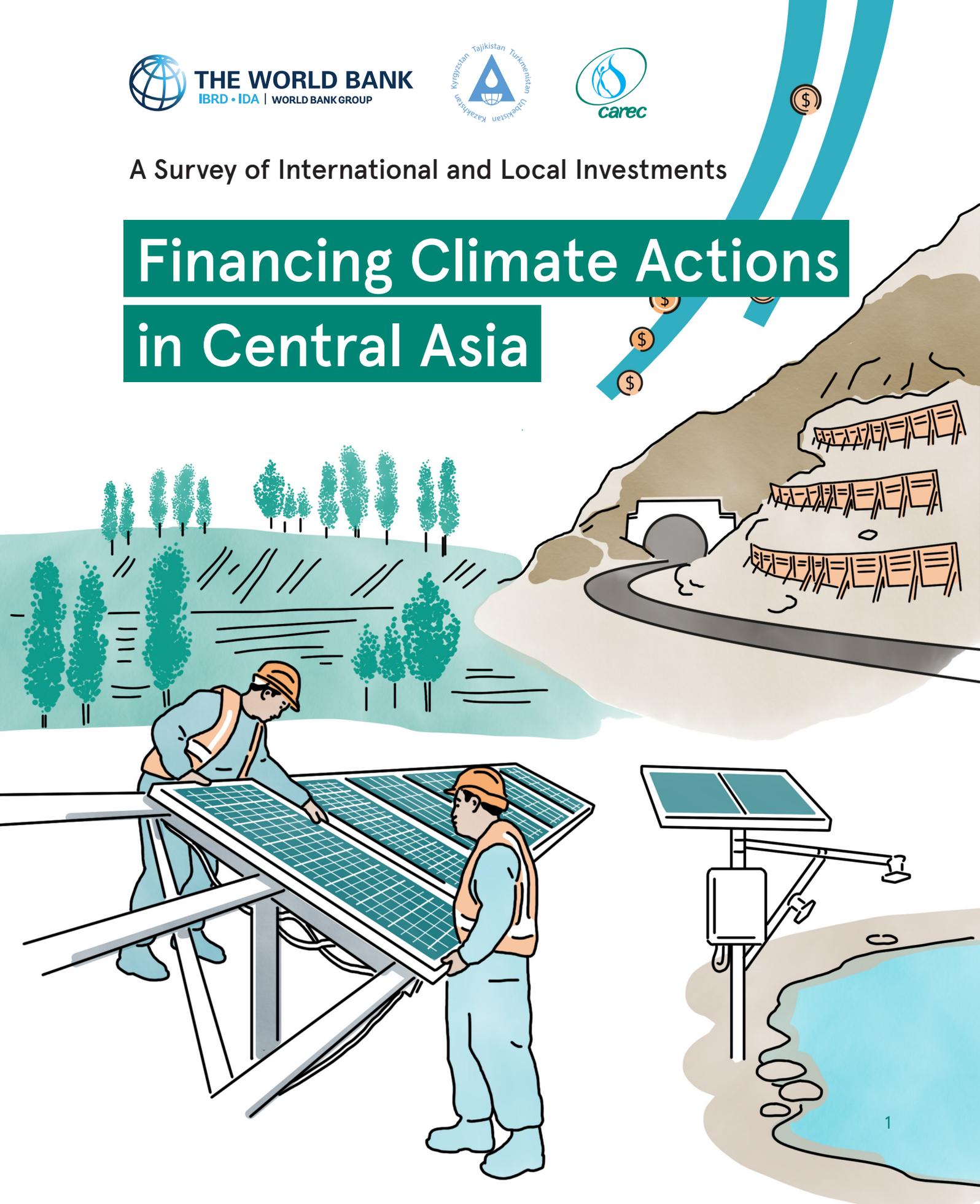


A Survey of International and Local Investments

Financing Climate Actions in Central Asia





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Financing Climate Actions in Central Asia. A Survey of International and Local Investments.

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Disclaimers

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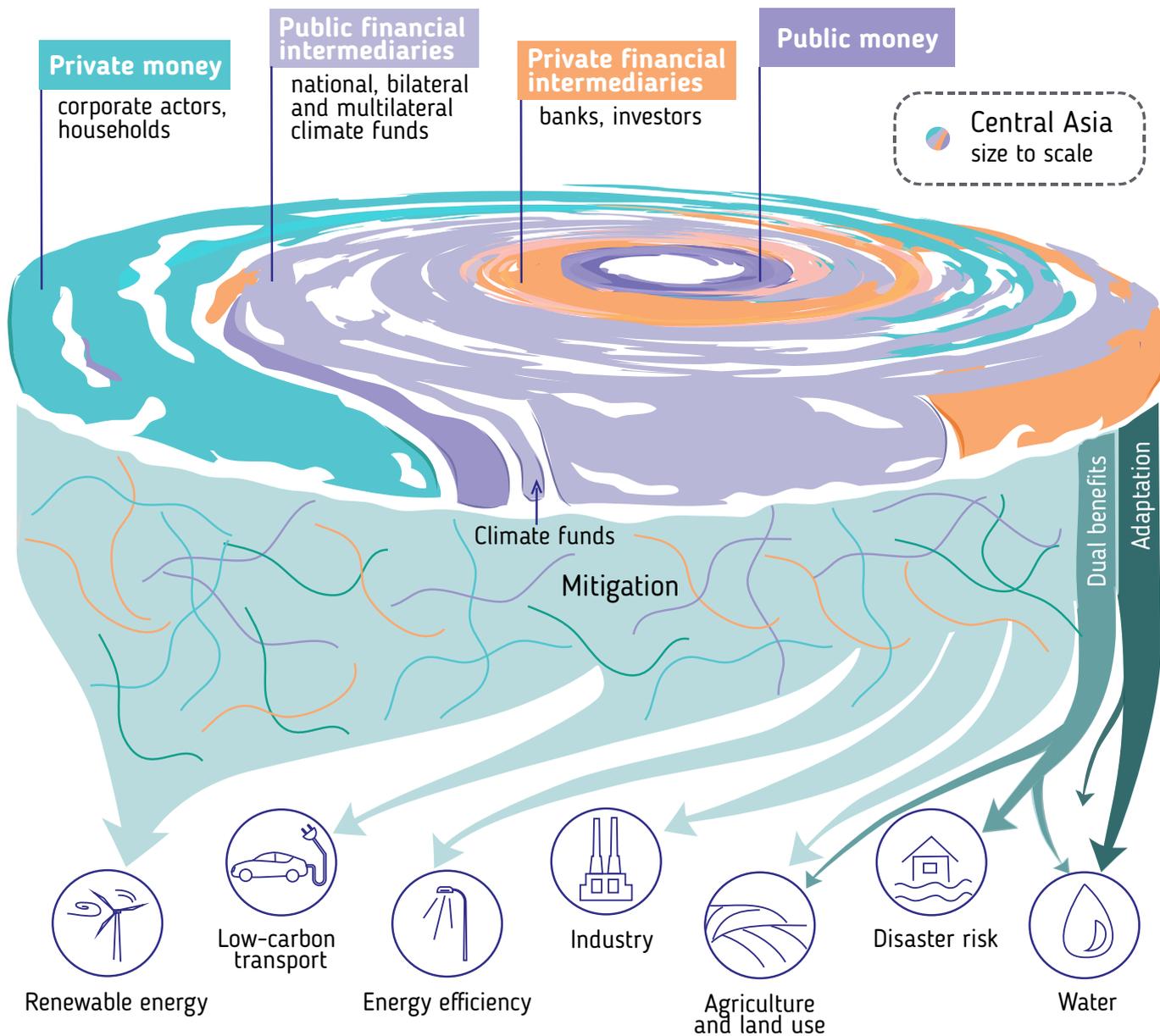
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Introduction

Global climate financing and Central Asia



The five countries of Central Asia – Kazakhstan, the Kyrgyz Republic, Tajikistan, Turkmenistan and Uzbekistan – are the recipients of a wide variety of climate finance projects. The region is not a prime destination for international climate finance though climate impacts can be particularly significant in the mountains and in densely populated areas, and the renewable energy potential and socio-economic benefits from transition to greater energy and water efficiency are well known. Accounting for private investment, public-private partnership projects and state-funded initiatives, however, makes clear that the financing of climate change solutions in Central Asia is diverse, growing and underestimated.

The Regional Environmental Centre of Central Asia (CAREC) commissioned this study under the Climate Adaptation and Mitigation Programme for the Aral Sea Basin (CAMP4ASB), which is financed by the World Bank, to broaden the understanding of climate finance in Central Asia. It gives a broad picture of current climate investments, attaches a climate perspective to non-traditional projects and provides recommendations for improving the investment climate, creating partnerships and mobilizing resources for climate protection and better living.

An understanding of what constitutes climate finance is important in the context of the official mechanisms of the United Nations Framework Convention on Climate Change (UNFCCC), and more broadly for private sector financing and insurance, so that analysts can capture and present a comprehensive and balanced picture of activities and progress. Not all climate financing comes with a straightforward connection to a specific mitigation or adaptation activity, and in terms of improving a community's or a country's climate resilience, many activities are possible. *Climate Finance in Central Asia* considers climate investments based on project descriptions and information from international and domestic organizations, governments and energy news sources, and considers

action plans and strategies, country reports, organization websites and other documentation.

Of the five Central Asian countries, Kazakhstan and Tajikistan have the greatest international climate investments by far as well as the most diverse projects, while Turkmenistan has the fewest. Tajikistan is the largest recipient of international funding in the form of grants (often blended with soft loans), while Kazakhstan is the region's leader in loan-based climate financing with the private sector playing a significant role. If the Clean Development Mechanism projects, public-private partnerships and (non-climate) projects on agriculture improvements, renewable energy, transport and forests are added, Uzbekistan would join the league of top performers.

At the regional level, larger projects focus on energy efficiency and climate resilience, and smaller projects improve climate observations, knowledge, policy and cooperation. If all international climate fund projects are added – over the past decade Central Asia received about \$2.5 billion of climate-focused investment. An additional \$2.5 billion of climate-relevant investments was invested from other sources.

Because of its much longer history, the GEF has sponsored the highest number of environment and climate projects. The GCF – as a new finance mechanism – has fewer projects, but they are much larger in scale. The EBRD, ADB, and the World Bank also have a large number of investments and projects, where the contribution of climate funds is used to make loan conditions more attractive and viable or to improve the potential for uptake and replication. Institutions often partner with the private sector and state institutions or other co-financers.

Rationale for conducting the analysis

The world is not keeping up with its commitments under the Paris Agreement, and the commitments are not keeping up with changing climate. The countries of Central Asia are planning for the next 26th UNFCCC Conference of the Parties in Glasgow, and have the opportunity to show up with new, more ambitious nationally determined contributions and equipped with a portfolio of climate project proposals for investors. The contributors of this report hope it helps the region expand its vision of what climate financing is and achieve a new level of planning for climate investments, and equally hope it helps traditional and new donors see Central Asia's potential to take climate action and to invest further resources in the region.

Through a rigorous approach to assessing the climate benefits of projects, analysts can capture and present climate activities and progress in a balanced picture that can help the countries set their climate priorities and determine where to invest. The results are likely to open eyes to the significant potential of the private sector to support climate initiatives, and may lead to more governmental incentives for renewable energy and other climate projects at a range of scales. Policymakers in the region may also discover how much hydrometeorological services contribute to progress on climate change, and the extent to which local efforts at afforestation add up to significant contributions. Governments can support these already existing domestic efforts, and other similar domestic work to great effect, but they have to understand them first.

A rigorous approach to assessing the climate costs of projects is also likely to help clarify climate priorities. When ambitious plans for investments in coal and cement collide with ambitious plans for clean energy, the analysis of costs and benefits can help policymakers determine a balanced course of action. An ongoing comprehensive assessment of

the climate relevance of projects and programmes can provide an understanding of how and why to support the decoupling of the economy and the environment so that the economy can grow without a corresponding environmental cost. The knowledge of the distribution of climate-relevant investments can also help policymakers identify areas that need more support.

This approach implicitly encourages a transformation in the way governments think about climate finance. By counting the climate-related financing in a credible manner, governments position themselves to know how to imagine and propose co-financing of large global climate fund projects. They can also demonstrate to potential investors that they understand their own particular situation. The knowledge that comes from this approach opens up possibilities for developing rationales for climate activities through government actions – the imposition of regulatory requirements on mining operations to ensure climate safety at high elevations, for example. Large state-owned companies could demonstrate the value of investing in climate activities as an example that others may follow – sponsoring decentralized afforestation projects is one current example.

Finally, the knowledge developed in a comprehensive analysis of climate activities can inform the development of insurance programmes. By one estimate the average annual losses to disasters in Central Asia is \$10 billion (GFDRR). The region does not even have adequate coverage available for severe weather events, much less long-term threats from droughts and other climate-related perils. The analysis of expenditures attributed to climate activities may help insurers understand the terminology and dynamics of climate risks sufficiently to make the calculations necessary to offer improved and expanded coverage.

The global pandemic and the opportunities for a green recovery

The release of this report coincides with the unprecedented challenge of the COVID-19 pandemic that has affected almost all countries around the globe, and postponed the international climate and biodiversity negotiations. In Central Asia, the health and socioeconomic crisis caused by the pandemic lowered household income, increased prices, and changed the schedules and logistics of renewable energy and climate projects. The regional climate change conference, annually organized by CAREC under the CAMP4ASB project, was postponed and moved to an online format. Over 320 participants took part in discussions of climate actions and responses in the time of a pandemic. Participants noted that softening commercial loan terms, providing financial incentives for climate-relevant projects – including green subsidies and tax breaks – and fostering green public procurement by state-run enterprises and agencies are among the tools for a green recovery.

The implications of the COVID-19 pandemic have touched the energy sector across the globe. Travel restrictions and quarantines have kept people off the roads and reduced commercial aviation to the barest minimum. In Central Asia this drop-off in energy demand hit the oil- and gas-dependent economies of Kazakhstan and Turkmenistan particularly hard, and created hardships among the migrant workers from Kyrgyzstan, Tajikistan and Uzbekistan in Russia and Kazakhstan. The International Energy Agency suggests that the pandemic's effects on energy systems are still unfolding, and that economic recovery and stimulus plans must put clean energy transitions at the center of the agenda (IEA 2020).

As a result of the reductions in economic activities caused by the COVID-19 shutdowns, global emissions in 2020 are projected to decline to a level between 4.2 to 7.5 per cent lower than 2019 (Bloomberg news, 2020, Financial Times 2020). This would be the largest annual reduction in emissions ever (IEA 2020). Central Asia's emissions are no doubt falling as a consequence of the drop in

economic activity, but both Tajikistan and Turkmenistan are less affected by COVID-19 than the other Central Asia countries, and may not experience significant emission reductions. In Uzbekistan, preliminary data show falling domestic gas supply and growing use of coal, but robust information will not be available until 2021.

This drop in emissions comes at a frightful cost in human suffering, but it demonstrates the scale of the challenge facing the world. According to the United Nations Environment Programme (2019), for the world to remain on track to meet the 1.5°C temperature goal set in the Paris Agreement, emissions must decline by 7.6 per cent per year every year between 2020 and 2030.

An analysis published just before the COVID-19 outbreak finds that despite record levels of global climate finance in recent years, annual investments remain far below what is needed to meet the 1.5°C temperature goal (Buchner et al. 2019).

The concept of building back better comes from the experience of disaster risk management, a discipline that is closely aligned with climate resilience. A major proponent of this approach is the Global Facility for Disaster Reduction and Recovery (GFDRR), a grant fund managed by the World Bank to help developing countries manage and reduce their risks from natural hazards and climate change.

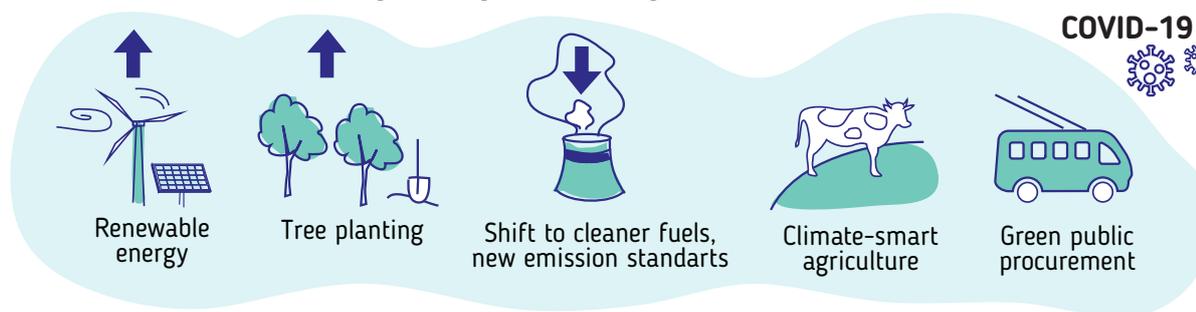
In its response to the pandemic, the Green Climate Fund points out that its investments in climate resiliency in water resources, health care and agriculture are activities that support a green recovery. The GCF is ready to provide rapid financial support or technical assistance to governments to craft their green economic stimulus measures and strategies for climate-resilient recovery through the GCF readiness programme.

At a recent international discussion on climate change, the Secretary-General of the United Nations spoke of the recovery from the COVID-19 pandemic as an opportunity for the world to take “a path that tackles climate change, protects the environment, reverses biodiversity loss and ensures the long-term health and security of humankind” (United Nations, 2020). The Organisation for Economic Co-operation and Development (OECD) warns that the temporary reductions in emissions resulting from slowdowns in economic activity – as occurred in the 2008 global financial crisis – have been overwhelmed by even greater increases in emissions in the recoveries, but sees an opportunity in post-COVID-19 recovery efforts to limit the risk of locking in carbon-intensive infrastructure by aligning public policy with climate objectives. The OECD recommends that governmental support packages be designed to invest in or favour sectors and technologies that can accelerate the transition, and improve resilience to future shocks from climate change.

The World Bank has devised a sustainability checklist that governments can use to assess the long-term effects of their recovery proposals and calls to develop policies that support a shift to clean energy and innovations in wind, solar and hydropower as well as the development of circular economies that reuse rather than waste. The World Bank also encourages investments in natural capital to restore landscapes and to manage them to optimize their ecosystem services. In addition, the World Bank calls for governments, academia, development banks and others to embrace and support so-called disruptive or innovative technologies such as multi-purpose infrastructure, cloud computing and remote sensing. Solar panels installed over irrigation canals, for example, can provide power for pumping while lessening the loss of water through evapotranspiration. These new approaches can reduce costs and increase resilience.

Elements of a green recovery

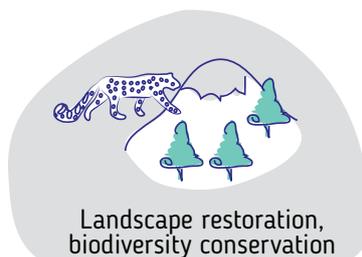
Cleaner energy and greenhouse gas emissions reduction



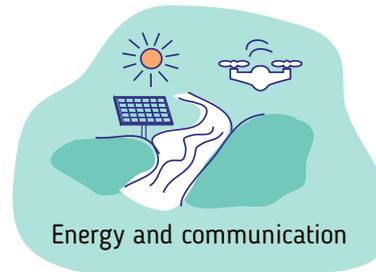
Circular economy for green growth



Increase natural capital



Promote disruptive technologies



Measuring climate financing

The countries of Central Asia, like all Parties to the United Nations Framework Convention on Climate Change, report on their efforts to reduce emissions and on their progress in adapting to the changing climate. Currently the countries of Central Asia report only the financing received from the global climate funds, but a complete assessment needs to consider the full range of climate-related projects.

As an easy first step the countries can include the value of any co-financing associated with a project. This means that a project with \$20 million in support from a global climate fund and \$80 million in co-financing – whether in cash disbursements or in-kind contributions of labour, technology or services – gets reported as \$100 million in climate-related expenditures, not \$20 million. The cash and in-kind co-financing adds value to a project, and accounting for these contributions is a legitimate way to portray the true climate investment.

Many energy-efficient buildings and hydropower, solar and wind plants in Central Asia are financed without any contribution from international climate funds. The climate benefits of such projects are clear, and the assessment of such projects can attribute 100 per cent of the funding as climate-relevant. The main difficulty in adding such projects to the climate reporting is that they may be scattered across a range of ministries, provinces or investors and may not be evident to those preparing the reports. Other contributions to a country's climate portfolio can be even more difficult to identify.

Indirect climate outcomes

Many projects can have indirect climate-relevant outcomes. Modernizing water infrastructure, for example, could fall into a category of water projects or infrastructure projects, but may have important climate resilience outcomes across a range of key economic sectors, all of which face

huge climate risks. In agriculture, improved water efficiency and management can build resilience by compensating for the disruptions in water resources resulting from climate change. Similarly, infrastructure improvements in the energy sector can allow hydropower producers to respond to the challenges of melting glaciers and changing flows, and help manage disaster risks associated with flooding and slides. In addition, where infrastructure projects help ensure safe drinking water and sanitation, they provide public health benefits that build community resilience. These indirect outcomes mean that water infrastructure projects may enhance food and energy security, reduce disaster risks and protect public health, all of which are important in developing climate resilience.

Projects that may seem unrelated to climate solutions – such as strategic road modernization – can actually contribute to improving resiliency. Roads connecting the southern, central and northern parts of the mountain countries of Tajikistan and Kyrgyzstan are essential for domestic trade, mobility and food security. When avalanches block roads, or flashfloods wash them away or when dust storms reduce visibility, people and the economy suffer. Higher climate resilience of these strategic roads is therefore important.

The assessment of the climate contributions of these types of projects is analytically challenging, and calls for a way to make attributions of climate finance across a range of projects and project activities. This assessment reviewed about 400 internationally and locally funded climate-relevant projects throughout Central Asia over the 2010–2019 decade, as well as active and planned projects and initiatives with climate benefits and clean energy objectives. Some projects are site-specific and others cover vast areas or multiple sites.

A comprehensive analysis of these projects and initiatives is beyond the scope of this report (list of the reviewed selected projects is available in a tabular supplement to this report), but the review

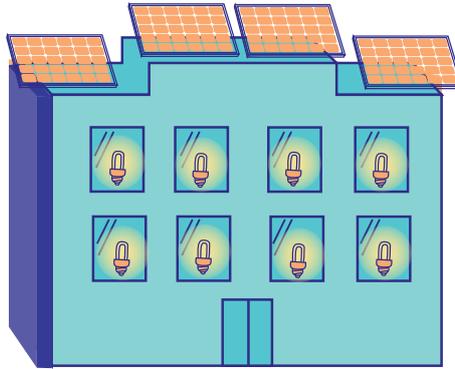
Project example: energy-efficient modern housing using renewable energy

Climate investment

Solar roof and LEDs **20%**

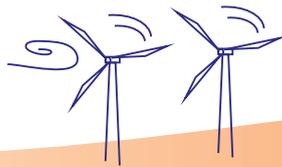
Co-financing

Energy efficient building, labor and materials **80%**



With partial climate financing, the total project can be considered as a climate project

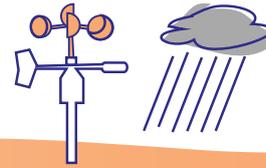
Projects with direct climate or clean energy objectives and benefits



Renewables



Low-carbon transport



Climate monitoring



Adaptation

Projects with indirect climate objectives and effects



Mitigation of dust storms



Afforestation



Water conservation

Projects with distant climate and significant socioeconomic benefits



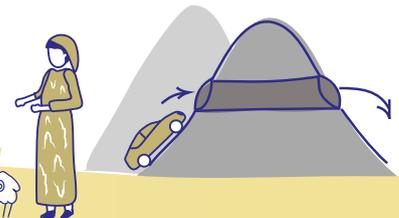
Reliable drinking water



Sanitation



Livelihoods



Strategic roads

found that over the past decade the total value of international projects with clearly defined climate and clean energy objectives and climate funding sources in Central Asia exceeded \$2.5 billion. If other internationally funded projects are added, which contribute indirectly and remotely to climate objectives and make up an additional \$2.5 billion – the total portfolio of climate-relevant projects may come to \$5 billion over the past ten years. For comparison, the construction of a large hydropower plant may require a similar budget. To put numbers into perspective, the annual costs of damage from natural disasters in Central Asia are estimated at \$10 billion by GFDRR. Even if more conservative and factual analysis is applied – the costs of losses and damages will remain higher than the current financing levels for climate and disaster risk reduction. The amount of domestic climate-relevant public and private funding was harder to quantify, but the review found a high likelihood that this domestic funding equals or exceeds the international support.

Complexities and nuances

The hierarchy for the attribution of climate relevance is fairly simple in concept. The attribution of projects that work specifically on climate mitigation, adaptation or clean energy is 100 per cent. For those with indirect benefits and objectives, the attribution depends on an estimate of the proportion of the project devoted to climate-relevant activities and its climate performance. In some cases the attribution will be clear, but numerous projects – improving roads, healthcare systems, safe drinking water and wastewater systems or better management of natural pasture lands – are designed without regard to climate outcomes, but nevertheless come with potential climate benefits. While the cumulative contributions of these projects can be large, their individual climate contributions can be modest and difficult to quantify.

Just as many projects can have positive climate contributions that countries will want to understand and track, other projects can have negative climate effects that are equally important to consider, especially those – such as coal mining projects and coal-fired cement plants or power stations – that can lock in carbon-intensive activities for years to come. An accurate picture of a country's progress on climate change depends on the inclusion of such projects in the analysis. In addition, some projects may have both positive and negative climate effects. For example, the expansion of gasification and electrification helps reduce reliance on coal and oil and cuts emissions, but these efforts are not climate neutral.

Other projects have climate and environmental benefits that accrue over time, and that are dependent on continuing management. Afforestation projects help reduce the impacts of dust storms, prevent flash floods and sequester carbon, but the benefits occur when the plantings reach a certain size and depend on tree survival and growth that may not meet expectations due to poor forestry management or inadequate fire controls. In the optimal conditions, afforested area of 1000 ha can provide carbon sequestration by biomass in the range of 1-1.6 mln tonnes CO₂-eq over 50 years of the project lifetime. Projects with environmental and socioeconomic objectives – improved urban waste management, for example – may lead to increased emissions. More efficient urban waste collection visibly improves the cityscape, but without investments in waste sorting, recycling and landfill gas capture, can lead to a less visible increase in waste accumulation at landfills and eventually result in increased emissions.

Some of these mixed projects may get support from climate funds, but often they are implemented by the private sector or state-run institutions and funded from state budgets. Where these projects include public financing, they may be easier for analysts to find.

The range of climate financing

Climate-centric point of view

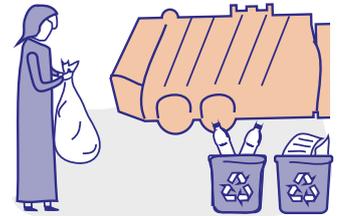
Global climate funds



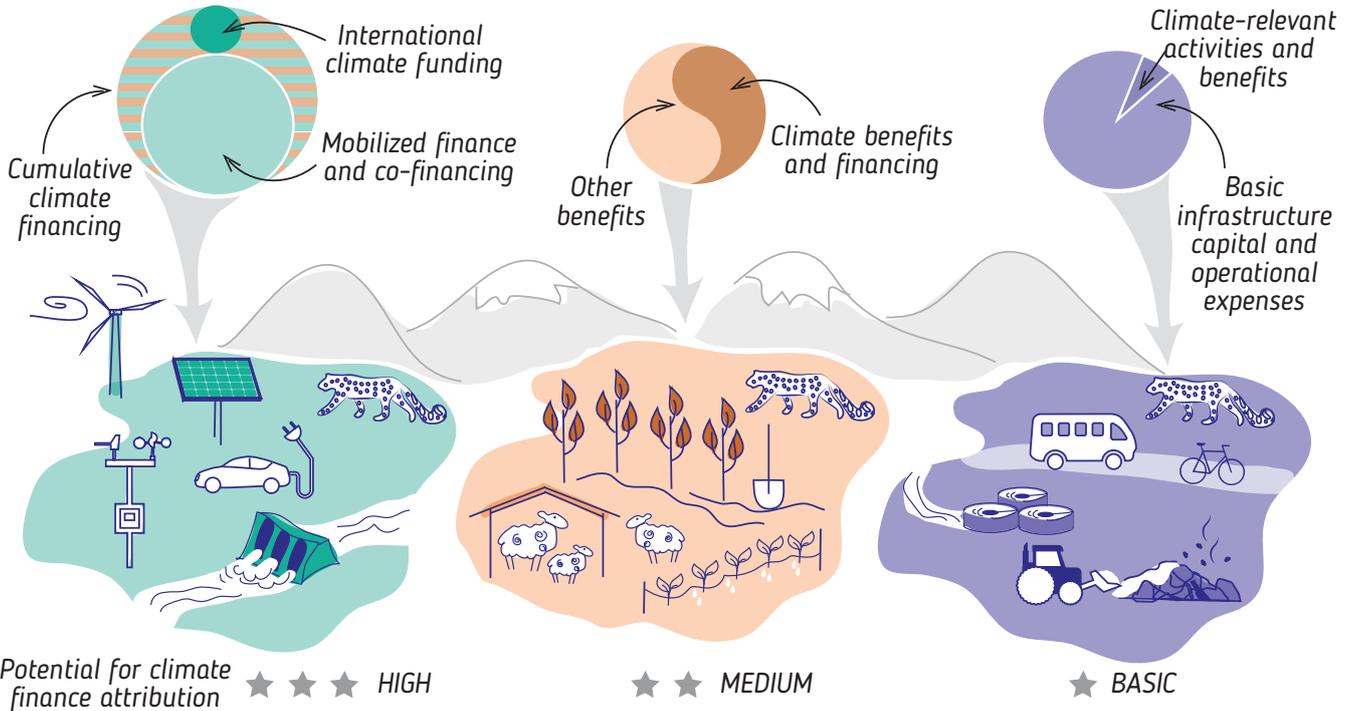
Climate finance instruments, renewables and low-carbon transport



Resource efficiency and environmental investments



Basic infrastructure investments



No climate links and attribution of co-financing

Incomplete consideration of climate financing

No climate links and attribution

No climate links and attribution

Conventional point of view

Limitations of the analysis

Although this report provides a greater understanding of climate finance in Central Asia, it comes with several limitations. The data paint a picture of international investments and well-documented projects in the region. They do not showcase the many domestic investments that go unreported.

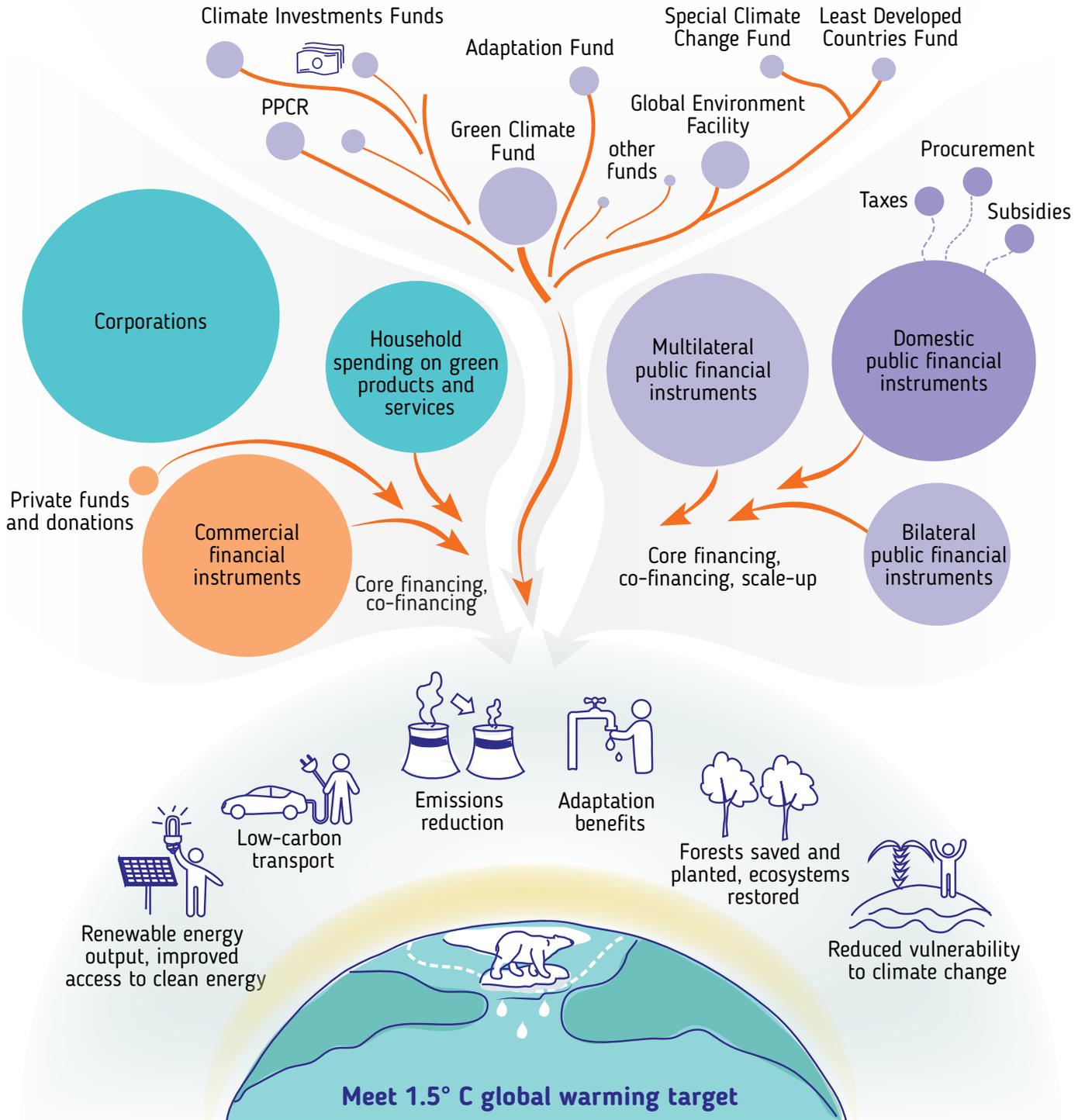
Domestic investments, whether public or private, may not appear in published reports, for example, and information on project performance – such as measurement, reporting and verification (MRV) – is scarce. State investments and budgetary funding for climate-related activities remain difficult to identify. All the countries of Central Asia maintain numerous state programmes that come with significant climate benefits – better hydrometeorology services, afforestation, water and soil improvements, disaster management and state-backed insurance – and all make substantial investments in energy, transport and urban systems. The proper accounting of the climate-related benefits of these efforts would go a long way towards clarifying the invisible parts of climate financing.

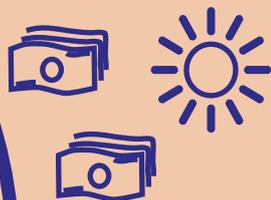
Civil society organizations (CSOs) conduct hundreds of interesting projects in the \$10 000–50 000 range. Numerous micro-loans and small grants for climate adaptation and renewable energy implemented by CSOs were successful, particularly in the Kyrgyz Republic, where civil society is most vibrant. In Tajikistan and Uzbekistan, micro-loans for climate adaptation and grants for technology demonstration, including those under the CAMP4ASB project and the GEF Small Grants Programme (SGP), feature success stories. These small projects fall outside of this analysis, and interested readers can consult CSO websites and grant programmes active in Central Asia for information.

In some cases, relatively small investments in capacity-building can result in large-scale impacts and gradual transformational changes through demonstration, replication and scaling up. The design of Kazakhstan's renewable energy incentives and the auctioning system, for example, help to propel renewable energy projects. The benefits of the capacity-building investments ripple out through time, and the quantification of the climate benefits remains elusive.

Projects often do not specify the financial instruments they are using – grants, concessional or market-rate loans, public or private sources of funding, perhaps a combination of instruments – so the nature of the investment remains unclear. Information on major infrastructure investments under the Belt and Road Initiative which may speed up or, conversely, delay climate targets is hard to assess. These and other limitations of the results presented here may yield to further research that tracks the success of projects through follow-up interviews or surveys, and through outreach across the region. The selected funding sources and indicators designed to capture the climate outcomes of projects are shown in the graphic.

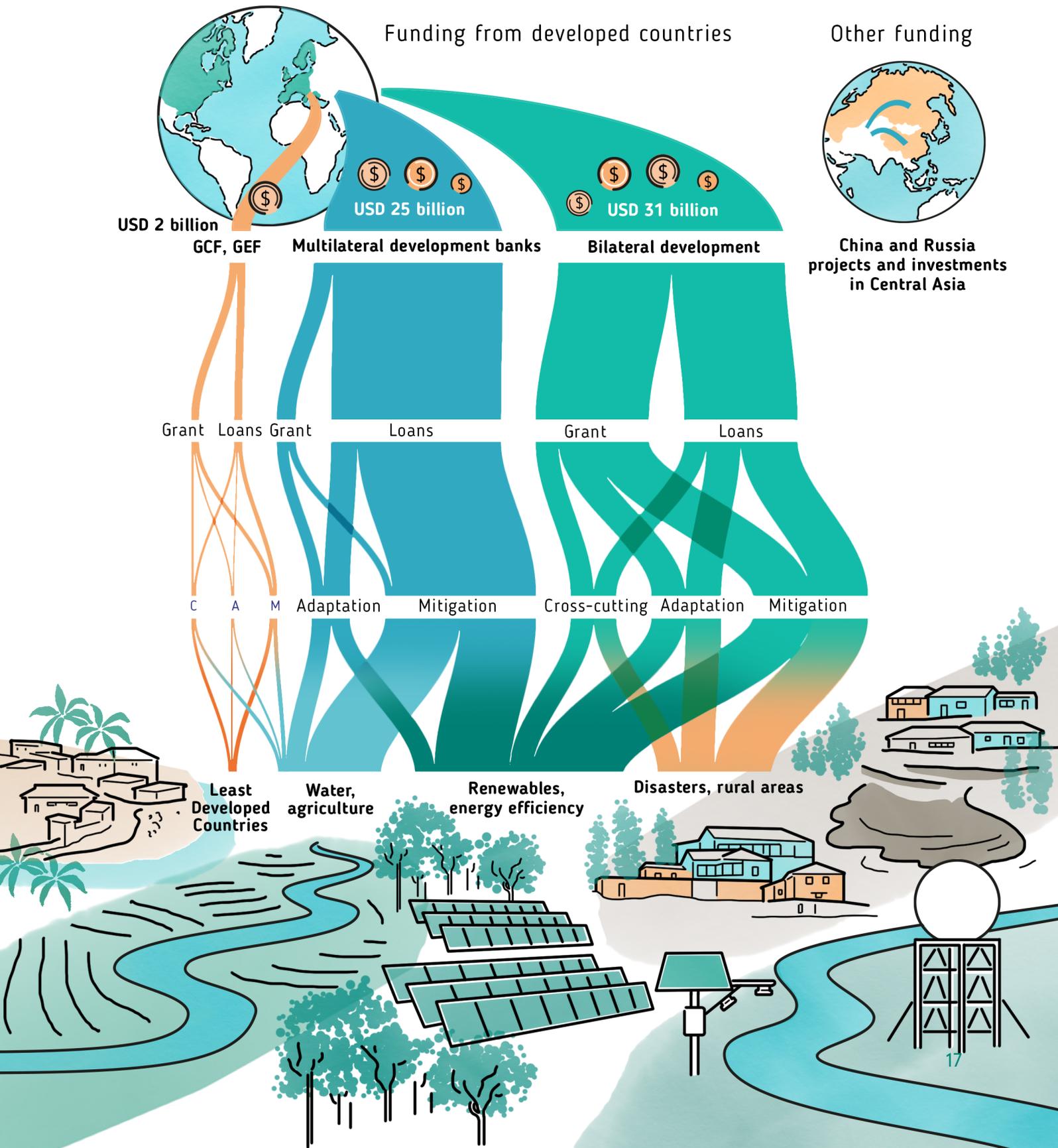
Global climate funding sources and performance indicators





Global climate finance

Global sources and flows of climate financing



The 2009 international climate change conference in Copenhagen (UNFCCC CoP-15, The Copenhagen Accord) set a climate finance target of \$100 billion per year from a variety of sources by the year 2020, and subsequent UNFCCC conferences reiterated this goal. Some countries and negotiators interpret this number as the total of all funding sources, private funding and actors included. Others consider this pledge of climate funding as dedicated support from developed countries either directly and separate from official development assistance or through the international climate funds. According to some, climate funding should predominantly come in the form of grants, and a significant part should support adaptation measures.

As a financial mechanism under the UNFCCC, the Global Environment Facility (GEF) is helping developing countries shift to low-emission development and improve and scale up adaptation measures. The total assistance provided through GEF at the global level exceeds \$10 billion in grants and over \$50 billion in co-financing. Using its Least Developed Countries Fund (\$350 million) and the Special Climate Change Fund (\$50 million), the GEF finances adaptation measures that help poverty-stricken countries move to a climate resilient development and reduce their exposure to climate risks. All Central Asia countries actively seek support from the GEF and participate in GEF projects through various implementing agencies. Switzerland as a GEF council member represents a GEF constituency of all five Central Asia countries plus Azerbaijan.

The Green Climate Fund (GCF), launched in 2011 shortly after the Copenhagen climate conference, aims to balance investments in mitigation and adaptation evenly, and – like the GEF – works to help developing countries shift to low-emission and climate-resilient development pathways. The GCF partners with private sector investors and offers loans, equity, guarantees and grants for climate projects tailored to specific needs, and supports the implementation of the NDCs. The GCF projects seek results in the areas of energy generation and access; transport; buildings, cities,

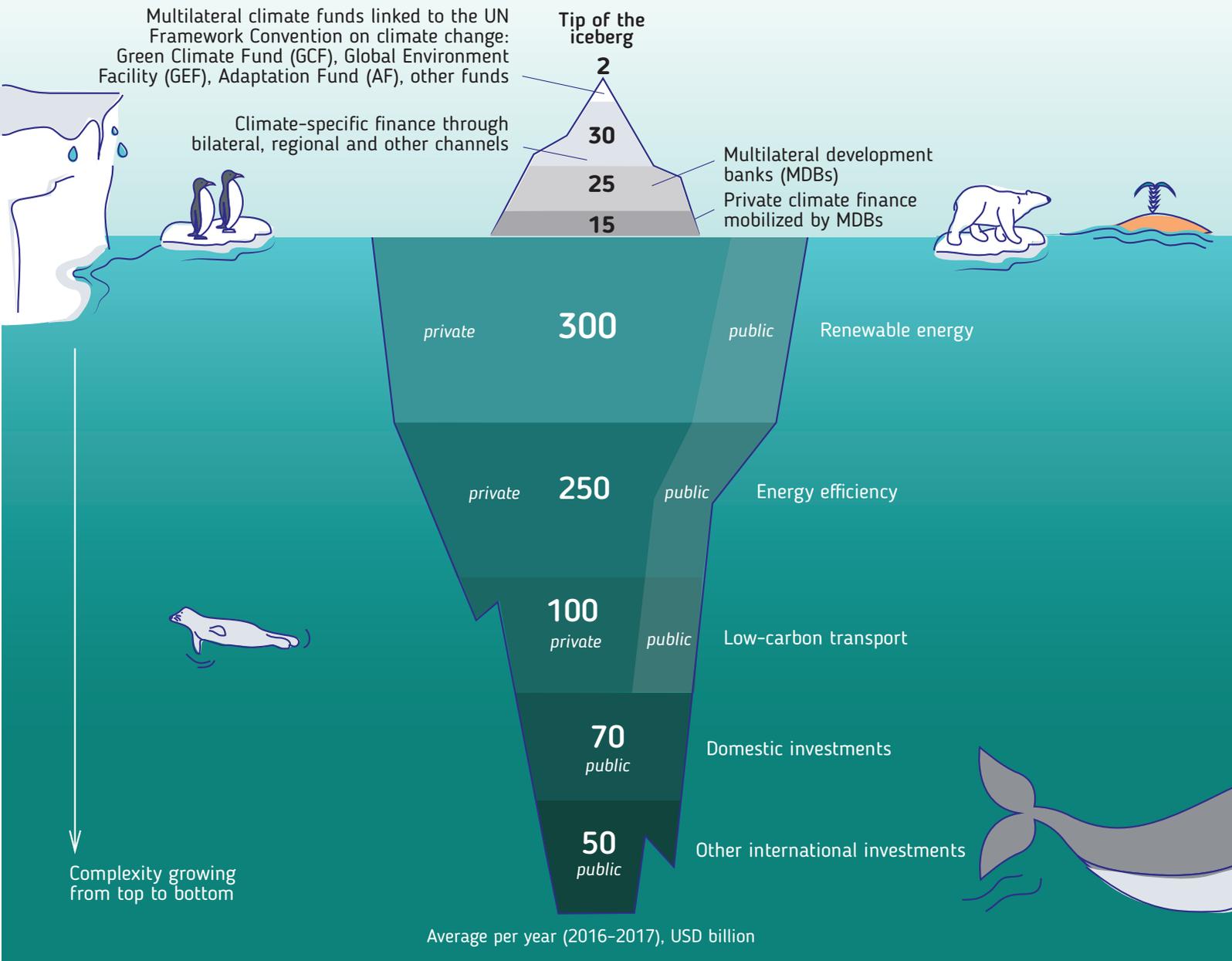
industries and appliances; forests and land use; health, food and water security; livelihoods; ecosystems and ecosystem services; and infrastructure and the built environment (GCF 2020a). Currently the GCF is the largest global climate fund and has raised \$10 billion in pledges from 49 countries, regions and cities. All Central Asia countries have designated the national authorities to work with GCF projects, started GCF readiness activities and some countries have already submitted and received project funding via the international organizations and banks.

The Clean Development Mechanism (CDM) enables emission reductions in developing countries through investments and technology transfer by developed countries under the Kyoto Protocol. The total investment in registered CDM projects globally is \$200 billion, including \$90 billion of investments in projects known to be operating. China, India and South Asia countries are major recipients of CDM projects, while in Central Asia only Uzbekistan has successfully designed and launched several CDM projects. The Adaptation Fund – another UNFCCC mechanism – is primarily financed by a 2 per cent levy on certified emission reductions from CDM projects and additional contributions from donors. Total contributions to this fund reached \$980 million by October 2020. Uzbekistan, Turkmenistan and Tajikistan have all received its funding.

Private climate funding, including support from households, corporations, investors and banks, has outstripped public funding over the past 10 years. Governmental (public) climate funding exceeds \$130–150 billion per year, and developed countries provide contributions via bilateral and multilateral development agencies and make pledges to the global climate funds.

Climate mitigation, especially renewable energy, low-carbon transport and energy efficiency projects, currently attracts more than 90 per cent of the total global climate finance. Grants make up less than 5 per cent of the global climate finance (and less than 20 per cent of the public climate finance provided by developed countries), yet the proportion of grants varies from country to

Global climate financing profile



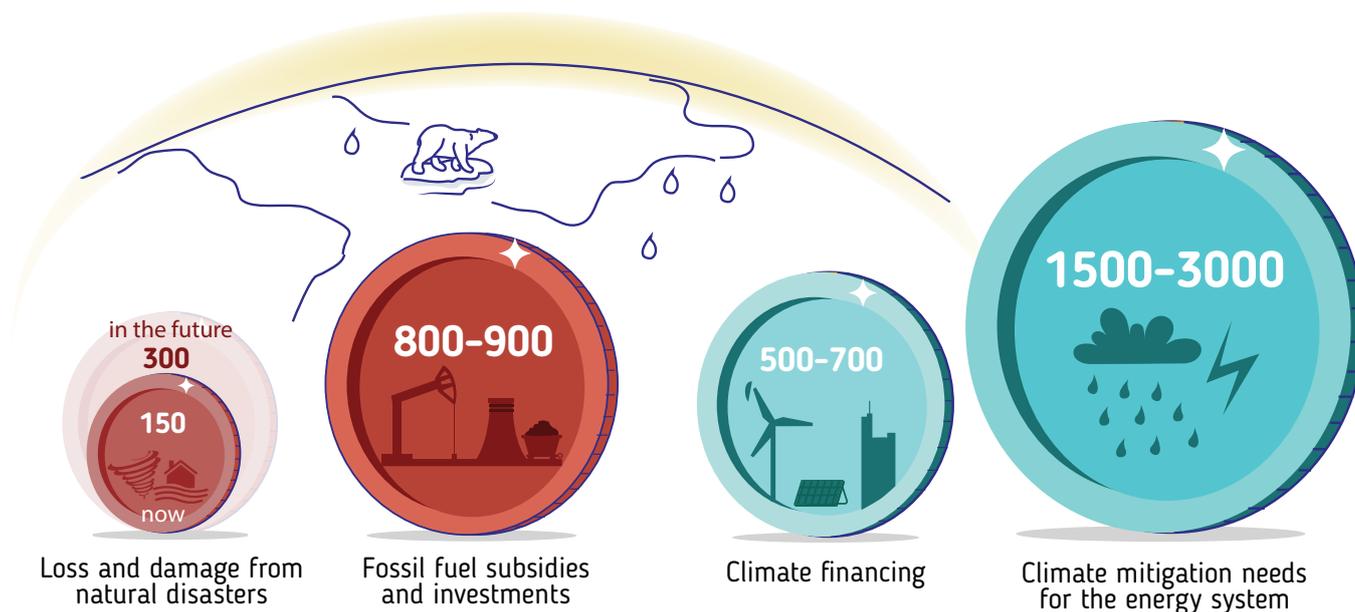
country, with a larger share of grant funding in low-income nations.

More conservative or narrowly focused assessments of climate finance often consider only the tip of the iceberg – project funding available through multilateral climate funds and climate-specific support from developed countries.

Such estimates can be accurate for the specific areas, but they may grossly underestimate the contributions of other climate finance sources and actors, principally the private sector. The UNFCCC conducts a periodic review of global climate finance flows and provides a comprehensive survey and analysis (UNFCCC).

Global climate financing in context

Billion US dollars per year



Globally, total climate financing (as a combination of public and private sources) is estimated at \$500–700 billion per year for the 2016–2018 period (OECD, UNFCCC). This may seem like a lot of money, but the annual average losses caused by natural disasters is estimated at \$150 billion a year in the past decade, an amount likely to grow to \$185–300 billion per year due to climate impacts (ADB). And climate financing is lower than fossil fuel subsidies and investments (UN).

Current climate finance levels fall well short of the estimated \$1.5–3.0 trillion a year required for the energy system alone (and \$6.9 trillion a year for all infrastructure investments) to meet the objectives of the Paris Agreement (2015) to reduce carbon emissions to limit the growth of global temperatures to 1.5°C–2.0°C from pre-industrial levels (CPI). The Global Commission on Adaptation (GCA, 2019) estimates adaptation costs at \$180 billion per year, where investing \$1 in resilient infrastructure in developing countries could yield between \$5 to \$9 in benefits by making infrastructure and dryland agriculture more resilient.

The commitment by developed countries to mobilize \$100 billion a year in climate finance by 2020 is a central element of the Paris Agreement. The Paris Agreement-related climate finance mobilized by developed countries increased to \$60 billion in 2018 (OECD, UN). If private climate finance mobilized by public finance is added, the total climate finance would reach \$78 billion. Preliminary data suggests a likely increase in public climate finance to about \$90 billion by 2019/2020 (UN). Countries have different methods and approaches for defining climate projects and many countries use a range of coefficients that apply depending on whether climate was the primary (up to 100%) or secondary (20%–50%) objective of such projects.

Typical indicators for climate finance projects



Agriculture

Modernize irrigation systems



Number of kilometres of infrastructure managed according to standard codes of practice
Reduction in annual maintenance costs

Improve agricultural practices



Number and percentage of farmers who adopt varieties or breeds adapted to new climate conditions
Land area cropped with adaptive varieties; percentage of total cropped area



Energy

Modernize hydropower plants



Number of plants adopting standard codes of practice; percentage of total plants
Reduction in annual maintenance costs

Diversify energy sources



Number and capacity of new wind, solar and biogas facilities; percentage of total energy
Number of businesses investing in micro-generation

Improve transmission and distribution systems



Number of kilometres of systems developed and managed according to standard codes of practice
Reduction in annual maintenance costs

Increase efficiency in buildings and communities

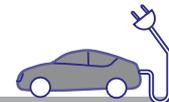


Number of buildings developed and managed according to standard codes of practice



Transport

Improve transport infrastructure



Number of kilometres of transport infrastructure developed and managed according to standard codes of practice
Reduction in annual maintenance costs



Water

Modernize water supply infrastructure



Number of kilometres of water supply infrastructure developed and managed according to standard codes of practice
Reduction in annual maintenance costs

Increase water use efficiency in communities



Number of communities that adopt enhanced water use practices; percentage of total communities
Number of communities that adopt water pricing policy reforms



Forestry

Improve forestry management



Number of hectares under sustainable forestry practices

Increase forested areas



Number of hectares planted in afforestation

The range of climate financing options spans levels of engagement from the global to the local and includes all manner of approaches from the general to the specific. Public and private sources work separately and together, and encourage innovation, experimentation and variations on established practice tailored to specific needs and conditions.

At first glance, the international climate funding in Central Asia may seem modest compared to the climate impacts and the needs – \$2.5 billion. Other global climate hotspots such as small island developing states, least developed countries and the booming economies of greater Asia are getting more international attention and funding.

The road to Green Climate Fund financing

The Conference of the Parties to the UN Framework Convention on Climate Change established the Green Climate Fund to help developing countries reduce their greenhouse gas emissions and enhance their ability to respond to climate change. As the world's largest dedicated fund for this purpose, the GCF supports the Paris Agreement goal of keeping the average global temperature increase well below 2°C by providing developing countries with climate finance.

The Green Climate Fund recommends that applicants for funding begin by submitting a concept note – a document providing basic information about a project or programme – that the Fund uses to determine how the concept aligns with its objectives. As a formal matter, the concept note is submitted by an Accredited Entity, which is an institution the Fund accredits for developing proposals and for monitoring and reporting on project activities, or by a National Designated Authority (NDA), which is the main point of communication between a country and the Fund. The NDA also provides a no-objection letter.

Prior to submitting a concept note, an applicant needs to have an idea for a project and knowledge of what GCF supports. Generally, the Fund supports mitigation efforts to reduce emissions related to transport, energy, forest and land use, and buildings, cities, industries and appliances. It also supports adaptation efforts to increase resilience related to health, food and water security; livelihoods; infrastructure and the built environment; and ecosystems. Detailed information on GCF project requirements is available at the Fund's website → www.greenclimate.fund. Once the Fund

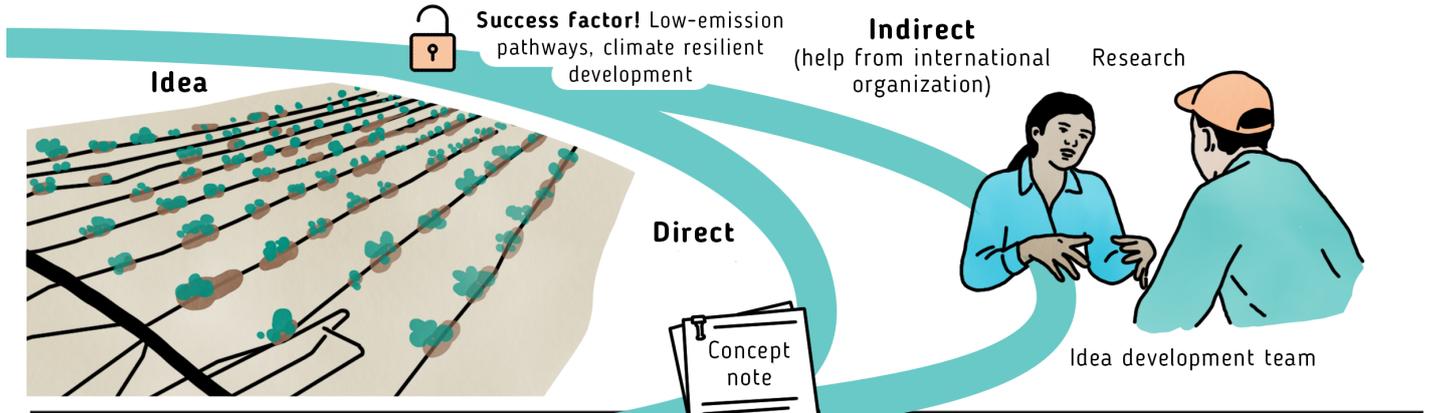
endorses the concept note, the applicant prepares a full proposal.

GCF policies, procedures and guidelines inform the design of all projects, and applicants need to review the Fund's results management framework; environmental and social safeguards; gender policy and action plan; stakeholder consultation and engagement principles; co-financing policy. Proposals should reflect the consideration of these design elements.

The proposal itself starts with a description of the climate context – the problem to be addressed, the demographic, economic and geographic characteristics of the area to be served and the project's relationship to other climate-related efforts in the area. Next comes a statement that logically connects the project activities to the outcomes needed to satisfy the project's long-term goals. This so-called theory of change considers the activities to be undertaken, the expected effects of the intervention, the barriers and the risks, and is then translated into a logical framework that captures the monitoring and evaluation requirements necessary to ensure the efficacy of each activity.

The proposal must demonstrate how the project aligns with the Fund's investment criteria – how it contributes to the achievement of the Fund's objectives; how it catalyses impacts beyond the project investment and brings transformative changes to the sector; how it meets the needs of the country and the targeted population; whether the country has the capacity to implement the project; and whether the project is economically

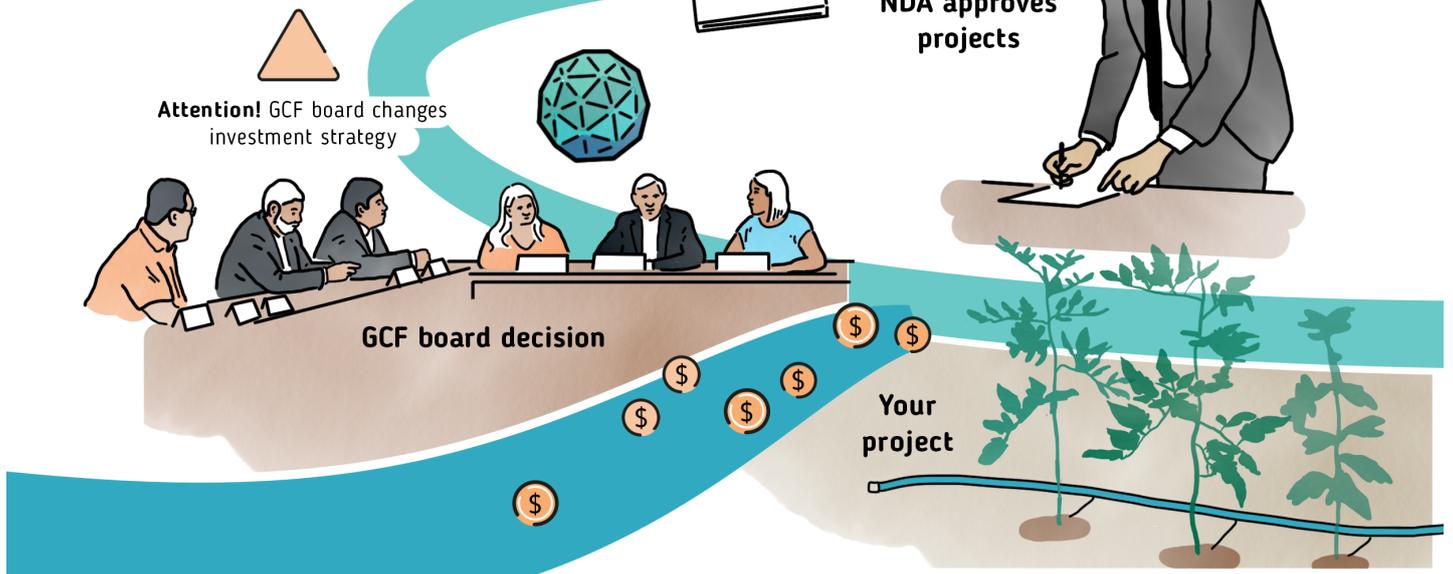
1. Idea development and concept note phase (duration around 6 months)



2. Proposal (duration around 6 months or longer)



3. Decision



and financially sound. Project proponents must also identify any important risks the project may face and propose measures to mitigate those risks; explain how the project will manage any environmental and social risks; and develop a plan for integrating gender considerations into the project.

Finally, the proposal must develop a GCF funding request supported by a detailed budget and other

related documents; justify the funding request with an explanation of why GFC support is critical in light of other potential funding and in consideration of barriers; and demonstrate that the project is financially viable in the long run after the GFC funding is exhausted. As with the concept note, the proposal must be accompanied by a no-objection letter from NDA.

Preparing bankable projects

The World Bank (2019) distinguishes between the use of “bankable” in the traditional investment financing context – having sufficient projected cash flow and high likelihood of success for the approval of commercial lenders – and in the context of climate financing, where projects win approval based on objectives, likelihood of success and sustainability. The World Bank (2019) defines climate finance as “any national, regional, or international financing provided for activities or projects that address the causes or impacts of climate change.”

Many climate projects rely on both public and private finance, and the bankability of projects is important to both sources. Project developers need to know the climate finance institutions’ objectives, eligibility criteria, application procedures and project cycles.

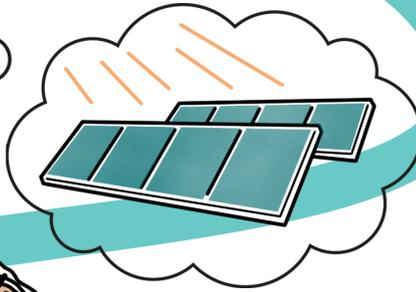
Climate finance projects also need to align with any relevant climate and development policies at the national and global levels. The source material: national communications to the UNFCCC; national climate change strategies and adaptation plans; national development strategies; sectoral strategies; regional plans; gender policies and plans; and the Sustainable Development Goals (World Bank 2019).

Finally, projects that capture co-benefits can attract more interest and support. They can build, for example, community resilience, protect human health or restore biodiversity.

The European Union, through its regional cooperation programme on environment, climate change and water (WECCOP) in Central Asia, has produced “Investor Guide” for preparation of investment projects on environment, climate change and water with information on the requirements and conditions, project cycles, and environmental and social criteria, set by various donors providing funds for climate adaptation and mitigation. Interested users and readers of this report are welcome to consult with the EU-sponsored climate and energy mechanisms available to Central Asia, including energy efficiency, clean energy and green development facilities implemented through the European Investment Bank (EIB) and European Bank for Reconstruction and Development (EBRD) partnerships with local banks.

China is a key trading and lending partner to Central Asia, and increasingly, countries of the region have access to sector- and project-level financing offered by China as part of the Belt and Road Initiative (BRI) or under bilateral agreements. China has recently designed and continues to work on its overseas investment greening principles and climate considerations, while the BRI International Green Coalition was established after the second high-level BRI Forum held in 2019. Cities, industries and individual entrepreneurs from Central Asia can study and pursue climate-relevant projects through these emerging opportunities. Funds and investment sources linked to the Islamic cooperation are also active in the region in the areas of renewables and energy efficiency, agriculture and transport.

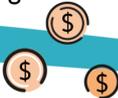
1. Money, idea and research



2. Presentation to climate funds or programmes

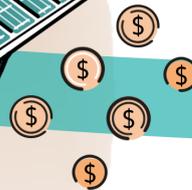
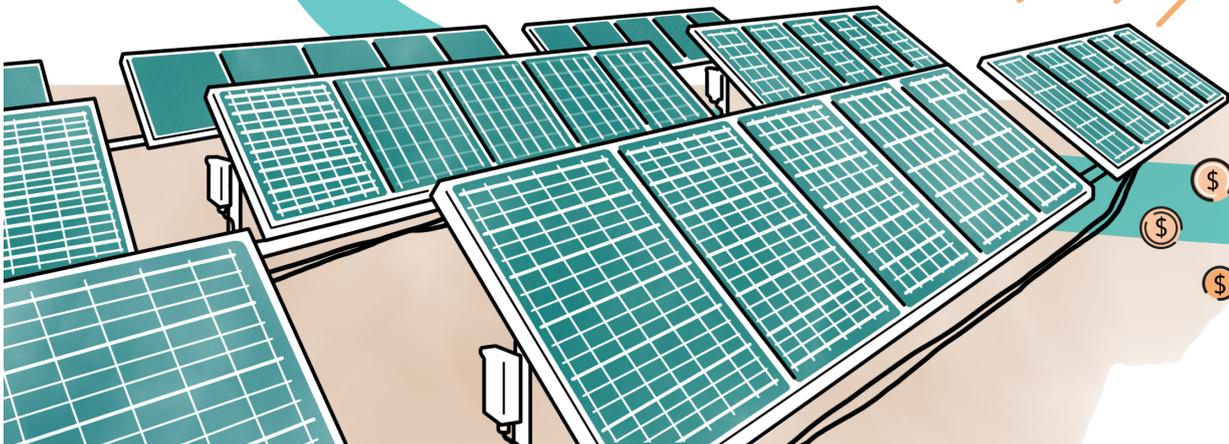


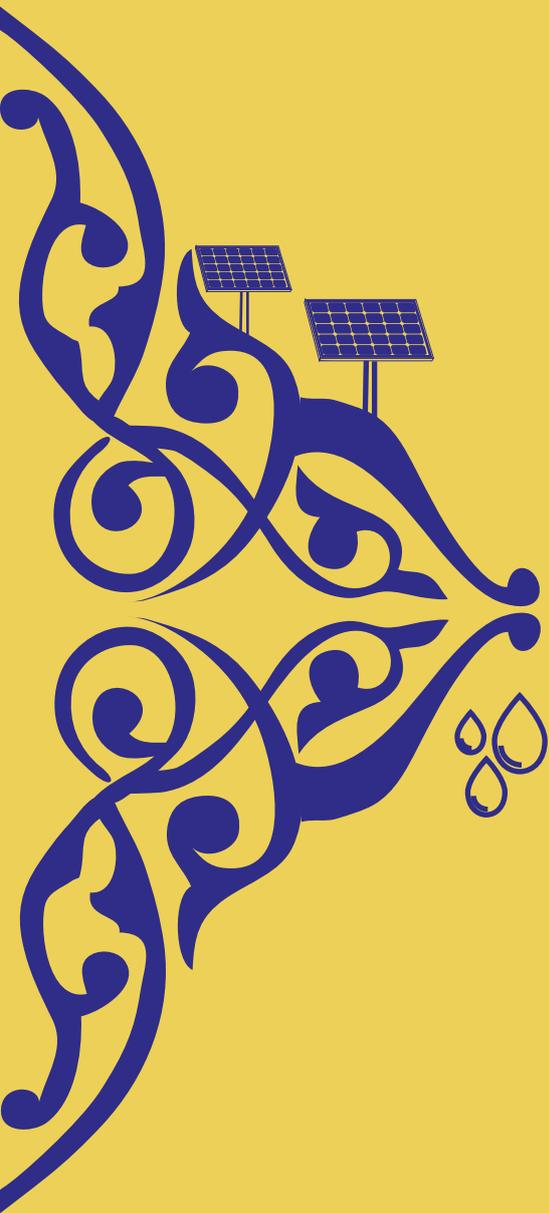
3. Cooperation with green banking



Attention! Many countries in Central Asia have state tariffs on electricity

4. Green project financing





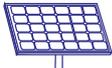
Regional synthesis and country overviews

Selected climate adaptation and mitigation projects financed by public and private sources

Clean energy



Wind power



Solar power

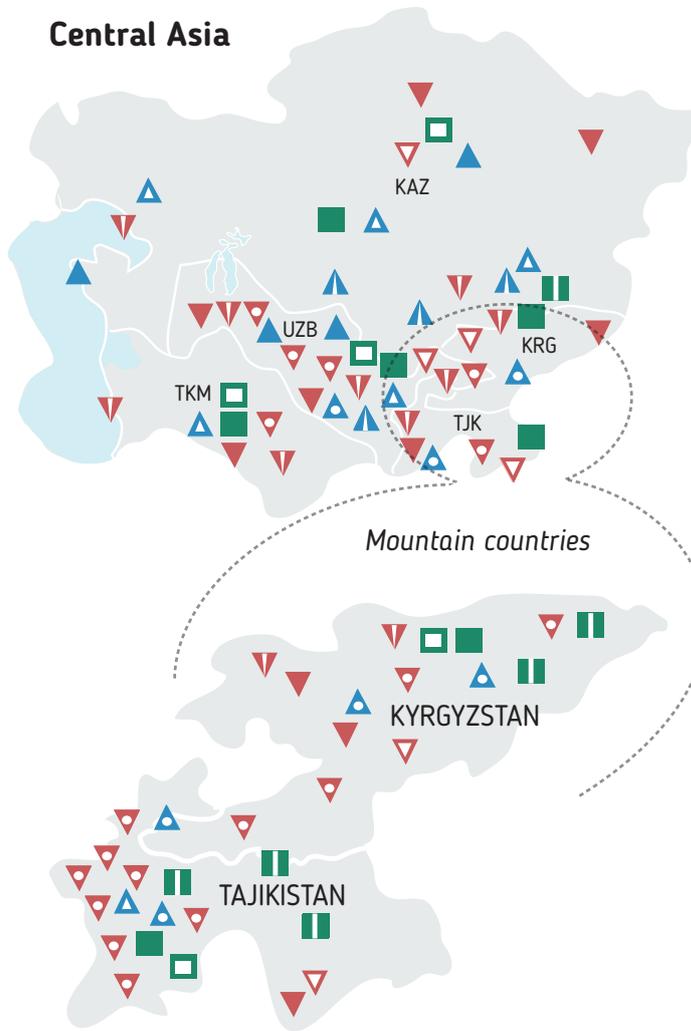


Hydropower



Gasification, natural gas for transport

Central Asia



Climate resiliency



Afforestation, tree planting



Coastal, river and water management



Climate adaptation in agriculture, food security



Early warning, risk reduction

Climate science, knowledge and engagement



Climate observations, hydromet modernization



Glacier studies



Demonstration projects



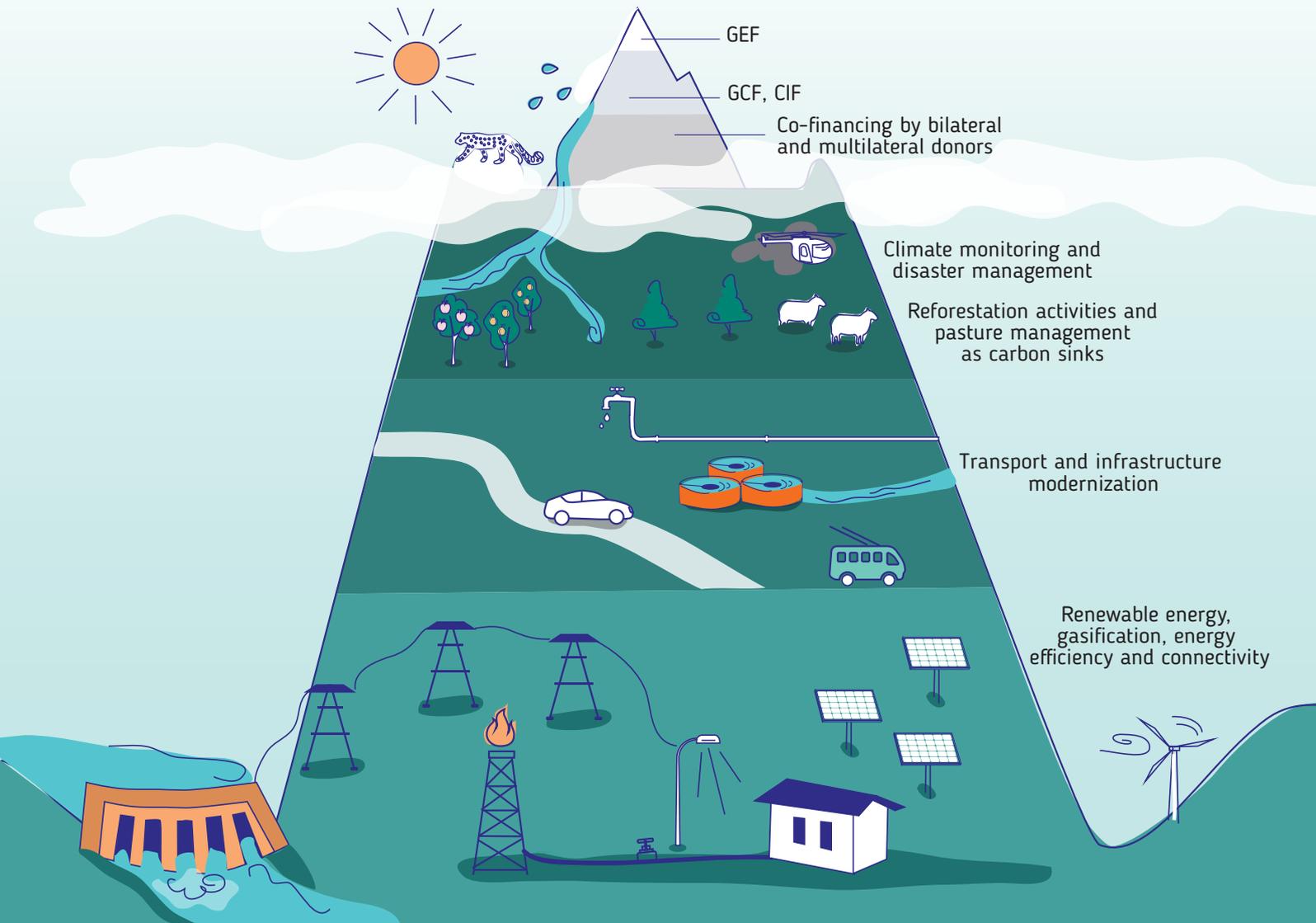
Reporting on climate and developing climate strategies

This survey reviews the direct funding and co-funding from official climate mechanisms and from private and public investments in sector-specific initiatives – projects related to energy, water resources, transportation infrastructure and agriculture, to name the most common. It also considers funding that supports countries and communities in building climate resilience – projects on energy and food security; waste and sanitation; environmental governance and hydrometeorological systems; and disaster risk reduction. These are all areas specified as priorities or concerns in countries’ official communications and nationally determined contributions to the UNFCCC, and while the climate connection may be less direct, it is no less vital in the response to climate change in the region.

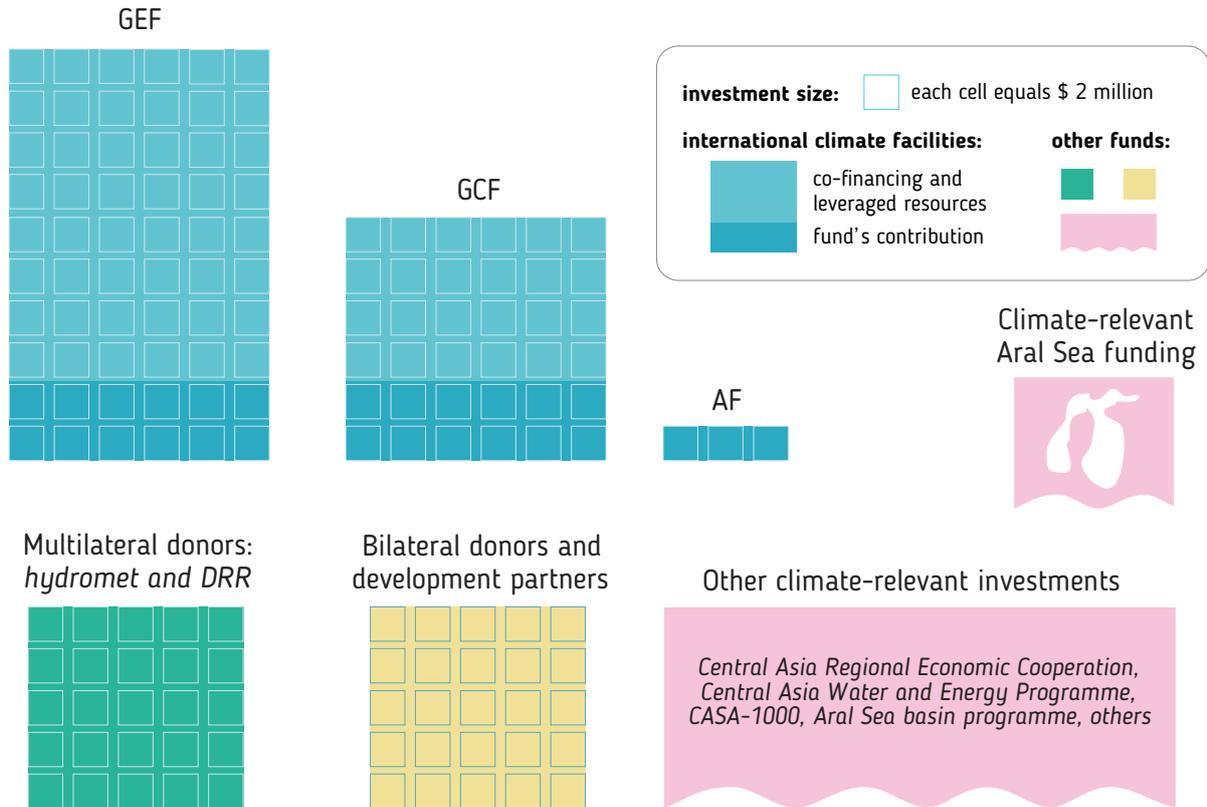
Sources of international climate financing in Central Asia include the Green Climate Fund (GCF), the Global Environment Facility (GEF), the Climate Investment Funds (CIFs) with co-financing or additional projects by the European Bank for Reconstruction and Development (EBRD) and its Green Economy, Renewable Energy, Water Resiliency and Energy Efficiency finance facilities; the World Bank; the Asian Development Bank (ADB); the Food and Agriculture Organization of the United Nations; and others. The simplified regional map displays selected projects in the energy sector, the agriculture and water sectors, and those with a focus on climate science, knowledge and policy engagement. Projects are scattered across the region with Turkmenistan having few projects relative to the other countries, and Tajikistan having many relative to its size.

The global climate funds – GEF, GCF, Adaptation Fund and Climate Investment Funds – are important sources of funding in the region, but in keeping with the narrow focus on these UNFCCC-related mechanisms, the countries of Central Asia have regarded projects supported by these funds as their entire climate action portfolios. They also tend to consider climate fund allocations to be the total monetary value of climate projects and disregard the often substantial co-financing. This approach prevents the countries from counting their own domestic and regional climate financing and leveraged financing, and so may underestimate and disregard many multi-million dollar private and public investments in clean energy, afforestation, disaster risk reduction, improved climate monitoring or enhancements in energy and water efficiency. As a result, the smaller contributions of the global climate funds and multilateral partners are clearly identified while the larger contributions of domestic sources remain unknown.

Climate financing profile of Central Asia



International climate funding at the regional level in Central Asia



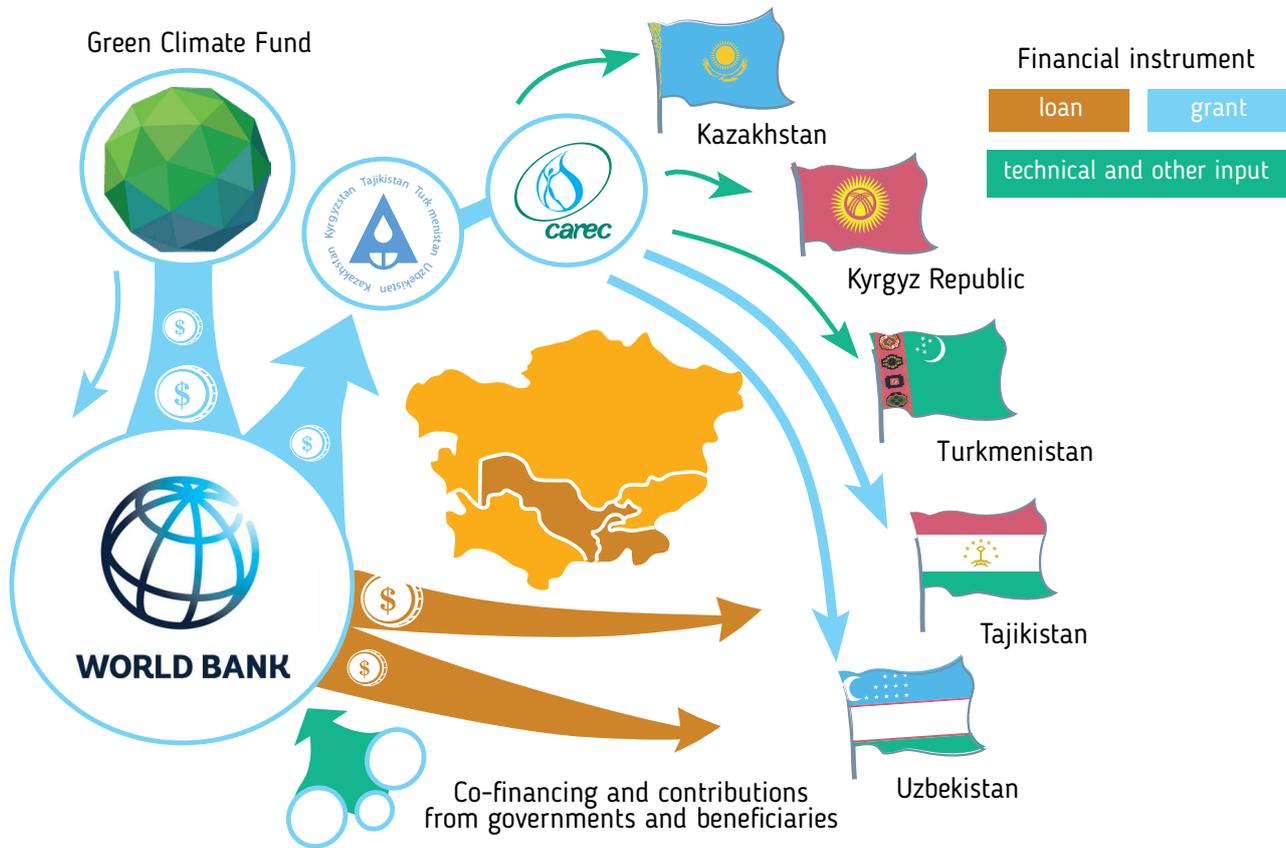
Scope of funding at the regional level mainly considers projects which support the Central Asia region at large, and are not country specific, but often such projects would focus on two or three countries, rather than all five. This is one of the complex factors in the analysis and attribution of climate finance to sectors and countries. GEF has been present in the region for more than two decades. It was instrumental in the initial efforts to mitigate the Aral Sea crisis. Over the past decade, GEF was one of the main sources of support to regional climate actions and leveraged high co-financing.

As a new major global source of climate funding, the GCF is supporting projects in Central Asia on energy transformation, hydropower resilience, food security and hydrometeorology. Some

of these projects are regional in nature, including geographically beyond Central Asia. The regional Climate Adaptation and Mitigation Program for the Aral Sea Basin (CAMP4ASB) supported by GCF is uniquely positioned. It targets regional needs of Central Asia with focus on the Aral Sea basin and national components in Uzbekistan and Tajikistan.

The first regional Adaptation Fund project implemented by UNESCO is just starting. It focuses on glacial lakes and reducing risks, which are often cross-boundary. Several regional initiatives funded by bilateral and multilateral donors address regional-level improvements in climate services, energy and water reforms and technologies.

CAMP4ASB: example of regional climate project



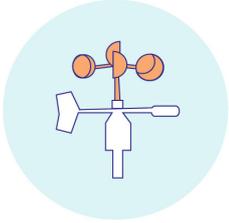
The CAMP4ASB programme (2016–2020, ongoing) supports the development of knowledge and the capacity to act on climate change in Central Asia and encourages national and regional cooperation. It provides financing and technical assistance, capacity-building and analytical support. National components in Tajikistan and Uzbekistan provide micro-loans to farmers for climate adaptation while assisting local banks and finance ministries to make climate financing understandable, attractive and sustainable. In addition, both countries benefit from technical support in improving and automating their meteorological services. All countries of the region benefit from regional climate forums, networks, knowledge products and trainings.

This programme is funded by GCF (\$19 million), the World Bank (\$38 million) and co-financed by

contributions from governments and beneficiaries (\$11 million). GCF funding to CAMP4ASB targets the most climate-vulnerable rural communities and strengthens their food security.

The International Fund for Saving the Aral Sea (IFAS) is a formal high-level entity responsible for the CAMP4ASB programme. In the implementation of this programme, IFAS is supported by the Regional Environmental Centre for Central Asia (CAREC) – an experienced organization with offices in all five countries. It engages with numerous NGOs, academia, parliamentarians and hydrometeorological services, and works closely with the mass media to cover climate issues. More detailed information is available on the CAREC project website → www.ca-climate.org and Central Asia Climate Information Portal → centralasiacclimateportal.org.

Other regional climate-relevant projects



Hydrometeorology and disaster risk reduction

Over the past 10 years, the World Bank has implemented the Central Asia Hydro-meteorology Modernization Project (CAHMP) with financing of \$39 million aimed at improving the accuracy and timeliness of hydrometeorological services, with a particular focus on the Kyrgyz Republic and Tajikistan. By 2020, the project helped fully automate meteorological stations in Tajikistan, upgrading manual observations and enhancing hydrological and agrometeorological monitoring. It assisted in meteorological network rehabilitation and increased automation in the Kyrgyz Republic and supported other countries in improving skills and technical capacity in weather forecasting. In addition to country-level support, the project implements a flow forecasting and flood warning system for the Amu Darya and Syr Darya basins and Central Asia flash flood guidance system and contributes to regional information exchange. GFDRR, managed by the World Bank, is supporting regional disaster risk reduction efforts.



Energy, transport and water

The Central Asia Water and Energy Development Programme (CAWEP) is a partnership between the World Bank, the European Union, Switzerland and the United Kingdom. It promotes energy and water security at the regional level and in the beneficiary countries. Since its inception in 2009 it has helped in diagnostic analyses and water and energy information systems, strengthening institutions, and supporting investments in energy and water.

Central Asia Regional Economic Cooperation (CAREC) is a partnership of 11 countries, including all five Central Asian countries, and development partners working together on connectivity, energy, trade, tourism and other areas. Since its inception in 2001, CAREC has mobilized more than \$37 billion in investments. Of this, \$14 billion has been financed by ADB; \$14.8 billion by other development partners including the World Bank, the Islamic Development Bank, and the European Bank for Reconstruction and Development; and \$8.2 billion by governments. It aims to achieve a reliable, sustainable, resilient and reformed energy market by 2030.



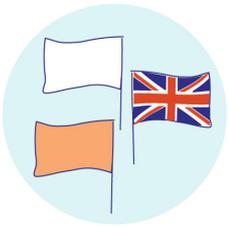
Science support to decision making

The new regional GEF and Adaptation Fund projects implemented by UNESCO target regional improvements in glacier monitoring and preparedness for, and response to, the risk of glacial lake outburst floods. In January 2020, Germany launched a new regional initiative "Green Central Asia", with focus on climate and security. Via GIZ, it will support countries in assessing the impacts of climate change and in taking preventive measures. German organizations will assist in snow cover and water assessments, climate impact analysis and science-policy links.



European climate and green economy partnership

The European Union development cooperation for Central Asia amounts to over \$1 billion through bilateral and multilateral channels. The EU–Central Asia Platform on Environment, Climate Change and Water Cooperation (WECOOP) was established in 2009, and contributes to policy dialogue among the Central Asian countries and cooperation with the EU. In 2020, the EU launched the SWITCH Asia \$14 million grant programme covering sustainable tourism, agri-food and textile industries in Central Asia and \$8 million Sustainable Energy Connectivity in Central Asia (SECCA) programme, which will strengthen institutional and regulatory capacity, raise awareness, improve data and modelling and facilitate the identification of bankable projects.



Climate and water diplomacy

The UK, as a host to the 26th Conference of the Parties to UNFCCC, is increasing its support to Central Asia for better preparedness for the landmark climate negotiations. Switzerland – a traditional donor of Central Asia countries – is extending its support bilaterally and through regional initiatives, such as Blue Peace and glacier monitoring (CICADA). In addition, Switzerland, being a GEF Council Member, represents interests of Central Asian states and Azerbaijan in the GEF. It supports BIOFIN projects in Kyrgyzstan and Kazakhstan, which help map out and understand domestic and international biodiversity and environmental finance in both countries – an experience that could be replicated across Central Asia. Germany, Finland, US and other countries also provide science, technical and policy support.

Each of the countries of Central Asia has its own climate priorities, international commitments and national plans and strategies, but shared interests – in the Aral Sea and Caspian Sea basins, in vital rivers crossing the boundaries of several countries, in the populous and fertile Ferghana Valley and elsewhere – offer opportunities for the countries to collaborate.

The country sections that follow provide highlights on key institutions, legislation, incentives and featured projects that are important for climate mitigation and adaptation efforts. The country profiles present a condensed selection of country features and facts, and for further details readers can explore references in this document or websites of the major organizations mentioned in this review.

Kazakhstan



Kazakhstan is the largest country of Central Asia with vast grasslands, deserts and mountains and is the most coal energy dependent economy of the region. It has identified adaptation priorities and ambitious mitigation measures, especially those related to the transition from coal-based energy to cleaner sources. The country is relying on international climate finance and domestic resources and is working to expand its project portfolio through GCF readiness activities and green finance services. In line with national priorities, a large proportion of climate financing goes to energy efficiency and renewable energy projects. Other sectors with climate financing support include transport, agriculture and water.

Kazakhstan is a leader in international climate financing among Central Asia states. It has received funding from global climate funds and leveraged co-financing from multilateral banks and bilateral channels in excess of \$1.7 billion over the past ten years. About \$1.3 billion of this funding comes from two principal sources – the Green Climate Fund and the Climate Investment Funds (CIF) – and the associated co-financing from the European Bank for Reconstruction and Development and other multilateral banks. These projects are providing long-term concessional finance to encourage private sector investments in solar, wind, small hydro-power and biogas projects, to improve energy efficiency and to step up progress towards a circular economy.

The European Investment Bank (EIB) supports Kazakh banks with credit lines targeting small- and medium-sized enterprises. The European Union has supported implementation of the green economy

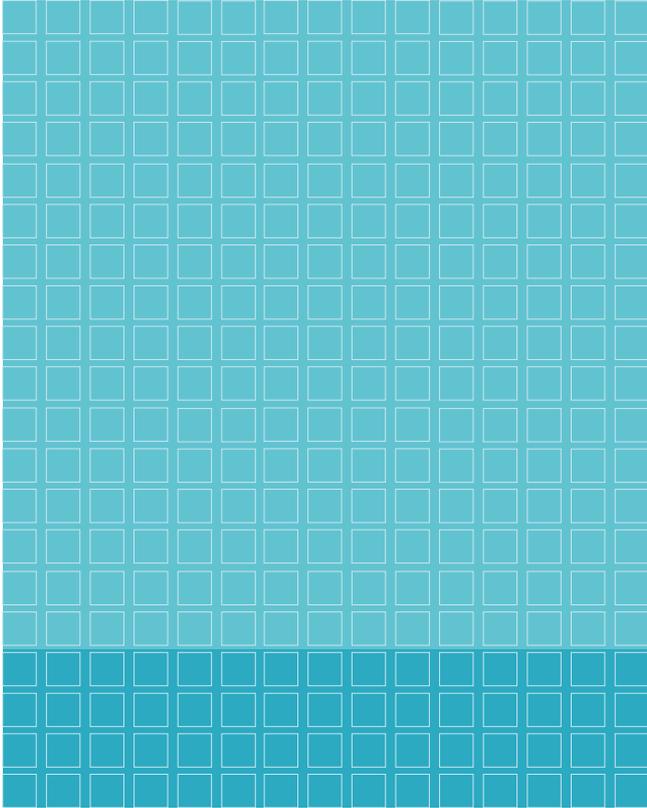
in Kazakhstan and the EU Delegation in Nur-Sultan is in charge of several regional EU funded projects. Bilateral support mainly comes from the US, Switzerland, France, Germany, Korea, Norway and the United Kingdom. Kazakhstan is a direct neighbor of China and cooperates under the Belt and Road Initiative on science, trade and technology.

Through improved weather and agrometeorological forecasting and flood warnings, local authorities, farmers and businesses can prepare for extreme weather impacts and prevent millions in losses and damages. Bilateral assistance, the GEF and regional projects and experience exchange all provide support for improved reporting and policymaking on climate change. Since 2018, Kazakhstan has participated in the Partnership for Action on a Green Economy (UN-PAGE), which helps countries introduce fiscal policy to reduce carbon emissions, and provides advice on developing legal tools for the revised Environmental Code and on developing circular economy sub-programmes, particularly on waste and sustainable public procurement.

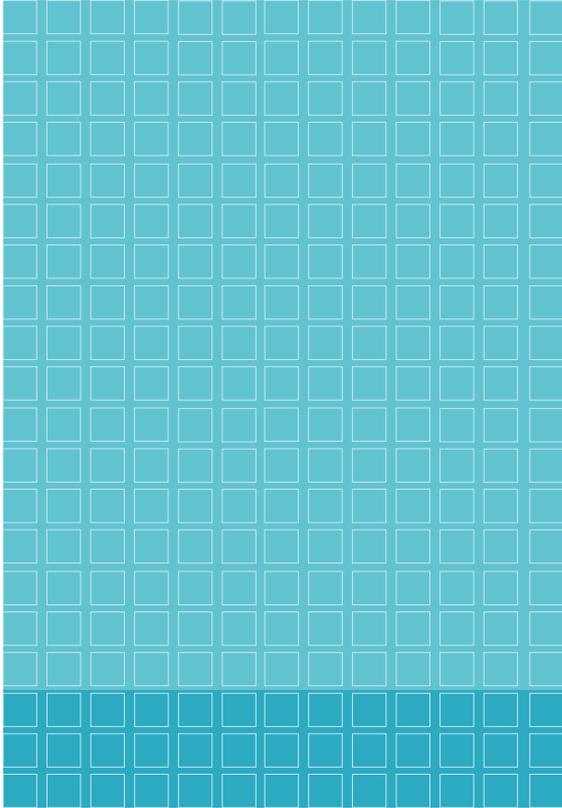
The Global Environment Facility helped Kazakhstan promote energy efficiency and renewable energy, make cities greener and conserve landscapes acting as natural carbon sinks, particularly the grasslands of northern Kazakhstan and the wild apple forests in the mountains. More than \$30 million provided by GEF resulted in a cumulative value of climate-relevant GEF projects implemented in Kazakhstan in excess of \$300 million. The United Nations Development Programme (UNDP) is the main implementing agency of GEF projects in the country and has mobilized additional resources to support Kazakhstan in climate risk assessment,

International climate funding in Kazakhstan

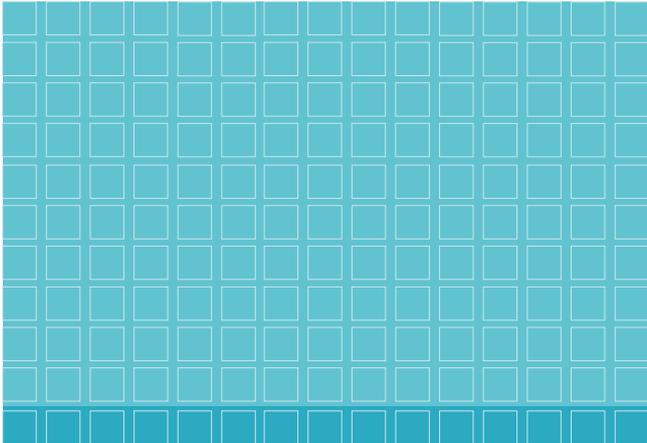
GCF



CIF



GEF



SCCF



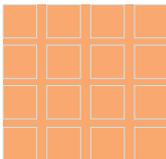
Bilateral donors and development partners



Multilateral donors



Green Economy Finance Facility (GEFF EBRD)



Other climate-relevant investments



investment size:  each cell equals \$ 2 million

international climate facilities:  co-financing  fund's contribution

other funds:    

resilient wheat production and food security measures, clean energy and the revised Nationally Determined Contributions under the Paris Agreement. The GEF Small Grants Programme Kazakhstan portfolio is diverse and covers numerous climate actions at the local level.

Through UNDP, Kazakhstan is participating in the Biodiversity Finance (BIOFIN) initiative and along with the Kyrgyz Republic has gained valuable experience in assessing and mapping the domestic and international sources of finance targeting biodiversity conservation. Currently, Kazakhstan is piloting biodiversity impacts offsetting measures. The Biodiversity Conservation Fund of Kazakhstan is the first non-state facility in the country to finance nature conservation and restoration through forest plantations, nature regeneration, ecotourism, alternative income activities and awareness-raising, and has worked with corporations and international donors to mobilize resources. While specialized state-regulated mechanisms exist for waste recycling and the cleanup of legacy pollution, the country has no plans to establish a centralized, government-managed domestic fund that would accumulate emission fees and other payments to reinvest in pollution reduction and prevention or climate action. Experience shows that only 5–30 per cent of environmental fees collected by the local authorities are directed to environmental restoration and improvement. The national Emissions Trading System (ETS) regulates domestic CO₂ emissions and encourages the development of low-carbon technologies. The system covers the energy, oil and gas sectors; mining; metallurgy; chemicals; and processing industries, and has recently been revised.

Vision 2050 and the Concept for a Transition to a Green Economy – defining documents for Kazakhstan’s future – direct sectoral strategies and regulations towards green growth. Kazakhstan is the only country in Central Asia to set and periodically assess so many energy, water, waste and other environmental targets. A long-term low-emission development strategy for 2050, currently under development with support from Germany, is another strategic document that will focus on cross-sector integration of the nationally

determined contribution targets and other climate priorities. These long-term strategies and targets give confidence to businesses and, when coupled with modern legislation and incentives, open a broad niche for climate actions financed from international and local public and private sources.

The Law on Energy Saving reinforces the government’s legal authority to regulate energy markets, enumerates energy efficiency principles, and specifies minimum energy performance standards for equipment and buildings. The Law on Supporting the Use of Renewable Energy Sources establishes a foundation for a feed-in tariff scheme and auctioning system. The revised Environmental Code of Kazakhstan – comprehensive framework legislation that went through an initial parliamentary review in October 2020 – considers incentives to support the uptake and scaling up of green technologies, the reduction of carbon emissions, and adaptation to climate change. Once adopted, it can serve as an example for other countries of Central Asia through the regional network of parliamentarians on climate change.

Kazakhstan’s Sovereign Welfare Fund provides energy sector financing directly through investments and indirectly as a shareholder in state-owned companies. It has received advice and support from international partners on greening its investment portfolio. Kazakhstan hosts the Astana International Finance Centre (AIFC), which was launched in 2018 and is poised to play a key role in investments for the Eurasian Economic Union, other countries of Central Asia and the Caucasus, western China and Mongolia. The AIFC includes the Green Finance Centre, which has recently produced a concept on the introduction and development of green finance instruments and principles in Kazakhstan.

In 2020 the Damu Entrepreneurship Fund at the Astana International Exchange (AIX) issued the first Kazakhstan green bonds, which support small- and medium-sized enterprises in implementing green projects, primarily on renewable energy. In the same year, ADB has raised 14 billion Kazakh tenge (KZT), equivalent to \$32 million, as the first green bonds auctioned and listed on the Kazakhstan

Stock Exchange (KASE). In 2018, the Government of Kazakhstan established the International Green Technologies and Investment Center, which works on renewable energy, waste and other projects. A combination of favorable policies and institutional factors makes Kazakhstan well prepared for more ambitious climate actions.

The Ministry of Energy, the Ministry of Ecology, Geology and Natural Resources, the newly created Ministry of Emergencies and the national hydrometeorological service are key state players in Kazakhstan's climate actions. The Kazakh branches of the International Fund for Saving the Aral Sea and the Eurasian Development Bank are involved in climate analytics and support of climate-relevant projects.

Kazakh non-governmental organizations (NGOs) are important partners in climate action, with Eco-Forum Kazakhstan being the umbrella organization for many environmental NGOs.

Finally, Kazakhstan is a host to several regional centres based in Almaty – the Regional Environmental Centre of Central Asia, the Regional Disaster Risk Reduction Centre, the Regional Glacier Centre – and to regional hubs of the World Bank, UN organizations and bilateral agencies. The Critical Ecosystem Partnership Fund – a new actor in nature conservation of the Mountains of Central Asia focusing on grants for NGOs, has a regional implementation team based in Kazakhstan, covering all the countries of Central Asia.

Energy, industry and transport



Kazakhstan's reliance on low-quality coal, its inefficient use of heat and electricity and its old energy infrastructure are among the factors that contribute to a carbon intensity of the economy that is among the highest in the world. Achieving the country's green economy and NDC aspirations thus calls for the introduction of low-carbon energy systems, and the transition from coal to less polluting and carbon-emitting natural gas is a priority. With co-financing from private and public funds, the government invested over \$650 million in a gas pipeline that is helping the capital city of Nur-Sultan make the switch. About 10 per cent of its population now has access to natural gas and in the next few years this proportion will expand, and the city's power plants will switch to natural gas. Similar work is underway for Almaty – the largest city of Kazakhstan and infamous for its poor air quality in winter. The amount of investment in these efforts is not yet known, but is likely to exceed \$250–500

million. Overall, the current level of gasification in Kazakhstan is about 50 per cent and by 2025 it will increase by 10 per cent with funding from domestic sources and foreign borrowing.

The country's potential renewable energy sources are significant, and the transition to a green economy envisions an alternative and renewable energy contribution to the total energy mix of 50 per cent by 2050. But limited long-term financing and insufficient technical and management capacity remain as challenges (OECD 2016a).

About ten years ago, Kazakhstan had a target for renewable energy to supply 3 per cent of the country's electricity by small hydropower, wind and solar by 2020. In 2019, these renewable sources contributed to 2.3 per cent of power generation and make Kazakhstan a leader in the development of renewable energy in Central Asia (excluding large

hydropower). Inevitable delays and constraints related to the pandemic may delay the achievement of the 2020 target, while the more ambitious target of 10 per cent is set for 2030. The auction system and clear targets supported by state-supported incentives help attract investors and boost renewable energy.

Financing from the EBRD, ADB, GCF, CIF and GEF supports efforts to reduce energy consumption – and emissions – through more efficient technologies and processes, and through an expansion of renewable energy developed with private sector participation through the Kazakh Renewable Energy Finance Facility. District heating projects include the rationalization of tariffs for heat, the introduction of meters, energy-efficient lighting, energy labelling, and support for energy efficiency improvements in buildings in Nur-Sultan and Karaganda. Bilateral donors also contribute to climate mitigation efforts in Kazakhstan. Switzerland, for example, has allocated \$23 million for energy efficiency investments in more than 80 schools, kindergartens and hospitals.

In September 2020, the EBRD launched a \$30 million Green Economy Financing Facility in Kazakhstan to support green finance for

households and small private enterprises investing in green technology solutions through micro-finance organizations. Thousands of households and small businesses across the country, including small villages and remote rural areas, will benefit from loans of around \$1 500 for investments in climate adaptation and mitigation technologies such as thermal insulation, photovoltaic or geothermal energy and water-efficient irrigation systems.

Industry modernization is under way with the introduction of more energy-efficient technologies. In the transport sector, an aging vehicle fleet and substandard infrastructure are contributing to high emissions. Of the 16 000 kilometres of Kazakh railways, 4 000 kilometres are electrified. Plans for 2020–2025 call for electrification of another 1 000 kilometres. Kazakhstan is a transit country linking Europe, Russia, China and South Asia, and consideration of carbon emission reductions in domestic and transit transport is essential. A UNDP–GEF project has helped Almaty limit the growth of transport emissions and improve environmental quality in the city, and EBRD loans to a municipally owned company have helped reduce GHG emissions by replacing outdated diesel buses with compressed natural gas buses (OECD 2016a).

Agriculture, water and waste management



Agricultural irrigation is the single highest water consumer in Kazakhstan, and the strategically important cotton, rice and sugar beet crops all rely on irrigation systems. The aging drinking water supply and wastewater treatment infrastructure face similar needs. The uneven distribution of water resources across the country implies variable climate change impacts, and poor management and uncoordinated policy have made the irrigation

and water supply systems more vulnerable (OECD 2016a). A World Bank irrigation project with a \$103 million loan combined with co-finance totaling \$343 million is working to rehabilitate irrigation and drainage systems; to improve the management and maintenance of these systems; and to make more efficient use of irrigated lands. Farmers in southern Kazakhstan are receiving incentives and subsidies for the introduction of drip irrigation. Farmers in

wheat-producing areas of northern Kazakhstan are introducing no-till technologies and using agrometeorological forecasts to optimize their operations and reduce loss and damage from weather anomalies and extremes.

The dramatic decline of the Aral Sea, which Kazakhstan shares with Uzbekistan, affected the local climate and undermined livelihoods. World Bank funding with governmental efforts worth \$80 million helped in the Northern Aral Sea recovery, and planned activities budgeted at \$120 million

aim at improving climate resilience of Kyzylorda province through sustainable water and natural resources management and economic development opportunities.

The EBRD supports green city actions and is planning to bring \$30 million in investment to improve solid waste management in Ust-Kamenogorsk and Semey. The private sector and public-private partnerships are involved in waste management and recycling.

Environmental protection, climate monitoring and disaster risk reduction



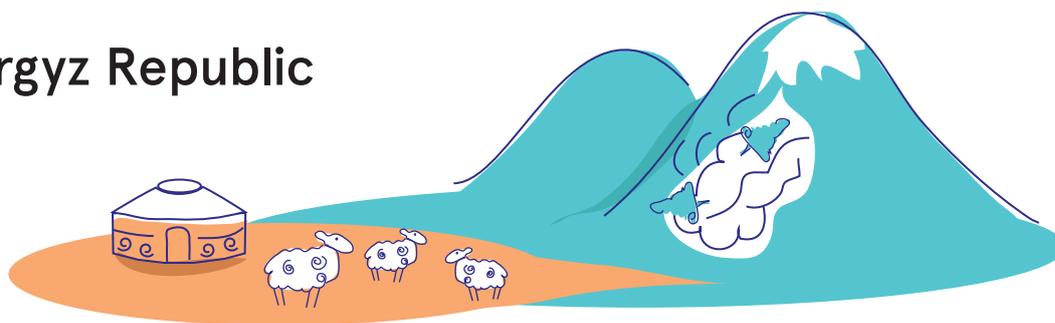
The Kazakhstan Ministry of Energy with support from the World Bank launched an online platform for monitoring, reporting and verifying emission sources and greenhouse gases in 2018. The country's major emitters can use the platform to transmit and record emissions data, and to trade on Kazakhstan's national Emissions Trading System (OECD 2016a). The Kazakh government is investing in modernization of its national hydrometeorological service, including modern weather radars and automated weather stations. The Ministry of Emergencies is implementing activities on disaster risk reduction funded by the state.

According to the BIOFIN study (2018), overall public expenditures on environmental protection and conservation in Kazakhstan are estimated in the range of \$120–140 million per year, while expenditures on environmental protection by businesses (both state-owned and private enterprises) come to \$350–400 million per year. The state budget is the only guaranteed funding source for biodiversity conservation and contributes 86 per cent of the

total biodiversity funding in the country. The rest is provided through international funds, resources mobilized by NGOs and through the private sector.

State funding to forestry and wildfire prevention was growing over years and in 2014 stood at 8.1 billion Kazakh tenge (\$45 million at the exchange rate that year). A major part of the national budget allocation to forestry went to the creation of a green belt around Nur-Sultan. This belt now exceeds an area of 70 thousand ha. Reforestation and nature-based restoration activities on the dry bottom of the Aral Sea mainly involve planting of saxsaul bush, with nearly 56 000 ha of dryland forest planted. World Bank financing of \$63 million between 2006 and 2015 was instrumental in this effort. In addition to the Aral Sea, the northern Caspian Sea shared between Kazakhstan and Russia is a shallow and highly sensitive water body to climate impacts. Kazakhstan is participating in international projects and is providing its own financing to protect vulnerable biodiversity, tackle sea level fluctuations and coastal flooding.

Kyrgyz Republic



Kyrgyzstan has a high-level Coordinating Commission on Green Economy and Climate Change that works to ensure multisectoral coordination of the country's climate-related activities. Kyrgyzstan's National Sustainable Development Strategy is a key document intended to lead the country to adopt the rational use of natural resources and to employ modern technology to reduce waste and pollution.

Most of Kyrgyzstan's climate financing comes from international sources, but the country has set up policy frameworks to promote the financing of climate activities from diverse sources. Recently, the Kyrgyz Republic has established a Climate Finance Centre as part of the Climate Investment Programme supported by the Climate Investment Funds and EBRD. As the country's designated entity for climate finance, the Centre assists in the development of climate investment programmes and projects, coordinates stakeholder engagement, and supports the design, implementation and monitoring of climate investments.

Over the past decade, Kyrgyzstan has received from international climate funds about \$150 million – resources from climate funds combined with co-financing. A similar amount was provided through multilateral banks – primarily EBRD, World Bank and ADB – to energy efficiency, water resilience and disaster risk reduction, including early warning and climate observations. Several multilateral banks finance hydropower modernization projects. China remains an important source of international investment for Kyrgyzstan, particularly in the transport, energy and mining sectors.

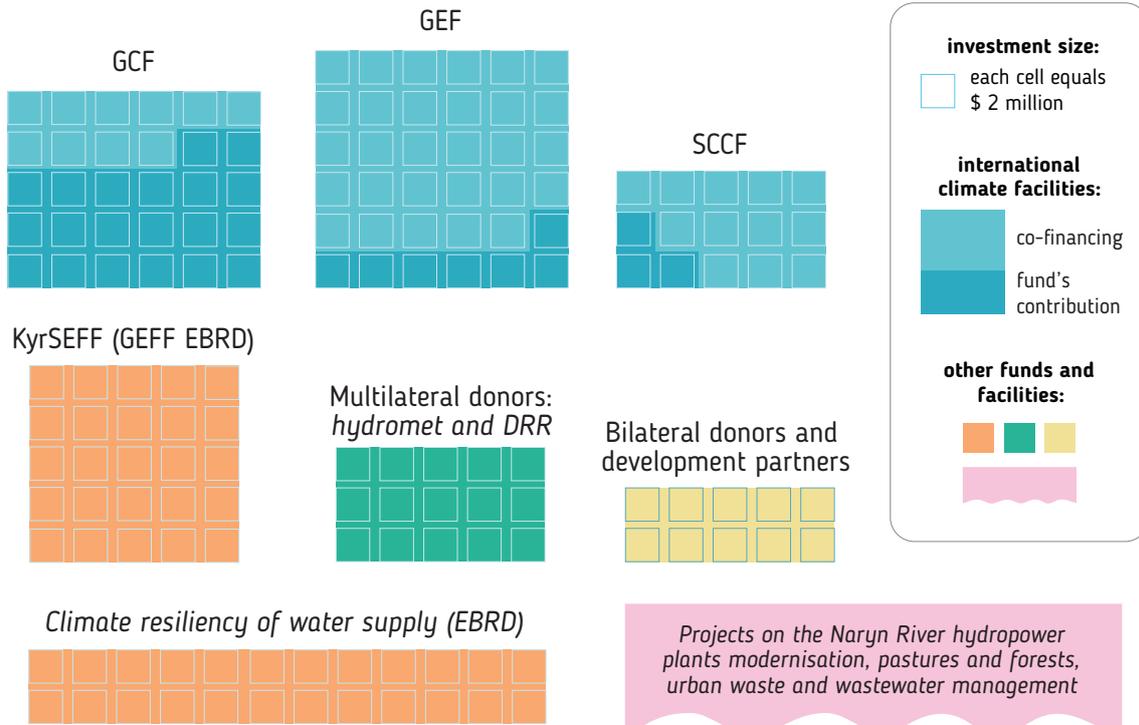
According to BIOFIN study (2019), government expenditures for environmental protection make 6.5 billion Kyrgyz som (in 2011-2016), the equivalent

of about 1 per cent of its GDP. The private sector contributed 4.8 billion Kyrgyz som, while development partners (international financing) contributed 1.2 billion Kyrgyz som. Of the total environmental expenditures estimated at 12.8 billion Kyrgyz som, one third (3.7 billion) could be attributed to climate adaptation, where the private sector plays the lead role, the domestic public funding is the second in importance. While the share of international climate financing may be less significant than other sources, it often acts as a catalyzer of important reforms and improvements.

A GCF project implemented by the World Food Programme in Kyrgyzstan provides vulnerable rural communities with climate services and helps farmers adapt their agricultural practices to the changing climate conditions. The project includes adaptation planning at the community level, the development of infrastructure, and measures to help diversify livelihoods. Another GCF project implemented by the UN Food and Agriculture Organization (FAO) enhances carbon sequestration potential in forests and rangelands (GCF 2020c). FAO is also implementing a countrywide GEF project on sustainable forest and land management under climate change. The World Bank is engaged in integrated forest management improvements through institutional strengthening, investments in ecosystem restoration, and better information such as forest inventories and other information developed with GIS and remote-sensing technologies.

Other GCF support goes toward adaptation planning and the country's readiness to work with GCF, while GEF provides funding to maintain climate reporting to the UNFCCC. Kyrgyz NGOs and associations play a key role in climate action at the local level. They rely on the EU and GEF for funding to implement

International climate funding in the Kyrgyz Republic



public awareness and demonstration activities, and engaged in promotion of the Kyrgyz Sustainable Energy Finance Facility (KyrSEFF). NGOs are welcome partners in intergovernmental processes and projects, such as the Chu–Talas River Basin Commission (Kyrgyzstan–Kazakhstan) and its climate change planning and adaptation activities.

The European Bank for Reconstruction and Development supports both mitigation and adaptation projects in Kyrgyzstan, and has focused on water supply, sanitation and loans for energy efficiency through KyrSEFF. The World Bank supports electricity infrastructure, including a CASA-1000 power line, and water sector reforms. The Asian Development Bank and the Eurasian Development Bank (EDB) support energy projects, including modernization of hydropower stations. The United Nations Development Programme supports disaster risk reduction with focus on impoverished and distant districts. Germany has supported a rural infrastructure development project, and Switzerland has supported a hydropower rehabilitation project, and assisted

small- and medium-sized cotton farmers develop certified organic and fair-trade cotton, water infrastructure improvements and sustainable mountain development. Other bilateral support comes from Austria, the Czech Republic, Finland, Japan, Korea, Sweden, and the United States (OECD 2016b).

The State Committee of Energy, Industry and Subsoil Use, the national electric grid and energy companies, power plants and local commercial banks have all received international financing for energy projects. Water supply and sanitation funding has been provided to the Ministry of Agriculture and Water Resources and municipal water companies. Financing for disaster risk reduction has gone to the Ministry of Transport and Communications and the Ministry of Emergency Situations (OECD 2016b). The World Bank, Finland and the GEF have supported a hydrometeorological and environmental monitoring systems upgrades in Kyrgyzstan.

While Kyrgyzstan's greenhouse gas emissions per capita are about one-third of the world average,

economic development is expected to increase emissions. National climate change adaptation policy identifies priority sectors – agriculture, energy, water, emergencies, healthcare, forests and biodiversity – and provides the basis for the adaptation focus. National sustainable development priorities seek to balance poverty reduction and social progress against the maintenance of ecosystems (OECD 2016b).

Several sectors identified in Kyrgyzstan’s NDC have received some climate financing, and some projects have been co-financed by domestic sources. As the operational framework for climate financing, the Climate Investment Programme seeks to mobilize finance for key economic sectors while taking advantage of any synergies among sectoral initiatives.

Energy, industry and transport



Kyrgyzstan’s aging and unreliable energy infrastructure cannot meet the country’s growing needs. Low water flows in winter reduce hydropower production, and the periodically reduced supply causes frequent outages and threatens energy security. Transmission losses are significant, and urban energy demands are increasing. Energy subsidies drain resources that could be used for maintenance and upgrades, but reforming the subsidy system is complicated by political sensitivities. The success of the country’s plans for sustainable development depends on the renewal and expansion of the energy sector (OECD 2016b).

A key income-generating industry of Kyrgyzstan is mining, a sector that involves many international actors from the West, Russia, China and other countries. With rising gold prices, mining is booming, but its development is impeded by local conflicts and high elevation challenges. Most valuable mineral reserves are located high in the mountains, and their development needs to consider the melting of glaciers and permafrost, changing rock stability and weather extremes. Some companies have concluded agreements with local governments on establishing socio-environmental funds, but climate change challenges and long term financing of tailings monitoring and stability are not yet reflected there.

Swiss financing went toward the rehabilitation of the aging At-Bashy hydropower plant, an important local energy source, and the ADB and the EDB supported the rehabilitation of the Toktogul hydropower plant – all located on the Naryn River. Funding from Russia and other sources was directed to gasification. The US Agency for International Development provided assistance in energy policy, sector reforms to make use of untapped hydropower resources, and the development of a regional energy trade. The EBRD has supported the Kyrgyzstan Sustainable Energy Financing Facility to provide technical assistance and loans for energy efficiency improvements (OECD 2016b).

Investments in conventional energy include modernization of the Bishkek thermal power plant, increasing coal production and plans for additional coal-fired power plants. While national road improvements and expansion contribute to driving ease and safety, Kyrgyzstan is seeing an increase in the number of imported, outdated cars. Railroad expansion plans – particularly a transit link from Uzbekistan to China – exist, but they are too costly to implement.

Agriculture, water and waste management



About two thirds of the people in Kyrgyzstan live in rural areas and work in agriculture, the country's largest economic sector. Rural Kyrgyzstan is mountainous and particularly vulnerable to climate change, and the country's adaptation plans call for new production practices; the diversification of crops; the selection of crop varieties and animal breeds adapted to the changing climate; pasture restoration; and better management of irrigation and drainage. The effects of climate change on Kyrgyzstan's water resources threaten the country's ability to maintain safe and sufficient supplies, as does its old and inefficient water infrastructure.

Adaptation strategies include measures to reduce water losses and to provide for the rational use of water resources (OECD 2016b).

Sweden, the EBRD and the GEF support capacity-building and targeted investments to mainstream climate considerations into the development of water infrastructure and to improve the climate resiliency of water supplies. The ADB has provided financing for a technical assistance project to build institutional capacity and policy development in water supply and sanitation (OECD 2016b). The EBRD is financing waste management improvements.

Environmental protection, climate monitoring and disaster risk reduction



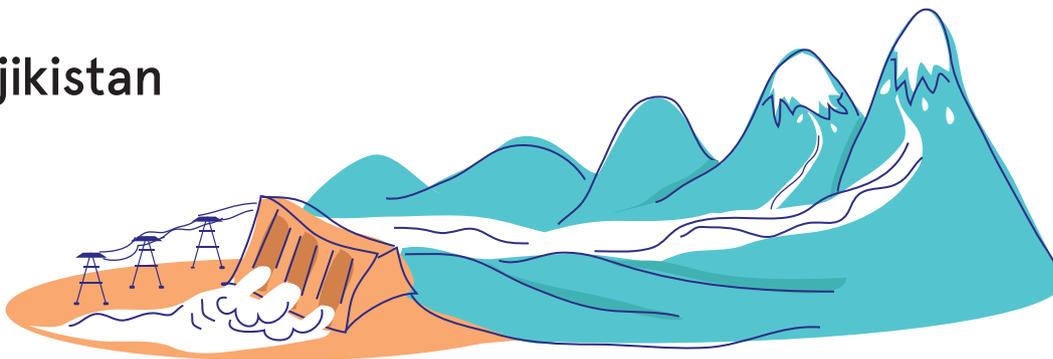
The depletion of forest cover in the mountains of Kyrgyzstan has made slopes more vulnerable to erosion and landslides. With more frequent and intense storms resulting from climate change, the mountains face increasing disaster risks. The annual average direct damage (to private and state property) caused by natural disasters in Kyrgyzstan is estimated at \$30–35 million. This estimate excludes many factors, and full accounting will likely result in a number several times higher. Climate risk assessment and national communications of Kyrgyzstan point to a staggering \$1 billion per year climate-related loss in no-action climate warming scenarios.

The Kyrgyzstan Ministry of Emergencies is responsible for responding to natural disasters, and for

climate monitoring and weather warnings via the national hydrometeorological service. Recent investments in hydrometeorology system modernization helped improve weather and water forecasts and warnings. For the longer term, insurance is needed to cover weather risks, and the implementation of construction codes and zoning requirements need to be strengthened (OECD 2016b).

With funding from GEF, GCF and other channels, FAO and the World Bank support improvements in forests and pastures. Various donors have supported the village investment projects, which broaden local economic activities and consider disaster risks.

Tajikistan



Tajikistan is the second largest recipient of international climate financing after Kazakhstan among the five Central Asia states. Not so long ago, it was the lead recipient due to its high vulnerability to climate change, its explicit needs and activities laid out in its national action plan, and its communication with donors. Over the past decade, Tajikistan has received about \$450 million from international climate funds, including co-financing. A similar amount was provided through multilateral banks – EBRD, World Bank, ADB and others – to hydropower modernization, greening the agriculture and other climate-relevant measures. A least \$75 million was directed to disaster risk reduction and modernization of climate observations. If all international climate-relevant project financing in Tajikistan is considered, the total will exceed \$1 billion over the past decade.

Tajikistan's mountains pose numerous natural disaster risks that result in losses and damages estimated at \$75 million per year (GFDRR). Its vital role as the region's water tower also attracts donor interest. And the high share of the rural population with weather-sensitive livelihoods attracts continuous international support for climate adaptation, early warning, disaster risk reduction and enhanced resilience, including for the hydropower sector – the key for the stable functioning of the economy.

Tajikistan's climate responses are reflected in a national development strategy and a national climate adaptation strategy. The Committee for Environmental Protection is engaged in several projects funded by the GCF, CIF and GEF, while its hydrometeorology agency is a key beneficiary of the World Bank's hydromet modernization programme (CAHMP). Both the agency and the

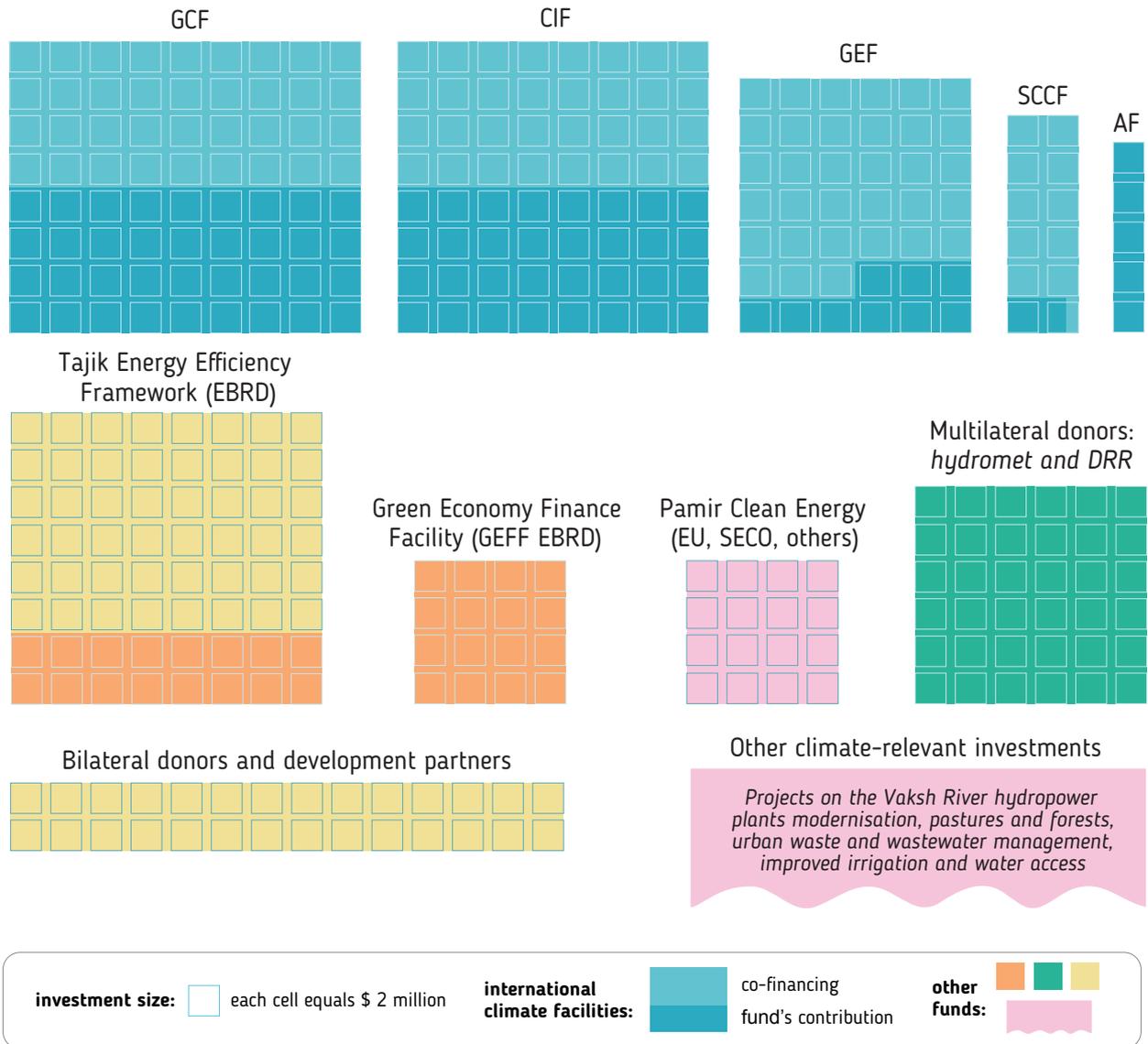
committee are strong players in national climate change policy and measures, and focal points to UNFCCC, GEF and GCF. The Ministry of Energy and Water Resources, the Ministry of Finance and the Committee on Emergencies participate in internationally funded projects relevant to climate actions.

While Tajikistan has not yet issued any government-backed green bonds, the ongoing construction of the Rogun Dam requires external co-financing, and in addition to the regular state budget allocations, Tajikistan has issued its first Euro Bonds worth of \$500 million to co-finance this project. The Rogun project is expected to be fully operational towards 2030. Over the past ten years, Tajikistan has invested more than \$2 billion (24 billion Tajik somoni) of the domestic public funds to this project. Its total cost is not easy to estimate, because its construction started in the 1980s (then was suspended in 1992 and resumed in 2008), but likely to exceed \$4 billion.

Another feature of Tajikistan is labor migration to Russia and Kazakhstan and a high proportion of remittances as a share of GDP, fluctuating between 30 to 45 per cent over the past decade. On average, the flow of remittances is estimated at \$2.5 billion per year and by far exceeds foreign and domestic public investments, including climate funding. Remittances play a substantial role in local consumption. Part of household expenditures linked to remittances goes to energy efficiency improvements and climate adaptation in agriculture, but the exact amount is hard to quantify.

Tajikistan's reliance on hydropower has helped keep its total and per-person emissions the lowest

International climate funding in Tajikistan



in Central Asia and among the lowest in the world. Even so, in its initial nationally determined contribution, Tajikistan commits to an unconditional target of not exceeding its base year (1990) emissions levels. In addition, the NDCs prioritize the energy, agriculture, water and transport sectors along with disaster risk management for adaptation actions (OECD 2016c). The revised NDC will be communicated in 2021.

Most international climate financing in Tajikistan comes as grants or concessional loans. The main multilateral sources are the World Bank, the Asian Development Bank, the European Bank for Reconstruction and Development, the Climate Investment Funds, the Green Climate Fund, and the Global Environment Facility. Bilateral sources include Canada, the EU, Finland, Germany, Japan, Korea, Norway, Switzerland and the United Kingdom.

Tajikistan receives support across the range of its priority sectors, and a distinguishing feature of this support is how much of it goes to multisectoral projects. The EU support for rural development stresses climate resilience through the sustainable use of natural resources in the agriculture and water resource sectors. The EBRD Tajik Climate Resilience Financing Facility promotes investments in improving the management of water and

energy in agriculture, industry and households. With a portfolio of \$150 million, the Pilot Program for Climate Resilience of the Climate Investment Funds delivers projects on enhancing the resilience of hydropower and improving rural livelihoods, and on water, transport and disaster risk management (OECD 2016c).

Energy, industry and transport



Population growth, economic development and a persistent gap between electricity demand and supply call for expansion of energy sector capacity. Power rationing in winter affects the rural population the most, but the opportunities for expansion include the country's substantial hydropower potential. The Rogun hydropower plant and dam construction continues with funding from the national budget, complemented by external borrowings and investments. The World Bank supported the feasibility study and regional consultations on Rogun and is currently supporting rehabilitation of the Nurek hydropower plant jointly with ADB and the Eurasian Development Bank, with total project cost at \$350 million. Another major regional power project evolving Tajikistan is CASA-1000, which the bank is facilitating to connect hydropower from Central Asia to Afghanistan and Pakistan.

An ADB project has supported the refurbishing of the Golovnaya hydropower plant, and Germany, the United Nations Development Programme and the Global Environment Facility have supported

the development of small hydropower. The EBRD and the Pilot Program for Climate Resilience have financed a project to increase capacity and efficiency and to strengthen resilience to climate change at the Kairakkum hydropower plant. An expected increase in hydrological variability due to disruptions in precipitation patterns and the melting of glaciers puts other the Soviet era hydropower infrastructure at risk. The GCF joined forces with the EBRD to help Tajikistan's hydropower sector adopt best practices, improve management capacity and integrate climate resilience into structural modernization (GCF 2020b).

In the Pamir Mountains of Tajikistan, Switzerland and the EU, have recently provided \$10 million and €20 million to build climate-resilient and sustainable energy systems in the Autonomous Region of Mountain Badakhshan, which is particularly vulnerable to the impacts of climate change. Earlier, their contributions in combination with Aga Khan Fund for Economic Development, helped establish the Pamir Energy company as the first public-private partnership in Tajikistan in clean energy.

The EU, the EBRD and the European Investment Bank have provided grants and loans for new metering and billing systems in the Sugd province in the north of Tajikistan (OECD 2016c). The state-owned Tajik aluminum company, TALCO, has embarked on technical modernization to improve efficiency of its industrial processes in one of the most energy-intensive industries in Tajikistan. At the same time, the company has established a subsidiary which produces coal.

Coal use in Tajikistan is quickly growing, particularly by new cement plants and new power stations built with Chinese investment and technology. Non-governmental organizations in Tajikistan voice concern over rapid growth of coal production and the use and potential lock-in of coal technologies, and call for disinvestment. Meanwhile, plans envisage further expansion of coal production from the current 2 million tonnes per year to 3–10 million tonnes per year this decade.

Economic development in Tajikistan depends on the transport sector, which faces difficult terrain, literally. One of the strategic priorities of Tajikistan is to break through its transport link deadlock. Mountains stand in the way of the development of rail systems to connect regions of the country, so vehicles move almost all freight and passengers. Public transportation in cities is insufficient to meet demand. The country's road infrastructure is vulnerable to the effects of climate change, and extreme weather events such as flash floods,

avalanches and rockfalls can do serious damage (OECD 2016c). Chinese investments are dominant in the transport sector of Tajikistan. Many vehicles use natural gas, which result in lower emissions.

An EBRD project to improve fuel efficiency and air quality in the city of Khujand is modernizing the city's bus fleet by introducing larger buses and reorganizing the existing mini-bus fleet into feeder services. Public transport of Dushanbe was upgraded and the GEF project helped improve and expand bike-friendly areas. In anticipation of the expected increase in the frequency and intensity of extreme events, an ADB project supports improvements in transport infrastructure to strengthen resilience to climate change (OECD 2016c).

Agriculture, water and waste management

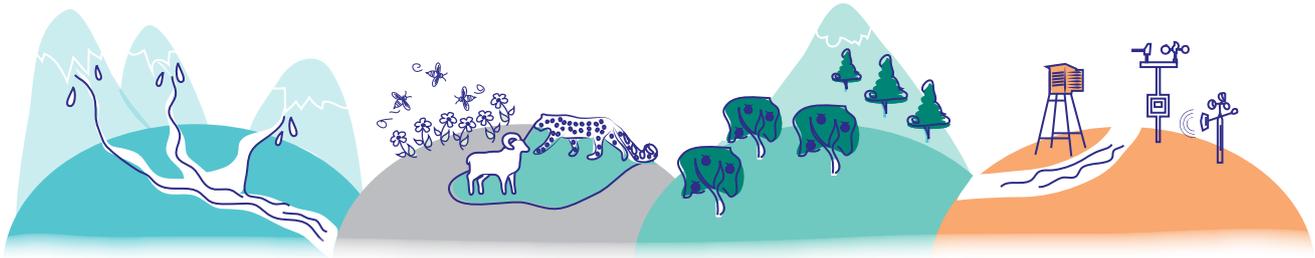


As the largest sector of the Tajik economy, agriculture accounts for 20 per cent of GDP, 53 per cent of employment and more than half of greenhouse gas emissions, but the country's emissions per unit of agricultural production are the lowest in Asia and Europe, and the opportunities for emission reductions may be limited. The agriculture sector is considerably vulnerable to climate change effects on water resources (OECD 2016c).

The World Bank promotes the commercialization of agricultural products through better access to agricultural markets and finance for farmers, traders, agribusinesses and processors. A combination of GCF and World Bank funding in excess of \$20 million under the CAMP4ASB regional project is going to Tajikistan to support micro-loans and grants for climate adaptation in agriculture. The Ministry of Finance and the Committee on Environmental Protection are facilitating the endeavor. These efforts are complemented by the national GCF project of \$10 million via the World Food Programme to improve food security and climate services for farmers. Germany supports a project to reduce poverty and increase food security through the adoption of the production of potatoes adapted to climate conditions (OECD 2016c).

Disruptions in precipitation patterns, reductions in glacial melt water and more frequent and intense extreme weather events are likely to compromise the capacity of the country's outdated water supply and sanitation infrastructure. The World Bank has recently started a \$59 million Rural Water Supply and Sanitation Project to improve access to basic water supply and sanitation services in selected districts. Japan is supporting capital investments in the water supply infrastructure in the Khatlon Region, and Switzerland, the GEF and the EBRD are supporting capacity-building for water companies and city authorities and the rehabilitation of drinking water infrastructure in northern Tajikistan. Separately, the EBRD supports operational improvements of local water management authorities and urban waste management in the main cities of Tajikistan (OECD 2016c).

Environmental protection, climate monitoring and disaster risk reduction



Tajikistan is a poor, mountainous, landlocked country that experiences frequent natural disasters and is highly vulnerable to climate change. Deforestation and excessive livestock grazing are increasing the vulnerability of mountain ecosystems to climate change. Extreme weather events have already increased the rate of soil erosion in forests.

Tajikistan estimates that annual losses and damages from natural disasters reach \$75 million. Reporting of the loss and damage from natural disasters, including extreme weather, is complex and depends on methodology and factors considered. Model-based assessments of such costs for Tajikistan run as high as USD 400 million per year (GFDRR). The costs of environmental degradation can run as high as 10 per cent of GDP.

With support from GEF, Tajikistan has conducted successful projects on conservation of agro-biodiversity, local cultivars and crop species important for climate adaptation. Ongoing GEF-supported efforts to protect the habitat of the iconic species of mountains – such as the snow leopard – lead to improved land- and nature-use practices in mountain regions and contribute to both biodiversity preservation and climate adaptation.

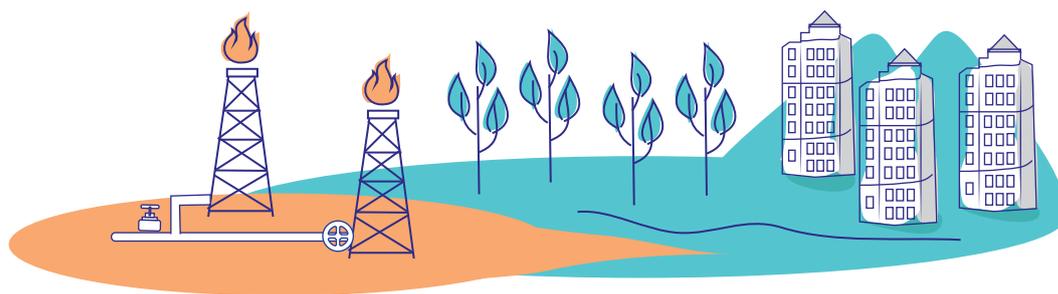
In addition to climate change adaptation, disaster risk management is a national priority, and the Committee of Emergency Situations in partnership with the national hydrometeorological service is developing early warning systems, and working to improve disaster risk reduction and disaster prevention and recovery (OECD 2016c).

Germany has supported sustainable forestry projects that take a joint forest management approach where local people take long-term leases on degraded forest land to rehabilitate and use (OECD 2016c).

A Climate Investment Funds project with co-financing from ADB in the Pyanj River Basin is climate-proofing the infrastructure for flood protection, upgrading early warning systems and raising awareness among local stakeholders. Switzerland is supporting integrated disaster risk management projects that build resilience to extreme weather events in rural communities by working to increase the productivity of land, improve rural livelihoods, and protect ecosystems (OECD 2016c).

The World Bank's \$50 million project on Strengthening Critical Infrastructure Against Natural Hazards is improving the country's disaster risk management capacity, and making critical infrastructure resilient against natural hazards in the Pamir Mountains and flood-prone Khatlon province. This funding comes in addition to support for Tajik Hydromet modernization over the past 10 years. In addition, GCF is providing financing via ADB to support the Tajik hydromet to develop timely and robust hydrological and meteorological information through structural changes and improvements in its operations center (GCF 2020d).

Turkmenistan



Climate financing from international sources in Turkmenistan is the lowest in the region and comes in the form of grants or technical assistance. The Global Environment Facility and the Adaptation Fund are the main international funding sources and over the past decade, Turkmenistan has implemented climate projects valued at \$200 million, including \$20 million from these funds and the rest as governmental co-financing. While the country continues to rely on GEF for climate reporting, policy development and demonstration projects, it allocates substantial public funding to cleaner energy, greener cities, water and afforestation.

On the initiative of the Turkmen president, World Bicycle Day (June 3) was instituted by the UN General Assembly, and Turkmenistan holds the Guinness World Record (2019) for the longest lasting cycling parade in one line. At the same time, as the largest producer of natural gas in Central Asia, Turkmenistan has high emissions of methane. Use of natural gas by industries and the general public reduces the climate footprint and the harmful emissions compared to burning coal, but per capita emissions in Turkmenistan are higher than the world average.

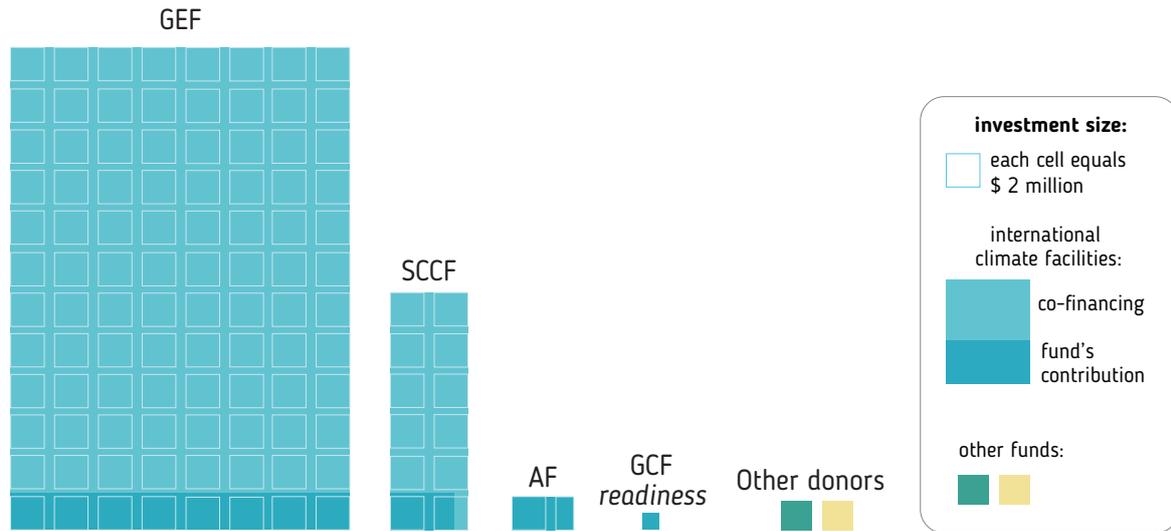
Turkmenistan has a national strategy on climate change with an emphasis on adaptation that serves as the basis for climate actions, and is revising its nationally determined contribution under the Paris Agreement. The Forest Code and the National Forest Programme establish policy frameworks in the forestry sector. A draft national waste strategy is under discussion, while the Caspian Sea action

plan (for the Turkmenistan section of the shared sea) considers potential risks from sea level fluctuations, emission reductions and climate-sensitive biodiversity, such as Caspian seals and other migratory species.

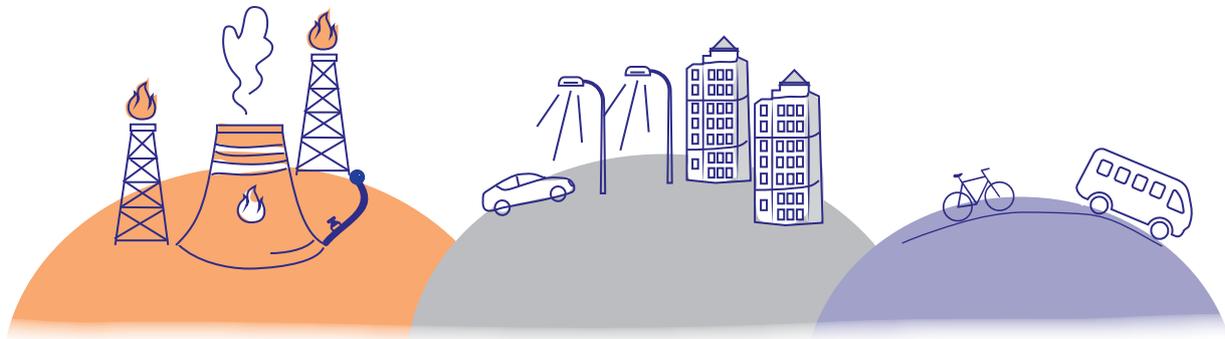
Foreign investors are welcome in the oil and gas industry, but the rest of the energy sector remains state-controlled. The Ministry of Agriculture and Environmental Protection is in charge of the country's GEF project portfolio through its international partners, primarily UNDP. Via UNDP Turkmenistan has implemented a successful project with the Adaptation Fund and is planning to scale up efforts. In 2020, Turkmenistan started its initial cooperation with GCF through a readiness programme where UNDP and the Turkmen branch of the Regional Environmental Centre of Central Asia are involved.

The European Union, United States and Germany have provided bilateral support. In addition, Turkmenistan participates in regional climate projects such as CAMP4ASB, Smart Waters and others that provide technical and other assistance in climate and water services improvement.

International climate funding in Turkmenistan



Energy, industry and transport



The opportunities for improvements in energy efficiency in Turkmenistan's infrastructure are substantial. The development of the country's significant renewable energy potential – primarily plentiful sun – has languished, despite its promise to reduce emissions, in part because local energy prices remain low and subsidized (OECD 2016d). The European Union and the United States have supported projects promoting energy security,

capacity-building among energy professionals, renewable energy and energy efficiency training and automated metering (OECD 2016d). The ongoing GEF project on sustainable cities is exploring options to reduce emissions and improve energy efficiency in selected cities of Turkmenistan.

Agriculture, water and waste management

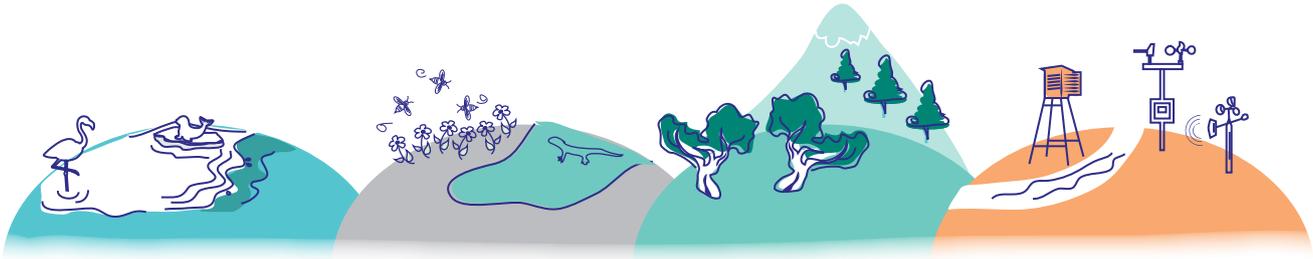


The agriculture sector generates about 10 per cent of Turkmenistan’s GDP and employs about half of its population. Cotton, wheat and livestock lead agricultural production in Turkmenistan, and irrigated cotton – with inadequate infrastructure – is a major energy and water consumer and a source of energy and water losses. More frequent and intense extreme weather events combined with higher temperatures and disrupted precipitation patterns add urgency to the need to develop adaptation measures (OECD 2016d). The GEF has supported energy efficiency in irrigation systems and took a no-regrets approach to reducing water demand and improving water supply systems in remote communities in the drought-prone Lebap and Dashoguz areas through the use of drip irrigation, rainwater harvesting and the measurement

of water usage. An Adaptation Fund project has helped Water User Associations implement community adaptation plans, and has invested in water management systems and infrastructure including drip irrigation and canal improvements (OECD 2016d).

In a sustainable forestry and pasture management project embracing both adaptation and mitigation, Germany supported an ecosystem-based approach to adaptation and used multi-stakeholder engagement to identify measures to integrate forest and pasture management, increase forest cover and enhance carbon sinks (OECD 2016d).

Environmental protection, climate monitoring and disaster risk reduction



The potential effects of climate change on forests include an increase in wildfires and pest infestations. The country's national forest programme establishes a framework for the protection and sustainable use of forest resources (OECD 2016d). Forest plantations around Ashgabat – the capital city of Turkmenistan – and in the Aral Sea region are particularly impressive. In 2020, Turkmenistan joined the Trees in Cities Challenge and planted over 2 million trees in the country's cities.

Uzbekistan



Uzbekistan demonstrates numerous improvements in the business climate over the past five years. In the World Bank's Ease of Doing Business rating, the country ranked 69 (out of 190 countries) in 2019, up from ranking 166 in 2011. Well-designed government policies help catalyse foreign investments, including clean energy and climate resilience. A new approach by the Uzbekistan authorities has allowed the EBRD – one of the key financiers of climate actions in Central Asia – to re-engage in the country, open a new office in Tashkent and launch a new country strategy in 2018. Now it plans \$0.5 billion investments to climate resilience of water supply and hydropower, green economy facility and projects supporting wind and solar power.

In 2019, the International Finance Corporation (IFC) signed an agreement with Uzbekistan to develop 900 MW of solar power, which will attract about \$1 billion of investment. In 2020, Uzbekistan announced a number of solar and wind power projects worth \$650 million funded through public-private partnership. Two 100 MW photovoltaic power plants will be commissioned in 2021. Other renewable energy projects financed or facilitated via ADB, World Bank's Scaling Solar Programme and EBRD are under planning and construction. The country's goal is to reach 25 per cent of renewable energy in total power generation by 2030, including five gigawatts of solar power.

The country has a successful record with GEF and Adaptation Fund projects, and has received GCF readiness support. Its ambitious plans for its GCF project portfolio are progressing slowly, however,

and currently the only GCF project funding it receives is through regional projects.

Uzbekistan is the leading country of Central Asia in developing and implementing Clean Development Mechanism projects that cover energy and chemical industries and solid municipal waste. The Paris Agreement replaced the Kyoto Protocol and its CDM, but the project formulation experience and mitigation effect of CDM projects in Uzbekistan remain substantial.

The Ministry of Economy and Foreign Trade is the National Designated Authority for GCF and is responsible for coordinating CDM-related activities in the country. Uzhydromet is the designated National Focal Point to the UNFCCC and is responsible for the preparation of national communications to the UNFCCC, GHG inventories and formulation of climate policy.

Uzbekistan has adopted a number of programmes to decrease energy consumption, implement energy saving technologies and develop renewable energy resources. A programme to transition to low-carbon development includes the energy and housing sectors. The World Bank's \$200 million Energy Efficiency Facility for Industrial Enterprises supports Uzbekistan in these efforts. The EBRD is providing support in designing a competitive bidding process for renewable energy projects and is preparing the documentation for the first wind tender. New legislation on the use of renewable energy sources (2019) provides incentives to the potential investors.

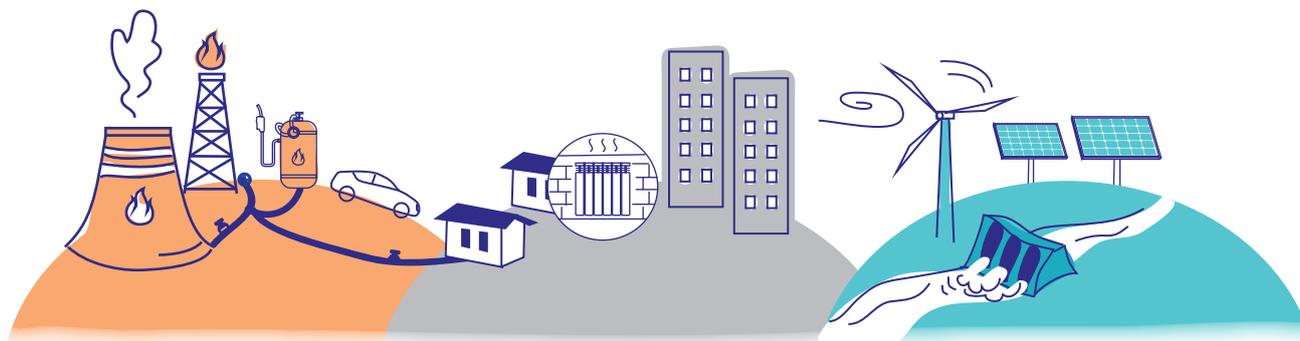
measures in sectoral plans and strategies. The Strategy for Implementation of the Sendai Framework for Disaster Risk Reduction 2015–2030 identifies priorities for disaster risk reduction and calls for investments in disaster risk reduction measures and increased preparedness.

The Asian Development Bank has provided concessional and non-concessional loans and grants mainly for water, agriculture, waste and energy sector projects. The World Bank has provided support for a large-scale water management project. The Islamic Development Bank has supported energy sector projects. Bilateral climate financing sources include Japan, the EU, Germany, Korea, Switzerland and the United States. Japan – by far the largest bilateral source – has supported two major energy sector projects (OECD 2016e).

The EU supported an investment in Samarkand’s solid waste management system. A €100 million European Investment Bank loan for water and wastewater projects will address Uzbekistan’s high water dependency on external sources as well as the scarcity of locally available freshwater resources. Another €100 million loan will support energy efficiency investments in the private sector (UNECE 2020).

The Ministries of Finance; Economy; and Agriculture and Water Resources are involved in a range of energy- and climate-relevant projects. Other national institutions involved in specific projects include UzHydromet and the State Committee for Nature Protection (OECD 2016e).

Energy, industry and transport



Reliance on fossil fuels and outdated infrastructure make Uzbekistan’s economy highly energy-intensive. Despite investments in modernization in recent years, more improvements in energy efficiency are necessary to eliminate shortages and to reduce emissions. Transport emissions are significant, and the number of motorized vehicles has increased in recent years (OECD 2016e). Prices of domestically produced fossil fuels continue to be regulated and subsidized (particularly natural gas), though progress has been observed in reducing a share of fuel subsidies relative to the Gross Domestic Product (UNECE 2020). The volume of gas flaring has declined due to measures

implemented by energy companies. Natural gas remains a key fuel for power generation in Uzbekistan and the government is investing into further gasification.

The potential for developing renewable energy sources – solar, wind, biomass and hydro – is large and largely untapped, and in recent years Uzbekistan attracted major investments, though these are not linked to the international climate funds. Programme on hydropower development envisages construction of 18 new plants and modernization of the existing plants aiming to increase the total hydropower capacity from 1.7 GW to over 3 GW

by 2025–2030. Uzbekistan also intends to build a nuclear power plant (1.2 GW) by 2030 jointly with Russia.

Uzbekistan’s climate mitigation includes measures to improve energy efficiency and to increase the renewable share of the energy mix to 21 per cent by 2030. Efficiency measures range from the introduction of standards for industrial production and energy labelling of household appliances to energy-efficient street lighting and lamps for residential and public buildings. A World Bank project has increased energy efficiency in industrial enterprises but energy losses in the sector remain high, as does the energy intensity of the economy. The Government is also funding and stimulating energy efficiency through new standards in industrial production, buildings and energy labelling of household equipment and energy-efficient lighting.

Japan’s financing focused on energy efficiency and reliable power supply through the development of two large-scale gas-fired power plants and the improvement of transmission lines and substations. Other energy efficiency efforts include the ADB and World Bank support for the decommissioning and replacement of obsolete equipment and the introduction of metering systems (OECD 2016e).

The Asian Development Bank – in partnership with the Ministry of Finance – has supported transport projects to develop Uzbekistan’s road network to improve domestic and regional connections in order to increase trade and support sustainable economic development. The ADB also supports improved efficiency in the transport sector through railway electrification measures that cut transportation costs, promote trade and reduce emissions (OECD 2016e).

The transport sector of Uzbekistan is dominated by road transport responsible for 98 per cent of passenger journeys and 90 per cent of freight. Many vehicles run on natural gas or liquefied petroleum gas due to resource availability and the fiscal advantages associated with these fuels. Uzbekistan has the highest density of railways in the region (14 km of lines per 1 000 km²). In 2019, around 2 700 km of the country’s total 7 000 km railways were electrified. Tashkent city operates a metro system, which keeps expanding thanks to the domestic public investments. From the current 40 km (many new stations were added in 2020) it will expand to 150 km by 2025–2030. Uzbek authorities plan a purchase of 300 electric buses in 2021–2023 for 1 trillion Uzbek sum (equivalent to \$100 million) and have recently acquired a new fleet of natural gas-powered buses, which are more fuel efficient, less polluting and more attractive for users.

Agriculture, water and waste management



Agriculture accounts for about 27 per cent of employment in Uzbekistan and contributes about 32 per cent to GDP (UNECE 2020). As climate change leads to reduced precipitation, to more and longer droughts and to more frequent and intense extreme weather events, Uzbekistan can

expect to face both economic and environmental challenges and may experience greater climate and water risks. Inadequate monitoring, low water prices and inefficient irrigation exacerbate the situation.

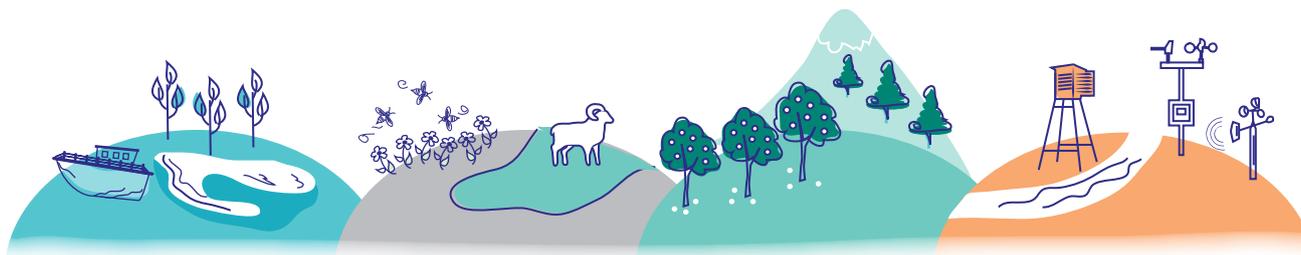
Water used for irrigation accounts for about 90 per cent of total water use. Government policy has recently focused on crop diversification and a movement from cotton to high-value crops with lower water requirements, but the losses from the irrigation infrastructure remain high. The water-saving systems cover 400 thousand ha or 10 per cent of irrigated lands. In 2019, government reimbursements to growers for the costs of new drip irrigation technologies came to \$15 million (UNECE 2020). Plans for 2021 include an additional 200 thousand ha of drip irrigated lands (Gazeta.uz).

A World Bank project in Karakalpakstan is working to enhance the adaptive capacity of farmers by modernizing the irrigation network, improving irrigated agricultural production, and promoting crop intensification and diversification. A joint ADB and Japan project is developing a sustainable and reliable water supply for the Amu Bukhara Irrigation System. The World Bank, the International Fund for Agricultural Development and Spain support projects to improve the horticulture sector through modern practices and better access to markets (OECD 2016e).

A project supported by the European Union works to improve water supplies and water resource management at the national, basin and farm levels and to help Uzbekistan develop Integrated Water Resources Management. Switzerland supports community water resources management and vocational education related to water and sanitation (OECD 2016e).

With support from ADB and governmental co-financing, new institutional arrangements and technical efforts allowed the country to increase the coverage of the population by waste services from 22 per cent in 2016 to over 50 per cent in 2018. Continued domestic funding and international loans support implementation of the Waste Management Strategy 2019–2028, which aims at 100 per cent coverage of the population by waste collection and 60 per cent waste recycling. The informal sector and private companies are very active in waste sorting and recycling in Uzbekistan, where the current municipal waste recycling (not yet reported officially) exceed 10 per cent – the highest rate among Central Asia countries.

Environmental protection, climate monitoring and disaster risk reduction



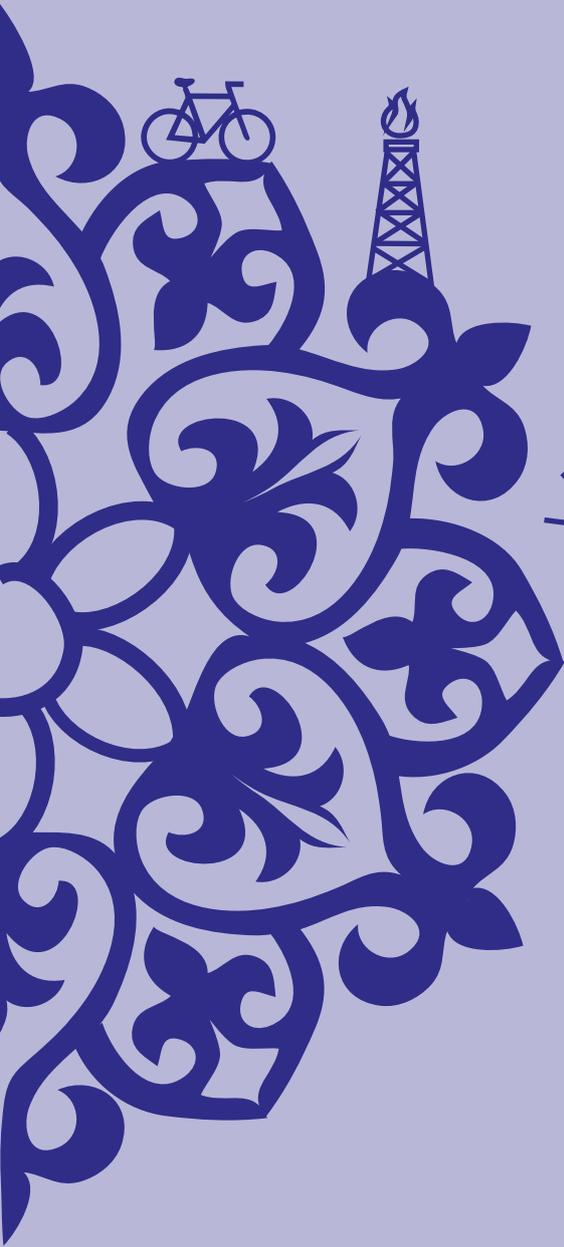
Over the past decade, Uzbekistan has devoted considerable effort and resources to respond to the Aral Sea socio-economic and environmental crisis. The approach includes afforestation, restoration of wetland ecosystems in the Amu Darya River delta, improving the management of water resources, improving health conditions and expanding employment opportunities (UNECE 2020). The Multi-Partner Human Security Trust Fund for the Aral Sea Region, initiated by the Uzbek President in 2018 and endorsed by the UN General Assembly is an attempt to enhance the governmental and donor aid to this region. Contributions to this fund by bilateral and multilateral donors and the Uzbek Government exceeded \$11 million (as of October 2020).

Frequent storms blow across the now exposed bottom of the Aral Sea and carry sand, dust and salt over wide areas, contributing to desertification. In response Uzbekistan – with the support of Germany, IFAS, the Japan Fund for Global Environment and France – has invested in the stabilization of soils by planting desert vegetation. The ongoing Aral Sea afforestation efforts already extend to 740 000 ha, about 40 per cent of which are in the exposed seabed. The rate of afforestation here is 15–20 thousand ha per year, however, due to harsh climate and soil conditions, seedlings' survival rate is only 40 per cent (UNECE 2020).

Thanks to reforestation and afforestation between 2010 and 2018, the percentage of forested lands grew from 6.6 per cent to 7.3 per cent the country's area, and the country's intensive afforestation programme has led to a noticeable increase in carbon removals. (UNECE 2020).

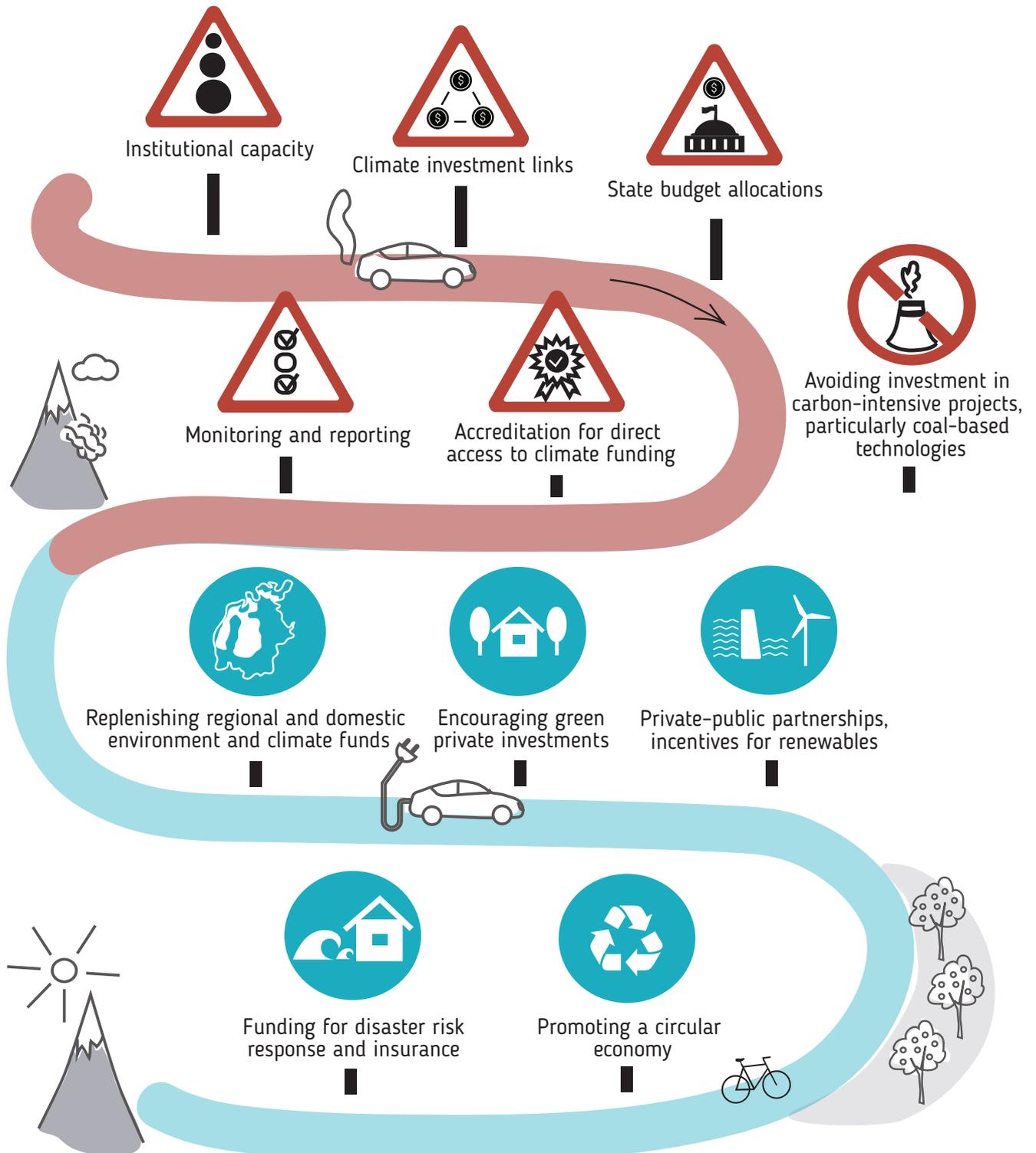
Uzbekistan maintains a system of pollution charges covering a wide range of air and water pollutants and intended to generate revenue for the environmental fund and the state budget. General government expenditures for environmental protection finance the operating costs of the public environmental authorities, activities related to the maintenance of protected areas, and the rehabilitation and expansion of municipal waste infrastructure. For the 2012–2019 period these expenditures represent a tiny share of the state budget – just 0.15 per cent in 2017, the equivalent of about 0.02 per cent of GDP. These expenditures appear to be inadequate in the context of the country's environmental challenges (UNECE 2020).

Until recently, climate monitoring of Uzbekistan was relying on outdated and manual network of stations, and low salaries demotivated staff. In November 2020, the Uzbek President has approved a Concept and Roadmap (2020–2025) for hydro-meteorological service development, allocating the domestic funding of 25 billion Uzbek sum (equivalent to \$2.5 million) and seeking additional funding from other sources. As part of efforts, CAREC through CAMP4ASB Programme has supported automation of 50 meteorological stations and staff training.



Prospects for mobilizing climate finance in Central Asia

Challenges and solutions in mobilizing climate financing



As policymakers across the region gear up their efforts in responding to climate change, they will need to confront their institutional challenges and constraints; understand the range of domestic financing available to them; consider the merits of adaptation projects for building long-term resilience in terms of energy, food and water security; recognize and appreciate the opportunities for co-benefits; become familiar with recent innovations; and learn from the experience of climate change efforts around the globe.

Both governmental and private sector institutions have roles and responsibilities in climate finance, and both face constraints on their ability to act. Selected shortcomings include:

- Understaffing and limited institutional capacity of agencies responsible for climate change issues
- Incomplete implementation of regulations and strategies and weak coordination between levels of government
- Lack of state budget allocations for climate-related measures and loose links between domestic and international investments to climate objectives
- Fiscal incentives, domestic investments or stimulus packages to carbon-intensive projects, particularly coal-based technologies
- Limited monitoring, reporting and verification (MRV) on climate actions

Private businesses willing to support government initiatives on climate mitigation and adaptation through participation or funding may express reservations related to the transparency or raise concerns about the effectiveness of projects. But corporate and environmental social responsibility – including climate change considerations – appears to be gaining traction in Central Asia. The concept of a green economy – already fully

embraced by Kazakhstan as the country's way forward – appeals throughout the region.

In their official reporting on efforts to reduce emissions and adapting to climate change, the countries of Central Asia limit their assessments to the financing they receive from the global climate funds. This approach overlooks substantial amounts of other climate-relevant funding, starting with the co-financing of these global climate fund projects. Other missing pieces are projects that have no international climate funds support and domestic financing for a range of climate-relevant projects. Expanding reporting to include diverse sources of funding will help the countries present a more comprehensive picture of their own and international efforts.

When the countries develop a better understanding of climate change financing through better monitoring and reporting, they may see opportunities to rethink their subsidies and incentives, create more climate and socioeconomic co-benefits through intentional design, and in the wake of the pandemic, they may find ways to incorporate climate intentions into economic recovery packages. They may also recognize the significant potential of the private sector to support climate actions and devise ways to balance plans for investments in coal and cement and other emitting industries with plans for clean energy.

On the strength of climate finance assessment, the governments will be able to demonstrate to potential investors that they understand their own particular situation, and will be able to imagine and propose co-financing of large international climate fund projects. By knowing weak points for mobilizing climate investment, governments should be able to bridge the gaps, in a similar fashion as they do it for improving the investment climate and ease of doing business.

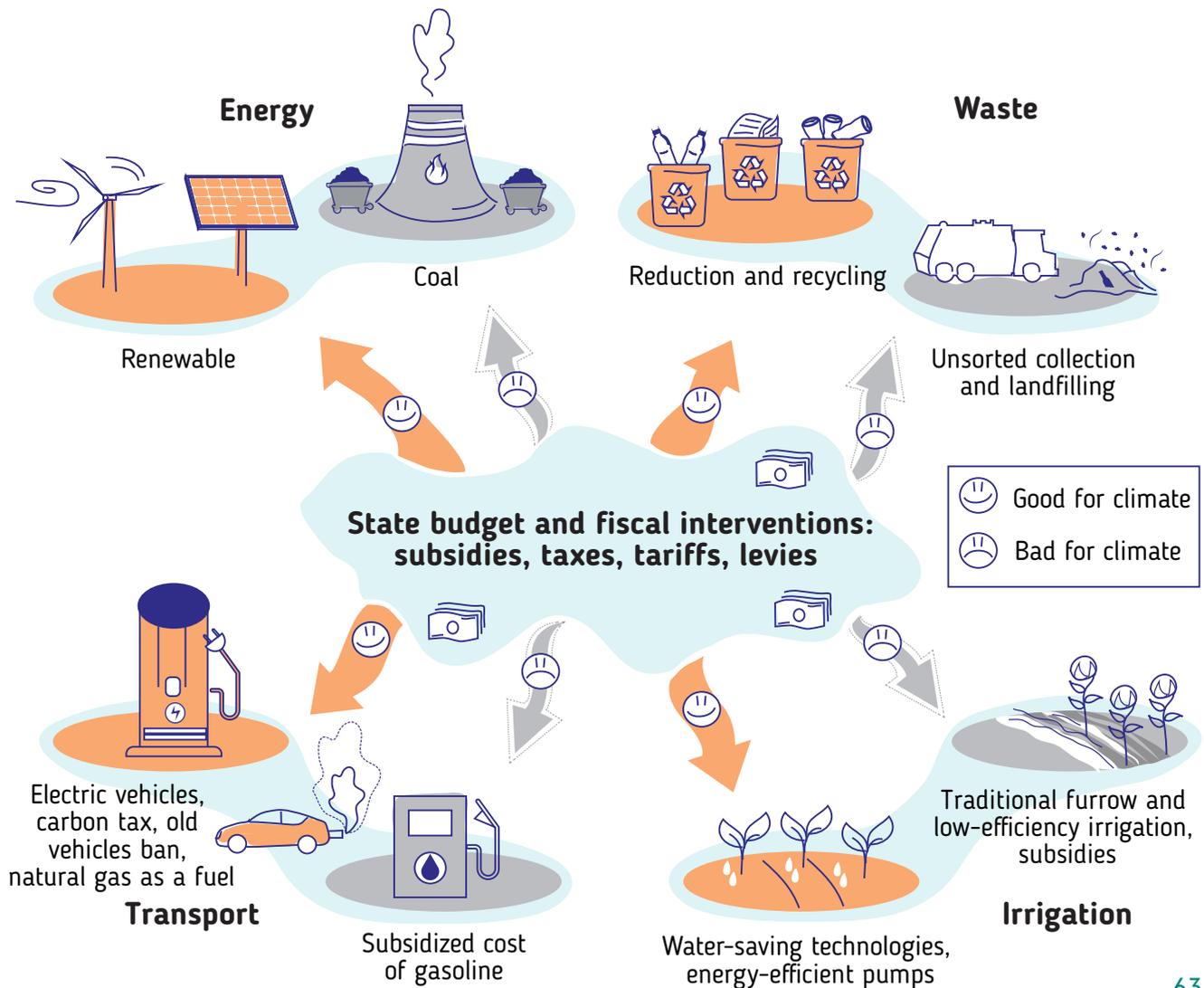
Domestic financing mechanisms

The array of domestic financing mechanisms in Central Asia includes monetary and non-monetary subsidies, and a range of payments, fees and taxes. An understanding of how these mechanisms work is essential to the evaluation of their effectiveness.

Government subsidies help consumers and producers maintain their incomes or reduce their costs, and can have either positive or negative environmental or climate effects. Subsidies can be

monetary or non-monetary: cash payments, tax relief or protection from competition. A reduced price for irrigation water, natural gas or electricity is a common subsidy in the region. Subsidies to energy and electricity encourage the inefficient use and lead to carbon emissions. Similarly, agricultural subsidies place additional burdens on the environment and water through the use of fertilizers and overuse of water.

Domestic climate-relevant finance regulations

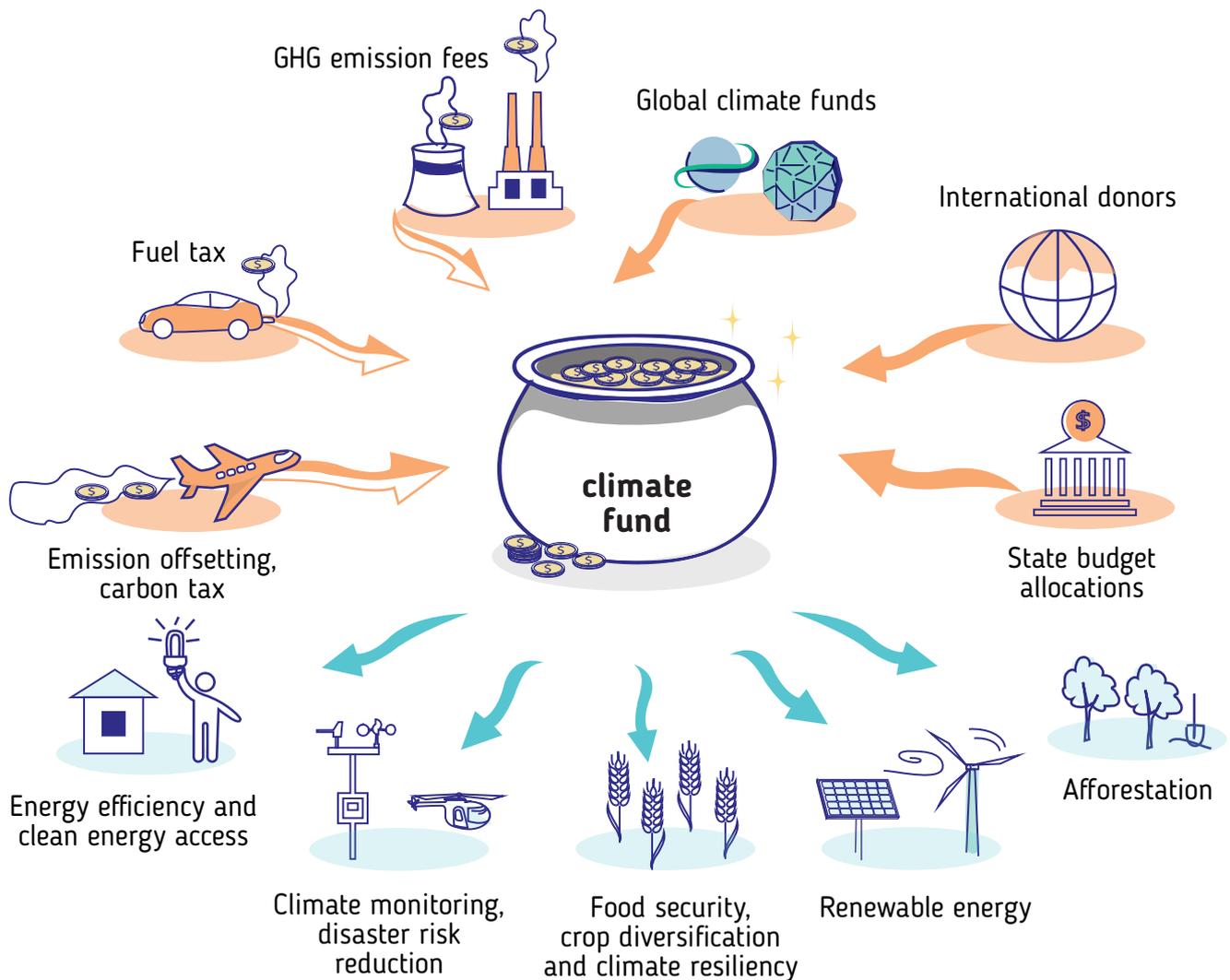


Recently, Central Asia states introduced tax incentives, stimulus packages and adjusted tariffs to contribute to sound nature resource management, energy savings and fewer emissions. Examples include renewable energy and drip irrigation subsidies and incentives, waste recycling fees and extended producer responsibility, imported cars and low-carbon mobility incentives.

Governmental regulations include mechanisms for collecting money from those who use the natural resources or contribute to pollution. A common

example is the lease payments for the use of pastures and fees paid for the development of mineral resources. Nature parks charge entrance fees that support the local biodiversity conservation. Payments for polluting activities such as air emissions, discharges to water and waste disposal are applied to costs of regulating these activities and encourage reductions in pollution. Until recently, however, very few climate-specific domestic mechanisms were introduced in Central Asia. One of them is a pilot carbon emission trading system (ETS) in Kazakhstan.

Sources of climate fund replenishment and expenditures

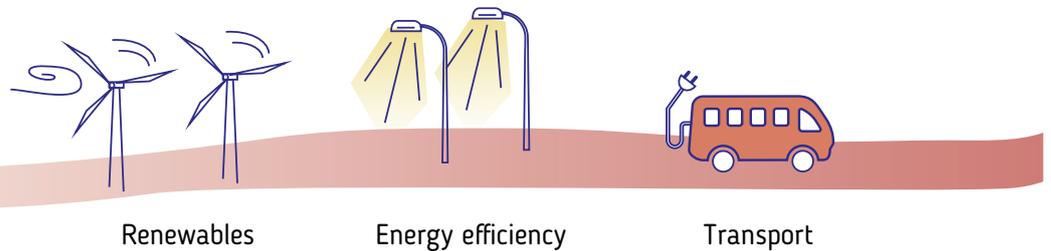


Recent innovations

A variety of innovative ways to provide climate financing have emerged in recent years – green bonds, fiscal instruments, climate-cautious investment and green procurement policies, private sector initiatives, and municipal initiatives.



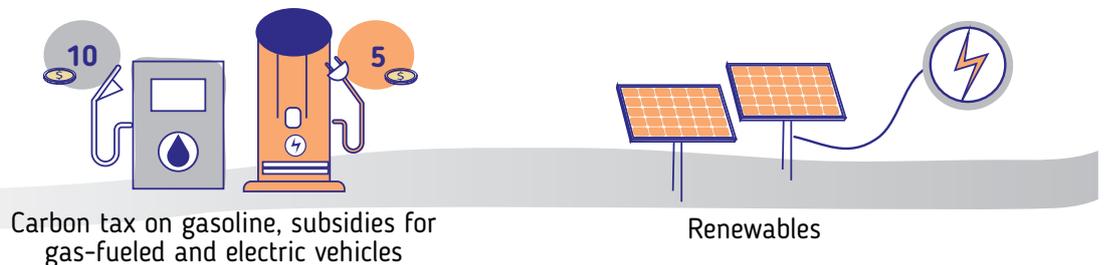
Green bonds



The structure, risks and returns of green bonds are the same as those of traditional bonds, but the proceeds are invested exclusively in projects that generate climate or other environmental benefits. Typically, a third-party verification establishes the validity of the benefits (UNDP 2016). The World

Bank Green Bonds are part of a larger effort to stimulate public and private sector responses to climate change. Uzbekistan’s Advanced Electricity Metering project is one of the recipients of such investment (World Bank 2020b).

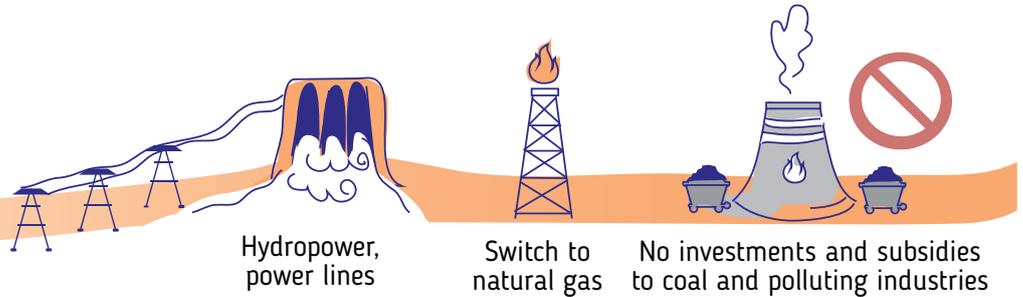
Fiscal instruments and auctions



The Climate Action Peer Exchange identifies a range of fiscal instruments that countries can use to respond to climate challenges. Emissions trading schemes belong in this group, as do carbon taxes; reductions in fossil fuel subsidies; tax credits,

grants or subsidized loans to provide incentives for climate investments (CAPE 2020b). Carbon tax relates to the carbon content of fuels and is used in the transport sector to reduce emissions by increasing the price of fuels.

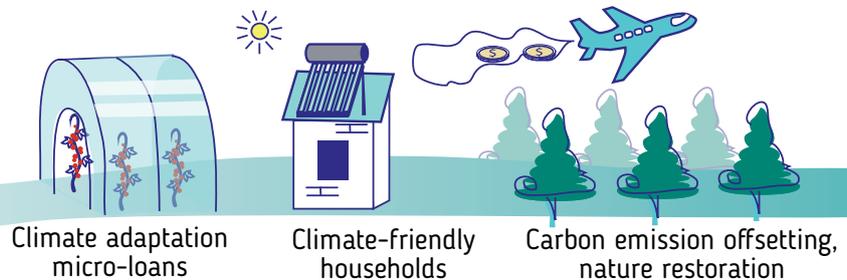
Strategic investment policies



The purchasing power of public entities has the potential to drive markets, and green public procurement can reduce emissions across sectors. The EU is using and promoting green public procurement and Kazakhstan and the Kyrgyz Republic are exploring feasible options, including

environmental and social considerations. Large state-owned energy companies or pension funds can take strategic investment decisions to switch their focus to renewables and de-invest from coal and other carbon-intense businesses.

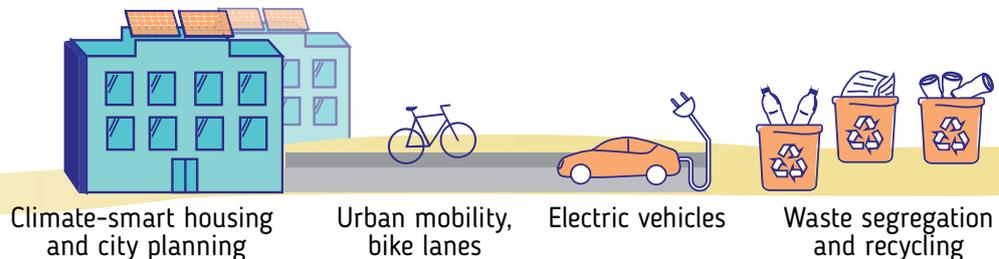
Private sector initiatives



The Green Climate Fund's Private Sector Facility offers a range of options to support mitigation and adaptation projects in developing countries. The Private Sector Initiative (PSI) under the UNFCCC focuses on adaptation projects. Major IT companies are switching to renewable power,

while traditional energy and automaking companies are investing to low-carbon technologies. In Central Asia, household expenditures on solar roofs, greenhouses and horticulture are growing, while energy companies, industries and airlines are seeking to offset their emissions.

Municipal initiatives



From small towns to megacities across the globe, municipal authorities and urban activists are taking action on climate change both on their own and in partnership with others, such as the Global Covenant of Mayors for Climate and Energy or C40

Cities. While cities of Central Asia are not very visible in the international climate action monitors, there are many steps they take on climate-friendly path – from green and bike space expansions to waste recycling and transport.

Other strategies and possibilities

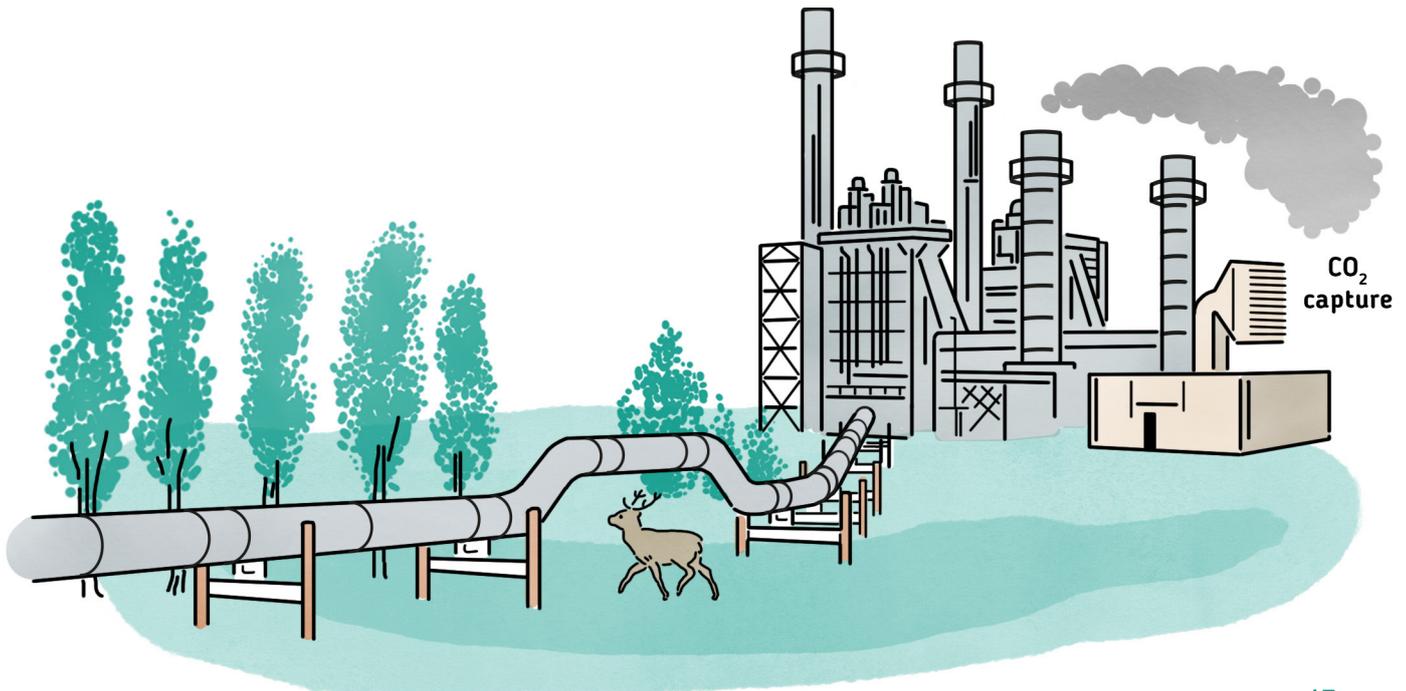
Of the many ways to combat climate change, the following are examples of how countries may find direct and indirect uses of established techniques that have proven effective over the long term. All of these strategies have multiple benefits.

Expanding nature-based solutions and rethinking polluting industries

Nature-based solutions are designed to protect and restore natural or modified ecosystems while supporting human well-being and providing biodiversity benefits. The International Union for the Conservation of Nature has developed a global standard to help practitioners design, implement and verify nature-based solutions, and recommends the use of ecosystem-based frameworks and tools (IUCN 2020). The World Resources Institute (WRI) offers a set of principles for one version of a nature-based solution – forest landscape restoration.

People around the world have practiced this “new” approach for centuries, and the people of Central Asia are using nature-based solutions whether they call it that or not. Many afforestation projects have elements of nature-based solutions and these and other projects could adopt more of the principles of landscape restoration and could create more climate and socioeconomic co-benefits through intentional design. The World Bank has recently initiated a design of regional “RESILAND CA+” Programme for Uzbekistan, Kazakhstan and Tajikistan to boost landscape restoration efforts.

A fresh reconsideration of polluting industries is another promising area for climate progress. Designing for the long-term impacts of climate change in sensitive zones can head off preventable catastrophes such as the potential infrastructure failures in high elevation mining. Other options include mitigation through technologies such as carbon capture and storage at cement plants or other significant emitters, and further reducing gas flaring and methane leaks.



Climate-proofing critical infrastructure

Economic sectors facing infrastructure under pressure from climate change and longstanding inefficiencies or deferred maintenance include mining, energy, agriculture and transport. Mining operations must now consider the melting of permafrost at high elevations, and recognize the threat that underground works and aboveground tailings ponds are at risk of failure. Transportation infrastructure is vulnerable to erosion and damage from storms and temperature extremes – one of many reasons to plant trees and other vegetation.

Under the Belt and Road Initiative and through bilateral agreements, China's influence in Central Asia is growing – as a buyer of energy and minerals and as a lender on domestic projects in mining, energy, tunnel or road construction, where large investments are essential, but their climate effects can be mixed. Whether the Belt and Road projects avoid locking in carbon-intensive technologies and contribute to achieving the climate goals across Central Asia will depend on how well they incorporate green principles and climate-resiliency factors into their design and implementation. Meanwhile, multilateral development banks are increasingly asking for climate change considerations in their project portfolios.



Green public procurement and other domestic programmes

Public organizations can apply social and environmental criteria when making their purchases. This approach is called sustainable or green public procurement. If Central Asia countries would consistently apply this approach, the benefits for people, economies and the environment would be tremendous. Take schools, for example. In making their buildings energy efficient, schools not only save money on operating costs, but also improve the teaching and learning environment. And through the sustainable procurement of meals, desks, uniforms, supplies and books, schools contribute to climate protection.

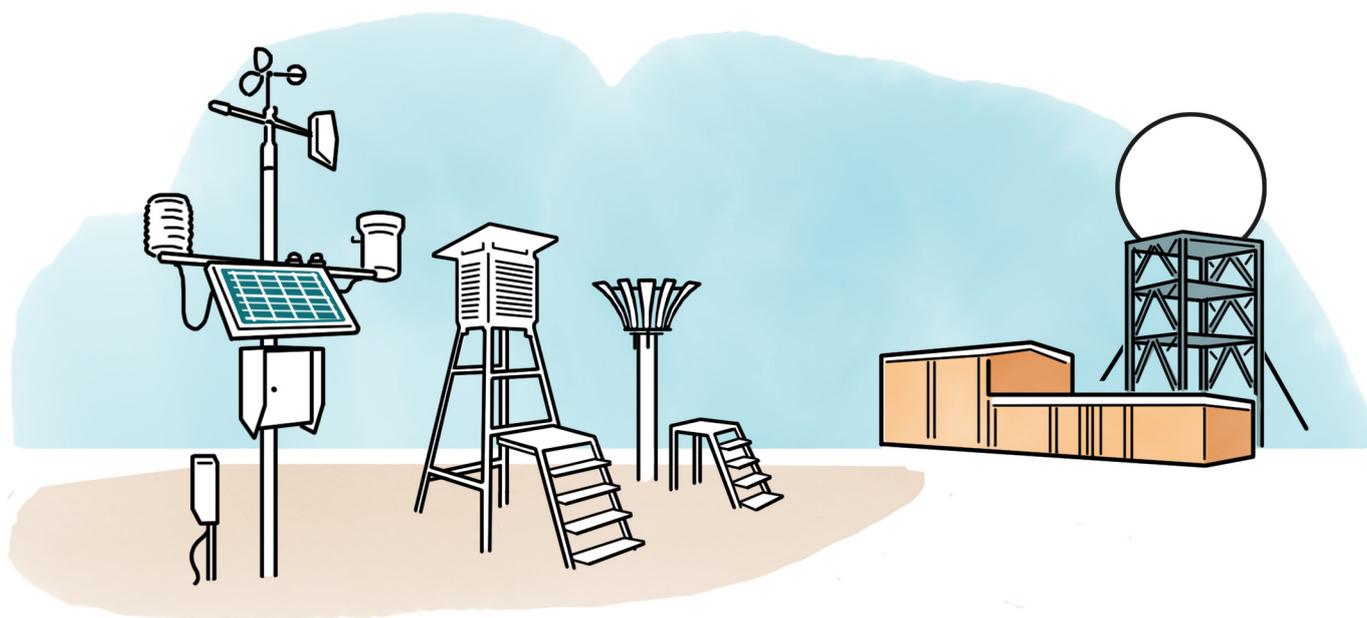
Other domestic projects with the potential to help respond effectively to climate challenges include encouraging the recycling and composting of waste, increasing the use of energy-efficient stoves and appliances among households, and providing support for the installation of solar panels and rainwater collection systems. These and similar efforts can reduce emissions while improving the quality of life for those who participate.



Modernizing hydrometeorological services

National hydrometeorological services provide climate services across a range of users, and the World Bank, the World Meteorological Organization and others are helping these institutions in Central Asia upgrade to modern standards. At the policy level, they can provide the monitoring information that informs assessments and the development of adaptation plans, as well as knowledge of seasonal water reserves and forecasts to inform decisions related to the balance of competing water needs between agricultural irrigation and hydropower generation. Models that assess the climate effects on food production can inform sector and individual decisions about what crops to plant. Long-term climate trends can inform traditional practices among farmers and pastoralists and assist communities in developing their land use plans.

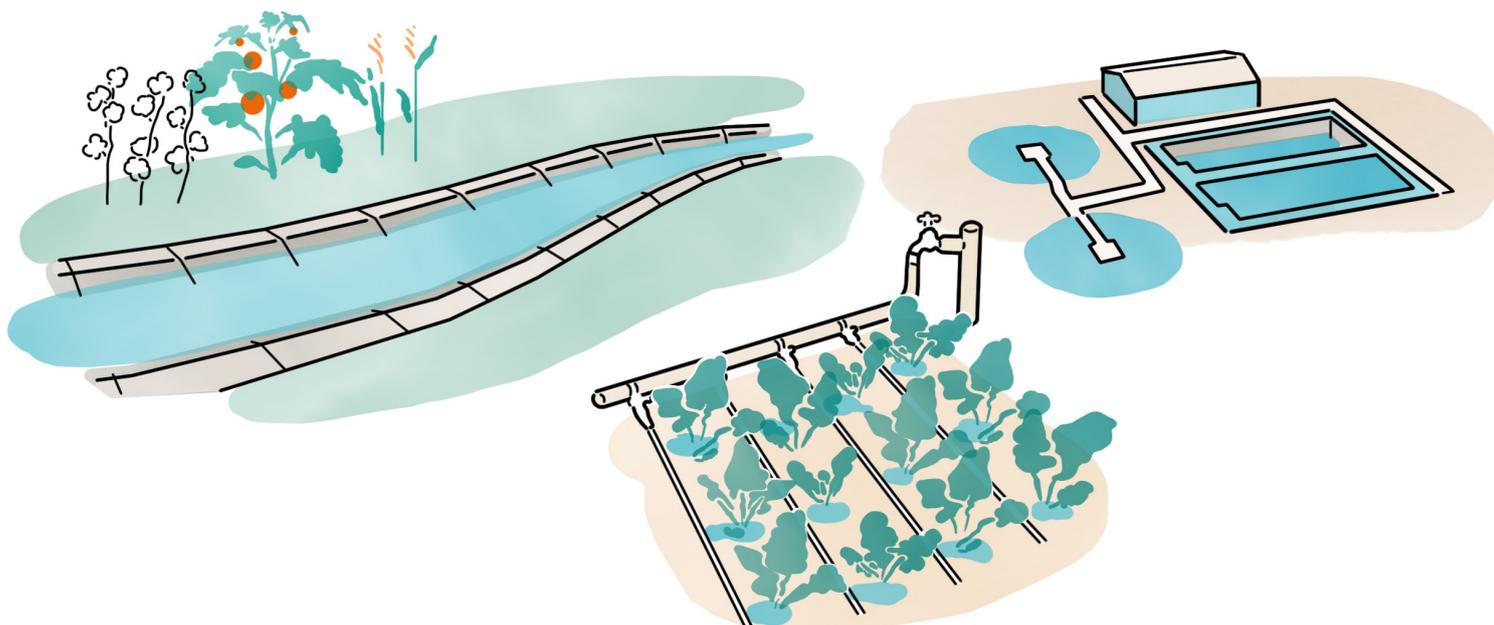
The WMO in collaboration with major development and climate finance partners created the Systematic Observations Financing Facility (SOFF) to provide financial and technical assistance to support national hydrometeorological services with operating and maintenance costs. SOFF intends to strengthen climate resilience across the globe through improved weather forecasts and climate analysis locally, regionally and globally. For the initial five-year operational period budgeted at \$400 million it will focus on least developed countries and small island nations. Fundraising efforts are currently underway and the facility is expected to be operational in 2022. Considering rapid evolution in weather science, technology and user demands, Central Asia countries need to continue to modernize their hydrometeorological services and make them more financially secure, flexible and user-oriented.



Better water management

Water is a vital resource for Central Asia. Two major rivers – the Syr Darya and the Amu Darya – sustain vast irrigated agriculture and globally important ecosystems, and are key for hydropower generation. Governments are struggling to modernize aging irrigation and drainage infrastructure and broadly implement water-efficient irrigation technologies. Over the past 40 years, water supply in Central Asia declined from 8 400 m³/person per year to 2 500 m³/person per year. By 2030, at the current rate of population growth, this reduction will reach a critical threshold of less than 1 700 m³/person. Climate change only increases water-related stresses and may reduce water flows in the irrigation season by up to 25 percent. Rapid glacier melt is increasing water flows for the time being. However, once river basins will reach their “peak water” by 2030–2050, this effect will be reversed, and water availability will decrease.

Adaptation will be a requirement, rather than an option, for the region. Improvements in irrigation efficiency could alleviate the problem and save money. For example, a 1 percent increase in water pumping efficiency would result in savings of \$10–18 million per year, and a 10 percent increase in efficiency would result in savings of \$100–180 million (CAWEP). More efficient water use in the economy could contribute to increased agricultural production, hydropower, reduced environmental stress of water resources and improved health conditions.

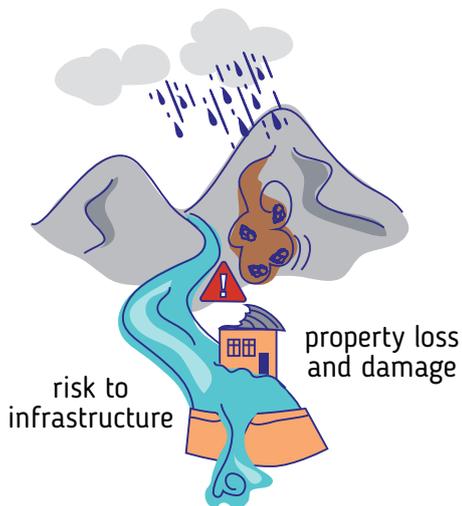


Adaptation for the long run

The following examples of adaptation strategies suggest a range of measures that can help countries reduce their risks related to energy, food and water security.

Adaptation options: energy security and flood risk

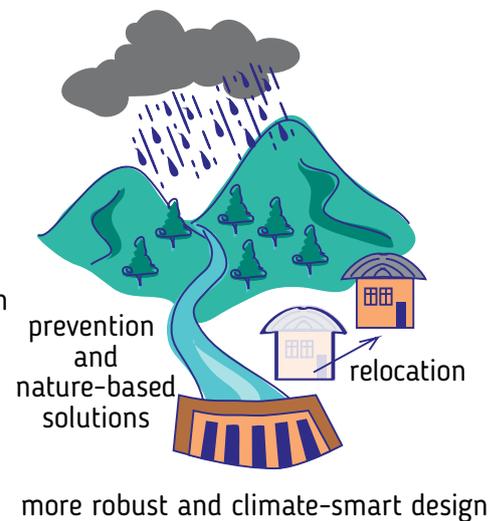
vulnerability and exposure to climate risks



enhancing climate resiliency



climate-smart development and adaptation



In the near term, governments can reduce the risks to infrastructure with protective measures such as dam safety improvements that can prevent catastrophic flooding and the damage to property that flooding brings. Longer-term nature-based solutions such as afforestation, which may take years

to reach maturity, will provide protection indefinitely. The relocation of houses and other buildings is a costly solution, but in the long run is likely to be less expensive and more effective than rebuilding every time a flood occurs.

Coping with extreme weather and improving food security

vulnerability and exposure to climate risks



impacts on cash crops and income crop failure, food security concerns

enhancing climate resiliency



protection diversification

climate-smart development and adaptation



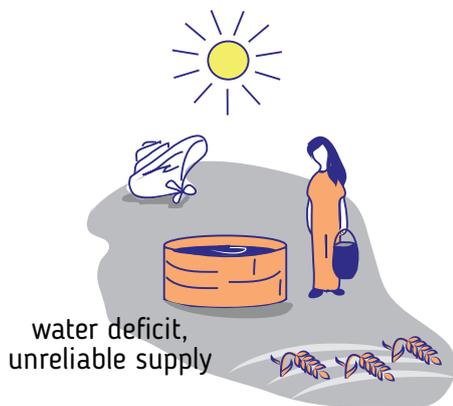
agro-biodiversity, long-term planning climate-smart pathway, resource efficiency

Extreme weather can cause crop failures that have immediate effects on household income for the farm families suffering the loss, and widespread and persistent extreme weather – multi-year droughts, for example – can jeopardize the food security for a country or region. Farm-level short-term options include taking inexpensive protection

measures such as providing shelter for livestock and introducing greenhouses. In the mid-term, farmers can diversify their crops, and select what to grow in light of the changing climate. Adopting agroforestry or climate-smart practices will offer more protections in the long run.

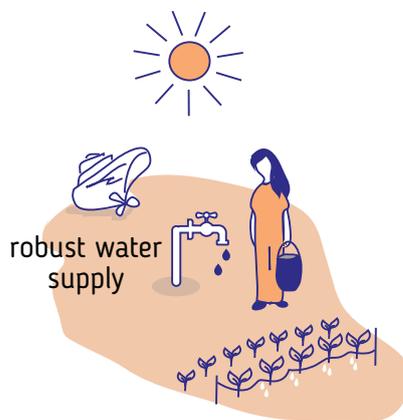
Climate impacts on water resources

vulnerability and exposure to climate risks



water deficit,
unreliable supply

enhancing climate resiliency



robust water
supply

water-saving technologies

climate-smart development and adaptation



water reserves

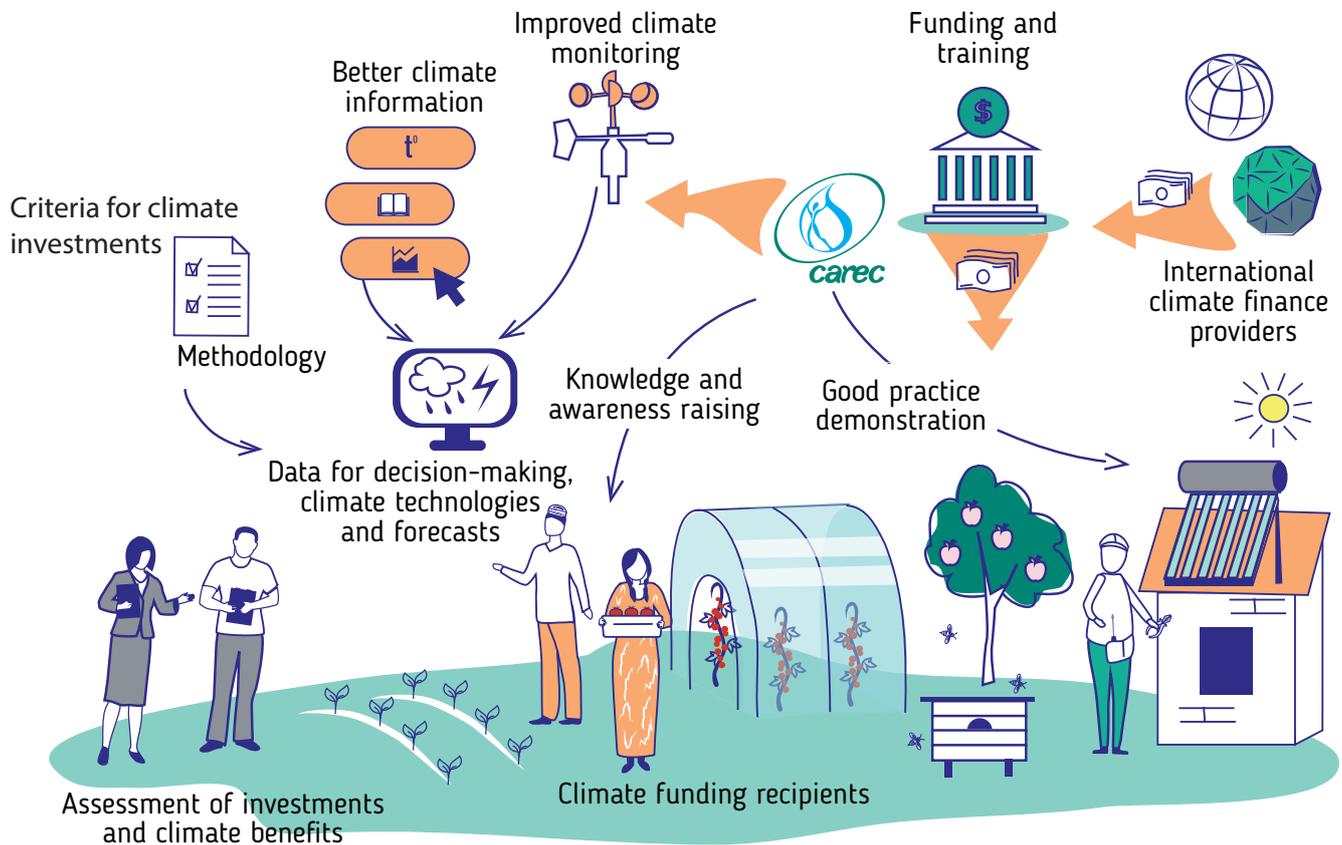
nature-based solutions

Rising temperatures and droughts threaten the reliability of water resources, while disrupted precipitation and changes in the timing of river flows add to the uncertainties. The World Bank global study “High and Dry” (2016) finds that Central Asia is the region most to lose or win from adaptation of agriculture, particularly irrigation, to climate change. Rainwater collection and water conservation practices such as drip irrigation can

improve the situation at the farm or household level, and the widespread adoption of these practices can make a difference more broadly. Community-based water reservoirs can improve water security, and nature-based solutions together with climate-smart development offer longer-term adaptation.

Learning from regional experience

CAMP4ASB: Sustaining climate investments



Implementation of the Climate Adaptation and Mitigation Programme for the Aral Sea Basin (CAMP4ASB) is a good regional example of the use of scientific and climate information in combination with demonstration of climate-smart technologies via NGOs, mass media coverage for greater climate actions uptake and awareness and farmer-level climate financing via micro-finance organizations and banks.

Climate Investment Assessment Mechanism developed jointly by CAREC and the Scientific Information Center of the Interstate Commission for Water Coordination (SIC ICWC) in 2018 was road-tested in several field missions. This process supported loan recipients in better consideration of climate factors and green technologies and helped micro-finance institutions to better assess climate relevance

of loan applications. Network of Experts for Sustainable Development in Central Asia provided training and demonstration to farmers and agri-businesses on low-cost climate and water technologies. Modern climate information system supported decision making among farmers and officials, and improved hydrometeorological monitoring contributed to more robust and timely weather and climate data.

Several monitoring missions to Tajikistan and Uzbekistan were conducted to assess climate investments of CAMP4ASB targeting energy efficiency, water management, gardening and crop production, including greenhouse-based vegetables production. Findings suggest that most loan recipients demonstrated strong economic performance and many recipients report and appreciate climate-related benefits.

Learning from global experience

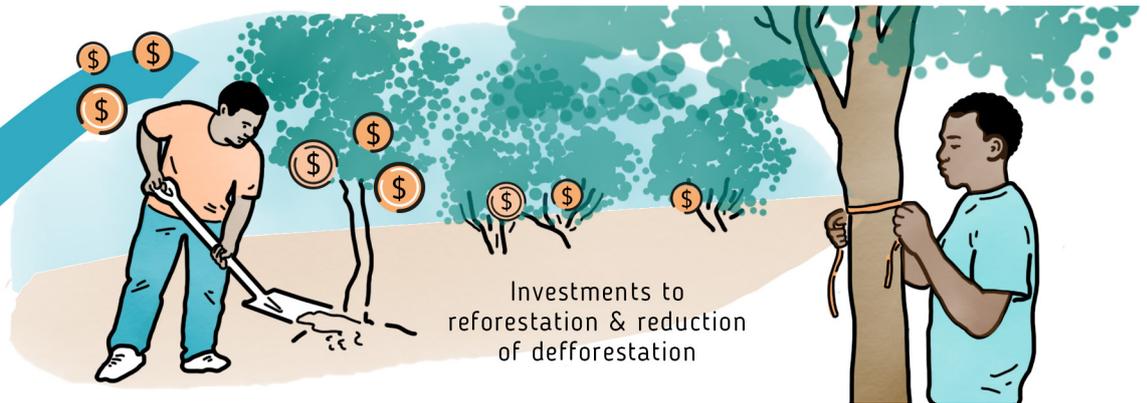
Over the years the international community has developed a variety of tools and approaches to combatting climate change. Among the most common are certified emission reductions; forest carbon sequestration and emission offsetting. Central Asia already has some experience in these approaches, and further efforts could be made to upscale them.



As the first global scheme to provide a standardized emission offset instrument – certified emission reductions – the Clean Development Mechanism under the Kyoto Protocol established a market-based approach for developed countries to offset their emissions by funding projects in developing countries. Similar, but modified Sustainable Development Mechanism is envisaged under the Paris Agreement. To qualify, projects must provide emission reductions that are additional to what

would otherwise have occurred and contribute to sustainable development. The CDM has become a model for countless other offsetting opportunities for individuals and businesses (UNFCCC 2020a). Uzbekistan already has the initial experience in CDM projects design and implementation in chemical and energy industries. Kazakhstan has designed and tested another market-based mechanism: domestic emission trading system.

REDD and forest carbon investments



The UN Programme on Reducing Emissions from Deforestation and forest Degradation (REDD+) works with developing countries to reduce forest emissions and enhance carbon stocks in forests while contributing to sustainable development. As a key asset in the fight against climate change, trees can remove carbon dioxide from the atmosphere to be stored in biomass and soil in a process known as forest carbon sequestration (UN-REDD 2020). As

a low forest cover region Central Asia did not participate in REDD+ yet, but countries and local communities implement numerous afforestation projects funded domestically and internationally. They can apply the international methods and experience, improve carbon sequestration monitoring and reporting, and pursue nationally appropriate mitigation action (NAMA) forest projects.

Emission offsetting



In situations where emission reduction is challenging, for example in aviation or industrial processes, offsetting by investing to the planting of trees or renewable energies is an option. Central Asia countries can study the international experience and micro-offsetting schemes.

Abbreviations

ADB	Asian Development Bank
AIFC	Astana International Finance Centre
BIOFIN	Biodiversity Finance initiative
CAMP4ASB	Climate Adaptation and Mitigation Programme for the Aral Sea Basin
CAPE	Climate Action Peer Exchange
CAREC	Regional Environmental Centre of Central Asia
CDM	Clean Development Mechanism
CIF	Climate Investment Funds
CSOs	Civil society organizations
EBRD	European Bank for Reconstruction and Development
EDB	Eurasian Development Bank
EIB	European Investment Bank
FAO	UN Food and Agriculture Organization
GCF	Green Climate Fund
GEF	Global Environment Facility
IFAS	International Fund for Saving the Aral Sea
KyrSEFF	Kyrgyz Sustainable Energy Finance Facility
NGOs	Non-governmental organizations
OECD	Organisation for Economic Co-operation and Development
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
WRI	World Resources Institute

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