

Resilient Recovery

Senegal and Côte d'Ivoire

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KEY MESSAGES

- Senegal and Côte d'Ivoire face steep challenges, including from climate change, in making a transition to the next stage of economic prosperity. As these countries plan for the future, investment in green sectors could deliver a sustainable and environmentally friendly post-pandemic recovery.
- Investment in adaptation measures could have the highest social-economic returns by generating more jobs and economic value in the long term relative to traditional investments. Strategically targeted investments in adaptation can help expand opportunities for the labor force, which is currently tied up in informal work. These realizable results, in turn, further increase resilience to climate impacts.
- Modeling shows that in Senegal, investment in adaptation initiatives could create over 200 percent more jobs within five years (600 percent within 20 years) and around 700 percent greater economic value in 20 years) relative to the stimulus financial package used as a counterfactual. A similar package in Côte d'Ivoire would generate up



to 180 percent more jobs within five years (400 percent within 20 years) and 265 percent more economic value in 20 years.

- Governments in both countries, which have a key role to play in setting long-term priorities for the economy and creating an enabling environment for the private sector, should develop a holistic approach to integrating public and private adaptation initiatives. They should integrate adaptation into fiscal policy and introduce innovative green financing.

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Africa, a continent vulnerable to climate change, is lagging behind in the adaptation process. Africa benefits very little from green financing and investments despite the existence of dedicated mechanisms. Yet even if they pollute the least, they remain the most vulnerable to the effects of global warming. African countries remain fully committed to climate action, ecosystem resilience and the conservation of biodiversity and the natural habitat that offers so much to humanity.”

H.E. Macky Sall

President of Senegal and Chair of the African Union

INTRODUCTION

Recent international crises, including the COVID-19 pandemic and war in Ukraine, have heavily affected the economic and social development of many countries globally. Africa is on the frontline of these crises. This chapter focuses on two country case studies: Senegal and Côte d’Ivoire. Both economies exhibit a recovery path from COVID-19, with real GDP growth in 2021 of 6.1 percent¹ and 7 percent,² respectively. However, the economic fallouts of the outbreak, the appearance of new variants, and the low rates of vaccines still threaten their recovery. Further, the tensions between Russia and Ukraine have led to a steep increase in food and energy prices, a deterioration of terms of trade, and a shortage of fertilizers, threatening the macroeconomic outlook and food security.

The impacts of these international shocks in Africa, especially on food security, economic recovery, and existing environmental and climate change vulnerabilities, only reemphasizes the need to engage in smart green economic growth. The concept of green growth encompasses the idea of sustained economic growth through 1) resource-use efficiency; 2) climate change response through adaptation and mitigation; 3) the creation of decent green jobs; and 4) human wellbeing and social inclusiveness.

Crucial for an effective green recovery plan is mainstreaming climate change adaptation into it. Adaptation measures must be implemented in every sector—agriculture, transportation, energy, trade, water resources, and urban development. It is important to invest in nature-based solutions (NbS), such as restoring mangroves to protect coastal communities or creating urban parks that absorb stormwater and moderate heat waves in cities. Given the vast human and natural resources of Senegal and Côte d’Ivoire, there is immense potential to move forward rapidly in labor-intensive modern industries such as ecotourism services, climate-smart agriculture, renewable energy, green building, and infrastructure.

Such adaptation measures will have several co-benefits. As highlighted in the State and Trends in Adaptation Report 2021,³ adaptation measures can be enormously cost-effective and have the potential to start a positively reinforcing cycle of benefits. Adaptation measures could help lift people out of

poverty, reduce hunger and undernourishment, fight diseases, create jobs, reduce inequality, mitigate the risk of conflicts, and give voice to the most vulnerable. Specifically, in Côte d’Ivoire, adaptation measures could increase the productivity and resilience of smallholder cocoa farmers. There is strong potential to pair adaptive investments in Côte d’Ivoire with several support initiatives in different sectors, including agriculture, fisheries, and forestry, to promote sustainable and efficient practices. Strategically targeted investments in adaptation can help expand opportunities for the labor force, which is currently tied up in informal work characterized by irregular and volatile incomes. These realizable results, in turn, further increase resilience to climate impacts.

This chapter presents an analysis of the economic and employment potential of green investments relative to traditional and high-carbon investments in Senegal and Côte d’Ivoire.⁴ For each country, an overview of the national economic context is provided, followed by the economic impacts of COVID-19 and country-specific policy responses, and then the results of the modeling exercise. Finally, some policy recommendations are provided.

This chapter expands the number of countries reviewed in the State and Trends in Adaptation Report 2021, using the same methodology. The evaluation uses an input-output model (or Leontief model), which is a quantitative macroeconomic model based on the interdependencies between different economic sectors or industries. The approach relies on input-output tables that describe the inputs used by each industry, the outputs produced by each industry, and the relationship between industry output and final demand among various users in a given year. The “synthetic industry approach,” developed by H. Garrett-Peltier,⁵ is used to analyze the expansion of green sectors based on the existing industries in the national account system. This allows the comparison of an expected traditional investment package to a hypothetical and equivalent green investment package. For a more detailed explanation of the methodology, refer to the background methodology paper.



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SENEGAL

Social and Economic Overview of Senegal

Senegal is the second-largest economy in West Africa and the West African Economic and Monetary Union (WAEMU). Before COVID-19 impacted the world, between 2014 and 2019 the Senegalese economy grew by an average of about 6 percent per year.⁶ The primary sector was the fastest-growing between 2014 and 2017, at 7.7 percent, on average,⁷ and employed more than 60 percent of the working population in 2019.⁸

The economic growth spurt was driven by the agriculture, manufacturing, construction, mining, and financial sectors, boosted by large-scale infrastructure projects, lower oil prices, and foreign investments (PSE-PAP, 2019–2023).⁹

The “Plan Senegal Emergent” (PSE) is a reference framework for the transformation of the country’s economic and social policy over the middle and long term. It aims for Senegal to reach emerging market economy status and become a hub for the West Africa region by 2035. This development strategy relies on three pillars: 1) structural transformation of

the economy with a strong capacity to export and attract investment; 2) a significant improvement in the living conditions of the population, a more sustained fight against social inequalities while preserving the resource base and promoting the emergence of viable territories; and 3) the strengthening of security, stability, and governance, the protection of rights and freedoms and the consolidation of the rule of law to create the best conditions for social peace and to promote the full development of human potential.

Senegal’s economic growth continues to face challenges from social issues, however, including high rates of poverty, limited jobs in the formal sector, and water resource partitioning. Almost 40 percent of the people live below the international poverty line, and more than half experience multidimensional poverty.¹⁰ Senegal’s score on the 2021/2022 Human Development Index was below the average for Sub-Saharan Africa; it ranked 170th out of 191 countries. Computations based on data from the National Agency of Statistics and Demography of Senegal (ANSD) suggest that only around 8 percent of working-age people are in formal employment, largely

because the formal economy is burdened by high regulatory rigidity and lack of opportunity.¹¹

According to the PSE, the short- and medium-term economic growth of Senegal depends on achieving good performance in agriculture (including livestock, fisheries, and forestry) and increasing investment. However, climate hazards negatively impact the production of the primary sector and threaten the food security of the country. Indeed, agriculture production declined by 2 percent in 2021 despite the resurgence of growth, partly due to climatic conditions.¹² Broadly, the primary sector, including agriculture, fishing, forestry, and livestock, employs more than 60 percent of the working population.¹³ The impacts of environmental issues could go beyond the primary sector. Tourism, identified by the PSE as one of the key sectors, has already suffered from the detrimental effect of climate change. For instance, the area of Saly has lost 30 percent of its infrastructure capacity due to coastal erosion.¹⁴

Moreover, water resource management is a crucial issue in Senegal. Water availability is ensured by sufficient rivers and groundwater resources, but there is a considerable unequal distribution across the country. Access to water is impeded either because it is too far from major consumption centers and development hubs or because it is difficult to mobilize to meet the population’s demand for drinking water or other uses (industry, agriculture, mines, etc.).¹⁵



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Impact of COVID-19 and Policy Responses of Senegal

As of September 15, 2022, Senegal had logged more than 88,000 COVID-19 cases and 1,968 deaths.¹⁶ The first COVID-19 case in Senegal was registered in early March 2020. The Government swiftly reacted to the situation by declaring a national state of emergency and implementing strict containment measures, including travel restrictions, curfews, school closures, public gathering bans, and border closures.

The COVID-19 pandemic led to job losses, business closures, and important income losses. For example, high-frequency phone surveys conducted by the World Bank found that 85 percent of households in Senegal reported income losses in the first months of the pandemic. Job losses among the most vulnerable workers, including farmers, fishers, women, youth, and those without a college education, can be irreversible and affect their productivity and income growth even as economies revive. In addition, the severe impacts seen for small and micro enterprises can lead to the erosion of entrepreneurial capital and jobs that can be hard to reverse.

Moreover, the war between Ukraine and Russia has led to an increase in food and energy prices and exacerbates inflationary pressures on Senegal. The lack of fertilizers for agriculture strongly threatens the harvest and food security in Africa, especially in Senegal.

To effectively respond to the health and economic emergency, the Government of Senegal implemented a comprehensive package worth 1,000 billion West African francs (FCFA), amounting to 7 percent of GDP.¹⁷ This economic and social resilience plan consists of four main pillars: 1) improving the health system; 2) strengthening social protection; 3) stabilizing the economy and the financial system to support the private sector and employment; and 4) securing supplies and distribution for key foodstuffs, medicine, and energy products. To support the health system, the Government has allocated FCFA 97 billion (0.7 percent of GDP) to improve testing, treatment, and prevention. In terms of social protection actions, one million households received food aid worth FCFA 64 billion, and utility payments (for water and electricity) for poorer customers were suspended for two months (FCFA

15.9 billion). In terms of economic stabilization, hard-hit sectors such as tourism and transport received direct support of about FCFA 100 billion.

The Government also set up a partial credit guarantee scheme for companies affected by the COVID-19 crisis for a total amount of FCFA 200 billion (FCFA 100 billion for credit to large companies with a 20 percent state guarantee, and FCFA 100 billion for small enterprises with a state guarantee

of 50 percent). However, the uptake has been low, and the Government has revised the design of this mechanism to make it more attractive in the context of the 2020–21 recovery plan. An expedited payment of unmet obligations aimed at strengthening firms' balance sheets (worth FCFA 200 billion instead of the FCFA 121 billion foreseen in the initial budget). On the tax side, the deadline for paying suspended tax obligations was extended from 12 to 24 months to improve the liquidity of firms.

Box 1. Modeling Approach for Senegal



In the case of Senegal, the green stimulus package is compared to an investment in the mineral extractive sector. The choice of the extractive sector as a counterfactual is based on the different country priority plans, especially the PSE. This development strategy aims at addressing the medium- and long-term social and economic challenges of Senegal to become an emerging country by 2035. This strategy is implemented through several short-term action plans called “Plan d’Actions Prioritaires (PAPs)”. The two first PAPs (2014–2018 and 2019–2023) identified the mining sector as one of the high-growth potential sectors, requiring Government to prioritize investments to develop the sector including gold and phosphate mining and the creation of hub mining.

The green investment package, on the other hand, is a set of investments in both mitigation and adaptation. It includes seven groups of interventions, namely:

- 1) Natural capital investment:** this sector includes interventions in coastal protection, aquaculture, and reforestation.
- 2) Energy:** this sector includes interventions in hydropower, solar photovoltaic, mini-grids, and onshore wind.
- 3) Agriculture:** this sector accounts for agroforestry, and resilient seeds.
- 4) Efficient retrofits:** this sector includes interventions in building efficiency, industrial energy efficiency, and appliance efficiency.
- 5) Transport:** this sector includes interventions in electric vehicles (EV), Bus Rapid Transit (BRT), and EV charging infrastructure.
- 6) Waste management:** this sector includes interventions in biomass plants and biogas plants.
- 7) Water management:** this sector includes flood mitigation, water demand management, and wastewater treatment plant.

The background paper gives more details on the modeling and assumptions.

Moving Toward Green and Resilient Economic Growth: Senegal

Our analysis shows that adaptation measures in Senegal would provide the highest returns in terms of jobs and economic values, among the set of green investments. Investment in adaptation initiatives could create 230 percent more jobs within five years (600 percent within 20 years) and 695 percent greater economic value in the long term (within 20 years) relative to the extractive sector stimulus package in Senegal. Climate change adaptation spending is estimated to boost employment by 14,098 job years directly and 16,571 job years indirectly (through supply chains). In contrast, the traditional package would support employment by creating 127 job years directly and 1,251 job years indirectly (Figure 1).

Analysis shows that, compared to high-carbon investments, flood adaptation, wastewater, and water demand management can generate an economic return of 380 percent while coastal protection, aquaculture, reforestation, and resilient seeds could generate more than 100 percent economic return.

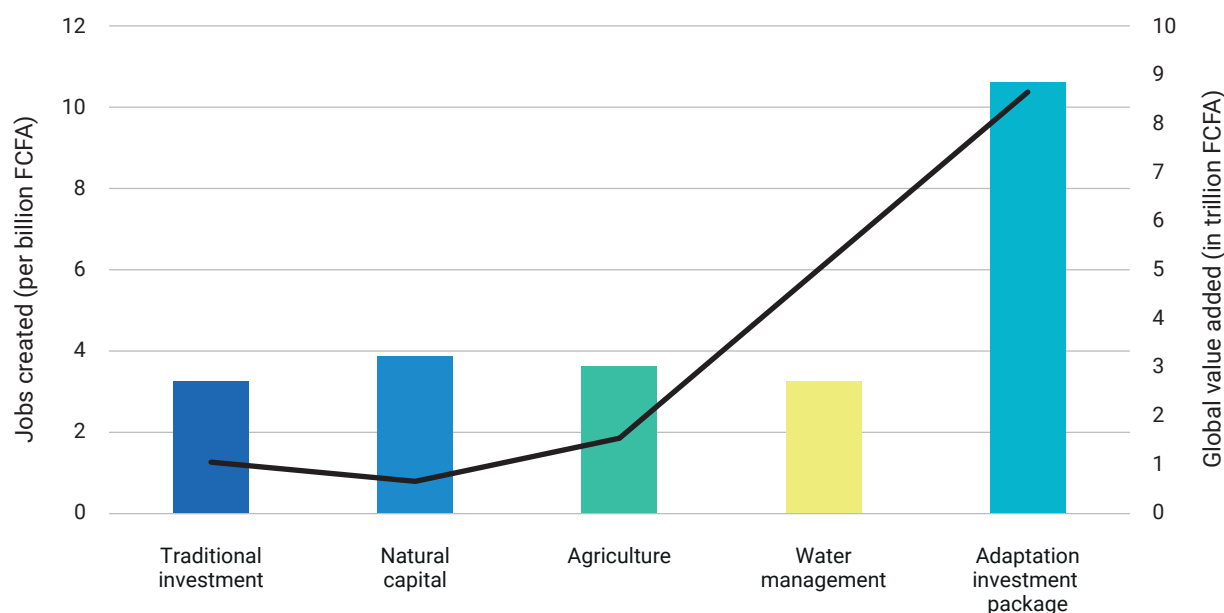
The potential for development of each of these sectors is now presented in greater detail.

Water Management

To respond to water management issues, the Government should prioritize the development of an integrated water management plan. Water management projects could include water capture and collection, water storage, water treatment (with methane emissions treatment), flood defense, drought defense, stormwater management, and ecological restoration and management. Regarding flood hazard mitigation, required investments are estimated at more than US\$2 billion over 2016–2035 to strengthen drainage infrastructure and plan urban ecosystems. The Agence Française de Développement (AFD) has funded a project worth €15 million in this sector.¹⁸

As for water demand management, several projects have already been initiated, including a water transfer project (KMS3) and a desalination plant in the Mamelles square in Dakar. Regarding wastewater

Figure 1. Total Job Creation and Gross Value Added by Different Investment Packages: Senegal



Source: Author's calculations based on estimates

Notes: This graph displays the total jobs in the short term (5 years, left axis) and gross value added in the long term (20 years, right axis) generated by both traditional mining investment and adaptation investment packages. "Traditional investment" refers to investment planned in the PSE-PAP 2019–2023 to develop the gold and phosphate mining as well as the extraction mining hub. The adaptation investment package includes a set of "green" sectors, each consisting of a package of interventions. The different sectors (as well as the respective interventions covered by them) are: **1) natural capital** (including coastal protection, aquaculture, and reforestation); **2) agriculture** (including resilient seeds, and agroforestry); and **3) water management** (including wastewater treatment, water demand management, and flood mitigation). "Adaptation investment package" refers to the sum of natural capital, agriculture, and water management. A technical note in the appendix discusses estimation approaches and assumptions.

treatment, the Senegalese National Office for Sanitation (ONAS) has awarded the SUEZ group and its partner, the CDE consortium, the contract to design and build a wastewater treatment plant at Hann Bay in Dakar. With a capacity of 26,000 cubic meters per day, this plant is part of a program undertaken by the Senegalese Government to clean up the severely polluted Hann Bay. It will allow for the conservation of the marine ecosystem in the bay and improve the sanitary conditions of some 500,000 residents in nine of Dakar's municipalities.¹⁹

There are important private sector opportunities in building wastewater plants, drainage systems, and desalination/water transfer infrastructure. For example, a desalination plant could be located on the Mamelles beach and the Hann Bay for the Dakar agglomeration.

Natural Capital

The preservation of natural capital in Senegal should be the backbone of any development strategy, due to the dependence of several key economic and social sectors on this capital. Coastal retreat in Senegal contributes to the destruction of houses, tourist buildings, and fishing infrastructure, and to the disappearance of beaches and the loss of agricultural land. The Senegalese Government should be strongly engaged in the integrated management of coastal zones (ICZM), especially in the Saly and Casamance areas.

Aquaculture has been identified and welcomed as a crucial solution to address the challenges to global food security arising from climate change and increasing population (National Research Council, 2015).²⁰ The development of aquaculture represents an opportunity to increase the supply of fish and satisfy domestic demand and external markets to generate employment and income. (PAP 2019–2023). Considering a decline in fishing production in recent years, and an increase in demand for fishery products in Senegal, aquaculture could be a solution contributing to maintaining the production of an important food commodity for the country.²¹

Reforestation, through reestablishing natural forests, planting more native species, or increasing the density or extent of an existing forest, could slow down the progression of the Sahara Desert and reduce the extent of climate change impacts. Several initiatives on these lines have been undertaken



in Senegal, including the “Great Green Wall,” the development and participatory management of forests (more than 30 forests with the sustainable and participatory energy and management project PROGEDE),²² and the restoration of mangroves with Oceanium.²³

Agriculture

Drought and floods increase the vulnerability of the agriculture sector and threaten the food security in Senegal. This requires a focused adaptive response. Agroforestry designed to introduce or better maintain forest trees could improve the quality of soil and the regulation of water flows, and restore the productivity of agricultural land. The Senegalese agriculture acceleration program (PRACAS) has identified agroforestry as one of the priority strategies for sustainable land management.²⁴ PRACAS supports the development of specific programs aiming at reinforcing the productivity of main crops including rice, groundnuts, onions, and off-season fruits and vegetables. One of these programs focuses on an intensive rice farming system that will reduce the



need for water by 40 percent relative to traditional rice farming. Further, the development of resilient seeds to adapt to environmental challenges should be one of the strategies adopted by the Senegalese Government.

Senegal should support innovative and tailored adaptation measures developed by local entrepreneurs to effectively contain the cost of climate change and preserve the economy. In addition to popular adaptive measures (agroforestry and resilient systems) in the agriculture sector, innovative natural-based solutions, energy-derived products, and information, communication, and technology (ICT) can all be mobilized to help the country adapt to climate change and increase the productivity and resilience of agriculture. For example, a Senegalese start-up called “EcoBuilders” has created environmentally-friendly and affordable storage units made from recycled tires, plastics, and natural materials, which preserve agricultural products longer than traditional storage, using zero energy. Such solutions can be an innovative response to the rise in temperatures in Senegal. New solar

energy equipment such as solar dryers (for fisheries) and solar tanks (for milk) can also contribute to the conservation of agricultural products.

Moreover, the experience of integrated climate-smart villages in Senegal shows that there is great potential for the development of smart technologies in agriculture. The experience in Daga-Birame village presents a valuable example. Land degradation and agricultural vulnerability resulting from climate variability have led Senegal to adopt the concept of climate-smart agriculture (CSA). This is what motivated the Senegalese Institute of Agricultural Research (ISRA) and its partners to develop the holistic model of Climate-Smart Village (CSV) in Daga-Birame in the Kaffrine region. CSA aims to sustainably increase agricultural productivity and farmers’ incomes to 1) achieve national food security and development goals; 2) build resilience and adaptation from agricultural and food systems to climate change; and 3) mitigate greenhouse gas emissions. The Value Chain Initiative (VCI) uses a holistic approach to integrating different agricultural and agroforestry practices and technologies. The emphasis is on: 1) the use of climate forecasts and information; 2) the choice of resilient varieties and good practices for adaptation to climate change; 3) the practice of agroforestry, with fruit trees and fodder species with a short production cycle; 4) concerted management of inter-village silvopastoral areas; and 5) diversification of crops (maize, watermelon, market gardening) and sources of income, with the creation of small forestry and agricultural enterprises (baobab fruit, peanuts, poultry farming, etc.).²⁵

Further, renewable energy can also contribute to adaptation and increase the cost-efficiency of agriculture. While solar dryers can be used in fisheries and agriculture and improve the transformation and conservation of products, solar tanks are very effective to preserve milk in sunny areas that are poorly connected to the power grid, particularly under high temperatures, as is the case in most of the silvopastoral areas in Senegal. There are already several initiatives of this kind under way with the installation of seven solar pumps in Kayar, 28 solar dryers in areas with fisheries, as well as several multifunction solar platforms in the Kolda and Sédhiou regions for grain milling, conservation, and transformation of food products.²⁶

CÔTE D'IVOIRE

Social and Economic Overview of Côte d'Ivoire

The Ivorian economy was growing with an average of 8 percent during the last decade. Growth was dynamic across all sectors, including crops, some modest diversification in manufacturing (the number of exported goods increased from 164 in 2000 to 184 in 2017), and buoyant services, which benefited from strong domestic demand and investments. Strong export performance, alongside moderate import growth, also supported a positive trade balance and a narrowing current account deficit.²⁷ Thanks to its strategic position and the dynamics of its economy, Côte d'Ivoire is seen as West Africa's economic hub.

Due to its high dependency on natural resource exportation, the nation's economy is inherently vulnerable to environmental challenges and remains exposed to commodity price cycles. According to the National Development Plan (NDP) 2021–2025, the

country was the world's largest producer of cocoa and cashew nuts, the world's fifth-largest producer of palm oil (and the second-largest in Africa), the world's fifth-largest producer of natural rubber (first in Africa), and the third-largest African cotton producer in 2019. Agriculture added value accounted for 20 percent of GDP in 2019, employing 40 percent of the country's working population.²⁸

The National Climate Change Program (PNCC) report details the increasingly adverse impacts of climate change on the different economic sectors of the country. Recognizing these challenges, Côte d'Ivoire included diversification, environment conservation, and the fight against climate change as one of the pillars of its National Prospective Study 2040 and NDP 2021–2025.

Impact of COVID-19 and Policy Responses of Côte d'Ivoire

As of June 2022, Côte d'Ivoire had recorded relatively low rates of COVID-19 infections, with



Photo: Pascal Maitre/Panos Pictures

82,305 cases and 799 deaths. After the first cases were registered in early March 2020, the Ivorian Government implemented containment measures and strengthened its crisis management capacity. Although these containment measures were less stringent than in some developed countries (as developing economies require a balance between controlling the pandemic and preserving livelihoods), they led to a recession in the economy with a growth rate of 1.8 percent in 2020.

Although the country is on a recovery path with post-pandemic GDP growth of 7 percent,²⁹ several sectors of the economy were strongly affected, including education, tourism, restaurants and hotels, financial services, transport, and logistics. The World Bank Enterprise Survey³⁰ indicates that 37.7 percent of firms were closed (temporarily or definitely), with rates much higher in Abidjan (about 60 percent) than in secondary cities, partly driven by forced closures (hospitality, retail, education) due to lockdown measures. Almost all (94.1 percent) enterprises experienced a decline in sales, and for many firms, the decline was steep, with a drop of 67 percent compared to the previous month. The closure of schools during the pandemic associated with the loss of income has likely increased the youth drop-out rate and imperiled human capital.

An August 2020 analysis by the World Bank³¹ found that 71 percent of surveyed households reported a drop in their income. Only employees of the public sector were less affected. Workers in the field of tailoring, retail services, hospitality, and transport more frequently reported that their revenue or salary had dropped, regardless of whether people were self-employed or wage earners.

The impact of job losses among the most vulnerable workers, including farmers, women, youth, and those without a college education, can still be felt even as economies revive. In addition, the severe impacts seen for small and micro enterprises can lead to the erosion of entrepreneurial capital and jobs that can be hard to reverse.

Although the Ivorian economic growth rate seems to be back to its pre-pandemic level, the fallouts of the outbreak coupled with the Ukraine-Russia crisis strongly threaten the sustainability of the recovery. The war has led to an increase in food and energy prices and exacerbated inflationist pressures.

The lack of fertilizers for agriculture strongly threatens harvest and food security in Côte d'Ivoire.

To overcome the adverse effects of the pandemic, the Ivorian Government implemented a comprehensive crisis response package to address the immediate health and economic impacts. The Ivorian Government adopted an emergency health response plan worth 96 billion FCFA (or 0.3 percent of GDP). This plan aims to 1) provide free care for those with the infection and equip intensive care units; 2) strengthen epidemiological and biological surveillance (virus testing; creation of a free call center, equipping laboratories); and 3) reinforce the capacity of pharmaceutical industries and finance research on the virus.

The Government announced a package of economic measures to support the income of the most vulnerable segments of the population through agricultural input support and expanded cash transfers, provide relief to hard-hit sectors and firms, and support public entities in the transport and port sectors to ensure continuity in supply chains. In this regard, the authorities created four special Funds to be spent over two years, including the National Solidarity Fund of 170 billion FCFA (0.5 percent of GDP), the Support Fund for the informal sector of 100 billion FCFA (0.3 percent of GDP), the Support Fund for the small and medium enterprises of 150 billion FCFA (0.4 percent of GDP) and the Support Fund for large companies of 100 billion FCFA (0.3 percent of GDP). It will also provide financial support to the agriculture sector amounting to 300 billion FCFA (0.8 percent of GDP).

On April 27, 2020, to help member countries cope with the fallout of the COVID-19 pandemic, the heads of state of WAEMU declared a temporary suspension of the WAEMU Growth and Stability Pact setting six convergence criteria, including the 3 percent of GDP fiscal deficit rule. This temporary suspension will allow member countries to raise their overall fiscal deficit briefly and use the additional external support provided by donors in response to the COVID-19 crisis. The declaration by the heads of state sets a clear expectation that fiscal consolidation will resume once the crisis is over.

As with many developing nations, Côte d'Ivoire's announced spending during this period has predominantly been funded by international partners

Box 2. Modeling Approach for Côte d'Ivoire



Photo: Roman Yanushevsky/Shutterstock

For Côte d'Ivoire, the green stimulus package is compared to an investment in the mineral extractive sector. The choice of the extractive sector as a counterfactual is based on the different country priority plans, especially the NDP 2021–2025. The NDP is a national development planning model adopted by the Government of Côte d'Ivoire. This development strategy aims at addressing the medium- and long-term social and economic challenges of becoming an emerging country.

The green investment package is a set of investments in both mitigation and adaptation. It includes six groups of interventions, namely:

1) Natural capital investment: this sector includes the interventions in reforestation, aquaculture, and urban parks.

2) Energy: this sector includes the interventions in hydropower, solar photovoltaic, mini-grids, and onshore wind.

3) Agriculture: this sector accounts for agroforestry, resilient seeds, and solar irrigation.

4) Efficient retrofits: this sector includes the interventions in building efficiency and industrial energy efficiency.

5) Transport: this sector includes the interventions in EV, BRT, and EV charging infrastructure.

6) Waste management: this sector includes the interventions in biomass plant and biogas plant.

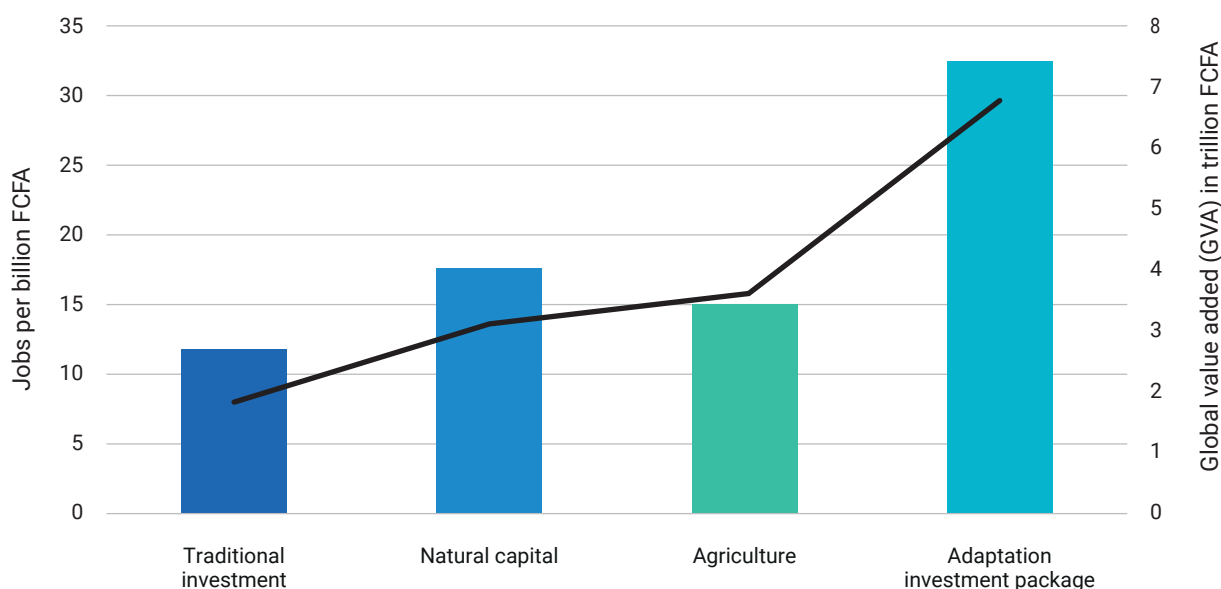
The technical background paper gives more details on the modeling and assumptions.

Moving Toward Green and Resilient Economic Growth: Côte d'Ivoire

Our analysis shows that among the set of green investments, adaptation measures in Côte d'Ivoire would provide the highest returns in terms of jobs and economic value. Investment in adaptation measures, among several other green interventions, has the highest social-economic returns, generating up to 180 percent more jobs within five years

(400 percent within 20 years) and 265 percent more economic value in the long term (within 20 years) relative to traditional investments. Adaptation spending is estimated to boost employment by 84,792 job years directly and 66,926 job years indirectly (through supply chains). In contrast, the traditional high-carbon investment package would increase employment by 1,854 job years directly and 497 job years indirectly.

Figure 2. Total Job Creation and Gross Value Added by Different Investment Packages: Côte d'Ivoire



Source: Author's calculations based on estimates

Notes: This graph displays the total jobs in the short term (5 years, left axis) and gross value added in the long term (20 years, right axis) generated by both traditional mining investment and adaptation investment packages. **"Traditional investment"** refers to investment planned in the NDP 2021–2025 to expand the mineral extraction sector. The adaptation investment package includes a set of green sectors. Each green sector contains several interventions. The different green sectors (as well as their respective interventions) are: **1) natural capital** (urban parks, aquaculture, reforestation); and **2) agriculture** (resilient seeds, agroforestry, and solar irrigation). **"Adaptation investment package"** refers to the sum of natural capital and agriculture. A technical note in the appendix discusses estimation approaches and assumptions.

Analysis indicates that aquaculture and reforestation can generate an economic return of 165 percent in the long term, while resilient seeds, agroforestry, and solar irrigation systems could generate more than 100 percent economic returns compared to high-carbon investments.

Natural Capital

Reforestation, through reestablishing natural forests, planting more native species, or increasing the density or extent of an existing forest, could slow the progression of the Sahara Desert and reduce climate change impacts. The recent COP15, hosted in Abidjan in May 2022, confirmed this commitment through the implementation of a project aiming at planting 12 million trees in 2022.

Fisheries and aquaculture are crucial in the West African region due to their contribution to food security and nutrition. This sector contributes to poverty eradication and the Sustainable Development Goals (SDGs) through job creation, livelihood

diversification, biodiversity conservation, and sustainable resource management. With sea erosion and pollution, it is crucial to develop aquaculture to ensure food security and preserve fish quality.

There is growing recognition that urban parks can be part of the climate solution through mitigation and protection of people and infrastructure from increasing heat waves, especially in the case of Abidjan.

Agriculture

Agroforestry designed to introduce or maintain forest trees could improve the quality of soil and regulation of water flow, and restore the productivity of agricultural land. Solar irrigation systems could considerably improve the regeneration and productivity of the soil. In addition, there is space to develop smart agriculture farms to leverage technology and the synergy of adaptive solutions. This can be especially productive in the center-west region of the country.

POLICY RECOMMENDATIONS

Based on the findings of the analysis for Senegal and Côte d'Ivoire, three key recommendations can be derived to unleash the potential of a green economy and ensure economic prosperity and sustainable development.

Public Finance Should Mainstream Climate Investment in Order to Attract Private Sector Actors

Investment in adaptation is no longer an option, but a priority, in order to preserve economic growth, ensure food security and attenuate the detrimental effects of climate change on the coastline, agriculture, and water availability. Governments should develop a holistic approach to integrating public and private adaptation initiatives. Governments can prioritize public investments in adaptation programs with positive externalities, address market imperfections and policies that make the adaptation of the private sector inefficient, and mobilize revenues for and distribute the benefits of adaptation. Better planning can enable an increase in the share of public investment in adaptation, and/or increase the efficiency of public adaptation initiatives.

There is a Need for Proactive Action on Innovative Finance Sources and to Work Toward Eligibility for Sustainable Bonds for Adaptation

Current adaptation finance flows are insufficient to meet growing adaptation needs on the continent. Innovative climate finance may allow grants or different funding sources to be combined with traditional climate loans, which enables investment in new sectors and facilitates the development of large-scale programs with improved effectiveness, impact, and replicability. Green and sustainable bonds, together with the increased level of transparency that they bring, can help secure market financing for future investments. To be able to attract financing, countries should create enabling conditions and incentives.

Promote an Adaptation-Mitigation Approach

Adaptation measures in mitigation projects could address potential climate risks, making mitigation projects more resilient to a changing climate. Renewable energy, including hydropower, solar photovoltaic, solar individual systems, and onshore winds, have considerable potential to provide energy access to rural communities by increasing interconnected networks. Climate change adaptation was perceived as a project safeguard that would provide benefits to local communities and project developers, as well as global benefits because carbon storage would be more permanent, particularly for forestry projects.

