

FINANCING OPTIONS FOR SECTORAL ADAPTATION PROGRAMMES

CONTEXT

Development mandate. To support the integration of climate risks into long-term economic and adaptation planning as well as evidence-based policymaking for adaptation to climate change in Mongolia, the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMUV) has commissioned the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) with the project Climate Resilient Economic Development (CRED) and Policy Dialogue and Knowledge Management on Climate Protection Strategies (DIAPOL-CE) to support the Government of Mongolia in the modelling and projection of macroeconomic effects that selected adaptation programmes are expected to have.

Climate change challenges. Mongolia faces growing challenges from climate change, including rising temperatures, increased frequency and severity of cold spells – so-called dzud events, prolonged droughts, and declining water availability. These impacts are putting significant pressure on key sectors such as agriculture, livestock, forestry, and water resources. In this context, increasing the volume, effectiveness and accessibility of climate finance, particularly for adaptation, is essential to safeguard the country's socio-economic development and strengthen the resilience of vulnerable communities.

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Project objectives. To address this need, the GIZ projects focused on two objectives: (i) conducting a comprehensive assessment of international climate finance flows to Mongolia, and (ii) developing two Project Idea Notes (PINs) to support the design of bankable climate adaptation investments in priority sectors. The assessment of climate finance flows provided an evidence base for understanding current trends in adaptation and mitigation finance, identified key contributors, and highlighted existing gaps and opportunities across sectors. Building on this analysis, the PINs focused on strengthening the resilience of Mongolia's agricultural sector through water harvesting and drip irrigation systems to attract blended finance and catalyse scalable investments.

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Purpose of the report. The purpose of this country report is to summarise the key findings and lessons learned from the implementation of the GIZ projects in Mongolia. Drawing on insights from the assessment of climate finance flows, consultations with national stakeholders, and the development of Project Idea Notes (PINs) aimed at designing bankable adaptation

projects, the report presents consolidated analyses and conclusions that can inform future planning and investment strategies. as requested by the Terms of Reference subject to contractual agreements with the greenwerk., two policy scenarios were further followed and concerted into PINs: (i) drip irrigation systems and (ii) water harvesting infrastructure.

ADAPTATION MEASURE	Brief description of relevance and scope
DRIP IRRIGATION	Drip irrigation systems represent a key adaptation measure to improve water-use efficiency in Mongolia's agriculture sector, particularly in the face of increasing droughts and reduced rainfall. These systems deliver water directly to the root zone of plants, minimising evaporation and runoff, while enhancing crop yields and reducing input costs.
WATER HARVESTING INFRASTRUCTURE	Water harvesting infrastructure is essential to address Mongolia's growing water scarcity and ensure a reliable water supply for agriculture and livestock. This measure includes the construction of water harvesting ponds, engineered wells, and livestock watering points, particularly in arid and drought-prone regions. By stabilising water availability and supporting downstream irrigation systems, these interventions reduce pressure on natural water bodies and improve pasture conditions.

1. ADAPTATION PRIORITIES AND FINANCING NEEDS

1.1. Adaptation priorities identified

Policy scenario and priority setting. The GIZ projects conducted a policy scenario to support Mongolia's adaptation planning, leading to the identification of priority adaptation actions based on sectoral vulnerabilities and economic viability, while assessing the potential for scaling up international climate finance. The project produced modelling results and policy scenarios for key sectors, highlighting cost-effective, high-impact adaptation programmes. These technical outputs directly informed the development of two PINs to support climate-resilient agriculture and water management solutions.

Water and land degradation trends. Modelling results and sectoral policy scenarios developed through the project confirm the urgency of enhancing water availability and use efficiency to build resilience in both farming and herding systems. For example, over 4.7 million hectares of pastureland and more than 80 million hectares of cultivated land are already

degraded, and these figures are projected to worsen under high-emission scenarios.¹ Agricultural productivity is further threatened by reduced precipitation, increased temperatures, and shortened growing seasons.

Key measures in crop farming. In the crop farming sub-sector, the GIZ projects identified the introduction of climate-resilient seed varieties, drip irrigation systems, and soil conservation practices (such as zero-tillage and straw mulching) as critical measures. These strategies aim not only to increase yields but also to maintain soil fertility and reduce water stress. The adoption of drip irrigation and eco-synthetic film technology was highlighted as particularly impactful, given the limited and highly variable rainfall across agricultural zones. These priorities are directly aligned with NAP Section 3.6, Target 3, which focuses on enhancing the resilience of agricultural ecosystems through innovation and sustainable land use.

Water management scenario. The water sector, modelled under the "Water Management" scenario, revealed that increasing water storage capacity, improving irrigation infrastructure, and reinforcing integrated water resource management (IWRM) are

¹ Ministry of Environment and Tourism – Mongolia. Fourth National Communication of Mongolia: Under the United Nations Framework Convention on Climate Change. April 2024. Available at: <https://unfccc.int/sites/default/files/resource/MONGOLIA%20FOURTH%20NC%202024.pdf>

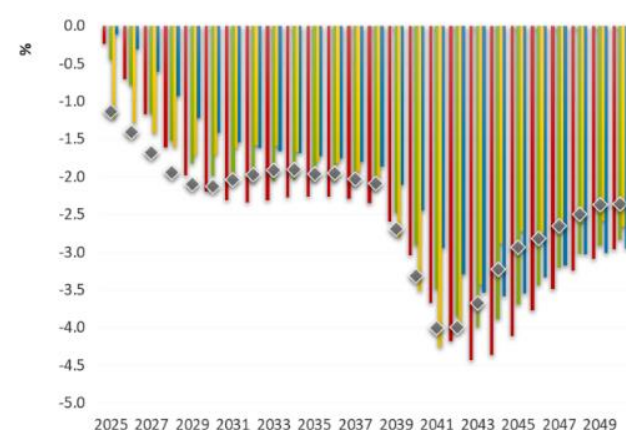
essential for resilience. Investments in water harvesting ponds, solar-powered pumps, and restoration of drying lakes and streams are critical to address the shrinking water availability, especially in the semi-arid and arid zones where much of Mongolia's agriculture is concentrated. These interventions link directly to NAP Section 3.2 on securing water resources under climate stress.

E3.mn input-output macroeconomic modelling.

In addition to reducing vulnerability to climate shocks such as dzud, targeted adaptation programmes such as irrigation infrastructure can generate broader economic benefits, including higher agricultural output, improved trade balances, and increased rural

employment. The e3.mn model, developed under the GIZ projects, provides an integrated framework for assessing these economy-wide impacts by capturing how changes in one sector affect others through direct and indirect linkages. In the SSP5-8.5 pathway, the combined effect is to reduce real GDP by up to 4% compared to a business-as-usual baseline, with pronounced impacts on exports, imports, investment and consumption. In contrast, the introduction of drip irrigation systems, as proposed in the PIN, generates economy-wide gains: real GDP increases by up to 0.6% per year (equivalent to MNT 270 billion), supported by rising agricultural yields, enhanced export potential and sustained investment activity.²

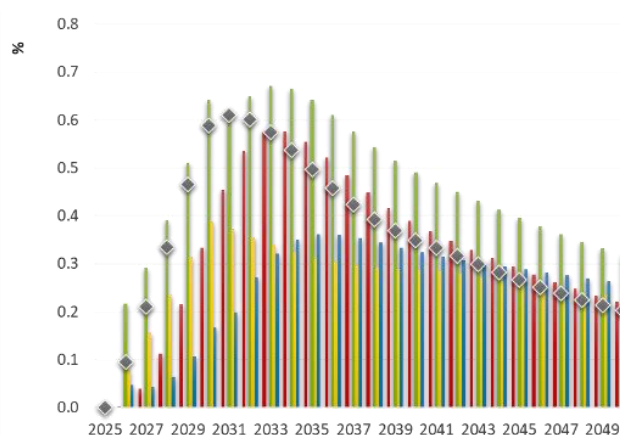
Figure 1 - Macroeconomic effects, 2025–2050, deviations from a hypothetical "No climate change" scenario



■ Household and NPISH final consumption ■ Gross capital formation ■ Imports of goods and services ■ General government final consumption ■ Exports of goods and services ◆ GDP at market prices

Source: GIZ-CRED / GWS based on e3.ge, March 2025³

Figure 2 - Macroeconomic effects of the "SSP5-8.5_Drip Irrigation" scenario, 2025–2050, deviations from a SSP5-8.5 scenario



1.2. Adaptation funding needs

Relevance of agriculture in adaptation finance.

The assessment of climate finance flows for Mongolia found that the agriculture sector is highly relevant for adaptation finance due to its central role in sustaining livelihoods, ensuring food security, and addressing land degradation and water scarcity. Agriculture,

including both crops and livestock, is highly exposed to climate risks such as rising temperatures, erratic rainfall, droughts, and extreme weather events such as dzuds. These vulnerabilities underscore the sector's priority status in Mongolia's NDC, NAP, and related strategic documents.

² GIZ. Assessing the Macroeconomic Impacts of Climate Change and Adaptation in Mongolia with the e3.mn Model: Updated Country Report. March 2025. Available at: <https://www.giz.de/de/downloads/giz2025-en-climate-economy-modelling-adaptation-report.pdf>

³ GIZ-CRED/GWS. Assessing the Macroeconomic Impacts of Climate Change and Adaptation in Mongolia with the e3.mn Model: Updated Country Report. March 2025. Available at: <https://www.giz.de/de/downloads/giz2025-en-climate-economy-modelling-adaptation-report.pdf>

Volume and allocation of adaptation finance.

Between 2017 and 2022, Mongolia received approximately US\$1.9 billion in international climate finance, of which US\$572 million was directed to adaptation. The agriculture sector accounted for the majority of this, receiving USD 277 million, or nearly 48% of total adaptation funding during this period. This substantial allocation reflects the strategic importance of agriculture in Mongolia's climate resilience agenda.

Funding distribution within the agriculture sector.

Within agriculture, funding has been predominantly focused on livestock and pasture-related activities, which received \$225 million, or 81% of adaptation funding in the sector. These funds were mostly provided through debt instruments, particularly concessional loans and blended finance from multilateral development banks (MDBs) such as the Green Climate Fund (GCF), the Asian Development Bank (ADB), and the World Bank. In contrast, adaptation finance for climate-resilient crop production and irrigation systems remained limited.

Estimated adaptation investment needs. In terms of investment needs, Mongolia's NDC estimates USD 5.2 billion for adaptation investments up to 2030. Agriculture and livestock are again highlighted as key sectors, along with water resources and land restoration. The National Adaptation Plan (NAP) also identifies agriculture as a top priority for investment in climate-smart technologies, irrigation infrastructure, drought-resistant crops, and improved farming techniques.

Pipeline and readiness of adaptation projects. The Flows Assessment conducted under the GIZ projects found that there are relevant project pipelines, including ADB's support for dairy herd management and livestock value chains, as well as smaller grants for fodder production and early warning systems. However, many of these projects remain at the concept or proposal stage.

2. IDENTIFYING FINANCING OPTIONS FOR SELECTED ADAPTION MEASURES

2.1. Overcoming key barriers for adaptation programmes in selected priority sectors

Barriers to climate adaptation in agriculture.

Mongolia's agricultural sector is highly vulnerable to water scarcity and climate risks, with limited access to finance preventing farmers from adopting sustainable solutions. Based on consultations with members of the Government of Mongolia and local experts from GIZ, the GIZ projects project were able to assess the national context and identify the main challenges hindering the implementation of effective adaptation programmes. These consultations, complemented by desk research and lessons learned from previous projects in the sector, provided critical insights into institutional, technological, financial, regulatory, and knowledge-based barriers, and informed the development of tailored strategies to overcome them.

Institutional and policy-level challenges. The agricultural sector faces a complex mix of institutional, technical, financial, and regulatory challenges that hinder the adoption of climate-resilient practices. Insufficient coordination among relevant government agencies may have contributed to fragmented land and water management policies, while local authorities and cooperatives often lack the resources to implement sustainable resource management. These barriers can be effectively addressed through an integrated approach, as proposed in the PIN on strengthening climate-resilient agriculture in Mongolia. The PIN outlines a combination of financial, technical, and institutional measures designed to overcome those challenges and enable scalable adaptation action. To address these institutional challenges, the PINs aim to improve access to climate finance for farmers and herders. It will also work with local authorities and cooperatives to oversee the operation and maintenance of water harvesting infrastructure and manage financial support to farmers and herders.

Technological barriers and proposed solutions.

On the technology front, low adoption of climate-smart practices and limited availability of modern irrigation systems exacerbate water inefficiency and land degradation. The project will introduce solar-

powered water pumps and drip irrigation systems to improve water use efficiency and reduce reliance on traditional, less effective irrigation techniques. These solutions will be complemented by capacity-building programs that provide training in soil conservation, drought-resistant crops, and digital advisory tools to optimise irrigation management. The development of water-harvesting infrastructure-such as engineered wells, rainwater storage systems, and livestock watering points-will further increase water availability and reduce vulnerability to drought and pasture degradation.

Financial barriers and blended finance approach.

Addressing financial barriers is central to the project's theory of change. Farmers often lack the financial resources to invest in climate-smart technologies or access long-term credit. To overcome this, the project will establish an innovative blended finance mechanism that combines concessional loans (60%), results-based grants (30%), and an initial seed grant (10%) to reduce upfront investment risks. This structure will enable farmers and cooperatives to adopt new technologies with minimal financial burden, while a revolving loan mechanism will ensure that repayments are reinvested in future adaptation projects. Local banks and financial institutions will also be engaged to provide tailored loan packages and improve farmers' financial literacy, thereby improving long-term access to credit and fostering a sustainable cycle of investment in climate-smart agriculture.

Below, the approach for strengthening climate-resilient agriculture in Mongolia is presented in two versions (PIN 1 and PIN 2).

STRENGTHENING CLIMATE-RESILIENT AGRICULTURE IN MONGOLIA THROUGH WATER HARVESTING AND DRIP IRRIGATION (PIN 1 – FINANCING OPTION WITHOUT THE AGRICULTURAL CORPORATION LLC)

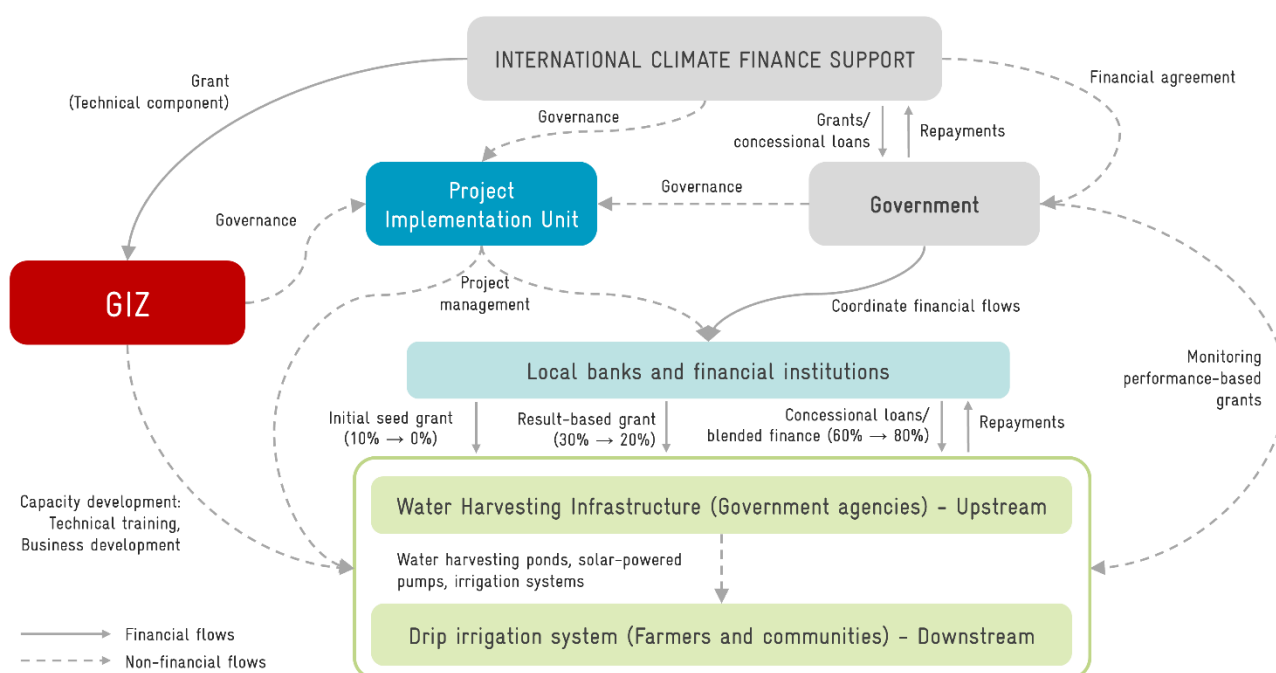
Challenges. The adoption of climate-resilient technologies in Mongolia's agriculture sector, particularly water harvesting infrastructure and drip irrigation systems, faces a number of financial and structural challenges. Farmers and cooperatives struggle with high upfront costs and limited access to

tailored financial instruments that meet the specific needs of small-scale agriculture. These constraints are exacerbated by low financial literacy, lack of collateral, and limited experience in managing credit and technology-based solutions. Existing financing options remain fragmented and often inaccessible, while public support mechanisms do not sufficiently de-risk investments in climate-smart practices. In addition, rural institutions often lack the technical capacity and resources to provide business development services or support the operation and maintenance of such technologies. Without a coordinated financing strategy and incentive mechanisms, the scalability and long-term sustainability of adaptation programmes will remain limited.

Outputs. In response to these challenges, the project proposes a structured blended finance model that supports both the implementation and scale-up of climate-resilient technologies in agriculture. Initially, the mechanism will combine 10% seed grants, 30% results-based grants, and 60% concessional loans. Seed grants will fund capacity-building activities, technical training, and business development services to prepare farmers and cooperatives for successful adoption. Results-based grants will act as performance incentives linked to the effective implementation, operation and maintenance of technologies, ensuring accountability and results. Concessional loans will be disbursed through local financial institutions in a revolving model, with repayments replenishing the fund and financing future investments. Over time, as international climate finance support is phased out, the financial structure will evolve: seed grants will decrease to 0%, results-based grants will increase to 20%, and concessional loans will increase to 80%. This adaptive structure ensures financial sustainability while gradually transferring ownership and responsibility to domestic institutions. The mechanism is designed to be institutionalised and scaled up across Mongolia's agricultural sector, enabling long-term transformation.

Financing structure. The implementation of this financing model relies on a multi-level governance framework involving international donors, the Government of Mongolia, GIZ, which organises the management of the Project Implementation Unit (PIU), and local financial intermediaries.

Figure 3 - Financing structure for PIN 1



Initial funding will come from international climate funds to support both technical assistance and the financial mechanism. These funds will be channelled through the Government of Mongolia, which will oversee alignment with national development and climate strategies. GIZ will support the coordination of project activities, disburse funds, and monitor the performance of financial institutions and beneficiaries to ensure transparency and accountability. Local banks and financial institutions will manage the disbursement and repayment of concessional loans and play a central role in the revolving fund. As the loan portfolio grows and repayments accumulate, these resources will be recycled into new investments, creating a self-sustaining adaptation finance ecosystem.

STRENGTHENING CLIMATE-RESILIENT AGRICULTURE IN MONGOLIA THROUGH WATER HARVESTING AND DRIP IRRIGATION (PIN 2- FINANCING OPTION WITH THE AGRICULTURAL CORPORATION LLC)

Challenges. Building long-term, nationally owned financing mechanisms for climate-smart agriculture in

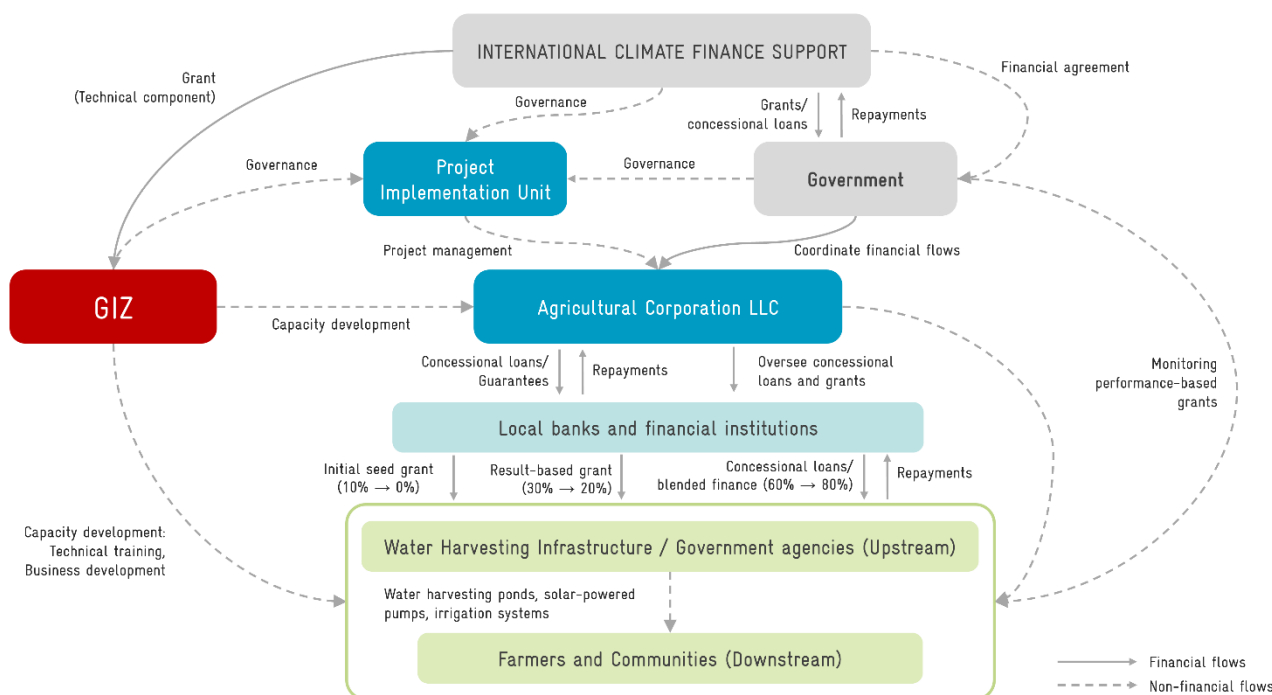
Mongolia requires overcoming institutional and structural constraints. While access to blended finance remains a key barrier, as addressed in PIN 1, ensuring institutionalisation and domestic ownership of climate finance flows poses additional challenges. Many local actors lack the capacity or mandate to manage complex financial instruments over time. In addition, financial institutions remain reluctant to fully engage in climate adaptation lending due to perceived credit risks, especially in the absence of robust risk mitigation instruments. Without a national-level entity that can independently absorb, manage and revolve climate finance, the sustainability and scalability of concessional lending models remain at risk.

Outputs. Unlike PIN 1, which piloted a blended finance mechanism under a donor-led structure, PIN 2 focuses on advancing the national integration of climate finance through a localised institutional framework. Its core output is the operational empowerment of the Agricultural Corporation LLC as a national financial intermediary. PIN 2 is structured to transfer responsibility for fund management, monitoring and grant allocation to this public institution, thereby embedding climate adaptation finance into Mongolia's domestic governance systems. The financing mechanism starts with a structure of

60% concessional loans, 30% results-based grants, and 10% seed grants to support capacity building and early implementation, with local banks disbursing funds directly to farmers and cooperatives. Over time, the model evolves to 80% concessional loans and 20%

results-based grants, phasing out seed grants and strengthening the revolving fund through loan repayments managed by the Agricultural Corporation LLC.

Figure 4 - Financing structure for PIN 2



Financing structure. To ensure long-term functionality and local ownership, PIN 2 introduces a phased transition strategy that places the Agricultural Corporation LLC at the centre of implementation. Initially supported by technical assistance and international funding, the Agricultural Corporation will gradually assume responsibility for managing loan disbursements, overseeing performance-based grants, and engaging local financial intermediaries. This approach allows for capacity development within the institution while maintaining continuity of operations. The revolving fund mechanism, through which repaid loans finance new adaptation investments, will be maintained and eventually become self-sustaining.

2.2. Opportunities of climate finance for adaptation programmes

Strategic groundwork for adaptation planning and finance. Mongolia has made important progress in identifying priority areas for climate adaptation, particularly in the agriculture and water sectors. While the assessment of climate finance flows found that Mongolia has tapped a range of international funding sources, including bilateral and multilateral channels, the overall volume of adaptation finance remains limited relative to the country's urgent needs. Adaptation has often struggled to attract scalable and bankable investment, with funding to date largely focused on mitigation. At the same time, modelling work and policy scenario analysis have provided a reliable basis for identifying sectoral priorities and specific adaptation actions. These findings provide a strategic starting point for strengthening the design of financing proposals and aligning them more closely with the priorities of international climate funds.

Key investment barriers. Desk research, complemented by consultations with representatives from the Government of Mongolia and local experts, provided relevant insights into the challenges and opportunities for scaling up international climate finance for adaptation. One of the key constraints identified is the heightened perception of financial risk due to Mongolia's harsh and increasingly unpredictable climatic conditions, including recurrent dzud, prolonged drought, and declining water availability. These extreme events not only threaten agricultural productivity and infrastructure durability, but also increase investor uncertainty, limiting the attractiveness of long-term adaptation investments. In addition, challenges related to limited project preparation capacity and fragmented coordination across sectors further complicate access to finance. To address these barriers, the financial models presented in the Project Idea Notes (PINs), in particular the revolving fund structure proposed in PIN 2, were identified as promising ways to improve the financial sustainability, investor confidence, and long-term scalability of climate-resilient investments.

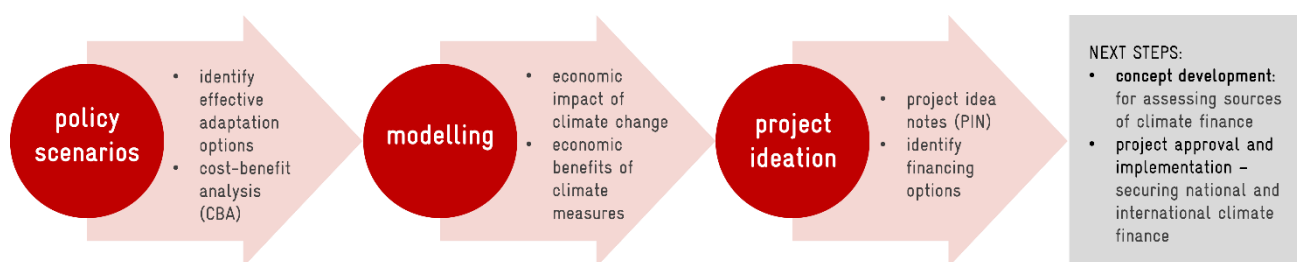
Scaling up adaptation. The two PINs developed under this initiative present blended finance models that combine concessional loans, results-based grants, and seed funding to de-risk investments and build resilience at scale. These models create clear entry points for co-financiers, particularly local banks and financial institutions, which can act as intermediaries for loan disbursement and repayment through revolving mechanisms. International climate funds and bilateral partners can support by providing initial concessional capital and guarantees, while the Government of Mongolia can contribute through policy alignment and budget co-financing. Together, with international climate finance support de-risking investments and the government creating a more

enabling environment, increasing private sector participation in adaptation investments enables the mobilisation of diverse sources of finance and strengthens the long-term sustainability of adaptation investments.

Adaptation unlocks opportunity. Investing in climate adaptation in Mongolia is therefore a strategic investment in the country's long-term stability and economic resilience. Beyond responding to immediate climate risks, well-targeted adaptation programmes can lay the foundation for broader systemic changes that reduce vulnerability and increase productivity. Over time, these investments can help create the conditions for other climate risk management instruments to flourish, including agricultural insurance schemes, performance-based financing, and private sector engagement in sustainable agricultural value chains. In this context, adaptation is not only a cost, but also an enabler for unlocking further development and financing opportunities.

Next steps for operationalising adaptation finance. Building on the two Project Idea Notes (PINs) developed under the GIZ projects, the next phase should focus on consolidating these concepts into formal Concept Notes in line with international climate fund requirements. This will include the refinement of technical and financial components, as well as a clear alignment with national adaptation priorities. Structured stakeholder consultations should be held with relevant ministries, local authorities, financial institutions and beneficiaries to validate the project design, ensure ownership and strengthen institutional coordination. These steps will also inform the development of a long-term financing strategy and readiness support, paving the way for full proposal development and submission to target financing institutions.

Figure 5 - Process of developing the PINs



Source: GIZ, CRED own figure

Next steps and opportunities of climate finance for selected adaptation programmes in Mongolia:

- › Building on the identified investment gaps and the current financing landscape, a **coordinated strategy to strengthen Mongolia's climate finance architecture** is essential. This includes advancing the development of integrated project pipelines that align national priorities with international donor modalities and investment criteria. In addition, leveraging existing climate policy frameworks will be critical to demonstrate coherence and long-term planning.
- › A strong M&R system is important not only for tracking outcomes and impacts, but also for unlocking results-based financing and concessional lending instruments. **Donors and international climate funds are increasingly linking disbursements to measurable results**, making early integration of M&R frameworks a requirement for long-term financial sustainability and accountability.

- › Furthermore, scaling up adaptation finance in Mongolia will require building stronger **enabling conditions for private sector engagement**. This includes improving access to climate data and risk models, providing targeted incentives for green investments, and developing regulatory instruments that support blended finance structures. Strengthening the capacity of local financial institutions to assess and manage climate-related credit risks is another priority to increase their role in providing adaptation finance.
- › Facilitating co-financing arrangements with local financial institutions and commercial banks is an important opportunity to expand the reach and sustainability of climate finance. Domestic banks can serve as key intermediaries for concessional loans and guarantees, especially when supported by technical assistance and risk-sharing instruments. Enabling their participation in blended finance schemes can help leverage private capital, reduce transaction costs and promote local ownership of adaptation. **International climate funds and bilateral partners** can support by providing initial concessional capital and guarantees.

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