



6.1. Cooperation Established with Scientific Institutions

6.2. Rangeland-Related Discussions, Consultations and Forums

6.3. Capacity Development, Knowledge Exchange and Specialist Training

6.4. Partnerships



PARTNERSHIP, SCIENTIFIC COOPERATION AND CAPACITY DEVELOPMENT

The system for determining rangeland condition at the national level, regularly monitoring changes, and using the results in land management and planning decisions is not an activity implemented by a single institution alone. Rather, it is a comprehensive process that has evolved through cooperation among multiple stakeholders. The quality and sustainability of this system depend directly on methodological support from scientific institutions, partnerships with international organizations, the capacity of local human resources, information systems, and technological innovation in field survey tools.

The 2018 national report clearly noted that cooperation among the Agency for Land Administration and Management, Geodesy and Cartography, the National Agency for Meteorology and Environmental Monitoring, the Ministry of Food, Agriculture and Light Industry, the Mongolian University of Life Sciences, the Mongolian National Federation of Pasture User Groups, the Green Gold–Animal Health Project, and the Jornada Experimental Range played a central role in developing rangeland assessment, monitoring and management methodologies. Therefore, in the present report, cooperation is considered not as a separate or isolated activity, but as a foundational factor of the national monitoring system.

6.5. Participation in International Conferences and Meetings and Presentation of Rangeland Photo Monitoring

6.6. Use of Rangeland Photo Monitoring and Its Results in Scientific and Other Research

6.1.

COOPERATION ESTABLISHED WITH SCIENTIFIC INSTITUTIONS



МОНГОЛ УЛСЫН ШИНЖЛЭХ УХААНЫ АКАДЕМИ
ГАЗАРЗҮЙ, ГЕОЭКОЛОГИЙН ХҮРЭЭЛЭН



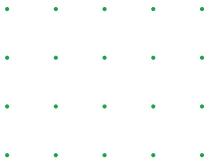
Stable and multi-faceted cooperation is being implemented with key national scientific and research institutions to assess the condition of Mongolia's rangelands, degradation dynamics and recovery potential on a scientific basis; improve the photo monitoring methodology; ensure data quality; and develop spatial analysis models.

These partnerships go beyond data exchange and include a wide range of activities, such as joint research, methodology development, training to improve specialists' skills, publication of scientific articles, and joint presentations at international conferences. In this way, they play an important role in improving the reliability and scientific value of the national rangeland monitoring network and in creating a verified evidence base for policy development.



The participation of scientific institutions has bolstered the scientific basis of the national rangeland monitoring network, thereby establishing conditions that facilitate the provision of more dependable information to policymakers.

The involvement of scientific institutions has strengthened the scientific foundation of the national rangeland monitoring network and created the conditions for providing more reliable information to policy-makers. Going forward, expanding cooperation with these institutions and introducing new technologies more deeply will be important for improving monitoring results and the content of information.



NATIONAL AGENCY FOR METEOROLOGY AND ENVIRONMENTAL MONITORING: A joint working group has been established to compare and analyse data from rangeland photo monitoring points in relation to climatic factors, including precipitation, evaporation, drought frequency and the length of the vegetation growing season. The main areas of cooperation include:

- Comparing indicators related to photo monitoring biomass and vegetation cover with long-term meteorological data from the National Agency for Meteorology and Environmental Monitoring, such as precipitation and temperature trends, in order to distinguish the main drivers of degradation.
- Conducting joint research to quantitatively assess the impacts of climate change on rangeland recovery potential.

INSTITUTE OF GEOGRAPHY AND GEOECOLOGY, MONGOLIAN ACADEMY OF SCIENCES: Cooperation is ongoing to develop and test methodologies for detailed mapping of the representative areas of monitoring points, identification of plant species, and classification and assessment of degradation levels. Key results and areas of work include:

- Development of methodologies and guidance for rangeland monitoring using remote sensing technology, in cooperation with institute specialists.
- Joint research to assess rangelands and vegetation health in the Tuul River basin.
- Joint organization of scientific conferences and seminars. This cooperation plays a key role in validating long-term changes in rangeland ecosystems through spatial analysis.

MONGOLIAN GEOSPATIAL ASSOCIATION: Cooperation is being implemented to integrate spatial data into the land monitoring digital system, egazar.gov.mn, and to test and develop analytical models based on artificial intelligence. Key areas of cooperation include:

- Providing technical support for the development of biodiversity and rangeland condition statistics dashboards within the Egazar system.
- Using AI algorithms to identify vegetation cover and estimate biomass, including pilot work that combines these approaches with Sentinel data to address high-resolution assessment challenges.
- Jointly developing GIS training and methodologies for using geospatial platforms for local specialists.
- Organizing joint projects and discussions, for example on appropriate use of land resources and spatial analysis.

In cooperation with the University of Wisconsin–Madison in the United States and the Mongolian Geospatial Association, an online training course titled “Application of Remote Sensing in Spatial Analysis for Environmental Conservation and Sustainability” was organized for more than 130 participants, including relevant officials of the GALAGC, monitoring specialists from the Departments of Land Administration, Construction and Urban Development in all 21 aimags, and other sector specialists.

As a result of the training, new opportunities were opened to expand cooperation in areas such as establishing a monitoring network to determine appropriate use and protection of land resources within the broader study of Mongolia’s natural resources and ecosystems, identifying socio-economic factors contributing to land degradation, and applying research results in practice.



6.2.

RANGELAND-RELATED DISCUSSIONS,
CONSULTATIONS AND FORUMS

6.2.1. NATIONAL CONSULTATION ON “ENSURING THE SUSTAINABLE OPERATION
OF THE NATIONAL RANGELAND MONITORING NETWORK”



DATE:
2025.04.01



LOCATION:
Ulaanbaatar



ORGANIZERS:
GALAGC; “Promoting Dryland Sustainable Landscapes and Biodiversity Conservation in the Eastern Steppe of Mongolia” project

 **PARTICIPANTS:**

More than 70 representatives from 28 organizations participated, including the Ministry of Environment and Climate Change, Ministry of Food, Agriculture and Light Industry, National Agency for Meteorology and Environmental Monitoring, National Statistics Office, National Emergency Management Agency, Information and Research Institute of Meteorology, Hydrology and Environment, Departments of Land Administration, Construction and Urban Development of Dornod, Khentii, Tuv and Sukhbaatar aimags, National University of Mongolia, Mongolian University of Life Sciences, Institute of Geography and Geoecology, Research Institute of Animal Husbandry, Mongolian National Federation of Pasture User Groups, and international and national projects and programmes.

 **RESULTS:**

The national consultation aimed to improve the operation of Mongolia’s national rangeland monitoring network, review its current status, reduce rangeland degradation, define future directions, and strengthen inter-sectoral and local participation. The event was important for identifying the current status and future development of the rangeland monitoring system, expanding cooperation among relevant institutions, supporting science-based policy development to reduce rangeland degradation, and delivering stakeholder recommendations to decision-making levels. A consolidated recommendation was issued from the consultation and shared with all participating organizations, which are now applying it in their activities.



FIGURE 19. Participants of the Consultation Meeting on “Ensuring the Sustainable Operation of the National Rangeland Monitoring Network”

6.2.2. SECOND CENTRAL ASIAN EXPERIENCE-SHARING SEMINAR OF THE DRYLAND SUSTAINABLE LANDSCAPES IMPACT PROGRAM, DSL-IP



DATE:

2025.08.18-24



LOCATION:

Ulaanbaatar –
Sukhbaatar aimag-
Khentii aimag



ORGANIZERS:

MOFALI; GALAGC; “Promoting Dryland Sustainable
Landscapes and Biodiversity Conservation in the
Eastern Steppe of Mongolia” project



PARTICIPANTS:

More than 20 international representatives participated in the seminar and field visit organized in Mongolia, including representatives from FAO, WWF, IUCN, WOCAT, the Committee for Land Resources Management of the Ministry of Agriculture of Kazakhstan, relevant national and local land administration officials, and representatives of the State Pasture Organization of Kyrgyzstan.



RESULTS

Under the seventh replenishment of the Global Environment Facility, the Dryland Sustainable Landscapes Impact Program is being implemented in 11 countries located in the world’s dryland regions. Under the sub-theme of “Sustainable Rangeland Management”, projects are being implemented in Mongolia and Kazakhstan in Central Asia. The first event to share good practices and knowledge generated through these projects was held in Almaty, Kazakhstan, in 2024, while the second event was organized in Mongolia. This represented an important achievement.



FIGURE 20. Participants of the Second Central Asian Experience-Sharing Seminar and Field Visit of the Dryland Sustainable Landscapes Impact Program, DSL-IP



**6.2.3. WORKSHOP ON ASSESSING SOIL ECOLOGICAL POTENTIAL AND
ALIGNING SOIL AND VEGETATION CLASSIFICATION STANDARDS WITH
INTERNATIONAL STANDARDS WITHIN THE FRAMEWORK OF LAND
CONDITION AND QUALITY MONITORING AND CERTIFICATION**



DATE:
2025.10.15



LOCATION:
Ulaanbaatar



ORGANIZERS:
GALAGC; Mongolian Integrated Land Management Alliance; Central Asian Soil Science Union; Mongolian Association of Agronomists



PARTICIPANTS:
More than 100 participants joined the discussion and training in person and online, including staff, researchers and consultants from government and non-governmental organizations, enterprises and institutions working in land monitoring, land condition and quality assessment, and land certification.



RESULTS:
The training and discussion aimed to provide specialists with information on improving the accuracy of soil data and introducing methodologies aligned with international standards within the framework of land condition and quality monitoring and certification. The event introduced international soil and vegetation classification systems, field-based assessment of soil ecological potential, and internationally used methodologies. It also identified opportunities to improve field surveys and results by using aerial and satellite imagery and images captured by unmanned aerial vehicles in land condition and quality monitoring and certification.

6.2.4. SEVENTH AND EIGHTH NATIONAL RANGELAND FORUMS



DATE:

2024.10.04,
2025.09.24



LOCATION:

Ulaanbaatar – Taragt
soum, Uvurkhangai
aimag



ORGANIZERS:

Office of the Deputy Prime Minister; Governors’
Offices of the 21 aimags; Green Gold Rangeland
Research Center



PARTICIPANTS:

More than 500 people participated in the two forums, including representatives of relevant organizations, citizens, herders, and women herder representatives from 19 aimags.



RESULTS:

A conference of women herders was organized as part of the rangeland forums.



FIGURE 21. Participants of the National Rangeland Forums



6.3.

CAPACITY DEVELOPMENT,
KNOWLEDGE EXCHANGE AND
SPECIALIST TRAINING

The quality and reliability of rangeland photo monitoring results depend directly on the common methodological understanding of the specialists conducting field surveys, their skills in data collection, and their capacity to process information. Therefore, one important area of cooperation is training and retraining specialists, exchanging experience, and connecting them to international and regional knowledge networks.

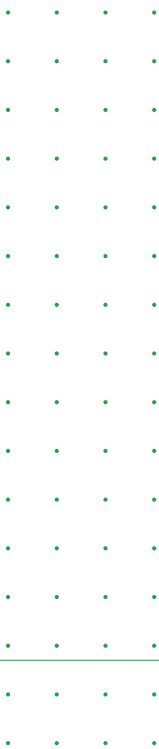
Within the framework of cooperation with the University of Wisconsin–Madison, SILVIS Lab and the Mongolian Geospatial Association, opportunities are being created for exchange programmes for scientists and researchers, summer courses in the United States and Mongolia, long- and short-term training in environmental conservation management, joint scientific meetings, and publication of articles and research outputs. This is useful for connecting sector specialists with international methodologies, new approaches and collaborative scientific work.

Under cooperation with the International Land Coalition, an agreement was reached to involve land sector officials in regional and international trainings, meetings, and winter and summer school programmes. This is important for supporting policy-level knowledge and experience exchange. Cooperation with UNDP includes support for building institutional staff capacity, digital systems, data analysis and user-centred information flows.

Therefore, in the future, capacity development should be institutionalized not as one-off training, but as a continuous development system covering field surveys, data processing, spatial analysis, use of digital systems, policy application and public communication skills.



In the future, capacity development ought to be established as an ongoing system rather than a series of isolated training sessions. This system should encompass field surveys, data processing, spatial analysis, the utilization of digital systems, policy implementation, and skills in public communication.



6.3.1. CAPACITY-BUILDING TRAINING FOR OFFICIALS OF THE DEPARTMENTS OF LAND ADMINISTRATION, CONSTRUCTION AND URBAN DEVELOPMENT IN THE EASTERN REGION



DATE:

2025.02.05-07



LOCATION:

Ulaanbaatar



ORGANIZERS:

GALAGC; “Promoting Dryland Sustainable Landscapes and Biodiversity Conservation in the Eastern Steppe of Mongolia” project



PARTICIPANTS:

Officials of the Departments of Land Administration, Construction and Urban Development of the eastern region aimags.



RESULTS:

During the training, information was provided on amendments to land legislation, newly approved regulations and methodologies, land management, cadastre and land monitoring. Participants discussed and exchanged views on challenges in delivering reliable and timely land-related public services to citizens and legal entities. In 2025, work has begun to newly develop or revise general urban development plans for 15 soums and to develop territorial development plans for two soums. It was decided that these planning documents should include specific measures for improving rangeland management and for appropriate use, protection and restoration of rangelands based on multi-year photo monitoring results.



FIGURE 22. Participants of the Capacity-Building Training for Officials of the Departments of Land Administration, Construction and Urban Development in the Eastern Region

6.3.2. TRAINING ON “RANGELAND PHOTO MONITORING FIELD SURVEYS AND IMPROVING THEIR RESULTS”



DATE:
2025.06.16-18



LOCATION:
Bayan-Ovoo soum,
Khentii aimag; Khulunbuir
soum, Dornod aimag;
Tumuntsogt soum,
Sukhbaatar aimag



ORGANIZERS:
GALAGC; “Promoting Dryland Sustainable
Landscapes and Biodiversity Conservation in the
Eastern Steppe of Mongolia” project; STREAM+
Sustainable Resilient Ecosystem and Agriculture
Management in Mongolia project



PARTICIPANTS:

Officials of the Departments of Land Administration, Construction and Urban Development of Dornod, Khentii and Sukhbaatar aimags; land officers from all soums of the three aimags; specialists responsible for development policy in aimag Governors’ Offices; soum rangeland specialists; and environmental inspectors.



RESULTS:

The training aimed to equip soum land officers, rangeland specialists and environmental specialists with the skills to jointly conduct rangeland photo monitoring surveys, provide them with the necessary tools and equipment, and strengthen teamwork skills for using annual photo monitoring results to plan, implement and monitor rangeland use and protection measures. Through rangeland photo monitoring surveys, degraded rangelands are being identified in detail, and the results are being presented to and discussed with herders at bag Citizens’ Public Khurals. This has begun to establish a good practice of planning and implementing rangeland use, protection and restoration measures in annual land management plans.



FIGURE 23. Participants during the Field Training on “Rangeland Photo Monitoring Field Surveys and Improving Their Results”

**6.3.3. KHANGAI REGIONAL TRAINING ON INTEGRATED LAND MANAGEMENT
PLANNING, MONITORING AND THE “EARTHRANGER” PLATFORM**



DATE:

2025.11.18-19



LOCATION

Arkhangai
aimag



ORGANIZERS:

Forest Agency; GALAGC; “Improving Ecosystem Services and Livelihoods of Local Communities through Restoration and Conservation of Mountain Landscapes in the Khangai Region” project



PARTICIPANTS:

Representatives of the Governors’ Offices, Departments of Environment, Departments of Food and Agriculture, and Departments of Land Administration, Construction and Urban Development of Bayankhongor, Arkhangai and Uvurkhangaï aimags, as well as representatives of deputy soum governors, bag governors, land officers, rangers, agriculture and rangeland specialists from the eight target soums of the project.



RESULTS:

Through this training, representatives of multi-sectoral working groups from the target aimags and soums strengthened their capacity in legal reforms related to land relations, development and implementation of aimag and soum land management plans, monitoring, procedures for making rangeland use more accountable, rangeland monitoring, rangeland management based on monitoring results, and improving forest pest monitoring and management through the EarthRanger platform.



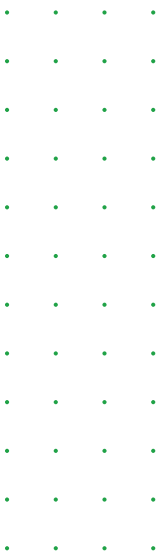
FIGURE 24. Participants of the Khangai Regional Training on Integrated Land Management Planning and Monitoring



With support from UNDP, the “Improving Adaptive Capacity and Risk Management of Rural Communities in Mongolia” project, implemented with the Ministry of Environment and Climate Change and financed by the Green Climate Fund, as well as other projects, programmes, international organizations and local government institutions, more than 650 participants were involved in domestic training and seminars on rangeland management. These participants included representatives and specialists of professional organizations at aimag and soum levels, as well as representatives of organizations under the Ministry of Food, Agriculture and Light Industry.

In 2024–2025, five 14-day training courses were organized in cooperation with stakeholders in the Inner Mongolia Autonomous Region of the People’s Republic of China. These trainings aimed to improve the knowledge and understanding of representatives of aimag and soum government institutions and cooperatives on rangeland management organization and primary handling and processing of agricultural products. In total, approximately 100 people were trained and specialized abroad.

Within the framework of the Law on the Legal Status of Herder Household Associations, adopted by the State Great Khural of Mongolia in 2024 to improve appropriate rangeland use, protsssection and the legal environment, Article 52.12 of the Law on Land provides that the procedure and contract template for allocating rangelands to primary associations of herder households shall be jointly approved by the central state administrative body responsible for agriculture and the state administrative body responsible for land matters. In this regard, a working group was established by order of the Minister of Food, Agriculture and Light Industry, a draft procedure was developed, and three online consultations were organized to present and discuss the draft. More than 400 representatives participated in the consultations, including specialists from the Governors’ Offices of 21 aimags and the capital city, aimag Departments of Food and Agriculture, Departments of Land Administration, Construction and Urban Development, National Agency for Meteorology and Environmental Monitoring, Departments of Environment, and relevant specialists from soum Governors’ Offices.



6.4.

PARTNERSHIPS



MINISTRY OF
ENVIRONMENT AND
CLIMATE CHANGE



Food and Agriculture
Organization of the
United Nations



INTERNATIONAL
LAND
COALITION



NATIONAL FEDERATION
OF PASTURE USER
GROUPS OF HERDERS

6.4.1. INTERNATIONAL ORGANIZATIONS AND DEVELOPMENT PARTNERS

In recent years, cooperation with international organizations and development partners has expanded significantly in the areas of rangeland condition assessment, improvement of sustainable land management policy, development of information systems, and integration of adaptation and restoration measures into planning.

Within the framework of cooperation with the “Promoting Dryland Sustainable Landscapes and Biodiversity Conservation in the Eastern Steppe of Mongolia” project, financed by the Global Environment Facility and jointly implemented by FAO and the WWF Mongolia Programme Office, the use of the Belcheer mobile application for rangeland photo monitoring has been made possible. This will help save labour and time in future monitoring activities.

The FAO-supported STREAM+ Sustainable Resilient Ecosystem and Agriculture Management in Mongolia project is providing practical support for improving aimag and soum land management plans, land monitoring, regulations and methodologies in the areas of sustainable land management, land degradation reduction, climate change adaptation and desertification mitigation. Within this cooperation, activities are being implemented to include land protection and restoration provisions in the revised Law on Land, develop new monitoring and planning procedures and guidelines, make additional improvements to the Integrated Land Fund Management System, and provide necessary equipment.



Cooperation with international organizations and development partners has notably increased in recent years.



Rangeland challenges are being tackled not merely as ecological concerns, but also as wider developmental matters associated with land governance, rights access, and institutional capabilities.

Cooperation under the memorandum of understanding with the International Land Coalition focuses on strengthening fair and inclusive land rights, introducing international good practices into the revision of the Law on Land, developing land governance assessment through the LANDEX platform, exchanging spatial data, localizing international experience in reducing and restoring rangeland degradation, and involving specialists in regional and international trainings and meetings. This shows that rangeland issues are being addressed not only as ecological issues, but also as broader development issues linked to land governance, access to rights and institutional capacity.

In addition, under the memorandum of understanding with the Mongolia Representative Office of the Wildlife Conservation Society, the project “Improving Ecosystem Services and Livelihoods of Local Communities through Restoration and Conservation of Mountain Landscapes in the Khangai Region” is being implemented jointly in eight soums of Arkhangai, Uvurkhangai and Bayankhongor aimags. Within this project, environmentally, socially and economically integrated measures are being implemented, including aimag- and soum-level planning, monitoring, improvement of digital systems, protected area management, forest and rangeland restoration, community-based natural resource management, and support for climate change adaptation capacity.

Under the memorandum of understanding with UNDP, the aim is to develop digital tools for monitoring and reporting rangeland condition, increase public and private sector access to data, analyse information and exchange results, and further develop the Belcheer application so that herders, herder households and cooperatives can directly enter information. This direction shows the potential to move rangeland information flows beyond the internal use of professional institutions towards an open, practical and multi-stakeholder system. The date information in the memorandum of understanding should be finalized and officially inserted into the report.



6.4.2. COOPERATION AGREEMENT WITH THE “PROMOTING DRYLAND SUSTAINABLE LANDSCAPES AND BIODIVERSITY CONSERVATION IN THE EASTERN STEPPE OF MONGOLIA” PROJECT



DATE:
2025.04



DURATION:
2022-2026



PARTIES:

GALAGC; “Promoting Dryland Sustainable Landscapes and Biodiversity Conservation in the Eastern Steppe of Mongolia” project

GOAL:

To create an enabling legal environment for implementing sustainable land management and to improve sustainable land management.

RESULTS:

Trainings and consultations involving key specialists from aimag and soum working groups, as well as representatives of herders, have been organized annually on planning, implementing and monitoring appropriate rangeland use. During 2022–2025, a total of 11,664 participants took part in 20 events.

In the nine target soums of the project, 1,768,502 hectares of rangeland were planned for restoration during 2022–2025, approved by resolutions of soum Citizens’ Representative Khurals and registered in the Unified Land Fund database. Of this, 146 measures in nine categories, covering 1,435,689 hectares, were included in annual land management plans and implemented. These measures included rangeland restoration, protection of water sources and riparian areas, construction of ponds, control of forest diseases and pests, and afforestation. Implementation reached 81 per cent.

Of the 68 photo monitoring points located within 5 km of restoration sites, recovery classes improved at 22 points, representing 835,502 hectares of rangeland, while condition remained stable at 27 points, representing 1,881,578 hectares. In addition, rotational use and resting measures were planned and implemented in the Bayantsagaan Tal Nature Reserve during 2023–2025. In 2024, the results of the research team from the National University of Mongolia showed no statistically significant difference from the soum photo monitoring results.



FIGURE 25. Meeting with Representatives of the “Promoting Dryland Sustainable Landscapes and Biodiversity Conservation in the Eastern Steppe of Mongolia” Project

6.4.3. COOPERATION AGREEMENT WITH THE STREAM+ SUSTAINABLE RESILIENT ECOSYSTEM AND AGRICULTURE MANAGEMENT IN MONGOLIA PROJECT



Co-funded by the
European Union

Implemented by



Deutsche Gesellschaft
für Internationale
Zusammenarbeit (GIZ) GmbH



Food and Agriculture
Organization of the
United Nations



DATE:
2024.12



DURATION:
2024-2026



PARTIES:
GALAGC; STREAM+ Sustainable Resilient Ecosystem and
Agriculture Management in Mongolia project



GOAL:
To cooperate on improving the legal framework of the Law on Land and strengthening the vertical
system of the land sector.



RESULTS:
During 2024–2026, the GALAGC is cooperating with the STREAM+ project to improve the legal
framework of the Law on Land and strengthen the vertical structure of the land sector.

Within the framework of this cooperation, work is being carried out to improve aimag and soum land
management planning, land monitoring, and land management regulations and methodologies in
relation to sustainable land management, land degradation reduction, climate change adaptation
and desertification mitigation. Cooperation also focuses on integrating land degradation, climate
change and biodiversity conservation issues into these documents, and protecting eroded and
damaged land from soil erosion.

In addition, the partners are jointly implementing activities to incorporate land protection and
restoration provisions into the draft revised Law on Land, develop regulations, methodologies
and guidelines for land management and monitoring, carry out additional development of the
Integrated Land Fund Management System, and provide necessary equipment.



FIGURE 26. Meeting with Representatives of the STREAM+ Sustainable Resilient Ecosystem and Agriculture Management in Mongolia Project and the European Union

6.4.4. MEMORANDUM OF UNDERSTANDING BETWEEN GALAGC AND THE
INTERNATIONAL LAND COALITION



DATE:

2025.12.22



DURATION:

2025-2027 он



PARTIES:

GALAGC; International Land Coalition; National Land Coalition

GOAL:

The International Land Coalition, a global alliance with 323 member organizations in 93 countries, will cooperate to implement activities in Mongolia aimed at strengthening fair and inclusive land rights, guided by the principles of people-centred land governance.

AREAS OF COOPERATION:

The International Land Coalition is an international network bringing together 323 organizations from 93 countries. Cooperation with the Coalition is planned to strengthen fair and inclusive land rights and support people-centred land governance in Mongolia.

Within the framework of this cooperation, support will be provided to reflect international good practices and regulations in the revised Law on Land and to improve the coordination and organization of land policy and operations. In addition, through the LANDEX platform, which measures global land governance indicators, the fairness and inclusiveness of rights to own, possess and use land will be assessed, creating opportunities to share Mongolia’s good practices with other countries.

The cooperation also plans to exchange spatial land data and information through an integrated international platform, use such data to address environmental issues, and introduce international experience in reducing and restoring rangeland degradation. It has also been agreed to involve relevant representatives in regional and international conferences and seminars, and to include land sector officials in overseas training programmes.



FIGURE 27. Meeting to sign a Memorandum of Understanding with the International Land Coalition and the National Land Coalition of Mongolia

6.4.5. MEMORANDUM OF UNDERSTANDING BETWEEN GALAGC AND THE MONGOLIA REPRESENTATIVE OFFICE OF THE WILDLIFE CONSERVATION SOCIETY



DATE:
2025.10.17



DURATION:
2025-2030



PARTIES:
GALAGC; Mongolia Representative Office of the Wildlife Conservation Society

GOAL:

To cooperate in improving ecosystem services, biodiversity and local livelihoods through restoration and conservation of mountain landscapes in the Khangai region.

AREAS OF COOPERATION:

The GALAGC is working with the Mongolia Representative Office of the Wildlife Conservation Society to implement the project “Improving Ecosystem Services and Livelihoods of Local Communities through Restoration and Conservation of Mountain Landscapes in the Khangai Region.” The project covers Bulgan, Chuluut, Ikhtamir and Tsenkher soums of Arkhangai aimag; Bat-Ulzii and Uyanga soums of Uvurkhangai aimag; and Erdenetsogt and Galuut soums of Bayankhongor aimag.

Within the framework of the cooperation, public participation will be ensured in the development, implementation and monitoring of aimag general land management plans and soum territorial development plans. Cooperation will also focus on improving protected area management, implementing sustainable land management, restoring forests and rangelands, and protecting wildlife and their habitats. In addition, activities are planned to support local livelihoods, strengthen community-based natural resource management, increase climate change adaptation capacity, and provide necessary equipment and tools.



FIGURE 28. Meeting to Sign a Memorandum of Understanding with the Wildlife Conservation Society (WCS) in Mongolia

6.4.6. MEMORANDUM OF UNDERSTANDING BETWEEN GALAGC AND THE UNDP
RESIDENT REPRESENTATIVE OFFICE IN MONGOLIA



DATE:
2025.12.22



DURATION:
2025-2027



PARTIES:
GALAGC; UNDP Resident Representative Office in Mongolia

GOAL:

To develop digital tools for rangeland condition monitoring and reporting, and to increase the use of open data, artificial intelligence and machine learning-based analysis.

AREAS OF COOPERATION:

The Agency for Land Administration and Management, Geodesy and Cartography will cooperate with the UNDP Resident Representative Office in Mongolia to improve access to, processing of and reporting on rangeland condition information. Within the framework of this cooperation, existing rangeland condition data will be consolidated and analysed, and digital tools for monitoring and reporting will be developed. The Belcheer application will also be expanded for users to enable direct collection of rangeland condition information and photographs from herders, herder households and cooperatives.

In addition, cooperation will focus on increasing public and private sector access to open data, exchanging results of data-based analysis, and organizing training and capacity-building activities for officials of the Agency and its subordinate organizations. The partners also plan to link outputs from digital tools based on artificial intelligence and machine learning to the Belcheer application, and to provide the necessary system access, information and technical infrastructure.



FIGURE 29. Meeting to sign a Memorandum of Understanding with UNDP Mongolia

6.4.7. MEMORANDUM OF UNDERSTANDING BETWEEN GALAGC THE UNIVERSITY OF WISCONSIN–MADISON, UNITED STATES, AND THE MONGOLIAN GEOSPATIAL ASSOCIATION



DATE:

2024.07.23



DURATION:

2024-2027



PARTIES:

GALAGC; Mongolian Geospatial Association; SILVIS Lab, the Spatial Analysis for Conservation and Sustainability Laboratory of the University of Wisconsin–Madison

 GOAL:

To expand cooperation in assessing, protecting and appropriately using Mongolia’s land resources, rangeland condition and ecosystem change through spatial analysis and joint research.

 AREAS OF COOPERATION:

The Mongolian Geospatial Association and SILVIS Lab, the Spatial Analysis for Conservation and Sustainability Laboratory of the University of Wisconsin–Madison, will cooperate in research, analysis, training and experience exchange. Within the framework of the cooperation, they will support the use of spatial analysis methods in studies of Mongolia’s natural resources and ecosystems, the establishment of a monitoring network to determine appropriate use and protection of land resources, and the identification of socio-economic factors contributing to land degradation.

The cooperation also plans to involve one to three specialists and researchers in long- and short-term training in environmental conservation management, organize summer courses in the United States and Mongolia, and discuss the results of joint research on rangeland condition and monitoring. In addition, the parties will cooperate in publishing books, brochures and scientific works on specific topics, participating in international conferences and meetings, and publishing joint research papers.



**6.4.8. MEMORANDUM OF UNDERSTANDING BETWEEN GALAGC AND THE
MONGOLIAN NATIONAL FEDERATION OF PASTURE USER GROUPS**



DATE:

2025.02.04



DURATION:

2024-2028



PARTIES:

GALAGC; Mongolian National Federation of Pasture User
Groups

GOAL:

To cooperate in organizing rangeland photo monitoring continuously, improving the methodology for collecting primary data, and introducing appropriate use of rangeland-based natural resources.



AREAS OF COOPERATION:

Cooperation with the Mongolian National Federation of Pasture User Groups will focus on monitoring and evaluating the impacts of rangeland use and improving rangeland management based on those results. Within the framework of the cooperation, the methodology for photo monitoring field surveys, data processing and analysis will be improved, and practical training will be organized for soum land officers to strengthen their capacity.

In addition, based on photo monitoring results, the cooperation will support the identification of appropriate rangeland use measures and increase the participation of soum land officers, herders and working groups under soum Governors' Offices in preparing implementable rangeland management plans. The partners will also work to make rangeland condition information open, timely and understandable for herders and the public, and to create conditions for using photo monitoring results as evidence in determining the value and recognition of livestock products.



6.5.

PARTICIPATION IN INTERNATIONAL CONFERENCES AND MEETINGS AND PRESENTATION OF RANGELAND PHOTO MONITORING



6.5.1. PRESENTATION ON RANGELAND USE, PLANNING AND MONITORING IN MONGOLIA AT THE SIXTEENTH SESSION OF THE CONFERENCE OF THE PARTIES TO THE UNITED NATIONS CONVENTION TO COMBAT DESERTIFICATION, UNCCD COP16

The sixteenth session of the Conference of the Parties to the United Nations Convention to Combat Desertification, UNCCD COP16, was held in Riyadh, Kingdom of Saudi Arabia, from 2 to 13 December 2024. From 5 to 13 December 2024, B. Dul, Head of the Land Monitoring Division of the GALAGC, and G. Gereltuya, Senior Specialist of the Land Management Division, participated in Green Zone events as members of Mongolia's team under the GEO Land Degradation Neutrality, GEO-LDN, programme.



FIGURE 30. Presentation of the Land Management Planning and Land Monitoring System to COP16 Participants



During the conference, the team participated in the GEO-LDN Global Dialogue Forum and delivered a presentation on work carried out in the areas of integrated land management planning and restoration, using the eastern region of Mongolia as an example. They also introduced rangeland photo monitoring activities, land management planning, the related digital system, and the land monitoring system to participants in the Green and Blue Zones. In addition, they exchanged experience with representatives from other countries and participated in meetings, trainings and seminars organized under the programme.



FIGURE 31. Dissemination Materials on Mongolia's Land Management, Land Monitoring Network and Rangeland Monitoring Presented to COP16 Participant

6.5.2. PRESENTATION ON MONGOLIA'S LAND MANAGEMENT AND RANGELAND CONDITION AT THE MEETING ON "PASTORAL LIVESTOCK AND MONGOLIA" DEDICATED TO THE 80TH ANNIVERSARY OF FAO

As part of the "UN Week" campaign dedicated to the 80th anniversary of the United Nations, a stakeholder meeting on "Pastoral Livestock and Mongolia" was held on 23 October 2025. During the meeting, participants discussed the current state of Mongolia's pastoral livestock sector, key challenges, joint solutions, ways to strengthen partnerships, and cooperation in preparation for the International Year of Rangelands and Pastoralists 2026.

The GALAGC delivered presentations on "Reform of Mongolia's Land Use Policy" and "Results and Significance of Rangeland Photo Monitoring." The presentations introduced ongoing and planned activities related to assessing rangeland condition, establishing an integrated database, and defining sustainable use policies on a scientific basis.



FIGURE 32. Stakeholder Meeting on "Pastoral Livestock and Mongolia" Organized as Part of the "UN Week" Campaign

Representatives of the Ministry of Foreign Affairs and the Ministry of Food, Agriculture and Light Industry also delivered presentations on "International Year of Rangelands and Pastoralists: Principles of the Government of Mongolia" and "Activities Being Implemented by the Government of Mongolia in Preparation for the International Year."

6.5.3. PARTICIPATION IN A STUDY VISIT TO CHINA UNDER ADB'S REGIONAL KNOWLEDGE SHARING INITIATIVE AND PRESENTATION OF MONGOLIA'S RANGELAND USE, PROTECTION AND MONITORING SYSTEM

Within the framework of the Regional Knowledge Sharing Initiative implemented by the Asian Development Bank, a Mongolian delegation led by Member of Parliament L. Munkhbayasgalan undertook a study visit to the People's Republic of China from 2 to 9 November 2025. The visit covered Beijing, Hefei in Anhui Province, Hohhot in Inner Mongolia, and Xilinhot.

The purpose of the study visit was to explore opportunities for cooperation in addressing risks caused by regional climate change, ecosystem degradation and sustainable management of natural resources. It also aimed to identify priority projects and measures that the Government of Mongolia could implement in expanded cooperation with ADB. During the visit, meetings and discussions were organized to study experience in water resource use, steppe rangeland use, ecosystem protection and restoration, as well as technologies and innovations in pastoral livestock production, and to explore ways to introduce and implement relevant practices in Mongolia.



FIGURE 33. Experience-Sharing Study Tour

The delegation also learned from various experiences on how ecological compensation and financial incentives are reflected in government policies and decisions and successfully implemented through cooperation among herders, cooperatives, local authorities and civil servants.

During the meetings and discussions, participants exchanged views on the following topics related to Chinese government policies, operations, research and analysis:

- ✓ Rangeland restoration technologies and financing;
- ✓ Ecological green development;
- ✓ Rangeland ecosystems and sustainable livestock production;
- ✓ Ecological valuation and compensation;
- ✓ Carbon markets;
- ✓ Desertification reduction programmes involving civil society organizations;
- ✓ Prevention of land degradation and monitoring of land condition and degradation using the latest remote sensing techniques and technologies;
- ✓ Use and restoration of water bodies and surface water harvesting.

6.6.

USE OF RANGELAND PHOTO MONITORING AND ITS RESULTS IN SCIENTIFIC AND OTHER RESEARCH

6.6.1. ASIAN DEVELOPMENT BANK RESEARCH ARTICLE²⁶

Restoring grasslands in Asia and the Pacific is important for stabilizing ecosystems and protecting the livelihoods of millions of people. In Mongolia, rangelands account for around 80 per cent of the land supporting herders' livelihoods, while in China they cover 40 per cent of the territory and support more than 18 million herder households.

These ecosystems provide important services, including carbon storage, regulation of water flows and biodiversity conservation. However, they have been degraded by decades of overgrazing and poor management.

Large-scale programmes implemented in China combine locally adapted long-term policies, investment and community participation to combat desertification. Mongolia also needs such sustained, long-term financing, while early, low-cost interventions can help reduce higher costs in the future.

Researchers emphasize the importance of not only limiting livestock numbers, but also creating new opportunities for herders and using economic incentives such as rotational grazing, restoration, and payments for ecosystem services.

The ADB article also highlights that remote sensing and data-based monitoring are becoming important models for policy-making and risk preparedness.



Researchers highlight the significance of not merely restricting livestock populations, but also fostering new prospects for herders and implementing economic incentives like rotational grazing, ecosystem restoration, and payments for ecosystem services.

6.6.2. STUDY ON ESTIMATING STEPPE VEGETATION PHENOLOGY AND BIOMASS IN MONGOLIA USING REMOTE SENSING

B. Muchir, a doctoral candidate at the Department of Geography, National University of Mongolia, used rangeland photo monitoring point data in a Ph.D. dissertation titled "Estimating Steppe Vegetation Phenology and Biomass in Mongolia Using Remote Sensing"²⁷.

²⁶ <https://blogs.adb.org/>

²⁷ <https://e-library.num.edu.mn/cgi-bin/koha/opac-detail.pl?biblionumber=144839>

The study used statistical indicators of above-ground biomass, AGB, determined through field measurements at photo monitoring points of the GALAGC, together with variables such as NDVI_{max}, EVI_{max}, precipitation, maximum air temperature, minimum air temperature, wind speed, digital elevation model and slope. The results showed that the average AGB for 2016–2021 was 69.55 g/m², ranging from a minimum of 4.19 g/m² to a maximum of 290.89 g/m².

To develop the most suitable model for estimating AGB in Mongolia's steppe, the eight variables listed above were selected and applied in four regression models. The dataset was randomly divided into 80 per cent training data and 20 per cent testing data for model fitting and validation. For the training data, the XGBoost model showed the highest accuracy, with $R^2 = 0.93$ and RMSE = 13.58 g/m², followed by the Random Forest model, with $R^2 = 0.84$ and RMSE = 21.30 g/m². For the testing data, the Random Forest model showed the best predictive performance, with $R^2 = 0.69$ and RMSE = 29.23 g/m², followed by the SVM model, with $R^2 = 0.61$ and RMSE = 32.89 g/m². The PLSR model showed comparatively weaker performance, with $R^2 = 0.47$ and RMSE = 38.08 g/m² for the training data, and $R^2 = 0.50$ and RMSE = 38.95 g/m² for the testing data. Therefore, the Random Forest model was selected as the most suitable model for estimating AGB in the study area.

6.6.3. STUDY ON SPATIO-TEMPORAL CHANGES IN RANGELAND CARRYING CAPACITY BASED ON REMOTE SENSING-DERIVED NET PRIMARY PRODUCTIVITY IN MONGOLIA²⁸

Increasing livestock numbers, combined with insufficient precipitation, are reducing rangeland biomass, which in turn reduces rangeland carrying capacity and contributes to rangeland degradation. In this study, net primary productivity, NPP, data from the Global Land Surface Satellite, GLASS, and the Moderate Resolution Imaging Spectroradiometer, MODIS, datasets for 1982–2020 were first converted into estimates of above-ground biomass, AGB. These estimates were then used to evaluate long-term trends in grazing carrying capacity, GCC, across Mongolia.

MODIS data showed an increasing trend in AGB between 2000 and 2020, while GLASS data reflected a decreasing trend between 1982 and 2018. Climate analysis for 1982–2020 found a positive correlation between AGB and precipitation, $R > 0.80$, and a negative correlation with temperature, $R < -0.60$. These climatic changes are reducing AGB and further weakening rangeland regeneration capacity.

At the same time, livestock numbers have generally increased since 1982, although they declined in some years due to dzud and summer drought, which temporarily increased carrying capacity. The carrying capacity assessment found that 37.5 per cent of rangelands were severely over carrying capacity, while 31.9–40.7 per cent remained within sustainable limits.

Spatially, the eastern region of Mongolia appears able to sustainably support current livestock numbers, whereas rangeland use in parts of the western, southern and northern regions is at moderate to dangerous levels. Detailed analysis of carrying capacity dynamics and its climatic drivers can provide scientific support to policy-makers for rangeland management in the Mongolian Plateau.

The livestock numbers, rangeland area, assessment results and statistical data used in this study were obtained from the GALAGC and the National Statistics Office.

²⁸ Rentsenduger, B.; Guo, Q.; Chuluunbat, J.; Baatar, D.; Urtnasan, M.; Avirmed, D.; Li, S. Spatio-Temporal Variations in Grassland Carrying Capacity Derived from Remote Sensing NPP in Mongolia. *Sustainability* 2025, 17, 5498. <https://doi.org/10.3390/su17125498>



6.6.4. STUDY ON SPATIAL AND TEMPORAL VARIABILITY OF NET PRIMARY PRODUCTIVITY OF VEGETATION IN MONGOLIA AND ITS DRIVING FACTORS

T. Nyamaa, a doctoral candidate at the School of Ecology and Environment of Inner Mongolia University, Inner Mongolia Autonomous Region, China, used rangeland photo monitoring point data in a Ph.D. dissertation titled “Spatial and Temporal Variability of Net Primary Productivity of Vegetation in Mongolia and Its Driving Factors”²⁹.

To estimate vegetation net primary productivity, NPP, in the study area for 2000–2021, the study calculated NPP, expressed as $\text{g C m}^{-2} \text{ month}^{-1}$, based on variables including $\text{SOL}(x,t)$, $\text{FPAR}(x,t)$, $\text{Te}(x,t)$, $\text{We}(x,t)$ and maximum light use efficiency, ϵ_{max} . Above-ground biomass determined through field measurements at photo monitoring points of the GALAGC, together with biomass data from the National Agency for Meteorology and Environmental Monitoring, were converted into ANPP and BNPP and compared with NPP estimated using the CASA model. The correlation coefficient was $R^2 = 0.66$, $p < 0.001$, and the root mean square error was 9.26 g C m^{-2} . These results indicate that NPP estimated by the improved CASA model can represent the actual NPP of vegetation in Mongolia.

During the 22-year study period, annual NPP increased across 87.8 per cent of Mongolia’s total vegetated area, by up to $3.88 \text{ g C m}^{-2} \text{ yr}^{-1}$, of which 26 per cent was statistically significant, $p < 0.05$.

6.6.5. MAPPING DOMINANT PLANT SPECIES IN GRASSLAND COMMUNITIES ACROSS MONGOLIA USING 10-M SATELLITE DATA AND ALPHAEARTH FOUNDATIONS³⁰

Grassland ecosystems are increasingly threatened by climate variability and rising grazing pressure. In Mongolia, traditional nomadic pastoralism historically maintained pasture health through seasonal livestock movements that allowed vegetation to recover. However, during the past three decades, rapidly increasing livestock numbers have exceeded the carrying capacity of many rangelands, resulting in widespread changes in vegetation composition and structure. However, nationwide monitoring of grassland species composition is challenging, posing a constraint for effective management of grassland ecosystems.

Our goal was to map dominant grassland species distribution map across Mongolia. We analyzed nine years of 10-resolution satellite imagery, encapsulated in Google AlphaEarth’s Foundation dataset, and a machine-learning approach trained with field plot data. The final model had an overall accuracy of 82% and a Kappa coefficient of 0.80.

Our results indicate substantial change in dominant species distributions from 2017 to 2025. Dry steppe grasses, particularly *Stipa krylovii* and *S. mongolica*, declined, while drought-tolerant species such as *Artemisia* spp., *Caragana* spp., and Gobi shrubs expanded. Sedge-dominated wetlands remained relatively stable. These findings provide critical information for grassland monitoring, conservation, and sustainable rangeland management across Mongolia. More broadly our results show that it is possible to assess changes in grassland composition, in addition to changes in vegetation indices or cover.

These findings provide important information for monitoring the status of Mongolian grasslands,

²⁹ Nyamaa, T., Sainbuyan, B., Narantsatsral, T., Lan, A., Urtnasan, M., Baoyin, T., Byambakhuu, G., & Munkh-Erdene, J. (2024). The influence of socio-economic factors on net primary productivity in Mongolia during 2000–2021. *Geographical Issues*, 24(01), 63–76. <https://doi.org/10.22353/gi.2024.24.05>

³⁰ Elbegjargal, N., Akasha, A., Mandakh, N., Dul, B., Radeloff, S. V. (2026). Mapping the distribution of dominant pasture vegetation in Mongolia using 10-metre-resolution satellite data and the AlphaEarth foundation model. NASA Biosphere International Conference. https://cce.nasa.gov/meeting_2026/index.html

land use, vegetation restoration, conservation, and sustainable management of grasslands.

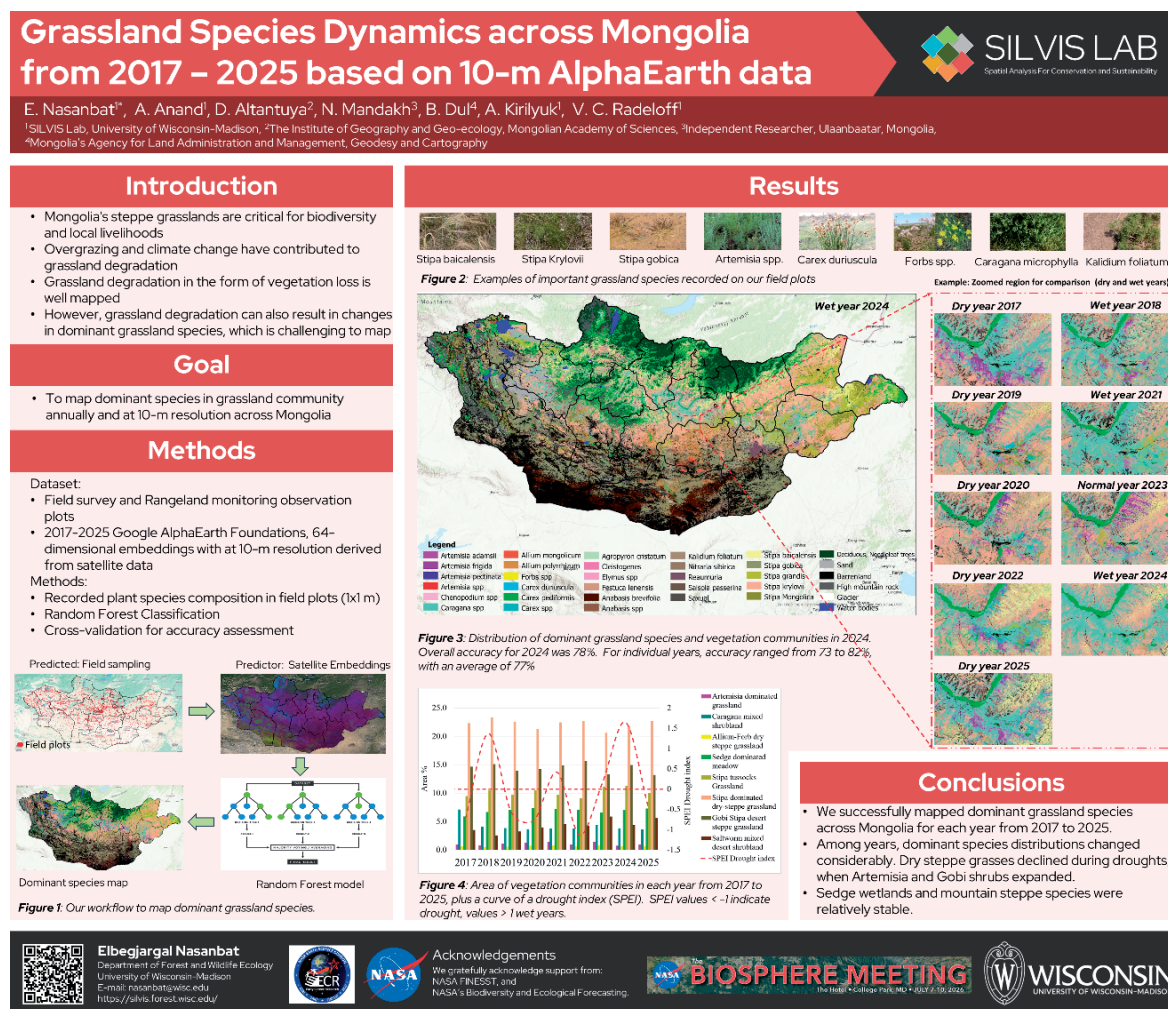


FIGURE 34. Poster Mapping the Distribution of Dominant Grassland Plants in Mongolia Using Satellite Data and the AlphaEarth Baseline Model

This research was presented at the NASA Biosphere Meeting, held in Washington, D.C., from July 7 to 10, 2026. https://cce.nasa.gov/meeting_2026/index.html