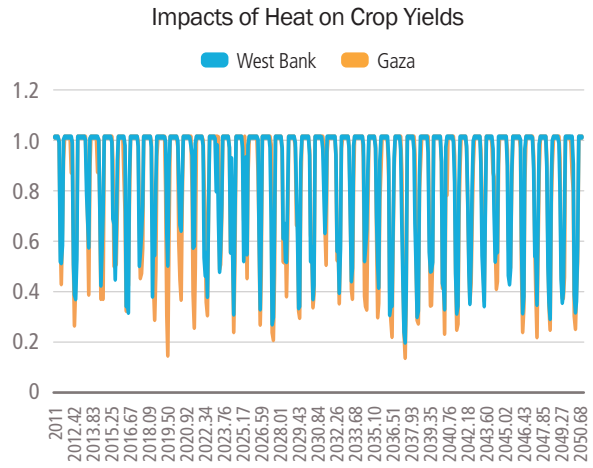
Annex B: Green Economy Model

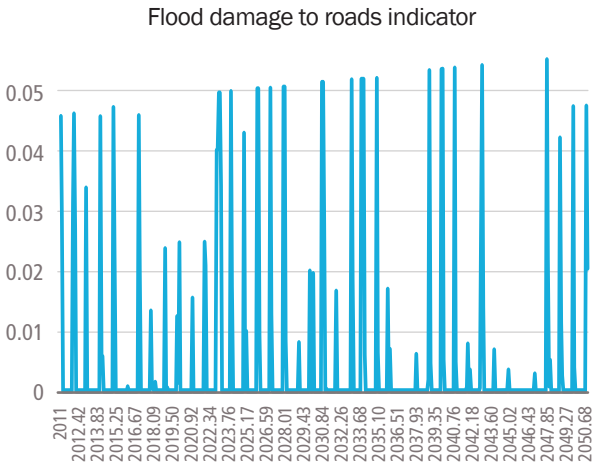
The Green Economy (GEM) for West Bank and Gaza is conceptualized based on System Thinking principles and built using associated System Dynamics (SD) modelling techniques. System Thinking is a holistic approach to analysis that focuses on the way that system constituent parts interrelate and how they work, over time and within the context of larger systems to which they belong. It is a way of making sense of the complexity of the world by looking at it in terms of wholes and relationships. System Thinking is generally applied in order to address the "counterintuitive behavior of social systems" (Forrester J. , 1973) whereby unanticipated side effects result from people's attempt to drive a system in one direction or to stabilize it, leading it, instead, into another direction or to further destabilize it. Such dynamics result in policy resistance, tendency for interventions to be delayed, diluted, or defeated by the response of the system to the intervention itself (Meadows D. , 1982). These features are at the heart of the climate-development nexus, indicating a clear need for embracing System Thinking ideas for advancing climate policy.

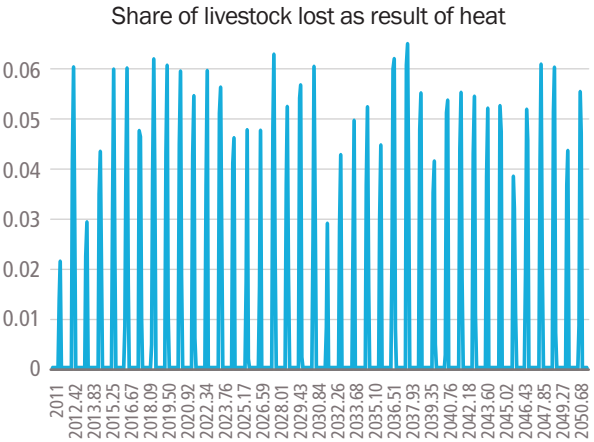
SD is a form of computer simulation modeling designed to facilitate a comprehensive approach to development planning in the medium to long term (Meadows D. , 1980; Randers, 1980; Richardson & Pugh, 1981; Forrester J. , 2002). SD operates by simulating differential equations with "what if" scenarios, explicitly representing stocks (level variables, such as land, labor force or human capital) and flows (such as GDP and consumption) and can integrate optimization and econometrics. The purpose of SD is not to make precise predictions of the future or to optimize performance; instead, these models are used to inform policy formulation, computing policy outcomes (both desirable and undesirable), and leading to the creation of a resilient and well-balanced strategy (Roberts, Andersen, Deal, Garet, & Shaffer, 1983; Probst & Bassi, 2014). Such an approach is consistent with policymakers' thinking framework, which weighs sets of outcomes based on political, technical, and institutional preferences in choosing from among policy packages (Garrido & Bassi, 2022).

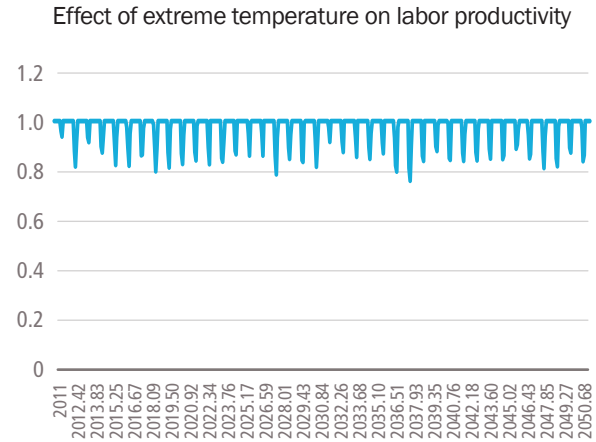
While no hard integration across models was feasible, the empirical exercise has strived for using, whenever needed, a common set of assumptions (e.g. on climate impacts scenarios, base-case demographics, macro inputs, sector-level inputs); for using outputs of a given empirical exercise as inputs into others (e.g. water and energy scenarios, from sector level work and from spatial work in CGE and System Dynamics models); and for understanding and reconciling differences across exercises. It is noted, in this regard, the use of GEM and the System Dynamics method to integrate knowledge generated by accompanying empirical exercises.

Climate change impacts that have been integrated in the macroeconomic analysis









Auxiliary scenarios include:

- **A counterfactual for the Fragility Scenario** that assumes no climate damages in the WB&G. This scenario enables to compare how climate damages estimated compare to those referred to in other empirical approaches

- **A Fragility Scenario, with climate impacts, but also with different reconstruction effort:**

- **Alternative climate action scenarios,** including with adaptation policies alone, mitigation policies alone, or a combination of adaption and mitigation effort.

Endnotes

1 According to the GoI, these restrictions are for the purpose of enhancing the security of Israel and Israeli citizens.

2 These model estimates and projections are based on a set of assumptions. The numbers relating to the current supply are reported by the PA. They do not include purchases from Israel, as the figure is intended to illustrate the situation of water security in the West Bank and Gaza. The demand projections in the figure are based on a per capita consumption of 120 liters per day, which is also reflects PA policy and strategy, and thus they differ from actual consumption, which is much lower.

3 Based on analysis of seven urban clusters: Bethlehem, Gaza, Hebron, Nablus, Ramallah-AlBireh, Deir el Balah, and Khan Yunis

4 The five SSP scenarios project the impact of climate change through 2100 based on alternative assumptions for carbon emissions, population growth, economic growth, and other factors. See: Intergovernmental Panel on Climate Change (2021) Sixth Assessment Report.

5 The role of the General Directorate of Climate Change and Disaster Risk Mitigations is currently under review.

6 According to the GoI, these restrictions are for the purpose of enhancing the security of Israel and Israeli citizens.

7 At the poverty line of $6.85 in 2017 PPP

8 The Palestinian Economic and Consumption Survey (PECS 2017) estimated the national poverty line in at US$8.9 per person per day. The official poverty line is based on a "deep poverty line," which reflects a budget needed for a family of two adults and three children to cover food, clothing, and housing. This line represents the minimum essentials required for a dignified life and does not account for human development requirements such as health care, education, and transportation.
See https://www.pcbs.gov.ps/Downloads/book572.pdf and https://www.pcbs.gov.ps/Downloads/book2368.pdf?date=7_5_2018

9 The detrimental economic impact of GoI restrictions, especially in Area C, is documented in detail in the 2014 World Bank Report "Area C and the Future of the Palestinian Economy".

10 USAID 2017 West Bank and Gaza Climate Change Risk Profile Fact Sheet

11 International Energy Agency 2021 data (https://www.iea.org/countries/israel)

12 Net lending" occurs when LGUs that function as distributors of electricity and water services fail to pay all or some of what they owe to Israeli utility companies. The GoI compensates the utilities by deducting a part of the value-added tax and customs revenue that it collects and is obliged to transfer to the PA. The PA subsequently attempts to recover the original payment from the LGUs, and these efforts may or may not be successful.

13 PCBS 2018

14 United Nation, World Population Prospects 2022. Accessed June 2023. https://population.un.org/wpp/Download/

15 Gender in Energy Interventions in Fragile and Conflict Affected Situations in the Middle East and North Africa. https://documents1.worldbank.org/curated/en/770271593465937531/pdf/Gender-in-Energy-Interventions-in-Fragile-and-Conflict-Situations-in-the-Middle-East-and-North-Africa-Region-Insights-from-Iraq-Lebanon-Republic-of-Yemen-and-the-West-Bank-and-Gaza.pdf

16 The Changing Wealth of Nations 2021: Managing Assets for the Future, doi: 10.1596/978-1-4648-1590-4.

17 Report on UNCTAD assistance to the Palestinian people: Developments in the economy of the Occupied Palestinian Territory, 2022; https://www.un.org/unispal/document/unctad-assistance-to-the-palestinian-people-developments-in-the-economy-of-the-opt-unctad-report-td-b-ex72-2/

18 There are an average of 16 electrical outages each month in the West Bank and Gaza versus an average of six in the Middle East and North Africa. See: World Bank (2019) Enterprise Survey of the West Bank and Gaza.

19 In addition to the loss of life, the cost of the most recent conflict in May 2021 Gaza was estimated at US$345-485 million during the first 24 months alone. See: World Bank/EU/UN (2021). Gaza Rapid Damage and Needs Assessment. https://documents1.worldbank.org/curated/en/178021624889455367/pdf/Gaza-Rapid-Damage-and-Needs-Assessment.pdf

20 UNRWA see https://www.unrwa.org/where-we-work/west-bank and https://www.unrwa.org/where-we-work/gaza-strip

21 Assistance Strategy for the WBG for the period FY22-25, Report no. 156451-GZ, World Bank Group (page 8)

22 Poverty map for the Palestinian Territories, "PECS and Census 2017", Technical report, June 2019

23 ILO see https://www.ilo.org/beirut/media-centre/news/WCMS_774736/lang--en/index.htm (accessed 10/3/2022)

24 PCBS see https://www.pcbs.gov.ps/Portals/_Rainbow/Documents/unemployment-2020-02e.html.

25 USAID, 2017. Climate change risk in the West Bank and Gaza: country risk profile

26 State of Environment and Outlook Report for the occupied Palestinian territory 2020, UN environment program

27 Intergovernmental Panel on Climate Change (2021) Sixth Assessment Report.

28 Shared Socioeconomic Pathways (SSP) scenarios SSP1-1.9; SSP2-4.5; SSP3-7.0

29 WBG Climate Risk Country Profile, 2022, World Bank, draft

30 City Resilience Program: Urban Climate Risk Analysis (UCRA) for West Bank and Gaza, GFDRR, World Bank.

31 Journal of Water Resource and Protection, 2018, 10, 215-229. Climate Change Challenges to Groundwater Resources: Palestine as a Case Study, Numan Mizyed

32 CLEAR Water Dashboard – Source: World Bank's Climate Knowledge Portal (2022)

33 UN Women/UN DESA 2021

34 UNEP "Palestine Country Savings Assessment (2018-2019) https://united4efficiency.org/wp-content/uploads/2022/08/PSE_U4E-Country-Saving-Assessment_Jul-22.pdf

35 Green Economy Module in Enterprise Survey for West Bank and Gaza, 2019.

36 Palestinian Central Bureau of Statistics. https://www.pcbs.gov.ps/Portals/_Rainbow/Documents/Emissions_2020_04.htm

37 United Nations Framework Convention on Climate Change. UNFCCC Initial National Communication Report

38 Initial National Communication Report to the UNFCCC, EQA, Palestinian Authority, 2016 (page 86).

39 The PA approved an update to its NDCs on October 2021, targeting a 17.5 percent or 26.6 percent reduction in GHG emissions relative to a business-as-usual counterfactual by 2040 under alternative scenarios.

40 Update on Climate Change Activities in Palestine, Communication by the EQA, Ramallah, NCCC meeting, February 28, 2023

41 Background note on Social Protection for the West Bank and Gaza CCDR, World Bank, March 2023

42 Palestinian Ministry of Health. Heath Sector Strategy 2021-2023. http://www.palestinecabinet.gov.ps/WebSite/Upload/Documents/%D8%A7%D9%84%D8%A7%D8%B3%D8%AA%D8%B1%D8%A7%D8%AA%D9%8A%D8%AC%D9%8A%D8%A9%20%D8%A7%D9%84%D9%82%D8%B7%D8%A7%D8%B9%D9%8A%D8%A9%20%D9%84%D9%84%D8%B5%D8%AD%D8%A9%202021-2023.pdf

43 Towards a Green Gaza: Improving Natural Resources Management, Reducing and Managing Waste, Creating Green Jobs

44 UNICEF, WHO, World Bank Group, 2021, Levels and Trends in Malnutrition

45 FAO Aquastat

46 https://www.nytimes.com/2014/02/09/opinion/sunday/friedman-whose-garbage-is-this-anyway.html?_r=3&module=ArrowsNav&contentCollection=Opinion&action=keypress&region=FixedLeft&pgtype=article

47 World Bank model estimates based on UN population data and various assumptions, including 120 liters per capita per day consumption, over 30% non-revenue water, among others.

48 This is based on the provision of 120 liters per person per day, using UN population data, and includes provision for 7 percent of industrial demand.

49 Model projections based on 15,800 ha in the West Bank and 13,500 ha in Gaza, with 6,000 cubic meters per ha.

50 United Nations (2021) "The allocation of water resources in the Occupied Palestinian Territory, including East Jerusalem" Report of the United Nations High Commissioner for Human Rights. https://www.un.org/unispal/wp-content/uploads/2021/10/A.HRC_.48.43_230921.pdf

51 See World Bank (2023) for a more detailed description of the model assumptions and definition of the scenarios.

52 CEPR 2012: Link accessed on March 5, 2022

53 UN COMTRADE Database, authors calculations to combine multiple agriculture and food related categories.

54 For overall planning purposes, Ministry of Agriculture recommends using an average figure of 600 m^3/dunum/year in West Bank. This figure has been calculated to account for the recent and considerable development of drip irrigation. The Ministry of Agriculture currently has to manage water shortages due to the difficulties in accessing water resources, and for this reason it supplies only 75 percent of the "normal" water demand (450 m^3/dunum/year instead of 600).

55 Hamada & Ghodieh, 2021. Mapping of Solar Energy Potential in the West Bank, Palestine Using Geographic Information Systems. Papers in Applied Geography.

56 World Bank (2017)

57 2019 "Integrated Nexus Strategy for Water, Energy and Agriculture in the Gaza Strip."

58 The costs projection here is a rough calculation based on projected water-sector energy demand from the WEF Modelling towards 2050. The unit energy costs data ($/MWh) drew upon Electricity Sector Masterplans for the West Bank (2022-2035) produced by CESI but was projected to the year of 2050 based on linear trends. This part of the water-sector energy demand analysis has been conducted for the WEF nexus specifically and is not included as part of the completed Electricity Sector Masterplans, which cover overall generation and transmission planning in the West Bank and Gaza. All costs here assume grid-connected generation capacity, and do not include stand-alone systems for water facilities.

59 The current electricity demand in WB&G of around 1200 MW is met largely by imports from Israel Electric Corporation (IEC). Only 200 MW of solar power generation capacity is installed within the Palestinian territories. With the electricity demand projected to grow to over 2,000 MW by 2030, much of the need will continue to be met by IEC imports as well as domestic generation in the Palestinian territories from planned natural gas-based power generation and solar power. Given that solar is an intermittent resource, and the solar electricity is without adequate battery energy storage systems (which are expensive), PENRA has made a realistic projection of about 20 percent of the share of electricity from solar under their Master Plan (prepared by CESI under the World Bank's ESPIP operation) and also as reflected in WB&G's NDC Update 2021. In that Generation Master Plan there is a provision of natural gas-based electricity generation, albeit using the most efficient and least emissions-intensive combined cycle gas turbine (CCGT) technologies (such as in the proposed Jenin 250MW CCGT power plant under development), as it is impossible to meet all the 24/7 electricity demand, including the base load by 100 percent solar and/or wind power. To be noted here is a fact that Israel's current power generation mix also includes 2/3rd share of gas-based CCGT and 1/4th share of coal-fired power plants as well.

60 ARCOWA, 2020. Energy Efficient Water Production and Purification in the West Bank Report 2. Jenin – Rapid Assessment

61 Due to population growth, urban expansion, increased waste, human activities, and natural processes

62 Fathom-Global 2.0 Flood Data 2020 (90m). https://www.fathom.global/fathom-global

63 USGS Landsat 8 Level 2, Collection 2, Tier 1 2017-2021 (20m). https://www.usgs.gov/core-science-systems/nli/landsat/landsat-collection-2-level-2-science-products

64 Hammer, M. S., A. van Donkelaar, C. Li, A. Lyapustin, A. M. Sayer, N. C. Hsu, R. C. Levy, M. J. Garay, O. V. Kalashnikova, R. A. Kahn, M. Brauer, J. S. Apte, D. K. Henze, L. Zhang, Q. Zhang, B. Ford, J. R. Pierce, and R. V. Martin. 2022. Global Annual PM2.5 Grids from MODIS, MISR and SeaWiFS Aerosol Optical Depth (AOD), 1998-2019, V4.GL.03. Palisades, New York: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/fx80-4n39.

65 The World Bank, Global Landslide Hazard Map 1980-2018. https://datacatalog.worldbank.org/search/dataset/0037584/global-landslide-hazard-map.

66 The global datasets used here do not necessarily consider granular variations on the ground level, but rather serve as a rough approximation of local conditions. Moreover, climate change introduces deep uncertainty in evaluating future risks, which tend to be complex and nuanced. Therefore, the findings of this analysis are meant to be used in conjunction with local data and ground truths before they could be directly applied toward concrete actions.

67 The exercise estimated the potential impact of selected investments and policy packages according to the parameters of the fragility and resilience scenarios. The impacts are measured by level of exposure of people and assets to climate-induced hazards, in addition to measuring mitigation co-benefits, including reduction in GHG emissions and energy consumption. The Towards Sustainability scenario and its implications for cities are analyzed qualitatively.

68 The simulation used data from:

(i) Crippa, M., Guizzardi, D., Solazzo, E., Muntean, M., Schaaf, E., Monforti-Ferrario, F., Banja, M., Olivier, J.G.J., Grassi, G., Rossi, S., Vignati, E., (2021). GHG emissions of all world countries - 2021 Report, EUR 30831 EN, Publications Office of the European Union, Luxembourg, ISBN 978-92-76-41547-3, doi:10.2760/173513, JRC126363.

(ii) Forest greenhouse gas emissions. Global Forest Watch. https://data.globalforestwatch.org/datasets/gfw::forest-greenhouse-gas-emissions/explore?location=2.370797%2C0.000000%2C2.17

(iii) G. Ahlfeldt, E. Pietrostefani, A. Schumann and T. Matsumoto (2018). Demystifying compact urban growth: Evidence from 300 studies from across the world. OECD Regional Development Working Papers. No. 2018/03. https://doi.org/10.1787/bbea8b78-en

(iv) Ewing, Reid and Cervero, Robert (2010). Travel and the Built Environment, Journal of the American Planning Association, 76:3, 265-294, 11 May 2010. https://doi.org/10.1080/01944361003766766

(v) World Bank (2022). West Bank and Gaza – Urban Climate Risk Analysis. Global Facility for Disaster Reduction and Recovery;

(vi) Pesaresi M., Politis P. (2023): GHS-BUILT-S R2023A - GHS built-up surface grid, derived from Sentinel2 composite and Landsat, multitemporal (1975-2030) European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/9f06f36f-4b11-47ec-abb0-4f8b7b1d72ea, doi:10.2905/9F06F36F-4B11-47EC-ABB0-4F8B7B1D7;

(vii) Schiavina M., Freire S., Carioli A., MacManus K. (2023): GHS-POP R2023A - GHS population grid multitemporal (1975-2030).European Commission, Joint Research Centre (JRC) PID: http://data.europa.eu/89h/2ff68a52-5b5b-4a22-8f40-c41da8332cfe, doi:10.2905/2FF68A52-5B5B-4A22-8F40-C41DA8332C;

(viii) Gao, J. and B. C. O'Neill (2021). Global One-Eighth Degree Urban Land Extent Projection and Base Year Grids by SSP Scenarios, 2000-2100. Palisades, New York: NASA Socioeconomic Data and Applications Center (SEDAC). https://doi.org/10.7927/nj0x-8y67. Accessed on June 2023

(ix) PCBS (2023). Projected Mid-Year Population Projections https://www.pcbs.gov.ps/site/803/default.aspx. Accessed on June 2023.

69 This is a scenario akin to the Current Policy Scenario (CPS) defined by the International Energy Agency IIEA).

70 Under the SD methods, the reference case is calibrated using historical data and the assumptions of "no climate action" described above. Under MANAGE model, the calibration is done following the standard CGE approach using a balanced SAM for year 2017. GEM WEST BANK AND GAZA is used to reconcile the exercises, but also to incorporate additional inputs from spatial analysis.

71 This scenario is not the same as the "independence scenario" referred to in West Bank and Gaza's updated NDCs, though it shares some of its features.

72 Under the *Continued Fragility* scenario, reconstruction costs are assumed at 10 percent of climate damages, or about US$25-30 million per year during 2022-2040.

73 This uses the 2022 World Bank classification of countries by income level, with the threshold between lower-middle income and upper-middle income countries being set at US$4,255. It is also assumed that growth rates in per capita GNI (Atlas Method) are similar to estimated real per capita GDP growth.

74 Under the *Continued Fragility* scenario, tax revenues and total revenues remain largely unchanged as a proportion of GDP, at around of 11-12 percent and 28-29 percent of GDP each over the analyzed period. With slightly declining government expenditures (based on the assumption that investments in energy, water, and post-disaster reconstruction are financed with foreign capital), the primary deficit narrows from 2.1 percent of GDP in 2022 to 0.15 percent by 2040, reducing the public debt stock from around 60 percent of GDP in 2022 to 53.6 percent in 2040

75 Israel's current electricity generation mix is dominated by fossil fuels, about 69 percent natural gas and 23 percent coal, with just 7-8 percent coming from solar power (Source: International Energy Agency, 2022). To compute GHG emissions from imported electricity from Israel, it is assumed that this electricity is generated exclusively with combined cycle gas turbine (CCGT) technology for the full estimation period. A more precise estimation would consider Israel own's plans for power generation technology, such as those included in its NDCs. The choice of gas emission factors allows for better comparison of GHG emission paths under the *Increased Resilience* scenario, in which gas turbine generation in the West Bank and Gaza partially substitutes electricity imports from Israel.

76 The baseline in the NDC update is referred to as the "status quo scenario" and assumes a 5.8 percent growth rate through 2040. It is based on projections by the 2016 NAP (INCR) and confirmed by the Green Climate Fund (GCF) Country Program (2020). Whereas GDP assumptions are exogenous in the NAP and NDC updates, they are endogenous in the Green Economy Model, so GDP growth rates vary across scenarios.

77 The *Towards Sustainability* scenario also includes a gradual but significant increase in access to land as a factor of production. This means that a higher amount of territory is also affected by climate hazards, which is factored in the model.

78 Per capita GDP growth reflects a slightly higher population growth rate in the Sustainability scenario (2.3 percent per year) relative to the Resilience scenario (2.1 percent per year) also reflecting the benefits of spatial integration and improved economic activity in terms of higher fertility and lower mortality ratios.

79 Occupied Palestinian territory. Health and climate change profile 2022. World Health Organization. https://apps.who.int/iris/bitstream/handle/10665/352629/WHO-HEP-ECH-CCH-22.01.04-eng.pdf?sequence=1

80 Bouquet B, Muhareb R, Smith R. "It's Not Whatever, Because This Is Where the Problem Starts': Racialized Strategies of Elimination as Determinants of Health in Palestine." Health and Human Rights Journal, Volume 24/2. https://www.hhrjournal.org/2022/12/its-not-whatever-because-this-is-where-the-problem-starts-racialized-strategies-of-elimination-as-determinants-of-health-in-palestine/

81 World Health Organization, Surveillance System for Attacks on Health Care (SSA). https://extranet.who.int/ssa/Index.aspx. Retrieved on January 30, 2023.

82 https://www.ochaopt.org/page/gaza-strip-electricity-supply

83 https://www.moh.gov.ps/portal/moh-gaza-power-station-suspension-will-directly-affect-health-services-in-gaza-hospitals/

84 https://www.ochaopt.org/content/humanitarian-needs-overview-and-humanitarian-response-plan-2023-dashboard

85 Covering about 20 percent of eastern Hebron, H2 has been under direct Israeli military control since 1997. By contrast, the much larger H1 area, which encompasses the rest of Hebron, is administered by the PA.

86 Economic Monitoring Report to the Ad Hoc Liaison Committee. May 2022. https://documents1.worldbank.org/curated/en/099407305062233565/pdf/IDU091fed1da019eb042d6090100a9320aa572de.pdf

87 https://documents1.worldbank.org/curated/en/099335106232257614/pdf/P1773990ae8cff0ff0996207da9fa55bae9.pdf and https://www.mosd.gov.ps/uploads/1659521603103795344.pdf

88 https://documents1.worldbank.org/curated/en/357071595970203856/text/West-Bank-and-Gaza-Emergency-Social-Protection-COVID-19-Response-Project.txt

89 Becerra, P., Malasquez, E., & Al-Saleh. J. (2021), "West Bank and Gaza: Links among Income, Jobs, and Food", in Hoogeveen, H. & Lopez-Acevedo (2021). Distributional Impacts of COVID-19 in the Middle East and North Africa Region. MENA Development Report;. Washington, DC: World Bank. https://openknowledge.worldbank.org/handle/10986/36618

90 Approximately 81 percent of agriculture in the West Bank and Gaza is rainfed and highly vulnerable to changes in the frequency, intensity, and timing of rainfall. In addition, rising temperatures and humidity can have detrimental impacts on storage and processing in olive and grapevine value chains, on which many smallholder farmers in the West Bank and Gaza depend. FAO (n.d.). Water efficiency, productivity, and sustainability in the NENA regions (WEPS-NENA). URL: https://www.fao.org/in-action/water-efficiency-nena/countries/palestine/zh/

91 European Union. Biennial evaluation of 2018-2019 Pegase Direct Financial Support ("Pegase DFS") to the Palestinian Authority. https://www.eeas.europa.eu/sites/default/files/documents/Final%20Report%20Biennial%20Eval%20PEGASE%20DFS-1.pdf

92 The Urban Model developed for this exercise estimates costs over the short, medium, and long term for seven cities.

93 IFC estimates that around 30 percent of bank balance sheets in emerging markets should be green by 2030 to meet global climate goals. In MENA countries, including West Bank and Gaza, the share of 'green' balance sheets in the banking sector is still at low levels and is not easy to estimate due to the lack of robust national taxonomies or definitions.

94 In 2019, the PMA also issued instructions incentivizing banks to invest in start-ups in the field of renewable energy, among others.

95 The role of the General Directorate of Climate Change and Disaster Risk Mitigations is currently under review.

96 Qazzaz, M. M., Preater, M., Jad, I., Moinier, C., & Smithers, R. J. (2021). The State of Palestine's Nationally Determined Contribution (NDC) implementation action plans: Health – Increasing awareness and capacities for disease prevention. https://ndcpartnership.org/countries-map/country?iso=PSE

97 United Nations Environment Programme. (2020). State of Environment and Outlook Report for the occupied Palestinian territory 2020. https://www.un.org/unispal/document/state-of-environment-and-outlook-report-for-the-opt-2020-un-environmental-program-report/

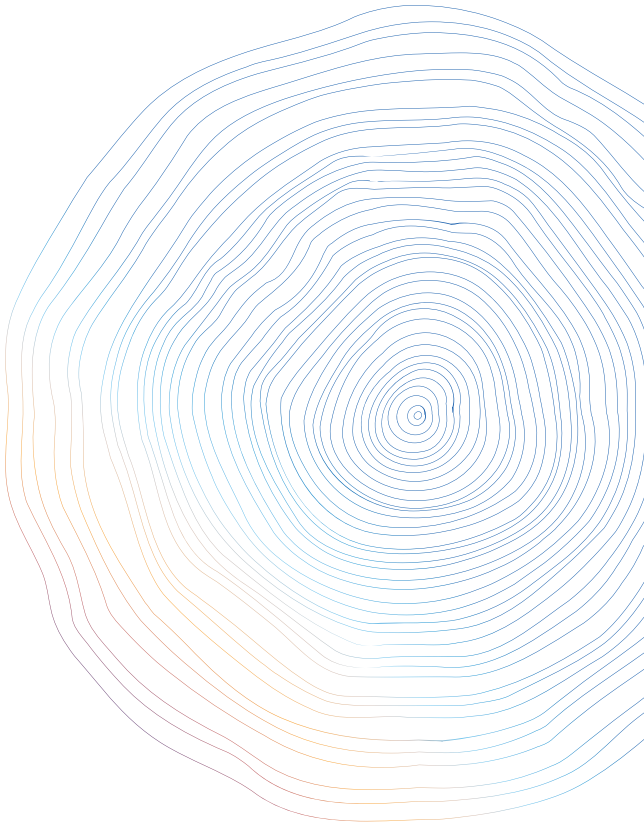
98 State of Palestine Environment Quality Authority. (2016). National Adaptation Plan to Climate Change. https://www4.unfccc.int/sites/NAPC/Documents%20NAP/National%20Reports/State%20of%20Palestine%20NAP.pdf ; UN Economic and Social Commission for Western Asia. (2023). Mainstreaming gender in climate action in the Arab region. https://reliefweb.int/report/jordan/mainstreaming-gender-climate-action-arab-region-enar ; Maier, E., Constant, S., & Ahmad, A. (2020). Gender in Energy Interventions in Fragile and Conflict Situations in the Middle East and North Africa Region. https://documents1.worldbank.org/curated/en/770271593465937531/pdf/Gender-in-Energy-Interventions-in-Fragile-and-Conflict-Situations-in-the-Middle-East-and-North-Africa-Region-Insights-from-Iraq-Lebanon-Republic-of-Yemen-and-the-West-Bank-and-Gaza.pdf ; Hasan, A., Jenevizian, A., Jad, I., Moinier, C., Smithers, R. J., & Abu-Ebid, M. (2021). The State of Palestine's Nationally Determined Contribution (NDC) implementation plans: Waste – Improving waste management. https://ndcpartnership.org/countries-map/country?iso=PSE

99 'Climate Change, Agriculture and Gender in Gaza: Assessing the implications of the climate crisis for smallholder farming and gender within olive and grape value chains in Gaza'. NORMAN MARTÍN CASAS, ASMAA ABUMEZIED, & CHARLOTTE L. STERRETT. July 2020. See link

100 United Nations Office for Disaster Risk Reduction. (2022). Policy brief: Gender-responsive disaster risk reduction. https://www.undrr.org/publication/policy-brief-gender-responsive-disaster-risk-reduction

101 Food and Agriculture Organization of the United Nations. (2022). Gender, Water, and Agriculture – Assessing the Nexus in Palestine. https://www.fao.org/3/cc0757en/cc0757en.pdf ; Oxfam. (2020). Climate Change, Agriculture and Gender in Gaza: Assessing the implications of the climate crisis for smallholder farming and gender within olive and grape value chains in Gaza. https://policy-practice.oxfam.org/resources/climate-change-agriculture-and-gender-in-gaza-assessing-the-implications-of-the-621024/

102 Hasan, A., Jenevizian, A., Jad, I., Moinier, C., Smithers, R. J., & Abu-Ebid, M. (2021). The State of Palestine's Nationally Determined Contribution (NDC) implementation plans: Waste – Reducing emissions in the waste management sector. https://ndcpartnership.org/countries-map/country?iso=PSE ; Smithers, R. J., Hasan, A., Harb, J., Holdaway, E., Madzharova, G., Preater, M., Jad, I., Moinier, C., Abu-Ebid, M., & Abuhaija, I. (2021). The State of Palestine's Nationally Determined Contribution (NDC) implementation plans and policy recommendations: Agriculture – Climate-resilient land planning and management. https://ndcpartnership.org/countries-map/country?iso=PSE



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