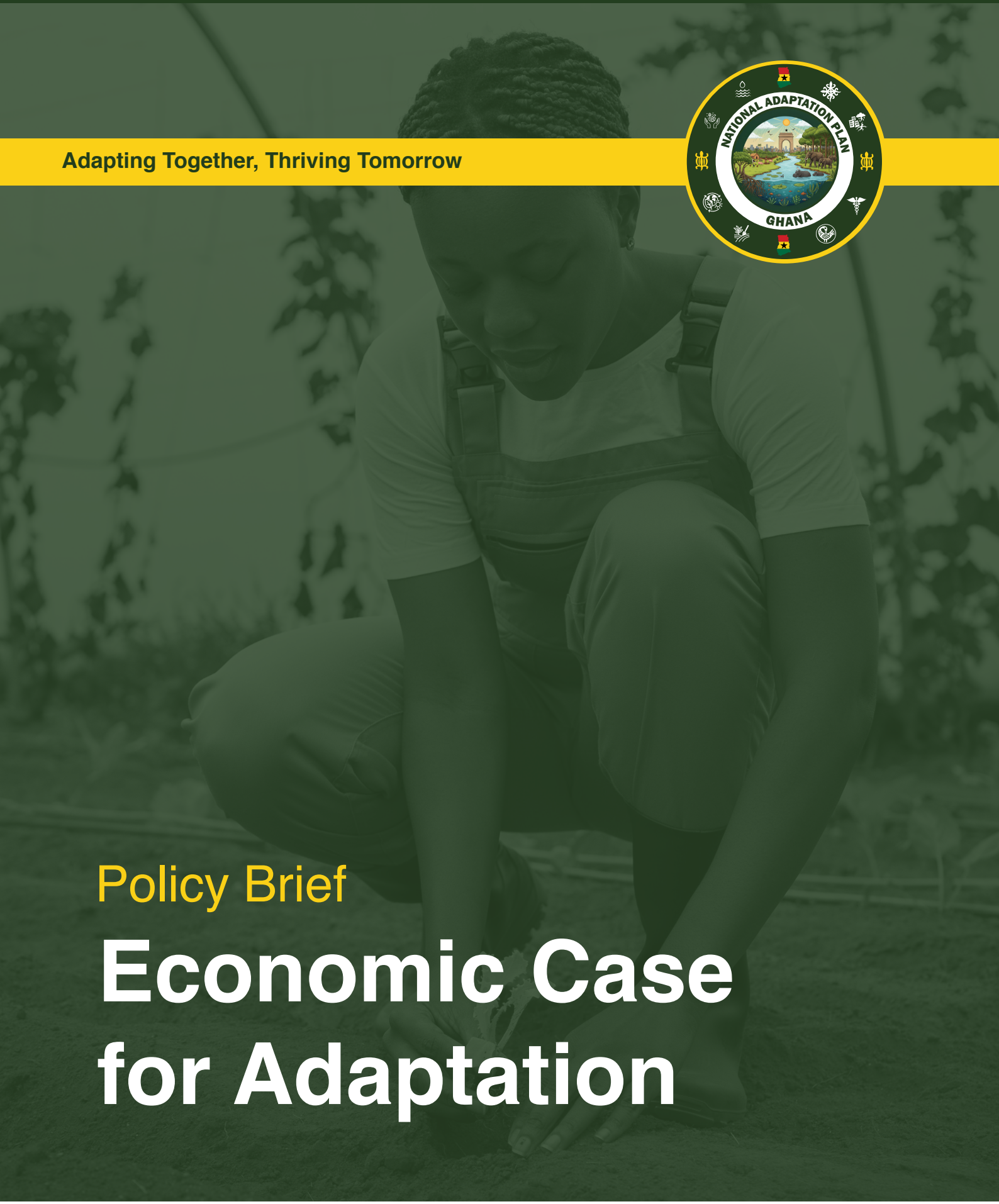
Adapting Together, Thriving Tomorrow



Policy Brief

Economic Case for Adaptation

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Contacts Information

No. 91 Starlet Street, Opp
Telephone: 050 6694760 /
050 6699466

P.O. Box M.326

info@epa.gov.gh

www.epa.gov.gh

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EXECUTIVE SUMMARY

Ghana faces intensifying climate risks that threaten its people, economy, and development gains. The country is already experiencing rising temperatures, erratic rainfall, prolonged droughts, frequent floods, and sea-level rise; which all posing serious threats to lives, livelihoods, and critical sectors. These hazards carry hefty economic costs: Ghana loses an estimated US$200 million each year from flood and drought damages, putting a drag on GDP growth. As the Bank of Ghana has cautioned, such climate shocks can fuel food inflation, destabilize financial markets, and force unplanned public spending on disaster relief. Indeed, Ghana's recent fiscal crisis, with public debt surging to ~93% of GDP and inflation soaring in 2022 underscores that the economy has little cushion for additional shocks. Inaction is not an option: the cost of failing to adapt is simply unsustainable, with escalating losses that jeopardize macroeconomic stability and long-term growth.

In response, the Government of Ghana has developed an ambitious draft National Adaptation Plan (NAP) 2025, a strategic framework to integrate climate change adaptation into national, sectoral, and local development planning. The NAP lays out priority resilience measures across all key sectors, from promoting climate-smart agriculture and sustainable water management to fortifying infrastructure, health systems, and natural ecosystems. Crucially, building climate resilience is not just a social or environmental imperative, it makes economic sense. Rigorous cost-benefit analysis shows that well-chosen adaptation investments will yield high returns.

For example, nature-based interventions (like reforestation, agroforestry, and climate-smart agriculture) can generate benefit-cost ratios far above 1 – meaning they return more than one dollar in benefits for each dollar invested – and produce robust net economic gains over time. A "hybrid" approach that adds targeted irrigation and water storage to nature-based solutions can boost agricultural output and stability even further, though it comes with higher upfront costs and requires innovative financing to be viable at scale. These resilience investments align perfectly with Ghana's development and poverty-reduction goals. The NAP also emphasizes strengthening institutions, funding, and knowledge systems (e.g. data and monitoring) to ensure adaptation efforts are sustained and effective.

In view of the context above, Ghana's policymakers should pursue a dual approach: embed climate adaptation into core economic decision-making while accelerating targeted sectoral interventions. From a macroeconomic perspective, climate resilience must be mainstreamed into fiscal policy and development plans – every ministry and district assembly should integrate adaptation into their budgets, and the Ministry of Finance, in line with existing and new frameworks, should track and prioritize climate-related expenditures. At the same time, Ghana needs to mobilize financing on all fronts. This means harnessing domestic resources (such as modest climate levies or green taxes) and deploying innovative funding tools, such as green bonds, setting up climate risk insurance schemes, and engaging private investors through public-private partnerships, all to supplement limited public funds. International climate finance is also vital: Ghana should capitalize on its IMF-supported reforms and work with partners to secure grants and concessional loans from sources like the Green Climate Fund, Adaptation Fund and the Funds for Responding to Loss and Damage.

Meanwhile, bold sector-specific actions are needed on the ground, guided by strong economic evidence. The economic appraisal shows that scaling up climate-smart agriculture, particularly drought-tolerant crops, efficient irrigation, and extension services, delivers consistently positive returns, with crop and fisheries adaptation bundles achieving benefit–cost ratios (BCRs) above unity across most climate scenarios, helping stabilise food production, rural incomes, and food prices. In the water and urban sectors, investments in groundwater management, watershed protection, and resilient urban drainage generate some of the highest economic returns nationally, with groundwater measures recording discounted BCRs of up to 8.9 under baseline conditions, significantly reducing flood damages and water insecurity in both cities and farming communities. Strengthening health systems through climate-resilient facilities and disease surveillance is likewise a high-value investment: health adaptation bundles show BCRs above 2.0 under baseline and moderate climate scenarios, reflecting avoided healthcare costs and productivity losses from climate-sensitive diseases and heat stress. Protecting ecosystems through forest restoration, wetland conservation, and coastal protection underpins resilience across sectors, with forestry and wetland adaptation delivering some of the strongest economic performance i.e. BCRs exceeding 3.0 in several scenarios, while buffering communities against storms and sea-level rise and sustaining livelihoods dependent on natural capital.

By combining prudent economic management with these targeted resilience measures, Ghana can safeguard its development gains and foster inclusive growth even as the climate changes. This integrated strategy will

ensure Ghana's economy remains robust, adaptive, and sustainable for generations to come in the face of climate change.

1. CLIMATE CHANGE AS A MACROECONOMIC RISK

Climate adaptation in Ghana is not merely an environmental issue; it is a core economic concern. Climate change impacts directly threaten Ghana's macroeconomic stability and development trajectory. Even in recent years of strong GDP growth, analysts warned that climate hazards could erode sustained progress. Ghana already suffers recurrent economic shocks from weather extremes: for example, floods and droughts together cause around $200 million in losses every year, damaging farms, homes, and infrastructure. These shocks translate into lost output and fiscal strain, droughts shrink agricultural yields (reducing rural incomes and tax revenues) while floods wreck roads and utilities, incurring hefty rebuilding costs. Over time, such repeated climate-related losses act like an economic brake, dragging down GDP growth and necessitating unplanned public expenditures.

The Bank of Ghana perspective reinforces this: climate volatility (like erratic rains or crop failures) can spur spikes in food prices and import bills, complicating inflation control and weakening the currency.[1] It also forces the government to divert funds to emergency response, worsening budget deficits. Ghana's 2022 financial crisis – marked by surging inflation and debt reaching 92.6% of GDP highlighted how vulnerable the economy is to shocks.[2] A severe climate event in such conditions could amplify hardship by undermining agricultural output, power generation, or infrastructure, thereby exacerbating inflation and poverty. Simply put, the cost of inaction on climate adaptation is far greater than the cost of proactive investment: continuing on a business-as-usual path would lead to escalating disaster losses, greater reliance on relief spending, and a risk of slowing long-term growth.

It's clear that one needs to recognize that this path is untenable given the ongoing threat of climate change poses significant risks to sustained development gains. Protecting the economy therefore requires integrating climate risk management into Ghana's macroeconomic planning. By reducing the impact of floods, droughts, and storms, effective adaptation measures will help stabilize agricultural production, moderate price volatility, protect infrastructure investment, and ultimately safeguard GDP growth and fiscal health. In summary, climate resilience is now a foundational pillar of economic resilience for Ghana.[3]

2. GHANA'S NATIONAL ADAPTATION STRATEGY FRAMEWORK

Ghana's National Adaptation Strategy Framework is underpinned by economic analysis that strengthens decision-making beyond identifying risks and proposed actions. While climate risk and vulnerability assessments highlight where climate impacts are most severe, the economic appraisal clarifies which adaptation options deliver the greatest value for money, how different actions reinforce each other, and what trade-offs emerge under increasing climate stress.

The economic appraisal applies a systems-based cost–benefit approach to assess bundles of adaptation actions across priority sectors, linking climate stressors to physical impacts, economic losses, and the benefits of targeted adaptation investments over time. By modelling costs and benefits to 2040 under different climate scenarios, the analysis shows how adaptation reduces long-term losses, identifies options that remain economically viable under high-warming futures, and highlights areas where returns diminish and sequencing becomes critical.

This approach allows Ghana to move from broad adaptation ambitions to a more strategic, evidence-led prioritisation of actions, favouring prevention-focused, high-return investments (such as ecosystem restoration, groundwater management, and climate-health surveillance), while flagging capital-intensive interventions that require careful phasing, complementary measures, or innovative financing. In doing so, the analysis strengthens the link between adaptation actions, development outcomes, and financing decisions, ensuring

[1] Bank of Ghana (November 2024) Climate Related Financial Risk Directive.

[2] World Bank (Oct 6, 2025) The World Bank in Ghana. Available at https://www.worldbank.org/en/country/ghana/overview#:~:text=In%202022%2C%20a%20combination%20of,and%20domestic%20coupon%20payments%20continued.

[3] Read more here, World Bank Group. 2022. Ghana Country Climate and Development Report. CCDR Series. © World Bank Group. http://hdl.handle.net/10986/38209 License: CC BY-NC-ND.

that limited public and climate finance resources are directed toward interventions with the greatest and most durable resilience benefits.

3. SECTORAL RESILIENCE PRIORITIES

To support strategic prioritisation of adaptation investments, the economic appraisal assessed the performance of different adaptation approaches under baseline and high-climate-risk scenarios. Rather than evaluating isolated projects, the analysis compares how business-as-usual responses, nature-based interventions, and hybrid approaches (combining grey infrastructure with ecosystem-based solutions) perform in terms of costs, benefits, and long-term economic resilience.

Table 1 summarises the comparative cost–benefit evidence, highlighting how each approach performs as climate risks intensify and where public and climate finance can achieve the greatest value for money.

Table 1: Economic Performance of Business-as-Usual, Nature-Based, and Hybrid Adaptation Approaches

Adaptation Approach	Typical Interventions	Economic Performance (CBA Evidence)	Performance Under High Climate Stress (SSP8.5)	Policy Implication
Business-as-Usual (BAU)	Limited or fragmented adaptation; stand-alone grey infrastructure; reactive responses	BCRs decline over time as climate damages rise; several capital-intensive sectors approach or fall below BCR = 1 by 2030–2040	Poor performance: roads, surface water systems, marine ecosystems, and livestock show negative or marginal net benefits	BAU is economically unsustainable; increases exposure to future losses and fiscal pressure
Nature-Based Interventions (NBI)	Forest restoration, wetlands conservation, mangrove rehabilitation, watershed management	Consistently high returns; forestry and wetlands record discounted BCRs >3 under baseline; strong positive NPVs	Resilient: BCRs largely remain >1 even under SSP8.5 due to lower costs and durable ecosystem services	High-value, no-regrets investments; should form the backbone of national adaptation portfolios
Hybrid (Grey + Nature-Based)	Urban drainage + wetlands; coastal defences + mangroves; roads + green buffers	Higher and more stable BCRs than grey-only investments; benefits amplified through bundled action effects	Strongest performer: hybrid bundles help sustain BCR ≥1 for infrastructure that otherwise becomes uneconomic	Preferred strategy for cities, water, and coastal systems; enables investment under climate stress.

Ghana's climate adaptation plan targets interventions in all climate-sensitive sectors of the economy. The following are the priority actions by sector, designed to safeguard livelihoods and growth in the face of climate change:

- **Agriculture & Food Security:** Promote climate-smart agriculture by introducing drought- and flood-tolerant crop varieties, expanding irrigation and water conservation (to reduce reliance on erratic rains), and strengthening pest/disease management for crops and livestock. Agriculture is identified as one of the sectors where early, preventive adaptation yields strong economic returns and avoids large future losses. Bundled climate-smart agriculture measures, i.e. combining drought- and flood-tolerant crop varieties, irrigation expansion, soil and water conservation, and improved pest and disease management, show positive benefit–cost ratios across baseline and moderate climate scenarios, reflecting avoided yield losses and income instability. Under unmanaged climate impacts, the appraisal projects a significant decline in crop yields and an associated reduction of up to 10 percent in agricultural GDP by 2040. Effective adaptation therefore plays a critical role in stabilising

food production, protecting rural livelihoods, and limiting food-price volatility in an economy where agriculture remains a major employer.

- **Water Resources & Infrastructure:** Invest in integrated water resource management to ensure water security and protect infrastructure. Water-related investments are highlighted as among the highest-value adaptation options in Ghana. The appraisal finds that integrated water resource management, particularly groundwater management, watershed protection, and catchment restoration, generates very high economic returns, with some water-sector measures recording discounted benefit–cost ratios well above 1 and remaining viable even under high climate stress scenarios. By contrast, stand-alone grey infrastructure becomes less cost-effective over time when climate risks intensify. Hybrid approaches that combine water storage, drainage, and flood protection infrastructure with upstream ecosystem management perform significantly better, reducing flood damages to roads, housing, and urban services while protecting the productivity of major urban centres such as Accra that underpin national economic growth.

- **Health Systems:** Strengthen the resilience of Ghana's health sector to cope with climate-related health threats. Strengthening climate resilience in the health sector has been demonstrated as a cost-effective means of reducing long-term social and economic losses. Bundled health adaptation measures such as disease surveillance and early warning systems, climate-resilient health facilities, and preventive public health interventions; show benefit–cost ratios above unity under baseline and moderate warming scenarios, driven by avoided healthcare expenditures, reduced mortality, and lower productivity losses. These investments are particularly important as climate change increases the incidence of malaria, cholera, heat stress, and flood-related health emergencies. By reducing the frequency and severity of climate-related health crises, adaptation in the health sector delivers economy-wide benefits beyond the health system itself.

- **Ecosystems & Biodiversity:** Protect and restore natural ecosystems as a buffer against climate impacts and to sustain livelihoods. Ecosystem-based adaptation emerges as one of the strongest performers in the economic appraisal. Forestry, wetlands, and mangrove restoration consistently deliver high benefit–cost ratios, often exceeding those of capital-intensive infrastructure investments, while remaining robust under severe climate scenarios. These interventions reduce flood and erosion risks, regulate water flows, support agriculture and fisheries, and provide carbon and biodiversity co-benefits. The appraisal shows that maintaining and restoring natural systems is frequently more cost-effective than engineered alternatives, particularly in coastal and riverine areas. As a result, ecosystem-based and hybrid solutions form a central pillar of Ghana's economically efficient adaptation strategy, simultaneously strengthening resilience, preserving livelihoods, and creating opportunities for green employment.

Note: The NAP also addresses other cross-cutting areas such as Disaster Risk Reduction in cities, where measures include improving waste management and emergency response, and Land Use Planning, to ensure new developments account for climate risks. However, the sectors listed above are among the top priorities given Ghana's vulnerability profile.

Also note that for these economic objectives linked to adaptation to be achieved, climate resilience shall require significant financing. A separate policy brief on this has been developed.

4. KEY RECOMMENDATIONS

Ghana stands at a pivotal moment in its development journey. The dual challenges of economic recovery and climate change demand an integrated strategy that turns vulnerability into opportunity. The analysis above leads to several key recommendations for Ghana's leaders and policymakers:

- **Anchor Climate Adaptation in Core Economic Planning:** The economic appraisal shows that delaying adaptation leads to escalating losses across key sectors, particularly under high-warming scenarios where benefit–cost ratios for reactive interventions fall below unity. Climate adaptation should therefore be treated as a macro-critical economic issue, not a stand-alone environmental concern. Integrating climate scenarios and adaptation priorities into national and sub-national development plans, public investment frameworks, and medium-term budgets will help avoid costly post-disaster expenditures. The Ministry of Finance and the Bank of Ghana should explicitly incorporate climate

risk scenarios into fiscal, debt sustainability, and macroeconomic outlooks, reflecting the appraisal's finding that proactive adaptation is significantly cheaper than reactive response.

- **Prioritize Adaptation Investments:** A set of low-cost, high-impact adaptation options that consistently deliver positive net benefits have been identified across climate scenarios. Nature-based interventions, such as reforestation, agroforestry, wetland restoration, and mangrove protection, record some of the strongest economic performance, with benefit–cost ratios well above 1 and robust results even under severe climate stress. Climate-smart agriculture packages also show high internal rates of return, driven by avoided yield losses, income stabilisation, and reduced food-price volatility. These findings support prioritising ecosystem-based and agricultural adaptation as early investments, particularly where they generate co-benefits for livelihoods, food security, and carbon sequestration.

- **Implement Targeted Climate-Proofing of Infrastructure:** Stand-alone grey infrastructure becomes increasingly costly and less effective as climate risks intensify, especially in urban flood-prone areas. Infrastructure adaptation should therefore be targeted, phased, and guided by economic efficiency. Priority should be given to assets where climate-proofing yields the greatest avoided damage i.e. urban drainage systems, transport corridors in flood zones, and water supply infrastructure while favouring hybrid solutions that combine engineered measures with nature-based systems. The appraisal shows that such hybrid approaches sustain positive benefit–cost ratios for infrastructure that would otherwise become uneconomic under high climate stress and significantly reduce long-term maintenance and reconstruction costs.

- **Align Financing Strategies with Economic Priorities:** Given Ghana's constrained fiscal space, the economic appraisal underscores the importance of directing limited public and climate finance toward interventions with the strongest and most durable returns. Financing strategies should therefore mirror the appraisal's prioritisation, channelling concessional and grant finance toward high-return, prevention-focused investments such as ecosystem restoration, water management, and climate-health systems, while using blended finance and public-private partnerships for capital-intensive infrastructure where economic viability depends on risk-sharing. Instruments such as green bonds, climate-linked levies, and viability gap funding can help mobilise private capital, while public resources absorb early-stage or climate risks. Aligning finance with economic evidence will maximise resilience gains without exacerbating fiscal vulnerability.

- **Strengthen Institutions and Accountability:** Adaptation outcomes and economic returns depend not only on the choice of interventions, but also on how well they are coordinated, sequenced, and monitored over time. Several adaptation bundles show declining benefit–cost ratios under high climate stress when actions are fragmented or delayed, highlighting the importance of institutional capacity and accountability in sustaining economic efficiency. Strengthening institutional arrangements particularly for cross-sector coordination, data sharing, and performance monitoring will help ensure that high-return adaptation options are implemented early and maintained over their full lifecycle. Embedding economic appraisal metrics (such as benefit–cost ratios, avoided losses, and robustness under climate scenarios) into Monitoring, Evaluation and Learning (MEL) systems and public investment decision-making can improve accountability, support adaptive management, and ensure that public resources continue to flow toward interventions that demonstrably reduce climate risks and fiscal exposure.

- **Advance Regional and Global Partnerships:** Several of Ghana's highest-return adaptation priorities, particularly ecosystem restoration, coastal protection, water resource management, and climate-resilient agriculture generate benefits that extend beyond national boundaries, including carbon sequestration, regional food security, and reduced transboundary climate risks. These characteristics make them especially well-suited for regional cooperation and international climate finance. Advancing regional and global partnerships can help Ghana scale up economically efficient adaptation options by mobilising concessional finance, technical expertise, and risk-sharing mechanisms that improve project viability. The appraisal's evidence on robust, high-return investments provides a strong basis for engaging multilateral climate funds, development banks, and bilateral partners, while also supporting collaboration with neighbouring countries on shared ecosystems and river basins. Positioning Ghana's adaptation portfolio around interventions with demonstrated economic returns will strengthen its credibility as a climate finance partner and increase access to external resources needed to implement large-scale, long-term resilience investments.