

ERINA-UNP Public Seminar

“Various Aspects of Northeast Asia: Key Findings of the 2023–2025 Project Research”

27 May 2026 (Wed)

Venue: Room 5401, University of Niigata Prefecture (Hybrid)

**Climate Change and the SDGs in Northeast
Asia: Lessons from Recent Research on
Mongolia and Russia**

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Content



RESEARCH OVERVIEW



KEY FINDINGS



CONCLUSIONS

Research Overview

Project Name	SDGs Responses and Challenges in the Northeast Asia Region
Research Themes	Climate Change and the SDGs
Project period	4/1/2023-3/31/2026
Principal Investigator	Enkhbayar Shagdar
Research collaborators	Zamba Batjargal (Mongolia)
	Myagmarsuren Altanbagana (Mongolia)
	Georgy Safonov (Russia)
Research objectives	<ul style="list-style-type: none">• Investigate the challenges and policy responses of Northeast Asian countries in achieving the Paris Agreement and the SDGs.• It focused on SDG 7, SDG 13, SDG 15, and SDG 17, and proposes policies and cooperative actions to support shared regional goals in clean energy, climate action, biodiversity conservation, and partnerships.

Synergy and trade-off between sustainable development goals and climate change mitigation in Mongolia using the Global Trade Analysis Project (GTAP) model


Key Findings

- A global carbon tax could reduce Mongolia's CO₂ emissions by 19.2%, but would also lower welfare and real GDP, showing a trade-off between climate action and short-term economic growth.
- Renewable energy promotion supports both SDG 7 and SDG 13 by expanding renewable electricity output and slightly reducing emissions.
- Stricter environmental regulations on mining encourage economic diversification by expanding manufacturing and agriculture-related sectors, although GDP and household income decline slightly.
- Agricultural productivity improvements generate the largest economic gains, increasing welfare, GDP, and household income, but also raise CO₂ emissions.
- Mongolia's domestic policies create regional spillover effects, including possible carbon leakage through increased coal production in other countries.

Climate mitigation policies in Mongolia generate both important synergies and notable trade-offs between sustainable development and greenhouse gas (GHG) emissions reduction objectives.

Global carbon tax significantly reduces emissions

- The simulation introducing a global carbon tax of US\$15/tCO₂ produced the largest environmental effect:
 - Mongolia's aggregate CO₂ emissions declined by 19.2%;
 - Merchandise exports increased by 0.99%;
 - Trade balance improved by US\$101.3 million.
- However, this scenario also generated substantial economic costs:
 - Welfare (EV) declined by US\$81.8 million;
 - Real GDP contracted by 0.41%;
 - Terms of trade deteriorated by 0.24%.
- This demonstrates a clear trade-off between climate mitigation and short-term economic performance.



Renewable energy promotion creates positive synergies

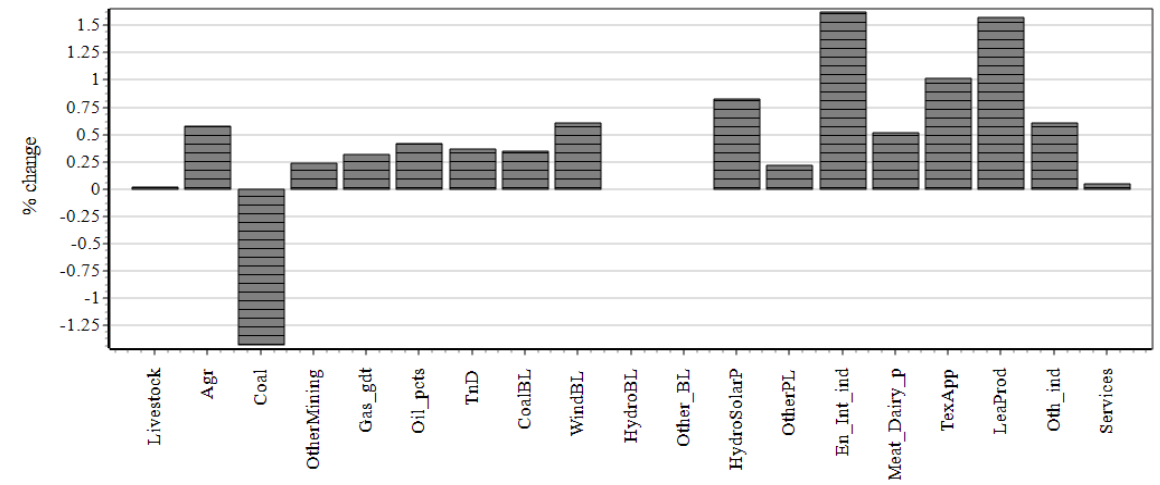
- The renewable energy promotion scenario, which reduced output taxes on renewable electricity generation, supported both SDG and climate objectives:
 - Renewable electricity outputs increased;
 - Carbon emissions slightly declined;
 - Terms of trade improved marginally.
- The findings suggest that renewable energy policies can simultaneously:
 - Support SDG 7 (Affordable and Clean Energy),
 - Contribute to SDG 13 (Climate Action),
 - Encourage structural transformation toward cleaner energy systems.

Source: Enkhbayar Shagdar, 2024

Stricter mining regulations encourage economic diversification

- The scenario imposing stricter environmental regulations on extractive industries reduced coal production while expanding many non-mining sectors:
 - Energy-intensive industries expanded by 1.62%;
 - Textile and apparel output increased by 1.01%;
 - Leather products rose by 1.57%;
 - Meat and dairy production increased by 0.51%.
- This indicates that environmental regulation can contribute to economic diversification and reduce excessive dependence on mining.
- However:
 - real GDP slightly declined,
 - household income fell,
 - and aggregate emissions marginally increased.

Source: Enkhbayar Shagdar, 2024





Agricultural productivity growth improves welfare but raises emissions


- The agricultural technology improvement scenario generated the strongest economic gains:
 - Welfare increased by US\$119.1 million;
 - Real GDP rose by 0.82%;
 - Household income increased by 0.93%.
- At the same time:
 - CO₂ emissions increased by 0.69%.
- This highlights another important trade-off:
 - ❖ Economic growth and rural development may increase environmental pressures unless accompanied by cleaner technologies.

Source: Enkhbayar Shagdar, 2024

Mongolia's policies can generate regional spillover effects

The GTAP simulations indicate:

- Domestic policy changes in Mongolia affect production structures in other countries and regions.
- ❖ For example:
 - Reduced coal output in Mongolia was partially offset by increased coal production elsewhere, particularly in China.
 - This suggests the presence of:
 - carbon leakage,
 - international market adjustment effects,
 - and cross-border policy interactions.



Integrated policy design is essential

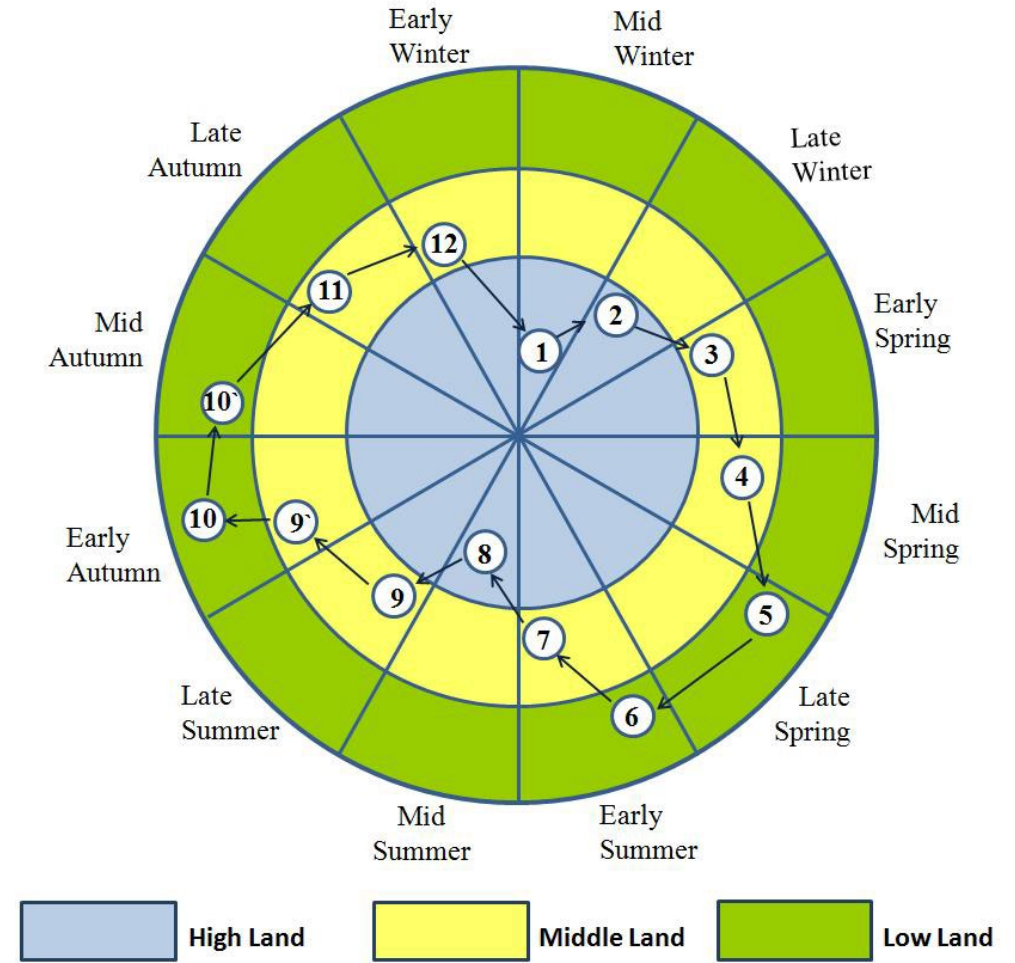
- Mongolia cannot achieve sustainable development and climate goals independently or through single-sector policies alone.
- Instead:
 - integrated policy coordination,
 - economic diversification,
 - renewable energy expansion,
 - and stronger governanceare necessary to maximize synergies and minimize trade-offs between SDGs and climate mitigation objectives.

Indigenous knowledge and adaptive mobility

Combining traditional pastoral knowledge with modern science and technology can support sustainable development and climate resilience in Mongolia.

- Traditional Mongolian pastoralism is a sustainable and resilient system based on **seasonal mobility, collective pasture use, and efficient resource management**.
- Multi-species herding and traditional ecological knowledge helps to prevent overgrazing and supports **self-sufficient livelihoods**.
- Climate change, globalization, mining expansion, and policy failures are increasingly **threatening pastoral livelihoods and grassland ecosystems**.
- *Dzud* disasters have caused severe livestock losses, poverty, and **migration to urban areas**.

Round of year life circles for the Mongolian pastoralists within a given ecosystem service domain



Source: Batjargal Zamba, 2025.

Tourism Connectivity for SDGs and Climate Resilience:

Sustainable cross-border tourism corridors can promote low-carbon regional connectivity, ecotourism, biodiversity conservation, and SDG-oriented regional development in Mongolia and Northeast Asia.

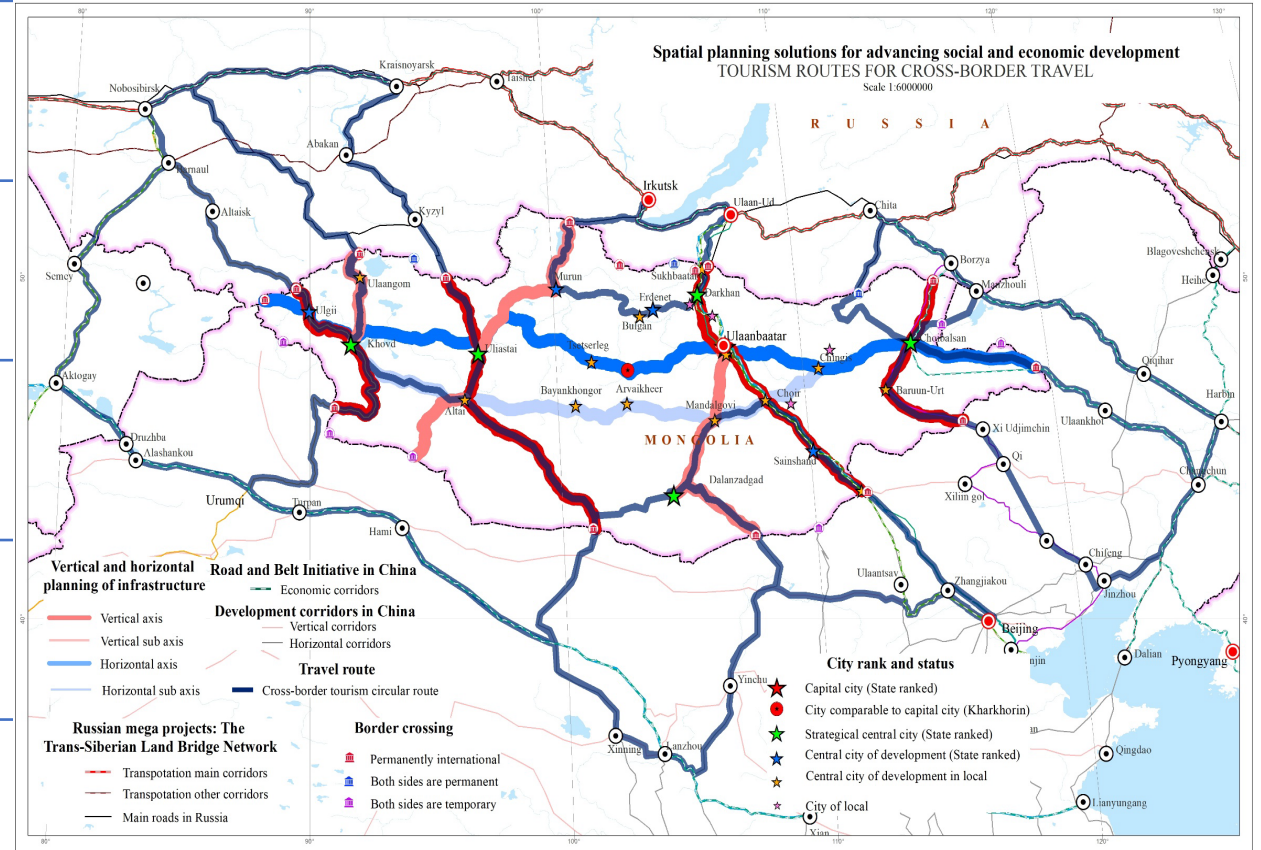
Sustainable tourism infrastructure, regional cooperation, and transport connectivity are identified as key factors for achieving *Mongolia's Vision-2050* tourism and development goals.

Cross-border tourism corridors support sustainable regional development by promoting green and low-carbon tourism connectivity across Mongolia, Russia, China, and Kazakhstan.

Cycle tourism is highlighted as an environmentally friendly tourism model aligned with the SDGs and sustainable transport development.

The corridors integrate protected areas, UNESCO heritage sites, and ecotourism destinations, emphasizing *biodiversity conservation and sustainable use of natural resources*.

The study suggests that cross-border tourism can contribute to SDGs related to sustainable cities and communities, decent work and economic growth, climate action, and regional partnership.



Russia and Decarbonization Challenges: Worsening geopolitical and economic conditions undermine progress toward decarbonization and the SDGs in Russia

Since 2022, sanctions, militarization, inflation, labor shortages, and technological isolation have weakened Russia's prospects for sustainable development and decarbonization.

Russia formally supports the SDGs and Paris Agreement, but implementation remains limited and inconsistent.

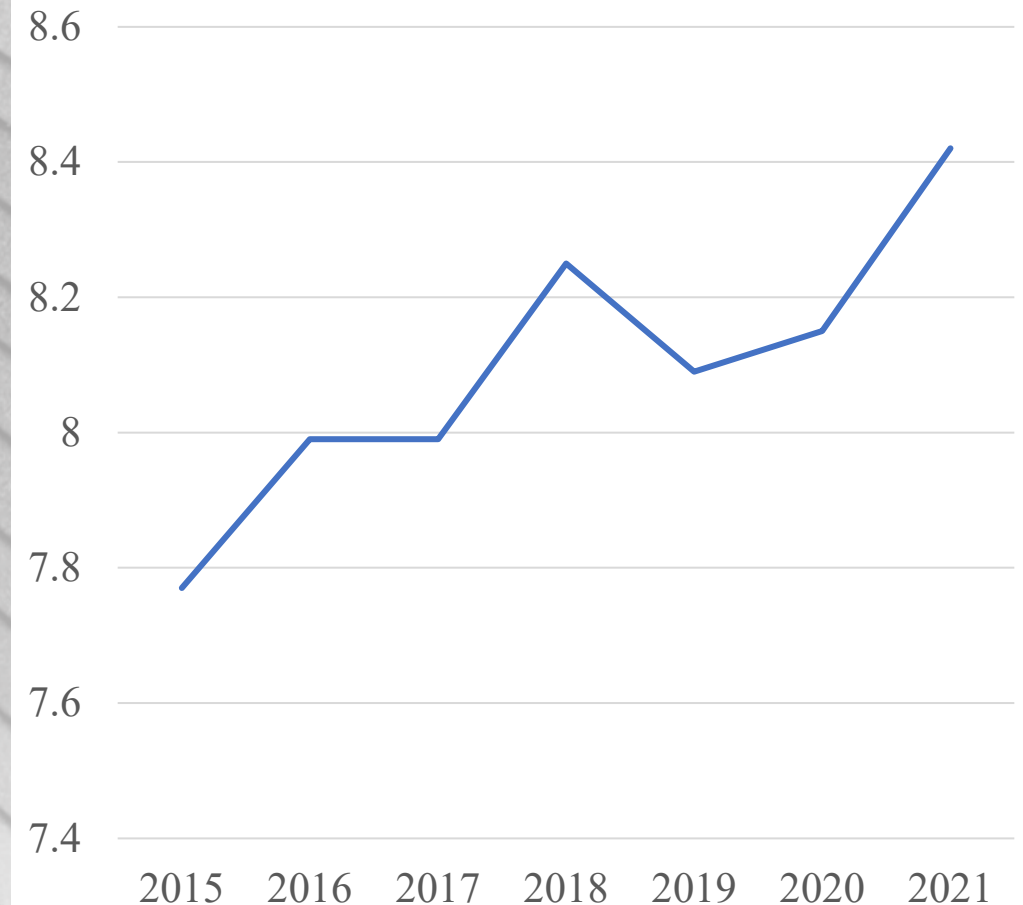
Some indicators improved (renewable energy share, lower air pollution), but others worsened, including energy intensity, fossil fuel subsidies, and CO₂ emissions.

Russia's climate targets are considered weak; emissions actually increased between 2015–2021.

Renewable energy and energy-efficiency programs have underperformed.

Deep decarbonization could provide health, environmental, and economic benefits, but current political conditions make progress difficult.

Energy intensity of GDP in Russia, TES/GDP (MJ per 2017 USD PPP)

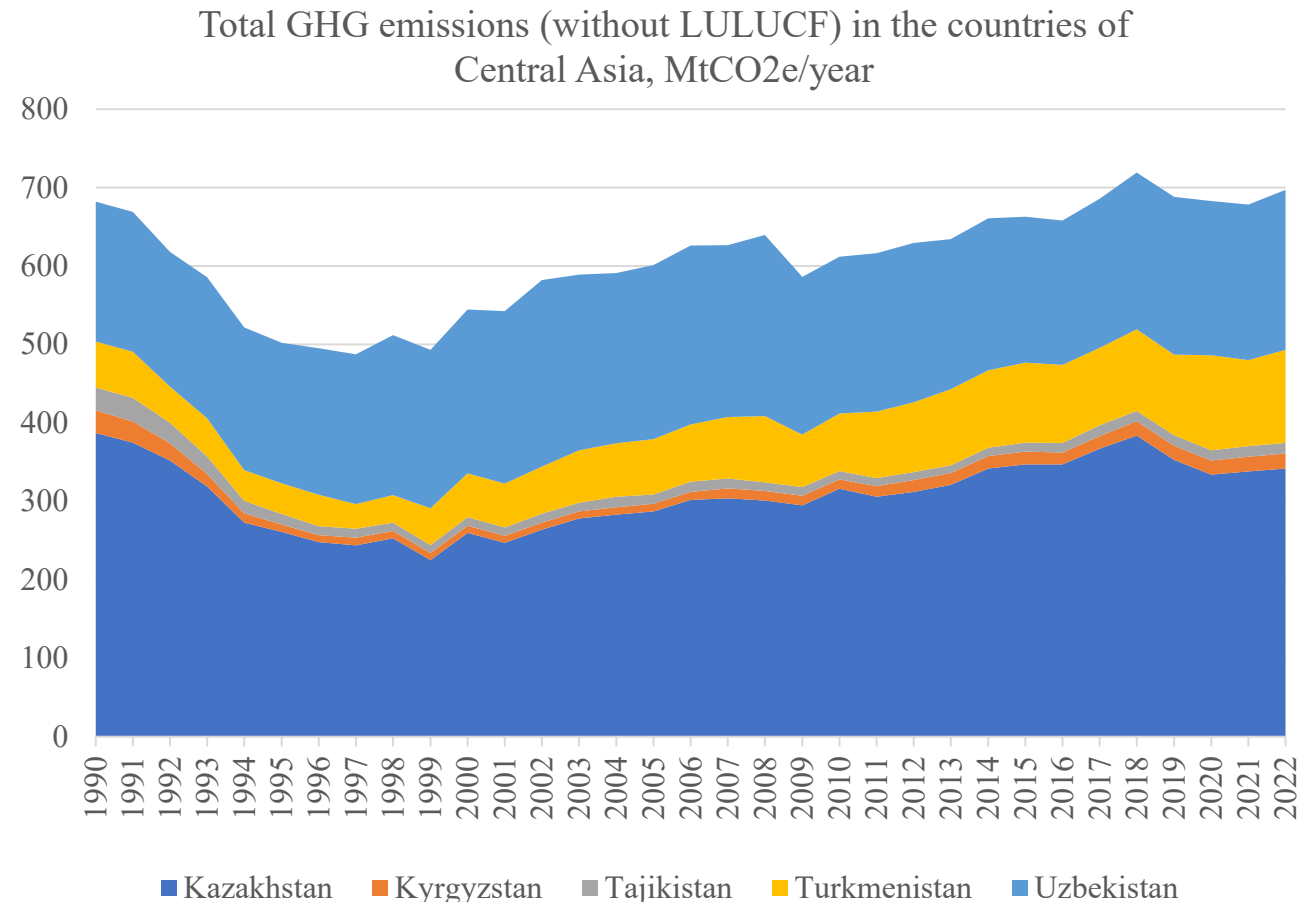


Central Asia and Regional Decarbonization

Climate Risks and Pathways toward Regional Decarbonization in Central Asia

Climate risks grow, but opportunities for low-carbon transition through renewable energy, regional cooperation, and green development strategies are significant.

- Central Asia is highly vulnerable to climate change, facing rising temperatures, glacier loss, and severe water stress.
- The region's emissions have risen since 2000 due to economic growth and fossil fuel dependence.
- Vast fossil fuel reserves create a major risk for global climate goals if fully exploited.
- Kazakhstan leads regional climate policy with carbon neutrality and renewable energy strategies, though coal dependence remains high.
- Kyrgyzstan and Tajikistan rely on hydropower but face infrastructure and energy-security challenges.
- Uzbekistan and Turkmenistan are pursuing green economy policies, renewable energy, hydrogen, and efficiency improvements.
- Regional cooperation, renewable energy investment, and international support are essential for successful decarbonization.



Source: Safonov, Georgy & Safonov, Mikhail , 2025.

Conclusions

- Mongolia needs integrated policies that combine renewable energy, economic diversification, technological innovation, and stronger governance to align SDG progress with climate mitigation.
- Indigenous knowledge and adaptive mobility can strengthen climate resilience and support sustainable development.
- Sustainable cross-border tourism corridors can promote low-carbon connectivity, ecotourism, biodiversity conservation, and SDG-oriented regional development in Mongolia and Northeast Asia.
- Worsening geopolitical and economic conditions may slow progress toward decarbonization and the SDGs.
- Despite growing climate risks, the region has significant opportunities for low-carbon transition through renewable energy, regional cooperation, and green development strategies.

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