

REPORT: Restoring Land, Securing Futures: Carbon Farming in Greater Central Asia

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Executive summary

The report assesses the opportunities and requirements for developing carbon farming in Kyrgyzstan, Mongolia, Tajikistan, and Uzbekistan. Together, these countries encompass Greater Central Asia's major landscapes and land-use systems, from mountain pastures and fragile watersheds to vast rangelands, irrigated croplands, saline soils and severely degraded drylands. The central conclusion is that carbon farming can provide a near-term vehicle for mobilizing additional investment to fulfill climate mitigation objectives, while generating important longer-term co-benefits for land restoration, rural livelihoods and resilience.

This potential however can be realized only through context-specific pathways that deliver credible, measurable carbon outcomes and are socially legitimate and financially viable. The strong case for carbon farming in the region is a structured financing approach that can reward measurable climate outcomes while supporting better land management. At current prices, near-term carbon revenues will generally be catalytic and complementary rather than sufficient to finance the full transition. Over the longer term, the more durable economic value will arise from healthier soils, more productive and resilient pastures, improved water management, reduced erosion, stronger rural livelihoods and lower exposure to drought and land degradation.

A substantial but context-specific opportunity

Greater Central Asia contains extensive landscapes where improved management can contribute simultaneously to climate mitigation, adaptation, land degradation neutrality, biodiversity, food and water security, and rural development. Relevant pathways include conservation agriculture and soil rehabilitation; agroforestry, shelterbelts and riparian buffers; forest restoration and afforestation; erosion and salinity control; rehabilitation of marginal or severely degraded land; and improved grazing and pasture restoration. National approaches are consequently best developed as portfolios of interventions rather than as a single carbon-farming model.

The opportunity is nevertheless constrained by the ecological realities of arid and semi-arid systems. Soil-carbon gains can be slow, spatially variable and difficult to distinguish from the effects of rainfall and temperature. Drought, fire, episodic overgrazing and management failure can reverse accumulated gains. Water-dependent interventions, including agroforestry, orchards, shelterbelts and afforestation, need to be assessed against landscape- and basin-level water availability, salinity, irrigation reliability and possible downstream effects. In pastoral landscapes, projects also need to preserve seasonal mobility, avoid displacement of

grazing pressure and recognize customary users. Carbon claims therefore require locally validated evidence, sufficiently long monitoring periods and conservative accounting.

Differentiated national pathways

The four countries share land-degradation and climate challenges, but their carbon-farming pathways likely differ. In Kyrgyzstan, major opportunities may concern mountain-pasture restoration, erosion control, forest and watershed rehabilitation, and improved soil management in irrigated valleys. Mongolia's main pathway may lie in adaptive grazing management and rangeland restoration, complemented by forest management and context-appropriate afforestation. In Tajikistan, major pathways may include erosion control, highland-pasture and watershed restoration, agroforestry and improved management of scarce arable land where water conditions permit. Uzbekistan offers opportunities in irrigated-soil restoration, salinity management, water-efficient agriculture, agroforestry and shelterbelts, rangeland rehabilitation, and restoration of the Aral Sea landscape.

Finance and market prospects

Voluntary carbon markets offer the most accessible near-term route because established standards already provide methodologies, registries and verification systems. Yet participation from Greater Central Asia remains very limited and agricultural and rangeland projects face high measurement and transaction costs. Paris Agreement Article 6 mechanisms could provide larger and potentially more durable government-backed demand, but require national authorization, tracking, corresponding adjustments and safeguards against exporting mitigation outcomes needed for domestic targets. None of the four countries currently operates a fully functioning domestic compliance carbon market. Green and sustainability bonds, results-based payments and other labelled finance can complement carbon markets by funding restoration, aggregation and monitoring before carbon revenues materialize.

The economics reinforce the need for blended finance. The report's illustrative calculations suggest carbon-farming revenues can help cover additional costs or reward early adoption, but will rarely finance the full transition. Grants, concessional loans, guarantees, insurance, advance purchase agreements and public support remain important, particularly for smallholders, herders and restoration projects with high upfront costs and long lead times.

Conditions for credible and investable carbon farming

A physical emission reduction or removal becomes a trusted unit of value only when it is measurable, additional, durable, uniquely accounted for and socially legitimate. The report identifies ten domestic enabling conditions plus one international interface. These include clear links among land tenure, pasture or forest-use rights, carbon rights, project authority, benefit sharing and long-term liability; assigned institutional mandates and predictable approval procedures; credible baselines, additionality,

leakage control, permanence and reversal-risk management; safeguards and independent verification; registries and controls against double counting; extension and local advisory capacity; aggregation and finance; alignment with land, agricultural and water policies; and the ability to authorize, track and report internationally transferred outcomes.

National land, soil, forest, pasture, water and climate datasets need to become usable project infrastructure. Monitoring systems for drylands can combine stratified field sampling, remote sensing and calibrated modelling, with transparent treatment of uncertainty and carbon-specific reversal accounting. National land-condition and land degradation neutrality monitoring can provide complementary evidence on ecosystem change, but cannot replace the carbon-specific monitoring required for crediting. Meaningful consent, grievance mechanisms, fair benefit sharing and risk sharing are equally important where land is communal, state-owned, fragmented or used by mobile pastoralists.

Priority action agenda

The report translates these findings into 20 recommendations organized in the SCALE framework. Strengthening the evidence base involves sharing and standardizing data, improving national reference information, developing dryland-appropriate monitoring, investing in testing sites and creating a regional learning platform. Creating country-specific pathways requires differentiated national priorities, alignment of carbon finance with land-management goals while safeguarding additionality, sequencing by readiness and potential, clearer legal and institutional frameworks, and ecosystem-specific management approaches. Advancing financial opportunities requires differentiated financing, fair benefit sharing, aggregation of smallholders and herders, and public or concessional support to lower entry barriers and share risks.

Linking carbon farming with land, water and development agendas involves integrating carbon measurement into existing sustainable land-management and restoration programs, connecting soil-carbon management with water security, and embedding projects in national priorities. Fragile landscapes, including the dried Aral seabed, remain strategic restoration priorities even where their near-term carbon potential is uncertain. Enhancing capacity for arid and semi-arid landscapes requires realistic expectations, long-term monitoring, locally validated evidence and stronger collective and landscape-level governance. Carbon finance is most appropriately directed toward activities that generate demonstrably additional mitigation outcomes, including interventions that would not otherwise occur or that increase the scale, speed or ambition of restoration.

Implementation can be sequenced according to both readiness and long-term value. Clearly delineated shelterbelts, afforestation on ecologically and hydrologically suitable land, selected forestry measures and some conservation-agriculture practices may offer early entry points because baselines and monitoring are more tractable. Pasture and landscape restoration may generate larger land, livelihood and resilience benefits but requires stronger governance, longer baselines, more sophisticated MRV

and cautious carbon accounting. Testing sites can validate practices, quantify costs, trial benefit-sharing models and clarify institutional responsibilities before wider scaling. A regional learning platform can lower costs through shared technical infrastructure, comparable protocols, scientific peer review and coordinated training across ecosystems with similar conditions, while leaving national legal and policy frameworks differentiated.

Overall, Greater Central Asia can become an important frontier for high-integrity carbon farming if carbon finance is used to accelerate restoration rather than determine land-management priorities. Success depends less on building credible evidence, secure rights, fair institutions, fit-for-purpose monitoring and financing arrangements that leave farmers, herders and landscapes more resilient after carbon payments end.