Financing Options for Sectoral Adaptation Programmes

Georgia
Kazakhstan
Mongolia
Nigeria

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Policy Advice for Climate Resilient Economic Development

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On behalf of
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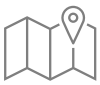

Georgia • Kazakhstan • Mongolia • Nigeria

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CONTENTS

1. CONTEXT

The work presented in this report was carried out as part of GIZ's Global Programme on Policy Advice for Climate Resilient Economic Development (CRED). CRED aims to strengthen the capacity of partner countries to systematically assess the economic impacts of climate change and integrate evidence-based adaptation measures into national development planning. The programme supports governments in building macroeconomic modelling systems, assessing adaptation financing needs and identifying policy pathways that promote climate-resilient growth.

In this context, four CRED partner countries – Georgia, Kazakhstan, Mongolia and Nigeria – were supported in identifying concrete financing options for selected adaptation measures and in assessing the gaps between adaptation needs and available financing. The overall objective was to provide strategic, practical guidance that would enable the countries to secure both domestic and international adaptation finance more effectively, thereby strengthening the implementation of their national adaptation goals.

At the core of the work carried out under the CRED programme was the development of Project Idea Notes (PINs). These PINs served as the primary outputs of the programme, translating technical modelling, policy scenarios and financial analysis into concrete proposals ready for engagement with climate funds. The overall approach was based on two main pillars. Firstly, an assessment of adaptation finance flows was conducted to identify funding gaps, map available financing from domestic and international sources, and provide targeted recommendations for mobilising additional financing. Secondly, adaptation finance priorities were identified on the basis of macroeconomic modelling and cost-benefit analysis (CBA), including sectoral vulnerability assessments and economic impact analysis. This ensured that adaptation priorities were based on solid, country-specific evidence and that they linked climate risks to tangible economic outcomes.

The project methodology included consultations with national stakeholders, such as ministries of finance, environment, agriculture and water, and with development partners, local experts and financial institutions. Climate finance assessments combined data from the OECD DAC Creditor Reporting System, national budgets, donor project pipelines and strategic policy documents. Macroeconomic models, dynamic computable general equilibrium (CGE) models and national adaptation plans (NAPs) were used as the basis for analysis.

The report is structured as follows: Within chapter 2, chapter 2.1 presents the approach used to identify adaptation finance priorities and the results of this, chapter 2.3 presents the approach used to assess adaptation finance gaps in the four countries and the corresponding results, and chapter 2.3 presents the PINs. Chapter 3 highlights the lessons learned across countries, summarises key barriers to adaptation finance and provides strategic recommendations for other countries seeking to scale up adaptation investments.

2. IDENTIFYING FINANCING OPTIONS FOR NATIONAL ADAPTATION PROGRAMMES

2.1. Identifying adaptation finance priorities

Macroeconomic modelling and cost-benefit analysis (CBA) are used as the analytical basis for identifying adaptation finance priorities as part of the CRED programme. Developed with national stakeholders, this approach supports long-term economic planning by assessing the costs of climate inaction along with the benefits of targeted adaptation measures. In Georgia, Kazakhstan, Mongolia and Nigeria, the CRED programme applied this methodology to understand how climate risks translate into economic impacts and to identify high-impact, cost-effective adaptation options in key sectors. The modelling results, combined with policy scenarios, provide countries with a structured basis for prioritising investments and engaging with international climate finance institutions.

The approach uses country-specific macroeconomic models in Georgia, Kazakhstan and Mongolia, and an extended CGE model in Nigeria, to simulate the economy-wide impacts of climate change and adaptation strategies. These models are designed to reflect the structural characteristics of each country's economy and are informed by local data, climate projections and sector-specific vulnerability assessments. Taking into account results from sectoral models, such as those focused on agriculture, energy and water, the macroeconomic models help assess direct and indirect impacts across the economy. In each case, the models are used to assess how specific adaptation measures, such as irrigation infrastructure or improved land management, affect variables such as GDP, employment, trade and investment.

In addition to macroeconomic modelling, the use of CBA helps to determine the economic viability of adaptation measures. Each option is evaluated on the basis of its implementation costs and expected benefits in terms of avoided damage, increased productivity and co-benefits to health and ecosystems. This enables governments to identify those measures that offer the greatest value for money, while also supporting broader development goals.

Policy scenarios are central to bridging the gap between technical modelling and policy-making. Developed in collaboration with national partners, these scenarios explore different adaptation pathways and test how a range of measures perform under different assumptions about climate impacts, funding availability and institutional capacity. These scenarios are used not only to assess the resilience benefits of specific investments, but also to understand financing needs and potential sources of support, including domestic budgets and international climate funds. Rather than focusing solely on technical detail, the approach emphasises usability and relevance to policy processes. Modelling activities are embedded in national planning cycles and coordinated with ministries, ensuring that results feed directly into development strategies and climate finance planning.

Georgia

Georgia's adaptation planning under the CRED programme addressed key climate risks that pose an escalating threat to economic sectors such as agriculture and infrastructure. Agriculture, which employs over 40% of the country's workforce, is particularly vulnerable. The priority adaptation measures identified included rehabilitating and replanting windbreaks to reduce wind damage and increase crop yields, and comprehensive flood risk management measures such as risk zoning, early warning systems and integrating climate-resilient designs into urban infrastructure.

These adaptation priorities were assessed using the e3.ge macroeconomic model, which applies a dynamic input-output framework to capture both the direct and economy-wide impacts of climate risks and resilience investments. The model incorporates sectoral data to

simulate how adaptation measures affect GDP, employment and other macroeconomic indicators over time. Scenario analysis was used to assess the comparative benefits of adaptation measures under different climate projections. The results showed that selected adaptation measures could contribute significantly to national economic performance, with investments in windbreaks projected to increase GDP by up to 0.56% per year and flood protection measures by up to 0.57%.

Kazakhstan

In Kazakhstan, two key adaptation priorities were assessed using macroeconomic modelling (e3.kz) and cost-benefit analysis: energy efficiency in buildings and the development of multi-purpose water infrastructure. These interventions were selected based on the country's exposure to both climate extremes and widespread infrastructure inefficiencies.

The first priority focused on the thermal upgrading of Kazakhstan's ageing and energy-inefficient building stock. Driven by the dual pressures of extreme cold and increasingly frequent heat waves, this scenario evaluated three renovation packages (super-simple, simple and full) targeting both public and residential buildings. The full package, which included insulation, smart heating systems and energy-efficient appliances, was found to offer extensive co-benefits, including significant heating energy savings (up to 60%), greenhouse gas reductions (202 tonnes of CO_2 equivalent per building), improved public health (with health cost savings estimated at KZT 500 billion), avoided repair costs (KZT 870 billion), increased property values and the creation of green jobs. Macroeconomic modelling projected that these measures could increase GDP by 0.19 percentage points annually until 2050 based on a moderate climate scenario (SSP1-2.6), driven by investment, energy savings and export potential. Employment gains were projected at 8,700 new jobs, mainly in construction and energy services. A grant/concessional loan financing model was assumed to mobilise the required capital and make the intervention economically and socially viable.

The second priority was the construction of counter-regulating (CR) reservoirs to address Kazakhstan's escalating flood risk, particularly in regions prone to infrastructure damage and agricultural disruption. The adaptation scenario proposed the development of 15–30 CR reservoirs, modelled on existing successful examples, coupled with nature-based solutions such as wetlands and green retention zones. Macroeconomic modelling using the e3.kz framework showed that CR reservoirs not only reduce average annual flood losses (currently estimated at USD 419 million), but also provide indirect benefits such as job creation, demand for construction materials, stabilised agricultural production and reduced pressure on emergency services. From a CBA perspective, the reservoirs have high upfront investment costs, but provide substantial returns in terms of avoided damage, improved irrigation reliability and long-term macroeconomic stability.

Mongolia

In Mongolia, the CRED programme supported a structured policy scenario process to identify adaptation priorities that address relevant challenges related to water scarcity and land degradation. Sectoral vulnerabilities were analysed in addition to economic viability to identify high-impact adaptation measures, with a particular focus on agriculture and water management. The modelling process highlighted the degradation of more than 4.7 million hectares of grazing land and more than 80 million hectares of arable land, as well as climate threats such as reduced rainfall and shorter growing seasons. Key interventions included the introduction of climate-resilient seed varieties, drip irrigation systems, soil conservation practices, and investments in water harvesting ponds and solar-powered pumps. These activities were directly aligned with the priorities of Mongolia's National Adaptation Plan (NAP) and formed the basis of two PINs on climate-smart agriculture and water management.

The e3.mn macroeconomic input-output model was used to assess the economy-wide impacts of proposed adaptation measures. The model quantified how targeted investments could mitigate climate shocks such as the severe cold weather phenomenon known as 'dzud', while generating wider economic benefits. Under a high emissions scenario (SSP5–8.5), the modelling showed that, without adaptation, climate

change could reduce real GDP by up to 4%. However, the introduction of adaptation measures, particularly drip irrigation, was projected to increase GDP by up to 0.6% per year, equivalent to MNT 270 billion.

Nigeria

In Nigeria, the CRED project used dynamic computable general equilibrium (CGE) modelling to assess priority adaptation strategies in the agricultural sector based on different fiscal and climate policy scenarios. These scenarios were aligned with national policy frameworks, including the NDC (2021 update), the Long-Term Low-Emission Development Strategy (LT-LEDS) 2060, the Nigeria Agenda 2050 and the National Development Plan (2021–2025). The analysis focused on climate-smart agriculture and water resource management as key entry points for building agricultural resilience. The modelling process aimed to identify cost-effective interventions with strong economic multipliers that could be translated into viable policy options. These technical outputs informed the design of a PIN that focuses on expanding irrigation, rehabilitating wetlands and strengthening financial support to smallholder farmers.

The CGE model was central to understanding the economy-wide implications of scaling up climate-smart agriculture (CSA). The model captured how investments in CSA measures can affect productivity, trade balances, employment and household welfare. In the context of rising food imports and declining staple crop yields due to climate shocks, the modelling highlighted the potential for adaptation measures to support import substitution and stabilise macroeconomic indicators. The benefits of 'soft' measures, including climate-resilient seeds, mulching, agroforestry and dry season cropping, were clear, with cost-benefit ratios ranging from 2.4 to 3.2. While these low-cost, scalable solutions provide immediate farm-level resilience, the model also highlighted the importance of 'hard' investments, such as large-scale irrigation and wetland protection, to ensure long-term systemic resilience. These measures, although associated with lower cost-benefit ratios (1.1–1.5), are relevant for climate-smart agricultural transformation and will require substantial external support to be effectively implemented.

2.2. Identifying adaptation finance gaps

The climate finance flow assessments conducted as part of the CRED programme in Georgia, Kazakhstan, Mongolia and Nigeria used a consistent and structured methodology to quantify adaptation finance gaps. The main objective was to understand how international and domestic financial resources, both public and private, are currently allocated to adaptation priorities, and how the amounts allocated compare with estimated investment needs derived from national climate change strategies and modelling exercises. The analysis focused on adaptation-relevant sectors identified through national frameworks (e.g. NDCs, NAPs) and macroeconomic modelling results, such as agriculture, water, energy efficiency and disaster risk management.

The approach combined ex-post analysis (tracking historical financial flows from 2017 to 2022) with ex-ante assessment (assessing expected needs and planned investments). Data were sourced from the OECD DAC Creditor Reporting System (CRS), national budgets and planning documents, donor project databases, and interviews with stakeholders such as government ministries, development partners, and implementing agencies. This allowed for a disaggregated analysis of both the volume and modalities of adaptation finance, distinguishing between grants, concessional loans and other financial instruments. In addition, financial flows were categorised by sector and sub-sector to identify gaps in important areas such as irrigation, crop resilience and urban flood protection.

The assessments also compared actual financial flows with estimated investment needs. These needs, often outlined in national climate change strategies or derived from macroeconomic modelling, consistently exceeded available funding. The results provided insights into systemic barriers to adaptation finance. These include limited project preparation capacity and a lack of standardised, bankable adaptation approaches. Structural issues, such as the public-good nature of many adaptation investments, further limited private sector engagement, particularly in sectors such as flood protection, forestry and water infrastructure.

Georgia

In Georgia, the assessment of climate finance flows revealed significant shortfalls in adaptation funding, particularly in the agriculture, forestry and other land use (AFOLU) sector and disaster risk management. Of the approximately USD 3.5 billion in international public climate finance received between 2017 and 2022, only 27% was allocated to adaptation. While agriculture received USD 57 million and forestry USD 44.2 million exclusively through grants, these amounts fall far short of the sectoral investment needs outlined in Georgia's NDC financing strategy, which estimates USD 174 million for agriculture and USD 58 million for forestry by 2030. The gap is even more significant in the area of flood disaster risk management, where no direct adaptation funding has been recorded during this period, despite documented vulnerabilities and increasing projections of average annual losses. Private sector participation in adaptation remains negligible, with green bonds and loans mostly targeting energy mitigation rather than resilience sectors.

The main lessons learned from the assessment highlight the structural barriers to adaptation finance. Adaptation sectors, such as AFOLU and flood management, are typically viewed as low-return public goods, which discourages private investment and limits domestic fiscal allocations. Regulatory frameworks and sectoral policies lack the coherence and incentives needed to unlock new sources of finance. However, the assessment identified opportunities to address these gaps through blended finance, carbon certification mechanisms and public-private partnerships. It highlighted the importance of shifting from reactive disaster response to proactive, risk-informed planning, supported by ex-ante investment in resilience infrastructure.

Kazakhstan

Kazakhstan faces a significant adaptation finance gap, which has a negative impact on its ability to respond effectively to growing climate risks. Between 2017 and 2022, the country received approximately USD 2.3 billion in international public climate finance, of which only 26%, or approximately USD 610 million, was allocated to adaptation. Of this amount, 96% of adaptation finance was provided through debt instruments, highlighting the disconnect between financing modalities and the non-revenue generating nature of many adaptation interventions. Priority sectors identified under the CRED programme, such as energy efficiency in buildings and multi-purpose water infrastructure (MPWI), received little or no direct international climate finance during this period.

This gap is particularly stark when compared to Kazakhstan's estimated climate investment needs. According to the World Bank, achieving carbon neutrality by 2060 will require an investment of USD 1.165 trillion, with at least USD 610 million needed for adaptation-related sectors. Kazakhstan's own Carbon Neutrality Strategy estimates that only 3.8% of these investments will be publicly funded, highlighting the urgent need to mobilise external and private capital. Nevertheless, progress is being made. The Asian Development Bank and the World Bank have proposed or committed to major projects in energy efficiency and water infrastructure, and national institutions such as the Astana International Financial Centre (AIFC) and the Development Bank of Kazakhstan are piloting green bonds and sustainability loans. The buildings sector offers particularly promising opportunities for private sector engagement, as demonstrated by the energy service company (ESCO) partnerships that have already mobilised USD 68 million.

The lessons learned from the assessment include the urgent need for Kazakhstan to shift from ad hoc and debt-heavy financing approaches to more balanced, concessional and grant-based mechanisms, especially for public goods. Institutional reforms, including regulatory support for energy efficiency, improved project preparation, and greater coordination between finance and sector ministries, are essential to unlock further adaptation finance. In addition, the national

capacity to design bankable adaptation projects and align them with donor priorities will need to be strengthened in order to close the financing gap and build long-term climate resilience.

Mongolia

Mongolia's adaptation finance landscape reflects its strong prioritisation of agriculture, in line with the sector's central role in sustaining livelihoods and addressing vulnerability to climate change. Between 2017 and 2022, the country received approximately USD 1.9 billion in international climate finance, of which USD 572 million was allocated to adaptation. Almost half of this adaptation funding (USD 277 million) was targeted at the agriculture sector, highlighting its strategic importance in national climate policy, including the NDC and NAP. However, a closer look reveals that, within agriculture, funding was heavily skewed towards livestock and pasture-related activities, which accounted for USD 225 million or 81% of adaptation funding for the sector. This reflects a focus on Mongolia's pastoral economy and vulnerability to 'dzud' events, but also highlights gaps in support for climate-resilient crop production and irrigation infrastructure.

Despite adaptation funding accounting for a relatively high share of total climate finance, Mongolia still faces a significant shortfall compared to its projected needs. The NDC estimates that USD 5.2 billion in adaptation investments will be needed by 2030, covering agriculture, water resources and land restoration. While multilateral funds such as the Green Climate Fund (GCF) and multilateral development banks such as ADB and the World Bank have supported large-scale investments in livestock, the project pipeline for crop and water-related adaptation remains underdeveloped. Many relevant initiatives are still at the conceptual or early proposal stage, suggesting a need for improved project readiness, pipeline development and access to grant funding for early-stage interventions.

Key lessons identified are the importance of diversifying adaptation finance within the agricultural sector to better support water-efficient farming systems, resilient crop production and smallholder innovation. The heavy reliance on debt finance also highlights the need to expand grant-based support, particularly for public goods and small-scale producers who may lack the capacity to engage with loan-based instruments. Strengthening inter-ministerial coordination and building capacity to prepare and scale up bankable adaptation proposals will be essential to unlock additional finance and ensure a more balanced investment across Mongolia's adaptation priorities.

Nigeria

Nigeria's assessment of climate finance flows highlights the agriculture sector as a clear priority for adaptation, given its significant role in supporting food security, employment and livelihoods across the country. Between 2017 and 2022, Nigeria received approximately USD 6.7 billion in international public climate finance, of which 54%, or approximately USD 3.6 billion, was allocated to adaptation. The agriculture, forestry and fisheries sector received the largest share of this, accounting for USD 1.3 billion. However, the assessment found an imbalance in the type of funding: 87% of adaptation funding for agriculture came in the form of debt, mostly from multilateral development banks. Within the sector, livestock-related activities received USD 263 million, while water-related agricultural investments received only USD 60 million, all in the form of grants. This disparity indicates significant underinvestment in water infrastructure, despite its central role in climate resilience and productivity.

According to the NDC Implementation Framework, some USD 114.63 billion will be needed for adaptation by 2030, with the water sector alone accounting for more than USD 105 billion. Despite this, funding for water-related adaptation remains limited and fragmented. Nevertheless, the assessment found that Nigeria has a promising pipeline of projects aligned with its adaptation priorities. These include large-scale initiatives such as the World Bank's Sustainable Power and Irrigation for Nigeria project (USD 700 million) and targeted agricultural programmes such as the GEF-supported Transformation of Food Systems and the Great Green Wall initiatives. In addition, emerging funds such as the Acumen Resilient Agriculture Fund II and projects

focused on the circular economy are adding further momentum to the financing landscape.

Learned lessons from the Nigeria assessment are the need to improve the balance between debt and grant financing for adaptation, particularly for sectors such as water, which are essential but have limited direct financial returns. The importance of strengthening national capacity to develop and implement bankable, large-scale adaptation projects was also highlighted.

2.3. Approaches for financing adaptation programmes

The CRED programme established a structured approach to support countries in identifying, prioritising and financing national climate adaptation programmes. As shown in Figure 1, this process begins with the development of policy scenarios and CBA to identify the most effective adaptation measures. These are then integrated into macroeconomic models to assess the broader economic impacts of climate change and the benefits of adaptation investments. Based on these analytical outputs, countries developed Project Idea Notes (PINs) outlining key interventions and associated financing strategies. The financing approaches developed for Georgia, Kazakhstan, Mongolia, and Nigeria are summarised below.

Georgia

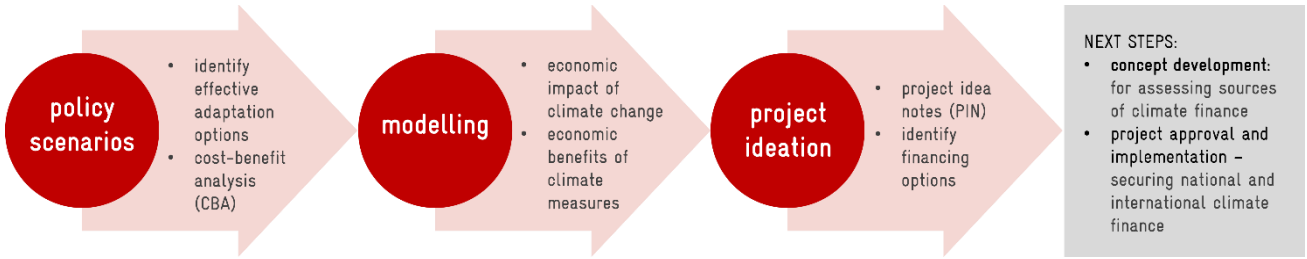
Georgia has developed two adaptation financing concepts through PINs aimed at securing international climate finance. Both concepts are rooted in detailed economic modelling and policy scenario development, and address systemic vulnerabilities in agriculture and disaster risk management.

Windbreak rehabilitation

The windbreak rehabilitation initiative addresses the climate-exacerbated threat of wind erosion and declining agricultural productivity. It responds to important challenges such as unclear land ownership, poor coordination among governance levels and limited farmer awareness. To overcome these barriers, the proposed intervention combines institutional reform, technical capacity building, and public-private co-financing mechanisms. Financing is based on a mix of public investments (for core infrastructure) and private contributions (for sustainable farm practices), with innovative components such as carbon market certification to monetise sequestration benefits.

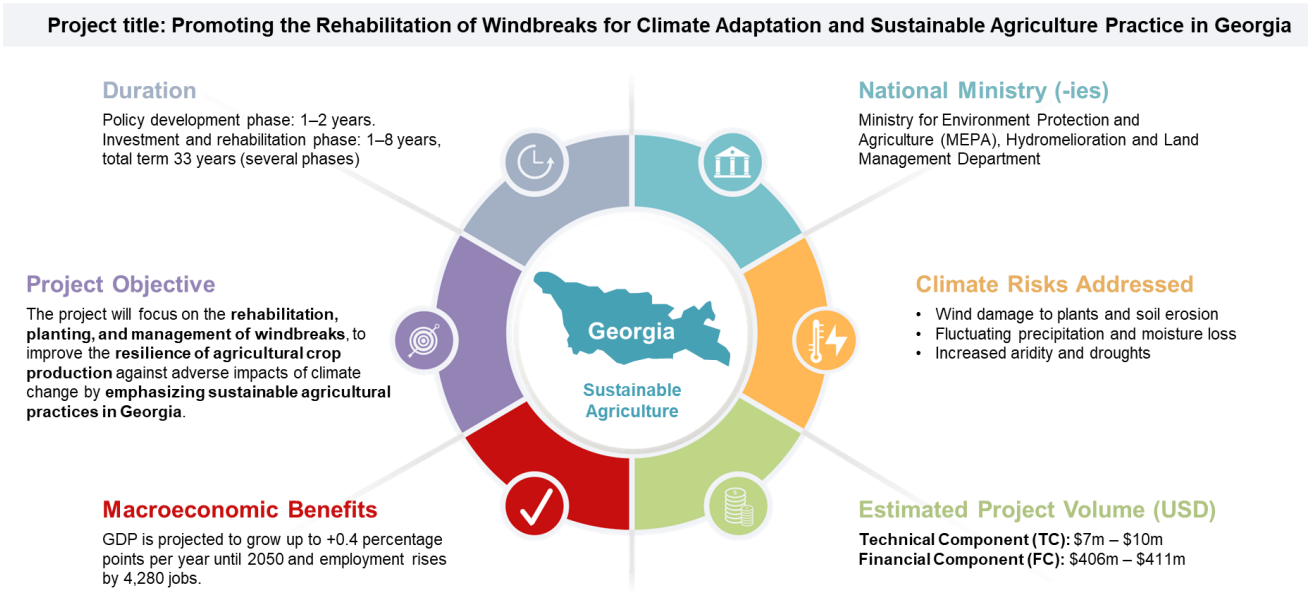
The total financing requirement ranges from USD 406 million to USD 411 million, with public funds supporting windbreak infrastructure and technical assistance, while private investments focus on localised agro-ecological improvements. The intervention targets 12,000 hectares of windbreaks protecting nearly 200,000 hectares of agricultural land across 18 municipalities, benefiting approximately 78,500 farmers. Over a 33-year lifecycle, the project has an estimated cost-benefit ratio of 0.16 and a total economic benefit of USD 2.54 billion, reflecting substantial returns in terms of land productivity, climate resilience and eligibility for green finance products.

Figure 1 - Process of developing the PINs



Source: GIZ, CRED own figure

Figure 2 - Project Proposal



Flood protection infrastructure

The second financing approach supports large-scale investment in river flood protection in the Mtkvari river basin, combining physical infrastructure with institutional capacity development. Key challenges include outdated infrastructure, fragmented institutional mandates, and technical gaps in modelling, data collection, and early warning systems. The project proposes a multi-hazard risk management plan (MHRP) with embedded flood risk zoning and hazard-specific construction norms to inform public investment strategies.

The financing requirement is broken down into three pillars: USD 155 million in infrastructure investment, USD 100 million for operational costs over the four-year implementation phase and USD 27 million for technical assistance. Innovative elements include public-private insurance schemes for agriculture and real estate to strengthen risk transfer and financial resilience. The economic case is strong: the cost-benefit ratio is 0.74, with an internal rate of return (IRR) of 23%, driven by avoided losses, improved asset protection and increased economic stability.

Kazakhstan

Kazakhstan has developed two high-impact PINs focused on addressing significant climate adaptation needs: (1) the development of multi-purpose water infrastructure (MPWI) and (2) enhancing energy efficiency and climate resilience in the building sector. These proposals are based on macroeconomic modelling, stakeholder consultation and policy scenario analysis, and are designed to unlock international climate finance while delivering long-term resilience and co-benefits.

Multi-purpose water infrastructure (MPWI)

Kazakhstan is increasingly vulnerable to climate-induced flood events driven by glacier melt, erratic rainfall and infrastructure degradation. The MPWI proposal responds to this by combining hard infrastructure investments with nature-based solutions and digital innovation. The core intervention includes constructing 15–30 counter-regulating reservoirs, modernising irrigation systems, and introducing AI-based water monitoring and flood forecasting technologies. These interventions aim to protect communities, enhance water availability across 280,000 hectares and improve agricultural resilience.

The estimated financing requirement ranges from USD 170 million to USD 285 million, with an additional USD 6–11 million for technical assistance. The financial structure relies on sovereign loans and concessional finance from multilateral development banks (ADB, World Bank, EIB), blended finance instruments (e.g. green bonds, performance-based grants), and public-private partnerships for infrastructure and smart irrigation. Results-based subsidies and concessional loans will support smallholder adoption of climate-resilient irrigation systems.

To mitigate risk and attract private capital, the project includes grant-based seed funding, a revolving fund model for sustainable reinvestment, and institutional reforms to enhance water governance. National implementation will be channelled through entities such as the Development Bank of Kazakhstan and local agricultural funds, linking international climate finance with country systems.

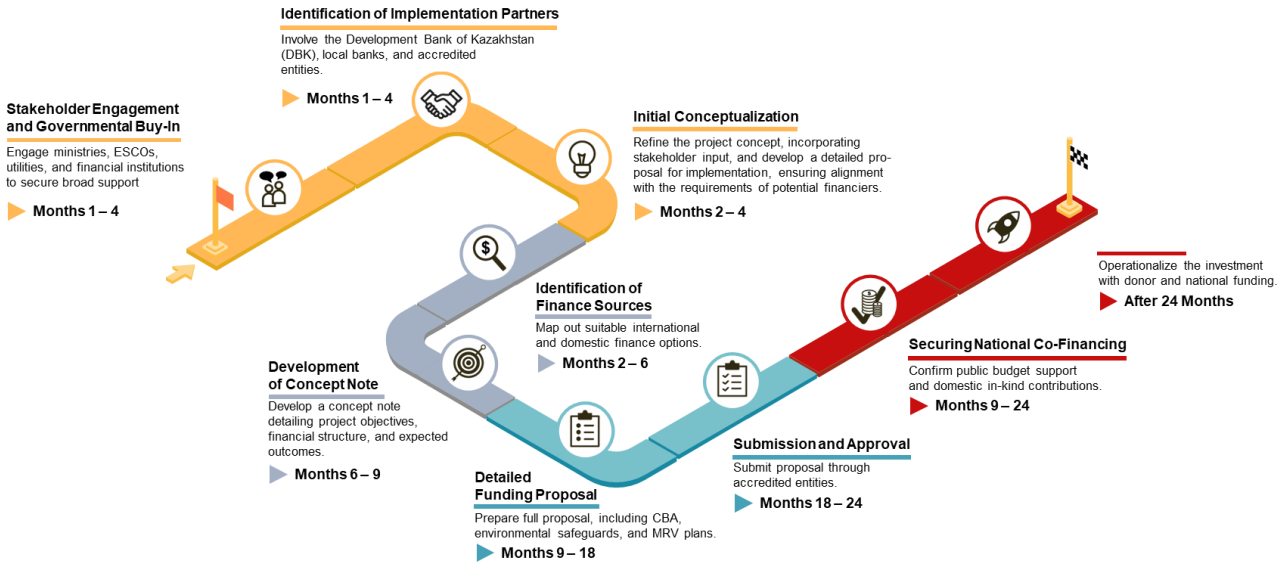
Energy efficiency and climate resilience in buildings

Kazakhstan's building stock is extremely energy inefficient, contributing to heightened vulnerability to climate extremes and driving excessive energy consumption. More than 90% of public buildings are rated below energy class C and 80% of homes lack basic insulation. The project proposes a transformative investment in thermal retrofits, smart energy systems and renewable integration such as rooftop solar and heat pumps. The initiative also aims to create a sustainable ESCO market and introduce smart digital tools to support energy governance.

Central to the financing strategy is the creation of a Sustainable Energy Revolving Fund (SERF), designed to combine grants (20–50%) with concessional loans (2–5%) tailored to different end-users, including vulnerable households, hospitals and schools. The financial requirement is estimated to be USD 285–455 million, with USD 11–17 million for technical assistance and capacity development. The SERF will be managed by a national financial institution, likely the Development Bank of Kazakhstan, ensuring local ownership and reinvestment of repayments.

The approach is performance-based: ESCOs will deliver retrofits based on energy performance contracts, and housing associations will receive tailored technical and financial support to mobilise collective investment. The financing model anticipates payback periods of 4–8 years for efficiency upgrades and 7–12 years for renewables, with IRRs in excess of 15% for pilot projects. Furthermore, the programme is expected to generate substantial employment, while reducing emissions and enhancing climate resilience.

Figure 3 - Financing Roadmap for Project Proposals



Mongolia

Mongolia's approach to financing climate adaptation in agriculture addresses systemic institutional, technological and financial barriers through two tailored PINs. Both proposals focus on the deployment of water harvesting infrastructure and drip irrigation systems, but differ in their institutional structure and long-term sustainability strategy.

Donor-backed blended finance mechanism (without Agricultural Corporation LLC)

This PIN proposes a donor-led blended finance mechanism to enable farmers and cooperatives to adopt climate-resilient technologies despite limited financial capacity. The project structure provides for a mix of 10% seed grants, 30% results-based grants and 60% concessional loans, with a planned shift towards a more loan-heavy model over time. Seed grants are directed towards capacity building, business development services and farmer training. Results-based grants act as performance incentives linked to the effective and sustained implementation of water-saving technologies, while concessional loans, disbursed by local financial institutions, form the backbone of the financing strategy.

The financial mechanism is supported by a revolving fund model, in which loan repayments are recycled into future investments. This model is coordinated by a Project Implementation Unit (PIU) managed by GIZ, in collaboration with the Government of Mongolia. The revolving structure ensures scalability and financial sustainability, with international climate finance (e.g. from the Green Climate Fund) covering initial costs. Local financial institutions play a key role in distributing and monitoring loans, and over time the model is designed to operate with reduced donor dependency, making it suitable for phased national scaling.

National institutionalisation via Agricultural Corporation LLC

This variation shifts the focus from donor coordination to national ownership by building institutional capacity within Agricultural Corporation LLC, a domestic financial intermediary. The financing structure mirrors PIN 1 initially, but differs by establishing the corporation as the permanent fund manager, eventually absorbing full responsibility for disbursements, monitoring and reporting.

PIN 2 introduces a phased transition strategy, where the corporation gains increasing autonomy as technical assistance and international support taper off. This localisation of climate finance aligns with Mongolia's broader goal of embedding climate adaptation into national governance structures. It is also designed to de-risk private financial sector involvement by providing a credible public intermediary capable of managing concessional lending and revolving funds. By gradually increasing concessional loan shares to 80% and eliminating seed grants, the model enhances long-term financial sustainability while maintaining support for smallholders through performance-linked grants.

Nigeria

Nigeria's climate adaptation financing approach under the GIZ CRED and DIAPOL-CE projects addresses the systemic vulnerabilities of its agriculture and water sectors by establishing a flexible, inclusive and scalable financial mechanism. The country's heavy reliance on rain-fed agriculture, coupled with increasing climate variability, places smallholder farmers at the centre of the adaptation challenge. Institutional fragmentation, technological gaps and high financing costs further impede the adoption of climate-smart practices. To overcome these barriers, the proposed strategy focuses on the creation of an Agriculture Support Facility (ASF), a blended finance platform designed to channel concessional finance, performance-based grants and technical assistance towards climate-resilient agriculture and watershed management.

Strengthening climate-smart agriculture through the Agriculture Support Facility (ASF)

At the core of Nigeria's adaptation financing model is the ASF, a revolving facility that aims to de-risk and crowd in investments for modern irrigation, sustainable land use and wetland restoration. Designed to target the most vulnerable farming communities, particularly in drought- and flood-prone regions, the ASF deploys a mix of concessional loans, performance-based grants and technical assistance. Concessional loans are disbursed by local financial

institutions using simplified procedures, enabling smallholders to invest in solar-powered drip irrigation, small-scale water retention systems and sustainable agricultural inputs. The revolving nature of the loans allows repayments to be reinvested, creating a sustainable financing cycle for adaptation measures.

Performance-based grants offer incentives for the adoption and maintenance of climate-smart technologies and are also used to co-finance shared infrastructure that benefits communities, including wetland rehabilitation and erosion control structures. Technical assistance complements these instruments by building the capacity of farmers, extension officers and financial institutions. Training programmes will focus on the operation and maintenance of irrigation technologies, sustainable farming practices and financial literacy, with special attention to gender inclusion.

The total estimated project budget is USD 71 million, comprising USD 69.5 million in financial support and USD 1.5 million in technical assistance over a five-year period. Funding will be sourced from international climate finance donors and bilateral development partners, with the Nigerian Government providing co-financing and oversight. The ASF will be governed by a dedicated Project Implementation Unit (PIU), supported by GIZ, and implemented in partnership with national ministries and financial intermediaries.

Over time, the ASF is envisioned to become a nationally owned financing vehicle, with local institutions assuming full operational responsibility. Complementary instruments such as climate risk insurance, guarantees, and co-investment partnerships with private banks will be explored to deepen financial access and resilience.

3. CONCLUSIONS AND RECOMMENDATIONS FOR FINANCING ADAPTATION PROGRAMMES

Adaptation finance is becoming increasingly important as countries face the rising costs of climate impacts and persistent underfunding of adaptation needs. Despite growing awareness, adaptation continues to receive a smaller share of climate finance, with significant gaps in key sectors such as agriculture, water and disaster risk management. As resources remain scarce and competition for funding intensifies, identifying and securing domestic and international funding opportunities will be important. Countries need to proactively assess their adaptation finance needs, align them with national priorities and develop clear strategies for accessing climate finance to ensure that resilience-building investments are both targeted and sustainable.

Lessons learned

The use of macroeconomic modelling and cost-benefit analysis (CBA) to identify adaptation priorities has shown significant value in linking climate risks to tangible economic impacts. The approach enabled countries to move beyond qualitative vulnerability assessments by quantifying how adaptation measures contribute to GDP, employment and sectoral stability under different climate scenarios. Integrating modelling results into national policy planning helped to structure evidence-based adaptation pathways and prioritise high-impact interventions. However, the process also highlighted challenges such as data limitations, the need for localised economic assumptions and institutional capacity constraints. For other countries, building technical capacity and ensuring early stakeholder involvement in scenario development are key to successful implementation. Embedding adaptation modelling into national planning cycles can strengthen ownership and ensure the relevance of proposed actions.

The assessments of climate finance flows revealed persistent structural imbalances in adaptation finance, with adaptation typically underfunded relative to mitigation and heavily reliant on debt-based instruments. Important sectors such as agriculture and water management often receive limited financial support, despite their centrality to climate resilience. The assessments underscored the importance of disaggregated, sector-specific analysis to identify where gaps exist and to inform the strategic mobilisation of finance. They also highlighted the lack of visibility of adaptation in national budgets and insufficient coordination between climate and finance authorities. For other countries, this suggests that systematically tracking adaptation finance flows, understanding the funding landscape and mapping funding against priority needs are essential steps. Strengthening coordination between ministries of environment, finance and sectoral line ministries is crucial to ensure more effective planning, access to finance, and alignment with international climate finance mechanisms.

Key barriers identified for adaptation projects across countries

The PINs reveal a consistent set of barriers that commonly act as obstacles to adaptation efforts. While the specific context varies, the challenges can be grouped into four overarching categories:

- *Financial barriers:* Access to adaptation finance remains a central challenge. Many projects face high upfront capital costs and limited availability of grants or concessional loans, particularly for infrastructure-heavy measures such as irrigation, flood protection or energy-efficient retrofitting. There is a strong dependence on debt-based financing, even in sectors where returns are uncertain or indirect. Smallholders and local institutions struggle to access credit due to stringent lending conditions, weak collateral systems and limited financial literacy. Mechanisms such as blended finance, risk-sharing instruments and revolving funds are still in development and require stronger institutional support for mainstreaming.

- *Institutional and governance barriers:* Poor coordination between ministries and unclear mandates across national and subnational levels limit effective implementation. Local authorities and cooperatives often lack the human and financial capacity to manage and sustain adaptation interventions. Ownership and maintenance responsibilities for significant assets such as windbreaks, reservoirs or irrigation systems are often poorly defined. Additionally, national adaptation goals are not always well integrated into sectoral policies, and technical institutions face gaps in training, resources and knowledge-sharing mechanisms.

- *Legal and regulatory gaps:* Many adaptation sectors are impacted by outdated or missing legal frameworks. Land tenure insecurity hinders investment in land restoration or long-term water infrastructure. Building standards and planning regulations often fail to incorporate climate resilience requirements. Regulatory enforcement is weak, leading to fragmented or ad hoc implementation of otherwise well-designed policies.

- *Technical, data and capacity constraints:* Adaptation planning and implementation are hampered by the limited availability of climate data, inadequate use of modelling tools and weak monitoring systems. Many areas lack the technical infrastructure and skilled workforce needed to deploy and maintain climate-smart technologies such as drip irrigation, solar-powered pumps or early warning systems. Awareness and uptake of such innovations remain low among farmers, community organisations and even some implementing agencies.

Recommendations for other countries

To effectively identify adaptation finance priorities and address financing gaps, countries should adopt a strategic and integrated approach that combines evidence-based planning with financial innovation and institutional coordination. The following recommendations summarise the key actions:

- *Integrate economic modelling and policy scenario development into national planning*: Use macroeconomic modelling and cost-benefit analysis to quantify the economic impacts of climate risks and the benefits of adaptation measures. Combine these tools with sectoral vulnerability assessments to prioritise interventions with high economic multipliers and social relevance, particularly in agriculture, water, infrastructure and health.

- *Strengthen national finance tracking and gap assessments:* Conduct regular climate finance flow assessments to map the volume and distribution of adaptation finance from international and domestic sources. Introduce climate budget tagging and public expenditure reviews to track how adaptation is reflected in national budgets and identify underfunded sectors.

- *Build institutional capacity and align stakeholders:* Ensure that ministries of finance, environment and sectoral authorities work together to align adaptation priorities with national development goals and donor expectations. Strengthen the capacity of local institutions and technical agencies to manage modelling tools, develop bankable projects and engage in international climate finance processes.

- *Develop innovative and inclusive financing instruments:* Explore blended finance structures that combine grants, concessional loans and private capital. Establish revolving funds and performance-based grants to support smallholders and local actors. Promote insurance schemes and other risk transfer instruments, especially for climate-vulnerable sectors. Tailor financial instruments to the needs of different beneficiaries, including women, smallholders and urban communities.

- *Ensure early stakeholder engagement and long-term ownership:* Involve civil society, the private sector and local governments in the design of adaptation priorities and financing strategies. This will improve relevance, increase buy-in and support implementation. Move towards national ownership of financing mechanisms by embedding them in existing governance and fiscal structures.

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