Food and Agriculture Organization of the United Nations

MONGOLIA'S

DOMESTIC CARBON MARKET SCHEME FOR CARBON SEQUESTRATION IN RANGELAND

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ABBREVIATIONS AND ACRONYMS

AFOLU	Agriculture, Forestry and Other Land Use
ALMGaC	Agency for Land Administration and Management, Geodesy and Cartography
CMO	Carbon Market Office
DIMA	Database for Inventory, Monitoring and Assessment (National rangeland database)
FAO	Food and Agriculture Organization of the United Nations
GCF	Green Climate Fund
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Greenhouse Gas
GS	Gold Standard
IKI	International Climate Initiative
IRIMHE	Information and Research Institute of Meteorology, Hydrology and Environment
MDCM	Mongolia's Domestic Carbon Market
MET	Ministry of Environment and Tourism
MoF	Ministry of Finance
MoFALI	Ministry of Agriculture and Light Industry
NAMEM	National Agency for Meteorology and Environmental Monitoring
NAP	National Adaptation Plan
NCC	National Climate Committee
NDC	Nationally Determined Contribution
NGO	Non-Governmental Organization
PSC	Project Steering Committee
PSE	Private Sector Engagement
RBRM	Resilience-based Rangeland Management
PUGs	Pasture User Groups
SCALA	Scaling up Climate Ambition on Land Use and Agriculture
SDGs	Sustainable Development Goals
SOC	Soil Organic Carbon
STM	State and Transition Model
VCS	Verified Carbon Standard
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change

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1. EXECUTIVE SUMMARY

Mongolia's rangelands, covering approximately 72% of the country, play a crucial role in supporting herder communities and acting as significant carbon sinks. However, unsustainable land management practices and the impacts of climate change have led to widespread rangeland degradation, with 76.9% of Mongolia's territory affected by desertification. Soil organic carbon (SOC) levels are projected to further decline, threatening both the environment and rural livelihoods.

To address these challenges, the Mongolia Domestic Carbon Market (MDCM) has been developed, a voluntary but government-regulated carbon crediting mechanism aimed at enhancing carbon sequestration through sustainable rangeland management under the Scaling up Climate Ambition on Land Use and Agriculture (SCALA) program. It supports Mongolia's climate commitments under its Nationally Determined Contributions (NDCs) to the Paris Agreement and provides a flexible platform for scaling up mitigation efforts while improving the resilience of herder communities.

The MDCM leverages soil carbon sequestration through rangeland restoration, offering a hybrid reward system that includes both action-based and result-based credits. These carbon credits can contribute to Mongolia's NDC targets or be traded internationally under Article 6 of the Paris Agreement. Additionally, the mechanism provides opportunities for domestic companies to purchase carbon credits, allowing them to meet their sustainability goals and potentially offset future regulatory obligations.

The MDCM integrates a robust Monitoring, Reporting, and Verification (MRV) system, aligned with international standards, ensuring accurate tracking of carbon sequestration while reducing transaction costs for participants.

The governance of the MDCM is led by the Ministry of Environment and Climate Change (MECC), with the National Climate Committee (NCC) providing oversight. Herder households, organized into federations, are central to executing rangeland carbon sequestration projects, with flexible participation options.

Key policy recommendations to enhance the MDCM include:

- Developing a comprehensive legal framework to support carbon market activities, including clear definitions of carbon credit ownership and transfer;
- Establishing a Carbon Market Office (CMO) to manage the operations of the MDCM and oversee the issuance of carbon credits;
- Strengthening national MRV systems and enhancing SOC measurement capabilities, particularly in remote areas;
- Promoting financial mechanisms such as voluntary carbon pricing, green finance initiatives, and public-private partnerships to incentivize market participation;
- Fostering stakeholder engagement and building capacity across communities and institutions to ensure widespread participation, including domestic companies.

Through the MDCM, Mongolia is poised to capitalize on its significant carbon sequestration potential, restore degraded rangelands, and engage proactively with global carbon markets. This will enable the country to meet its national climate goals while contributing to international climate cooperation, enhancing the resilience of its rural communities, and providing opportunities for domestic companies to participate in sustainable development.

2. INTRODUCTION

Mongolia has experienced significant climate changes, including the annual average near-surface temperature rising by 2.46°C between 1940 and 2022, making it one of the fastest-warming countries globally. This rapid warming has led to more frequent and severe extreme weather events such as droughts, heavy rainfall, and harsh winters (called dzuds). These climatic changes have devastating effects on Mongolia's ecosystems, agriculture, and livestock, which are vital to the whole population[1].

Based on the assessment of the National Report on the Rangeland Health of Mongolia, as of 2020, the composition of plant species has changed by 70% across all grassland areas, as compared to reference levels. Additionally, 76.9% of Mongolia's total territory has been affected by desertification to some degree, with desert areas increasing by 2.4%, steppe areas by 2.6%, and dry steppe areas by 13.9%. It is also expected that soil organic carbon (SOC) will continue to decrease 18% to 28% by the middle of this century, varying across natural zone areas throughout the country[2].

As of 2023, Mongolia's agriculture sector contributes approximately 13% to the country's GDP and employs about 26% of the workforce. The sector is crucial to the nation's traditional culture and economy, with herders, who make up nearly 10% of the population, managing over 64.7 million livestock across 112 million hectares of rangeland. This extensive livestock management is central to Mongolia's rural livelihoods and economic activities[3].

Despite its importance to the economy, the sector faces considerable vulnerability to climate change, exacerbated by the increasing frequency and intensity of climate-related hazards. The intertwining relationship between climate change and agriculture in Mongolia is complex. On one hand, agriculture contributes significantly to greenhouse gas (GHG) emissions, while on the other, rangeland-based livestock and rain-fed agriculture practices are profoundly affected by climate change.

Mongolia's 2023 National GHG Inventory revealed that the agriculture sector is the largest emitter (51.97% of the national total GHG emission), generating 22.4 million tCO_2e due to the increased number of livestock[4].

Recognizing the need to mitigate emissions and enhance resilience, the UNDP SCALA National Programme explores market-based schemes for the agriculture sector, focusing on carbon sequestration in rangelands. This approach aims to capture and store CO_2 in soil and vegetation, improve soil health, and increase rangeland productivity. This can be achieved through improved land management and balanced livestock numbers that align with the ecological potential of the rangeland, thereby increasing organic carbon content in the soil and biomass.

To address these challenges, implementing national carbon market schemes for rangeland carbon sequestration could offer transformative solutions, promoting sustainable agricultural practices and supporting Mongolia's adaptation to climate change.

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[1] Fourth National Communication of Mongolia (FNC), 2024
[2] National Report on the Rangeland Health of Mongolia, 2020 and FNC, 2024
[3] https://www.nso.mn/en/statistic/statcate/48171307/table-view/DT_NSO_1001_022V1
[4] National GHG Inventory, Climate Change Research and Cooperation Center, 2023

2.1 Objectives of the report

This report aims to conduct a comprehensive analysis of existing carbon market schemes and initiatives in Mongolia and internationally. The primary objective is to develop an appropriate domestic carbon market scheme for rangeland carbon sequestration in Mongolia. This involves evaluating current practices, identifying gaps and opportunities, and proposing a structured framework for implementing an effective carbon market that aligns with national policies and international commitments.

2.2 Scope of the analysis

The analysis encompasses a detailed review of carbon market mechanisms, focusing on their application in rangeland carbon sequestration. It includes an examination of Mongolia's NDC, international carbon market frameworks such as those under the Paris Agreement, and methodologies like the Gold Standard. The report also explores policy, financial, and social incentives necessary for fostering transformative change in Mongolia's rangeland management practices. Furthermore, the integration of carbon market schemes into national policies, ensuring gender inclusiveness, and alignment with initiatives such as the 'Food Revolution' National Movement, Vision-2050 Long-term Development Policy, and the National Adaptation Plan (NAP) are critical components of this analysis.

2.3 Methodology

The methodology for this report includes a thorough review of existing literature, including peer-reviewed publications, government reports, and documents from international organizations. Data on current carbon market schemes, both domestic and international, was collected and analyzed to identify best practices and lessons learned. The study also involved consultations with stakeholders, including policymakers, researchers, and community representatives, to gather insights and validate findings.

2.4 Structure of the report

The report is structured to provide a logical flow from the theoretical foundations of carbon markets to practical recommendations for implementing a domestic carbon market in Mongolia. Following this introduction, the literature review will provide a comprehensive overview of the current state of carbon markets, both globally and within Mongolia. Subsequent sections will delve into specific analyses of policy, financial, and social incentives, and the integration of carbon market schemes into national policies. The report concludes with a set of recommendations aimed at enhancing the effectiveness and sustainability of Mongolia's carbon market initiatives. In summary, this report seeks to lay the groundwork for a robust and effective domestic carbon market in Mongolia, focusing on rangeland carbon sequestration.

3. BACKGROUND

3.1 Carbon storage and sequestration in rangeland

Global soil carbon sequestration potential

Soils contain several important carbon (C) pools and play an essential role in the global C cycle. Total soil C consists of organic C and inorganic C, with organic C being part of soil organic matter (SOM).

Soil organic carbon (SOC) represents a stock of around 1,500–2,400 Gt[5] C (~5500–8800 Gt CO_2) in the top meter of soils globally (Batjes, 1996; Sanderman, Hengl, & Fiske, 2017). The lower estimate in the range is approximately three times the stock of C in vegetation and twice the stock of C in the atmosphere (Smith, 2012). Small changes in C stocks can therefore have significant impacts on the atmosphere and climate change. Since the onset of agriculture around 8,000 years ago (Ruddiman, 2005), soils have lost around 140–150 Gt C (~510–550 Gt CO_2) through cultivation (Sanderman et al., 2017). It is known that best management practices can restore at least some of this lost carbon (Lal et al., 2018), so it has been suggested that soil C sequestration could be a significant GHG removal strategy, also called negative emission technology or carbon dioxide removal option (Smith et al., 2020).

The basic process of SOC sequestration in the terrestrial biosphere involves transfer of atmospheric CO_2 into plant biomass and conversion of biomass into stable SOC through formation of organo–mineral complexes (Lal et al., 2018). Thus, soil carbon sequestration relies on plant photosynthesis to carry out the initial step of carbon 'removal' from the atmosphere. However, rather than increasing the storage of carbon contained in plant biomass, SOC sequestration relies on management practices that increase the amount of carbon stored as soil organic matter, primarily in cropland and grazing lands. The main advantage of scaling up soil C sequestration as a biological negative emission strategy is that carbon stocks are most depleted on lands currently under agricultural management and thus this approach does not require land use conversions (e.g., to forests) nor does it increase the competition for land resources. In addition, increases in SOC stocks are highly beneficial in maintaining and increasing soil health and soil fertility, which provides additional incentives for adopting SOC sequestering practices (Paustian et al., 2019; GSOCseq v1.1 - Technical Manual, 2022).

Global estimates of soil C sequestration potential vary considerably, but a recent systematic review by Fuss et al. (2018) suggests an annual technical potential of 2–5 Gt CO_2/year. Estimates of economic potential are at the lower end of this range (Smith et al., 2008; Smith, 2016; Smith et al., 2020). Attainable soil C sequestration in rangelands is 50-150 kg C ha^{-1} (0.1835 – 0.5505 t CO_2 ha^{-1} yr^{-1}), as a function of ecosystem type and grazing management (Conant et al., 2001).

SOC sequestration potential in Mongolian rangeland

Mongolian rangelands, which cover approximately 70% of the country's land area, possess significant potential for carbon storage due to their extensive root systems and soil organic matter. This grassland soil can serve as a primary sink for atmospheric CO_2. Enhancing carbon sequestration in these ecosystems can improve soil health, increase biodiversity, enhance water retention capacity, and boost rangeland productivity. In these grasslands, perennial herbaceous forbs and grasses dominate, and precipitation has a significant influence on the net primary productivity (grassland plant biomass). Chang et al., (2015)

[5] 1 Gt = 1 PG = 1 billion metric tonnes

employed the calibrated Century model to assess SOC accumulation under reduced grazing intensity scenarios, and the projected accumulation rates were 22.0–36.9 g C m^{-2} yr^{-1} (0.22-0.369 t C ha^{-1} yr^{-1}) in the near term, 2012–2035, when simulating the effect of grazing management practices on forest steppe grasslands in Mongolia (Chang et al., 2015). Total SOC Relative Sequestration Rates based on the Sustainable Soil Management Scenario 3 of Global Soil Organic Carbon Sequestration Potential Map (GSOCseq) shows that 4.691±2.979 M t C yr^{-1} (Total RSR SSM3) and 0.103±0.013 t C ha^{-1} yr^{-1} (Mean RSR SSM3) for Mongolia ('Map – GSOCseq v.1.1,' 2022). However, short-term changes in SOC are usually relatively small compared to the amount of C stored in grassland soils (Conant and Paustian, 2002), and detecting these changes may encounter some limitations (FAO, 2019).

Soil organic carbon quantification at the Information and Research Institute of Meteorology, Hydrology and Environment (IRIMHE)

The Century4.0 model predicts soil organic matter with a dynamic model that calculates soil-vegetation productivity, and the DayCent4.5 model, which is a day-step version of the Century4.0 model, is used to assess the impact of climate change on rangelands in Mongolia. DayCent models were prepared using data from more than 70 meteorological stations for the years 2000 to 2020, the model then being run to determine the main parameters of soil-plant productivity, such as soil organic carbon (up to 20 cm), and above-ground biomass (AGB) and below-ground biomass (BGB) calculated in daily steps.

In order to predict future changes of soil organic matter, the DayCent model was used in accordance with regional climate model (RegCM4-HadGEM2) scenarios, with high (PRC8.5) and moderate (PCR4.5) emissions of greenhouse gases. By removing systematic errors at the meteorological stations, and preparing by maximum, minimum and average air temperature and precipitation (Gomboluudev, 2022), future data for 2050 and 2080 was calculated.

The results from model-estimated current (as an average for July) and future carbon content changes are shown in Table 3-1. The SOC content calculated by the model is the highest in soums in the high mountain region, 5,907 g/m2 (59.07 t/ha), while the lowest is 2,824 g/m2 in the desert region, and 4,165-4,746 g/m2 in other natural regions. Under the impact of future climate change, the soil organic carbon content will decrease throughout the country. The calculation results show that the rate of reduction is greater in the case of high GHG emissions (PCR8.5), 18%-28% in the middle of this century and 27%-35% at the end of the century.

Table 3-1 Current content of SOC, and it's changes (Fourth National Communication, 2024)

Natural zones	Current content, g/ m^3	Future changes, %			
		Scenario RCP4.5		Scenario RCP8.5	
		2046-2065	2080-2099	2046-2065	2080-2099
High mountain	5907.8	-4.2	-22.9	-22.8	-34.7
Forest steppe	4746.8	-2.3	-18.8	-18.8	-27.0
Steppe	4405.9	-6.6	-21.0	-21.9	-34.5
Desert steppe	4165.6	-8.9	-28.8	-28.8	-42.3
Desert	2824.4	-10.0	-24.3	-25.4	-34.5

3.2 Relevant policy and regulatory environment for climate change

Institutional framework and coordination mechanisms

Ministry of Environment and Tourism (MET):	At the national level, the MET is the primary government body responsible for the development and implementation of climate change policies in Mongolia. It plays a central role in coordinating with national, subnational, local, and international stakeholders. The MET is tasked with ensuring that Mongolia meets its international climate commitments, including those under the United Nations Framework Convention on Climate Change (UNFCCC). **Important note:** after the 2024 parliamentary election, MET changed to Ministry of Environment and Climate Change (MECC).
Legal Mandates and Reporting Obligations:	Under the Law on Air (Article 24.2), the MET is legally mandated to conduct national communications and biennial update reports in accordance with the guidelines of the Conference of Parties (COP) to the UNFCCC. This role includes compiling and submitting reports that detail Mongolia's efforts and progress in mitigating climate change, adapting to its impacts, and adhering to international climate agreements.
Climate Change Project Implementing Unit (CCPIU):	Established in 2015, the CCPIU was created under the MET to fulfill Mongolia's commitments to international climate agreements, including the National Communications (NC), Biennial Update Reports (BUR), Intended Nationally Determined Contributions (INDC), and Nationally Determined Contributions (NDC).
Climate Change Research and Cooperation Centre (CCRCC):	In 2020, the Government of Mongolia established the CCRCC, a state-owned enterprise, to further consolidate climate-related research and project implementation. The CCRCC took over the responsibilities of the CCPIU and the Joint Crediting Mechanism (JCM) Secretariat, streamlining efforts to meet the country's NDC commitments and manage bilateral and multilateral climate mechanisms.
The National Climate Committee (NCC):	re-established in 2023, chaired by the Deputy Prime Minister, coordinates climate action across sectors and regions. The NCC has the authority to establish sub-committees and professional councils to support its work. A professional council was established on April 1, 2024, consisting of 22 members, to provide expertise and guidance on national climate strategies. The NCC also engages local governments through its provincial branches, ensuring climate initiatives are implemented nationwide.

In Mongolia, the coordination of international climate change engagements and the administration of financial resources for climate-related activities involve multiple ministries, each with specific roles:

Ministry of Foreign Affairs (MFA):	The MFA is responsible for coordinating Mongolia's engagements with international climate change processes, external development partners, and regional organizations. This includes representing Mongolia in international negotiations, such as the UNFCCC conferences and managing diplomatic relations with countries and organizations involved in climate action.
Ministry of Finance (MOF):	The MOF plays a crucial role in administering financial resources provided by international financial institutions for climate change-related projects. It acts as the central coordinating agency for all projects that involve international financial support, ensuring that these

	funds are allocated effectively and in alignment with Mongolia's climate and development goals. The MOF also handles the financial reporting and accountability for these funds, ensuring transparency and compliance with international standards.
Ministry of Economy and Development (MED):	The MED is responsible for coordinating cross-sectoral policy, with a focus on integrating sustainability and climate considerations into Mongolia's economic development strategies. The MED ensures that climate issues are incorporated into the planning and implementation of economic policies, promoting sustainable development and the transition to a low-carbon economy. This includes facilitating investments in renewable energy, energy efficiency, and other green technologies.

Policy and regulation

The Government of Mongolia has adopted national and sectoral strategies and policies which address climate change adaptation and mitigation issues such as National Action Plan on Climate Change (2011-2021), the Green Development Policy (2014-2030), the NDCs under the Paris Agreement (2015-2030), and Mongolia's Long-term Development Vision 2050. Recently the NCC approved the NAP, which was developed as a part of continued process toward the low carbon and climate resilient development.

NDC:	As the Paris Agreement called upon all parties to prepare an updated NDC by 2020, Mongolia enhanced its mitigation commitments of reducing GHG emissions by 14% in the INDC (2015) to 22.7% in NDC (2019), excluding LULUCF, below the business-as-usual scenario by 2030.
NDC Action Plan (2021):	The NCC approved the NDC Action Plan, which outlines three high-level targets and 24 specific goals. This plan provides a detailed roadmap for investments and measures, focusing on removing identified barriers and filling investment gaps in both mitigation and adaptation sectors. The NDC Action Plan includes qualitative adaptation targets covering key areas such as animal husbandry, rangeland, arable farming, water resources, and natural disasters.
Vision 2050:	This long-term development policy aims to guide Mongolia towards a low-carbon, productive, and inclusive green economy. Vision 2050 sets the foundation for achieving sustainable economic growth while addressing climate change and environmental sustainability.
New Recovery Policy (2021):	As a response to the economic impacts of the COVID-19 pandemic, the New Recovery Policy aims to align short-term recovery efforts with long-term sustainability goals. This policy emphasizes the development of renewable energy capacity, the stability of the energy system, and the promotion of eco-friendly development practices under the Green Development Recovery initiative.
Food Revolution National Movement (2023):	The 'Food Revolution' National Movement, initiated by the President of Mongolia, aims to secure the country's food supply and improve food security. This initiative seeks to reduce Mongolia's dependency on imported food products, which currently constitute about 50% of its food supply, and to bolster domestic production through the development of agricultural clusters and food production complexes. This movement responds to vulnerabilities exposed by the COVID-19 pandemic and geopolitical conflicts, aiming to transform Mongolia into a self-sufficient and eventually food-exporting nation.

To address the issues of overgrazing and rangeland degradation, the Mongolian government has implemented several key policy measures aimed at promoting sustainable livestock management and reducing the environmental impact of animal husbandry.

These measures include:

Action Plan of the Mongolian Agenda for Sustainable Livestock (2019):	This action plan outlines a comprehensive strategy for improving the sustainability of Mongolia's livestock sector. It includes measures to enhance rangeland management, promote efficient livestock production practices, and improve the resilience of herder communities to climate change impacts.
Law on Livestock Tax (2021):	This law introduced a tax on livestock, aimed at discouraging excessive herd sizes that contribute to overgrazing and rangeland degradation. The tax incentivizes herders to focus on quality over quantity, encouraging more sustainable livestock management practices.
Abolition of Quantity-Based Subsidies for Livestock Production (2021):	The government removed subsidies that previously incentivized the increase of livestock numbers without consideration of the carrying capacity of rangelands. This policy shift aims to reduce overstocking and its associated environmental impacts.
Law on the Legal Status of the United Federation of Pastoral Households:	Implemented starting July 1, 2024, this law establishes the legal framework for pastoral household associations, which play a crucial role in managing communal rangelands. The law formalizes the responsibilities of these associations, including compliance with sustainable rangeland management practices.
Law on Reducing the Negative Effects of Climate Change on Traditional Animal Husbandry:	This law, effective from April 24, 2024, focuses on mitigating the impacts of climate change on traditional herding practices. It includes provisions for improving rangeland management, enhancing resilience to climate-induced hazards, and promoting sustainable livestock practices.
Pasture Use Agreement:	Under this policy, herder household associations are required to have formal rangeland use agreements with local governments. These agreements are designed to ensure that herders adhere to sustainable rangeland management practices, including regulating grazing intensity and timing to prevent overuse and degradation of rangeland resources.

These policies collectively aim to promote more sustainable livestock production, reduce environmental degradation, and enhance the resilience of pastoral communities. By implementing these measures, the Mongolian government seeks to balance the needs of traditional herding practices with environmental conservation and climate resilience efforts.

Green finance initiatives[6]

Mongolia faces significant funding and financing challenges in implementing its NDC and broader climate action goals. The estimated total cost for implementing the NDC is approximately $11.5 billion, with $6.3 billion allocated for mitigation measures and $5.2 billion for adaptation initiatives. This substantial funding requirement highlights a significant shortfall in available climate finance, necessitating urgent and ambitious financing strategies from both public and private sectors.

In response to the need for more robust climate financing mechanisms, Mongolia's Financial Stability Council approved the National Green Taxonomy in 2019. This taxonomy helps classify environmentally sustainable investments, but there remains significant room for improvement in its definitions, applicability, and incentives.

The Financial Regulatory Commission has also approved regulations for the registration and issuance of green bonds in 2021, alongside green insurance as an amendment to the insurance package rules in 2022. These measures aim to promote sustainable financing within Mongolia's financial system.

Approved in 2022, the National Sustainable Finance Roadmap aims to increase the share of green and sustainable loans in the banking sector to 10% and in the non-bank sector to 5% by 2030. This roadmap outlines the strategic directions for expanding sustainable finance and encouraging investments in environmentally sustainable projects.

To mobilize more resources for climate action, it is essential that the government introduce necessary monetary policies, fiscal measures, and financial incentives that promote green loans and the issuance of green bonds. For instance, in March 2023, Khan Bank—Mongolia's largest commercial financial institution—issued the country's first-ever green bond, marking a significant step towards developing green capital market instruments. This green bond issuance is expected to facilitate a stable funding source for expanding green investments and supporting women-owned and/or led micro, small, and medium-sized enterprises (MSMEs). These enterprises represent a significant portion of Mongolia's business sector, yet they often face a substantial financing gap, with 70% of women-owned or led MSMEs being underserved or not served by the current financial system.

National Monitoring, Reporting, and Verification (MRV) system

The climate change MRV system, while in alignment with the Intergovernmental Panel on Climate Change (IPCC) guidelines for inventory reporting, requires significant enhancements to meet the Paris Agreement's additional requirements. The current MRV system primarily compiles national inventories for submissions to the UNFCCC, but it lacks comprehensive documentation or legal frameworks that clearly define the roles and responsibilities of various agencies. This deficiency hinders the regular collection of activity data necessary for the annual GHG inventory, as well as for projections and mitigation analysis.

The Mongolian Agency for Standardization and Metrology (MASM) has officially adopted several key ISO standards into the Mongolian National Standard (MNS) framework, which are crucial for the development and verification of carbon projects and activities.

[6] ADB, Thematic assessment (summary): Climate Change, 2023

These standards include:

1. ISO 14064-1:2018 - Greenhouse gases — Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals: This standard provides a framework for organizations to quantify and report their greenhouse gas (GHG) emissions and removals. It is essential for establishing baseline emissions and tracking reductions over time, ensuring transparency and consistency in reporting.

2. ISO 14064-2:2019 - Greenhouse gases — Part 2: Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements: This standard focuses on project-level GHG accounting and reporting. It outlines the principles and requirements for quantifying, monitoring, and reporting GHG reductions or removals. This is particularly important for carbon offset projects, ensuring that the reductions claimed are real, measurable, and verifiable.

3. ISO 14064-3:2019 - Greenhouse gases — Part 3: Specification with guidance for the validation and verification of greenhouse gas assertions: This standard provides requirements and guidance for validating and verifying GHG assertions. It specifies the principles and processes for verifying the GHG data and information reported under ISO 14064-1 and ISO 14064-2. This standard is vital for ensuring the credibility and accuracy of reported GHG emissions reductions and is often used by Verification and Validation Bodies (VVBs) to certify carbon projects.

The adoption of these ISO standards into the MNS helps establish a robust framework for carbon accounting and reporting in Mongolia. This ensures that carbon projects in Mongolia align with international best practices, thereby enhancing their credibility and facilitating participation in international carbon markets.

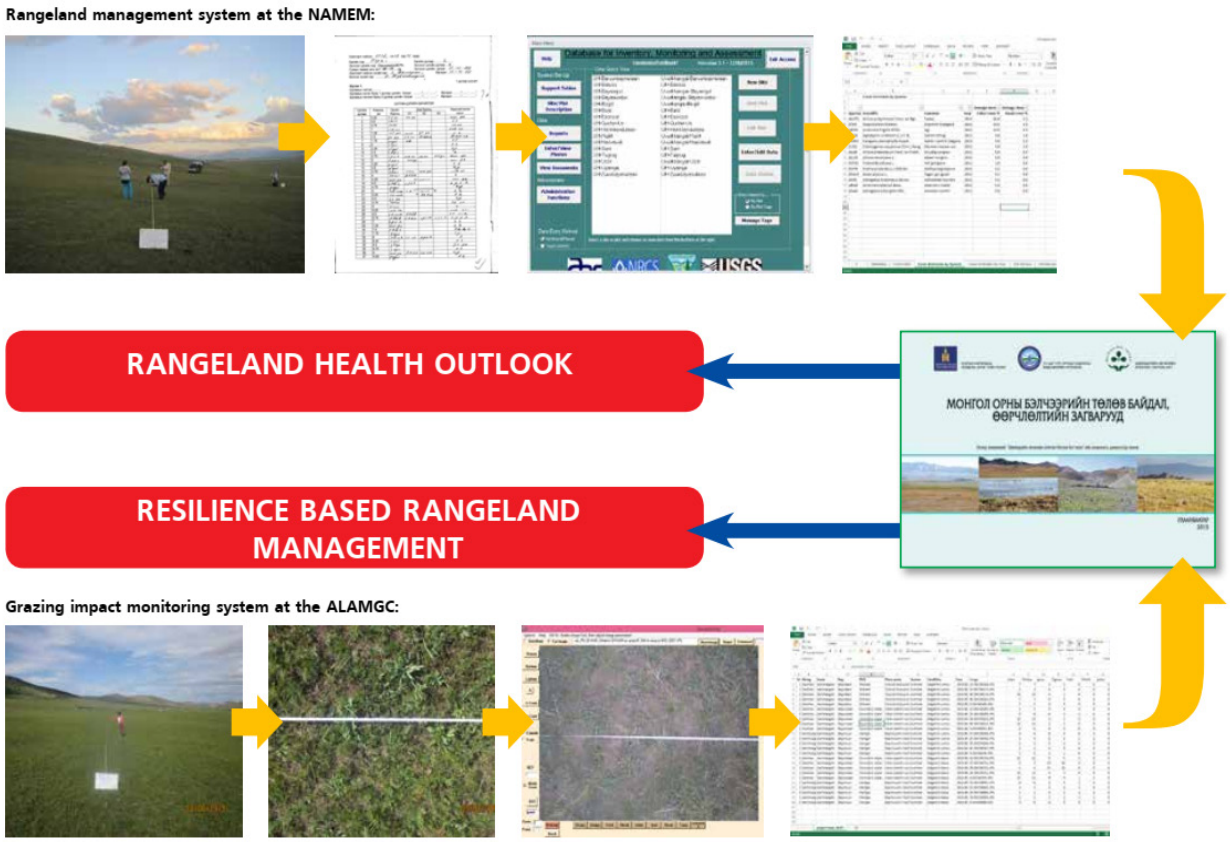
3.3 Rangeland health monitoring methods and management approach in Mongolia (all information of the 3.3 is taken from external sources for explanatory purpose)

Mongolian rangelands encompass diverse ecosystems, from deserts to high mountains, covering 72% of the country's area. They support a rich biodiversity and are vital for livestock, which is central to Mongolia's traditional nomadic pastoralism. This pastoralism is characterized by seasonal movement and multi-species herding, adapted to the harsh climate and varied landscapes. However, challenges like overgrazing, climate change, and land degradation threaten these rangelands. To address these challenges, Mongolia has implemented comprehensive rangeland monitoring and management strategies, supported by international partnerships, such as the Green Gold project funded by the Swiss Agency for Development and Cooperation. Key components of the monitoring system include:

Rangeland Monitoring Sites: The National Agency for Meteorology and Environmental Monitoring (NAMEM) and the Agency for Land Administration and Management, Geodesy and Cartography (ALMGaC) oversee rangeland monitoring at 1,600 and 5,100 sites, respectively. These sites are instrumental in assessing health and changes in rangeland conditions. The NAMEM provides detailed data suitable for interpreting long-term trends in vegetation and ground cover, which can be linked to erosion models[7] (Figure 3-1).

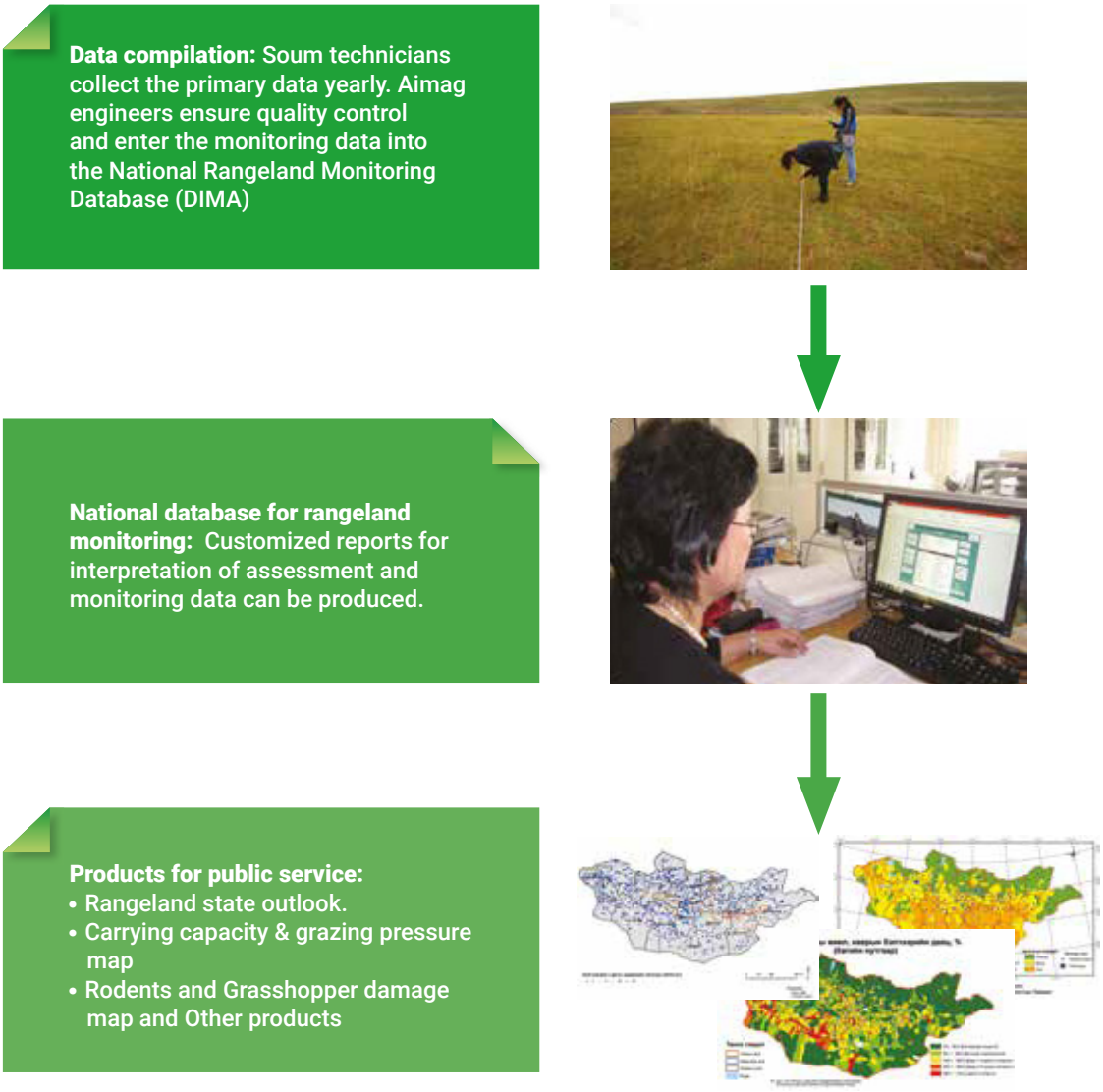
[7] National Federation of Pasture User Groups http://en.greenmongolia.mn/post/132995

Figure 3-1 National and local level monitoring system (source: Bulgamaa et al., State and Transition Models of Mongolian Rangelands, 2018)



National Rangeland Monitoring Database (DIMA): Established in 2015, this database provides baseline data on the ecological health of Mongolia's rangelands. It serves as a critical tool for tracking changes in rangeland conditions over time (Figure 3-2).

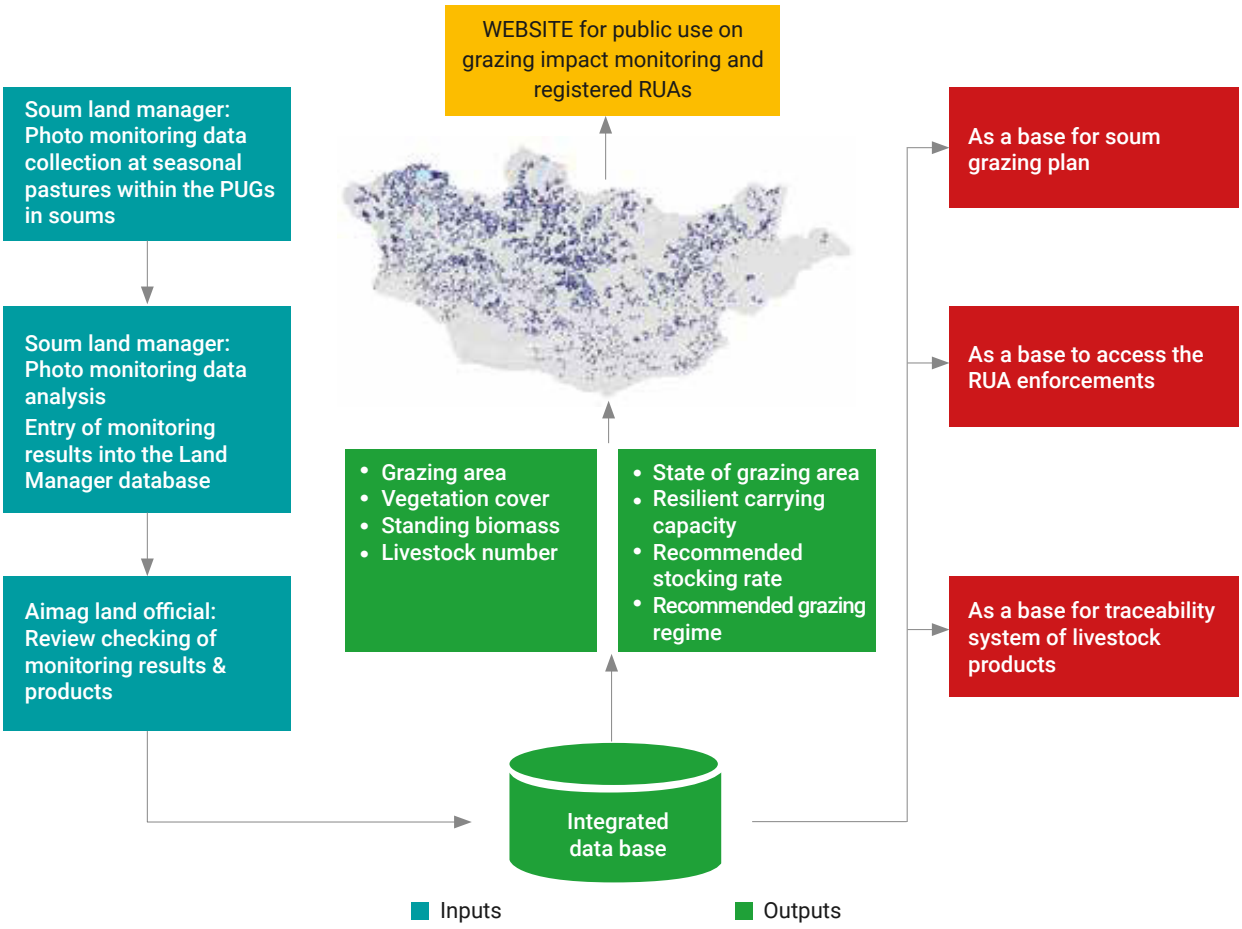
Figure 3-2 NAMEM monitoring data collection workflow (source: National report on the rangeland health of Mongolia, 2018)



The photo point monitoring method: This method (Booth and Cox 2008) was developed and piloted to provide information on the cover of plant functional groups that are adequate for grazing management decisions and to report vegetation trends at the functional group level. ALMGaC decided to adopt this method and implement it nationally as a basis for assessing grazing management impacts. The photo point monitoring system also represents different pasture users groups (PUGs) and different seasonal rangelands[8]. The publicly available database can be found here - www.egazar.gov.mn and is illustrated in Figure 3-3.

[8] National report on the rangeland health of Mongolia, 2018

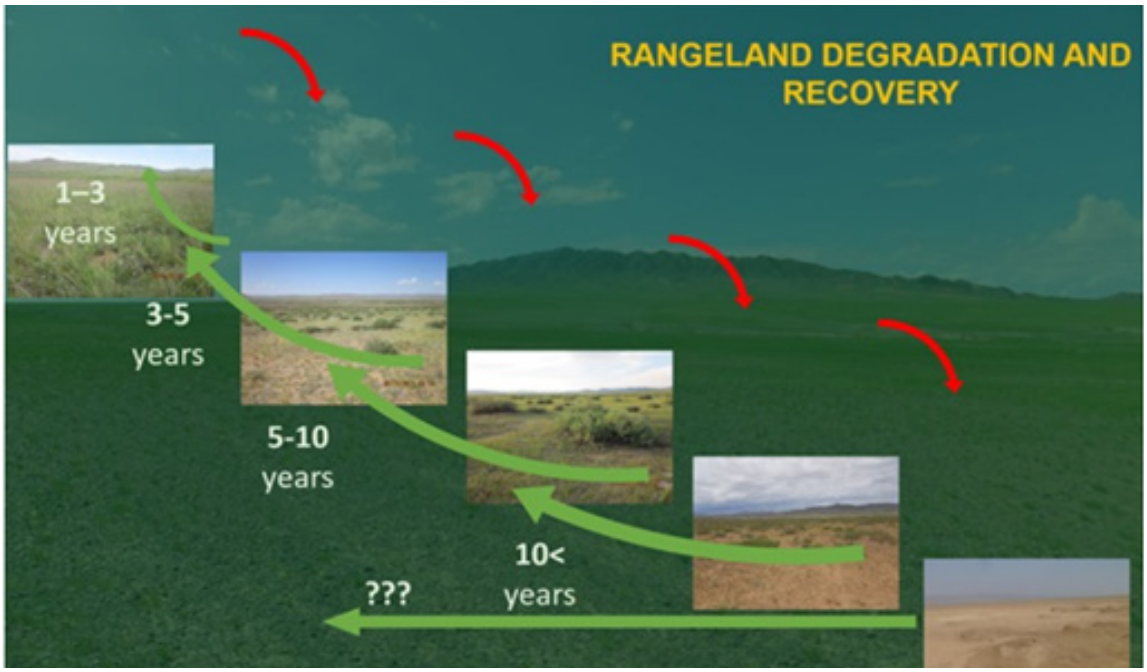
Figure 3-3 Photo point monitoring system functioning at the ALMGaC (source National Report on the Rangeland Health of Mongolia)



Ecological Site Descriptions (ESDs) and State and Transition Models (STMs): Mongolian rangelands are classified into 22 Ecological Site Groups (ESGs). There are five in the Forest Steppe Zone; five in the Steppe Zone; five in the Desert Steppe Zone; four in the Desert Zone; and three in the High Mountain Zone. Each of them has a 'state-and-transition model' that describes how the rangeland has changed and how it can recover with improved management. The ESDs provide detailed information about a particular kind of land in a distinctive Ecological Site.

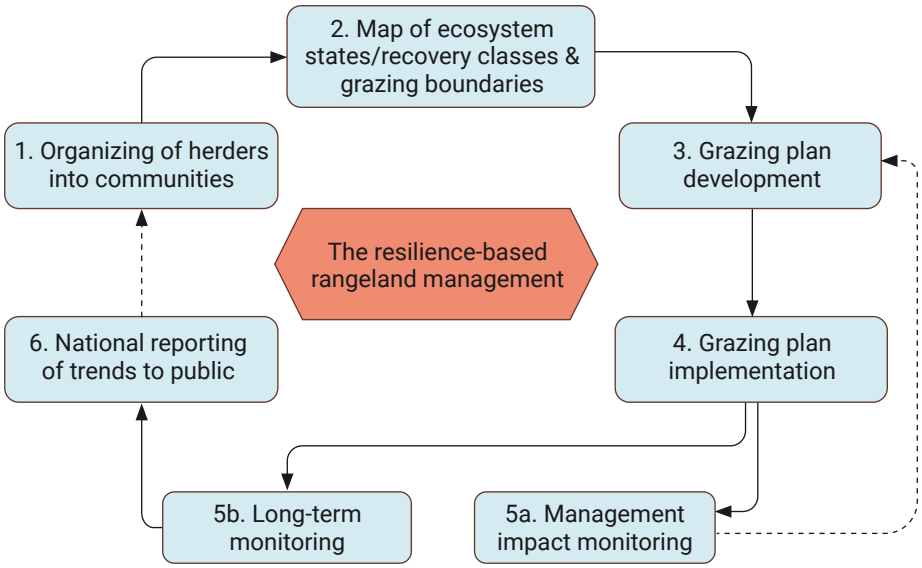
ESDs also provide land managers with information needed for evaluating land as to suitability for various land-uses, capability to respond to different management activities or disturbance processes, and ability to sustain productivity over the long term. The ESD concepts and state and transition models were approved by the Mongolian Academy of Sciences in 2018 and are used by government agencies as a management tool (Figure 3-4).

Figure 3-4 **Conceptual visualization of ESD and STM (source: http://en.greenmongolia.mn)**



Resilience-Based Rangeland Management (RBRM): This approach focuses on maintaining the ecological balance and resilience of the rangelands. It involves local herders and officials in identifying problems and implementing management practices that support sustainable production. The use of herder organizations, such as PUGs, is central to this approach. The framework is described in the Soum Annual Land Management Planning (SALMP) manual and involves six critical steps (Figure 3-5) involving the Ministry of Food, Agriculture, and Light Industry (MOFALI), the ALMGaC, and the NAMEM at the national level, along with PUGs and soum government at the local level.

Figure 3-5 **Steps in the resilience-based rangeland management**



1. The RBRM process begins with the establishment of PUGs (or other governance mechanisms) that organize herder communities according to traditional grazing areas (step 1).

2. Pasture boundaries are mapped and agreed upon by herders within the PUGs, and with neighboring groups. Spatial information on ecological sites, seasonal rangeland use, and rangeland state are added to the map. The soum land manager, rangeland specialist, and PUG representatives use ESDs to evaluate rangeland areas within each PUG (step 2).

3. The soum land manager, rangeland specialist, and PUG representatives use ESDs to evaluate rangeland areas within each PUG (step 3).

4. Plans are implemented via herders following the technical recommendations provided by rangeland and animal breeding officers (step 4). Recent experience indicates that this is the most complex step because a variety of decisions must be made on activities including rotational grazing, fodder preparation, animal breeding, animal health management, and marketing.

5. The impact of management in different seasonal rangelands is assessed by the land manager at the PUG level using the recently implemented photo-point method and observations of rangeland use (step 5a, 5b).

6. Based on the assessment, the land manager updates a map of ecosystem states and recovery classes that provide a spatially explicit representation of management needs. This map is an important tool to adjust or enforce management actions (step 5a).

7. Long-term monitoring data by NAMEM and ALMGaC at their respective monitoring sites are delivered to aimag and national offices and trends are reported to herders, soum government, and the national public (step 6). New information about rangeland change can be used by NAMEM and ALMGaC to periodically update ESD documents.

Rangeland Use Agreements (RUAs) are a key tool in resilience-based rangeland management, allowing herders and local governments to negotiate and agree on mutual rights and responsibilities to maintain rangeland health. There are now (as of October 2023) almost 98,000 herder households belonging to about 1,600 PUGs across Mongolia that are implementing RBRM plans[9]. RUAs are enforced through annexes providing baseline information, monitoring data, and assessments of management practices and their impacts.

Responsible Nomads Initiative: This initiative aims to certify and promote sustainable livestock products through a digital traceability system. It encourages herders to adhere to sustainable grazing practices and provides a market for products that meet these standards.

[9] Mongolian National Federation of Pasture User Groups - http://en.greenmongolia.mn/post/132995.

4. OVERVIEW OF CARBON MARKET SCHEMES

International carbon markets have evolved significantly since their inception, with the Kyoto Protocol and the Paris Agreement providing the primary frameworks. The Kyoto Protocol introduced mechanisms like Joint Implementation (JI) and the Clean Development Mechanism (CDM), which laid the groundwork for trading carbon credits globally. The Paris Agreement furthered this by introducing mechanisms under Article 6, which promote international cooperation on emissions reductions through market and non-market mechanisms.

Emissions Trading Systems (ETS) have become a central tool for many countries to meet their climate targets. As of 2023, ETS covers 58% of global GDP, with 36 systems in operation and another 22 under consideration, particularly in emerging economies like Argentina, Brazil, India, and Vietnam. The revenue generated from ETS reached a record $74 billion in 2023, highlighting the growing reliance on these systems for funding climate action and supporting vulnerable communities[10].

The voluntary carbon market (VCM) is also growing rapidly, driven by increased corporate commitments to carbon neutrality. Companies are increasingly focused on carbon removal projects, as opposed to merely reducing emissions, reflecting a shift in market dynamics. This growth is supported by the development of more robust MRV frameworks, ensuring the credibility and effectiveness of the credits traded[11] .

Despite the growth, there are challenges in creating a unified global carbon market. Disparities in market design, regulatory frameworks, and carbon pricing across jurisdictions can create inconsistencies and limit the effectiveness of international cooperation. Additionally, balancing market-based approaches with non-market mechanisms and addressing equity concerns remain critical issues.

Overall, international carbon markets are expanding and diversifying, providing crucial tools for global climate action. The continued development and integration of these markets will be essential in achieving broader climate goals including the reduction of global GHG emissions.

4.1 Classification of carbon markets

Carbon markets are designed to reduce GHG emissions through economic incentives. They operate by setting a cap on emissions and allowing entities to trade emission permits or credits. The primary types of carbon markets include cap-and-trade systems, carbon offset markets, and carbon taxes.

Cap-and-trade systems

In a cap-and-trade system, a government sets a cap on the total amount of GHG emissions allowed. Entities such as industries or power plants are allocated or can purchase emission allowances, which represent the right to emit a specific amount of GHGs. If an entity emits less than its allowance, it can sell the excess permits to others. Conversely, if it exceeds its allowance, it must buy additional permits. This creates a financial incentive for entities to reduce their emissions. Examples include the European Union Emissions Trading Scheme (EU ETS) and the Regional Greenhouse Gas Initiative (RGGI) in the northeastern United States.

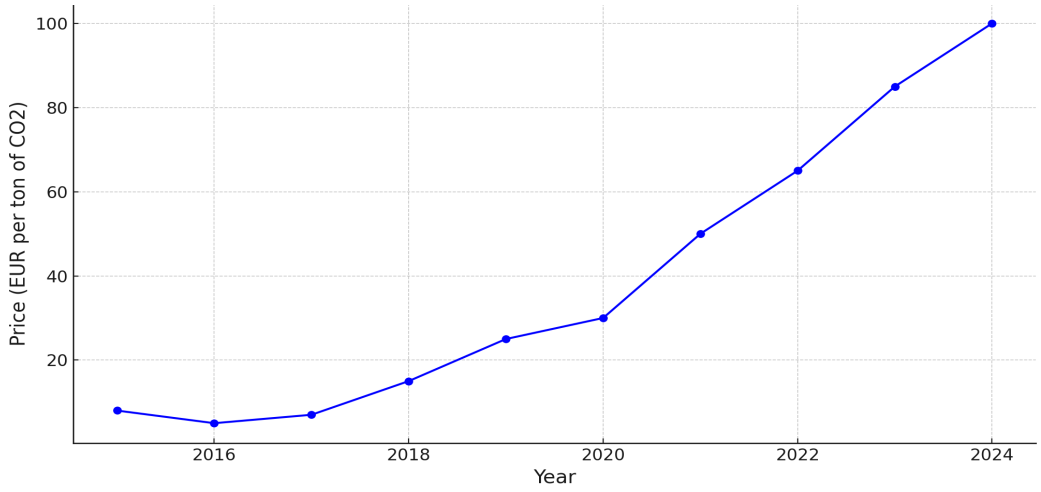
[10] https://icapcarbonaction.com/en

[11] Boston Consulting Group https://www.bcg.com/publications/2023/why-the-voluntary-carbon-market-is-thriving

European Union Emissions Trading Scheme (EU ETS)

The EU ETS, the world's first major carbon market, was launched in 2005. It covers emissions from power plants, industrial facilities, and airlines operating between European countries, accounting for about 40% of the EU's total GHG emissions. The system operates on a cap-and-trade principle, where a limit is set on the total emissions allowed, and companies can buy or sell allowances as needed. As of 2024, the price of EU ETS allowances is around €90-€100 per ton of CO_2 (approximately $98-$110 USD)[12]. The EU ETS has been effective in reducing emissions in covered sectors, with reforms in recent years addressing initial challenges. The following chart illustrates the price trends of EU ETS allowances from 2015 to 2024, showing the significant increase in prices over the years, particularly from 2018 onwards (Figure 4-1).

Figure 4-1 EU ETS Allowance price trends (2015-2024)



Carbon offset markets

Carbon offset markets involve projects that reduce, remove, or avoid GHG emissions, such as reforestation, renewable energy projects, or energy efficiency improvements. These projects generate carbon credits, which can be sold to entities that need to offset their emissions. Standards such as the Gold Standard (GS) and Verified Carbon Standard (VCS) ensure that these credits represent real, measurable, and additional emission reductions.

Compliance and voluntary carbon markets

Carbon markets can also be broadly categorized into compliance markets and voluntary markets.

Compliance carbon markets

Compliance carbon markets are established by mandatory national, regional, or international regulatory frameworks. They require entities to adhere to legally binding emission reduction targets. Entities that fail to comply with these targets face penalties. The key components of compliance markets include cap-and-trade systems and other regulatory mechanisms.

[12] World Bank, 2024, State and Trends of Carbon Pricing

- **Cap-and-trade systems:** As discussed earlier, cap-and-trade systems set a cap on emissions and allow trading of emission allowances. The EU ETS and RGGI are prime examples.
- **Baseline-and-credit systems:** These systems set a baseline level of emissions for entities. Entities that reduce their emissions below the baseline can earn credits, which can be sold to others who need to meet their reduction targets.

Voluntary carbon markets

Voluntary carbon markets allow entities to purchase carbon credits on a voluntary basis, often driven by corporate social responsibility goals, sustainability commitments, or consumer demand for greener products. These markets are not regulated by law but are often governed by standards and certifications to ensure the integrity of the credits.

- **Project-based offsets:** These involve projects like reforestation, renewable energy, and methane capture. Projects generate carbon credits based on the amount of GHG reduction they achieve.
- **Corporate commitments:** Companies voluntarily offset their emissions to achieve carbon neutrality or to meet sustainability targets. This can enhance their brand image and meet consumer and investor expectations.

Payment types in carbon market schemes

Carbon market schemes can be classified based on the types of payment structures used to incentivize emission reductions. The three primary types are action-based payments, hybrid payments, and result-based payments.

Action-based payments

Action-based payments provide financial incentives for implementing specific activities or practices that are expected to lead to emission reductions. These payments are made based on the completion of certain actions, regardless of the immediate measurable outcomes. For example, payments might be provided for adopting improved land management practices, planting trees, or installing renewable energy systems. The key advantage of this approach is that it can encourage early adoption of sustainable practices.

Hybrid payments

Hybrid payment schemes combine elements of both action-based and result-based payments. They provide some upfront funding to support the initial implementation of sustainable practices, followed by additional payments contingent on achieving measurable results. This approach can reduce the financial risks for project developers and encourage ongoing commitment to achieving emission reductions. For instance, an initial payment might be given for planting trees, with further payments based on the growth and carbon sequestration performance of the trees over time.

Result-based payments

Result-based payments are contingent on the actual measured outcomes of emission reduction activities. Payments are made only after the emission reductions have been verified. This type of payment structure ensures that financial incentives are directly tied to the effectiveness of the mitigation activities. It encourages rigorous MRV processes to ensure the integrity of the emission reductions. An example of result-based payments is the issuance of carbon credits only after the sequestered carbon has been verified by independent auditors.

Carbon tax

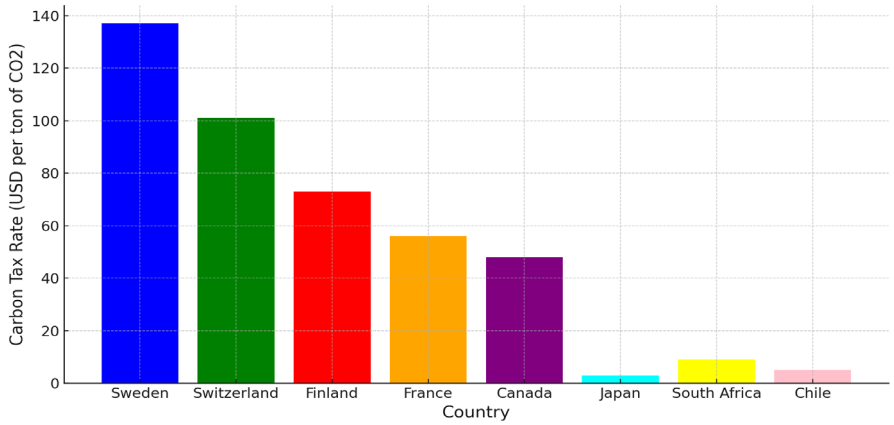
A carbon tax directly sets a price on carbon by defining a tax rate on GHG emissions or on the carbon content of fossil fuels. Unlike cap-and-trade systems that set a quantity limit on emissions, a carbon tax sets a price that emitters must pay for each ton of GHG emitted. This creates a financial incentive for businesses and consumers to reduce their carbon footprint by adopting cleaner technologies and practices.

Implementation of carbon taxes

- **Price stability:** Carbon taxes provide price certainty, as the cost per ton of GHG is fixed. This helps businesses plan for long-term investments in low-carbon technologies.
- **Revenue generation:** The tax generates revenue that can be used by governments to fund climate initiatives, reduce other taxes, or address social equity concerns.

Global carbon tax trends reflect the increasing adoption and variation of carbon pricing mechanisms across countries and regions. As of 2024, over 60 countries have implemented carbon pricing mechanisms, including carbon taxes and emissions trading systems (ETS)[13]. Carbon tax rates vary significantly across countries. While Sweden has one of the highest rates at $137 per ton of CO_2, other countries have much lower rates, such as Switzerland ($101 per ton of CO_2), Finland ($73 per ton of CO_2), France ($56 per ton of CO_2), and Japan ($3 per ton of CO_2). Many countries are gradually increasing their carbon tax rates to meet long-term climate goals. The following chart shows the carbon tax rates for a selection of countries around the world, highlighting the diversity in carbon pricing approaches (Figure 4-2).

Figure 4-2 Global carbon tax rates (2024) for selected countries



Comparison between domestic and international carbon markets

Domestic

Domestic carbon markets, such as the EU ETS and California's Cap-and-Trade Program, focus on reducing emissions within a specific country or region. They involve setting a cap on emissions and allowing entities to trade allowances to meet their reduction targets. These markets are typically regulated by national or regional governments and are mandatory for covered entities.

[13] World Bank, 2024, State and Trends of Carbon Pricing

International

In contrast, international carbon markets involve cross-border trade of emission reductions. They are often facilitated by international agreements, such as the Paris Agreement, and involve mechanisms like Internationally Transferred Mitigation Outcomes (ITMOs) and the Sustainable Development Mechanism (SDM). International carbon markets provide opportunities for countries to achieve their emission reduction targets cost-effectively by investing in mitigation projects in other countries. This can lead to technology transfer, capacity building, and financial support for developing countries.

4.2 Key international carbon market schemes in nature-based solutions

Nature-based solutions (NBS) are increasingly being integrated into international carbon market schemes to leverage natural ecosystems for carbon sequestration. These schemes focus on preserving and restoring forests, wetlands, grasslands, and other natural landscapes to absorb CO_2, while also providing biodiversity and community benefits. Key initiatives include the REDD+ mechanism and various carbon offset programs, which incentivize conservation and sustainable land management practices globally.

4.2.1 Forest carbon market schemes

Forest carbon market schemes play a vital role in nature-based solutions by targeting the reduction of deforestation and promoting activities such as reforestation and afforestation. These initiatives generate carbon credits through the capture and storage of CO_2 in both biomass and soil. Renowned frameworks like the GS and the VCS are essential for ensuring the environmental integrity and social benefits of these projects. They implement rigorous MRV processes to verify that the emission reductions are genuine, measurable, and additional.

The market for forest carbon credits has seen substantial growth, with forest and land-use projects accounting for nearly half of the market share in voluntary carbon markets. In 2022, the price of high-quality, nature-based carbon credits increased by 82%, driven by demand for projects that provide additional environmental and social benefits. The voluntary carbon market reached a record value of over $1 billion in 2021, spurred by corporate commitments to net-zero emissions and a growing interest in nature-based solutions. As the market evolves, there is an increasing emphasis on establishing robust global standards and certification processes to ensure the quality and integrity of carbon credits[14].

4.2.2 Gold Standard

GS is an international comprehensive voluntary carbon standard, which was developed in 2003 by a group of NGOs led by the Worldwide Fund for Nature[15]. They established a system to identify and encourage activities that generate credible GHG reductions that maximize wider sustainable development outcomes. Any projects under the GS must demonstrate at least three sustainable development goals to get approval, including SDG13 on climate action. The standard is applicable to both the (Kyoto) compliance market (GS-CERs) and the voluntary market (GS-VER).

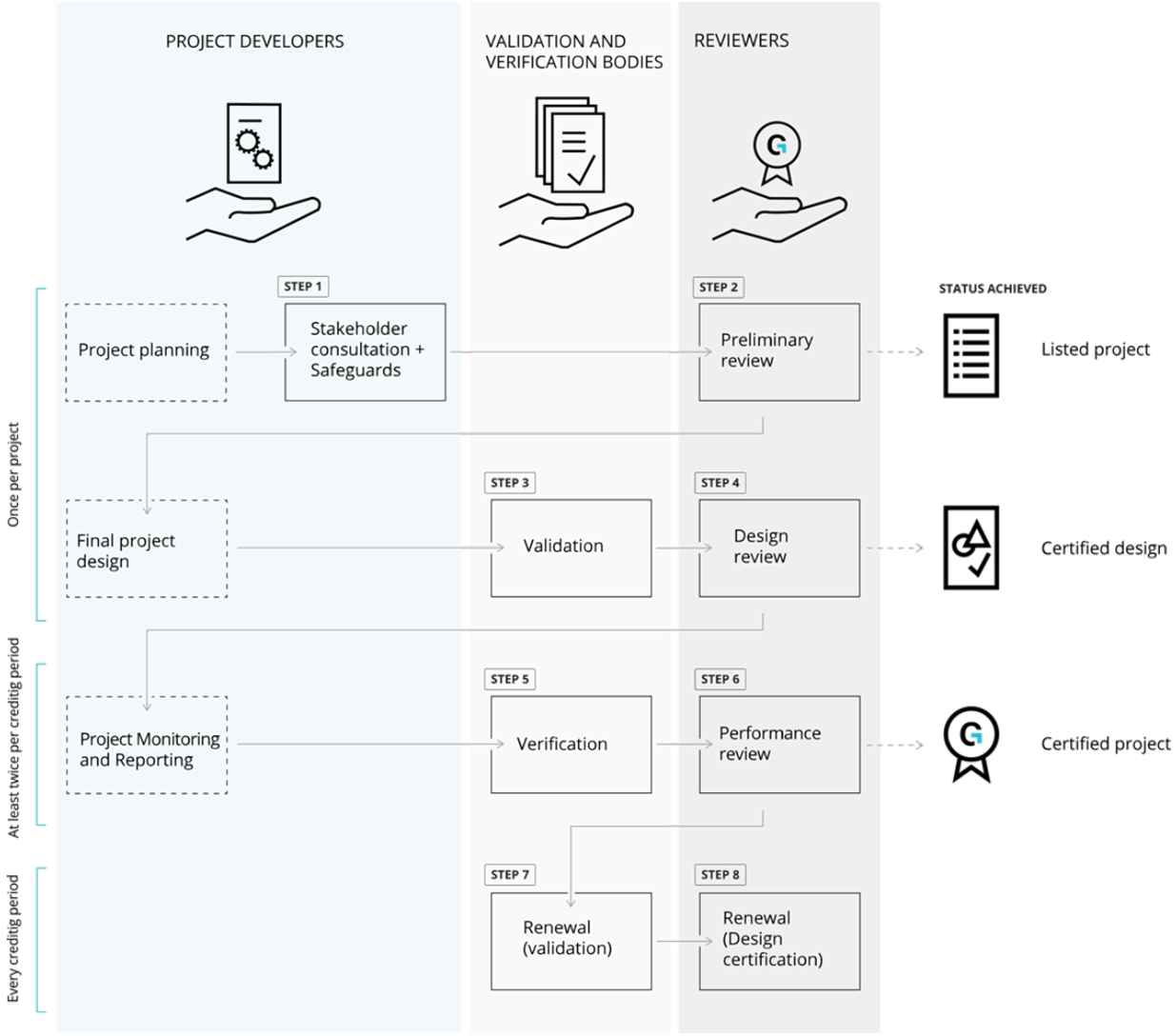
GS projects can be developed in different sectors, such as land use, forestry, and agriculture. All projects should apply GS principles and requirements, activity requirements related to the project type, and other associated documents to ensure they achieve significant positive economic, environmental, and social contributions to local communities. The GS will accept some methods provided by other standards, such as

[14] Ecosystem Marketplace and Bain websites

[15] https://www.goldstandard.org

Kyoto Protocol's CDM, including afforestation/reforestation, manure management, livestock management, and fertilizer management projects. A project cycle of the GS is presented in Figure 4-3.

Figure 4-3 The project cycle of the GS



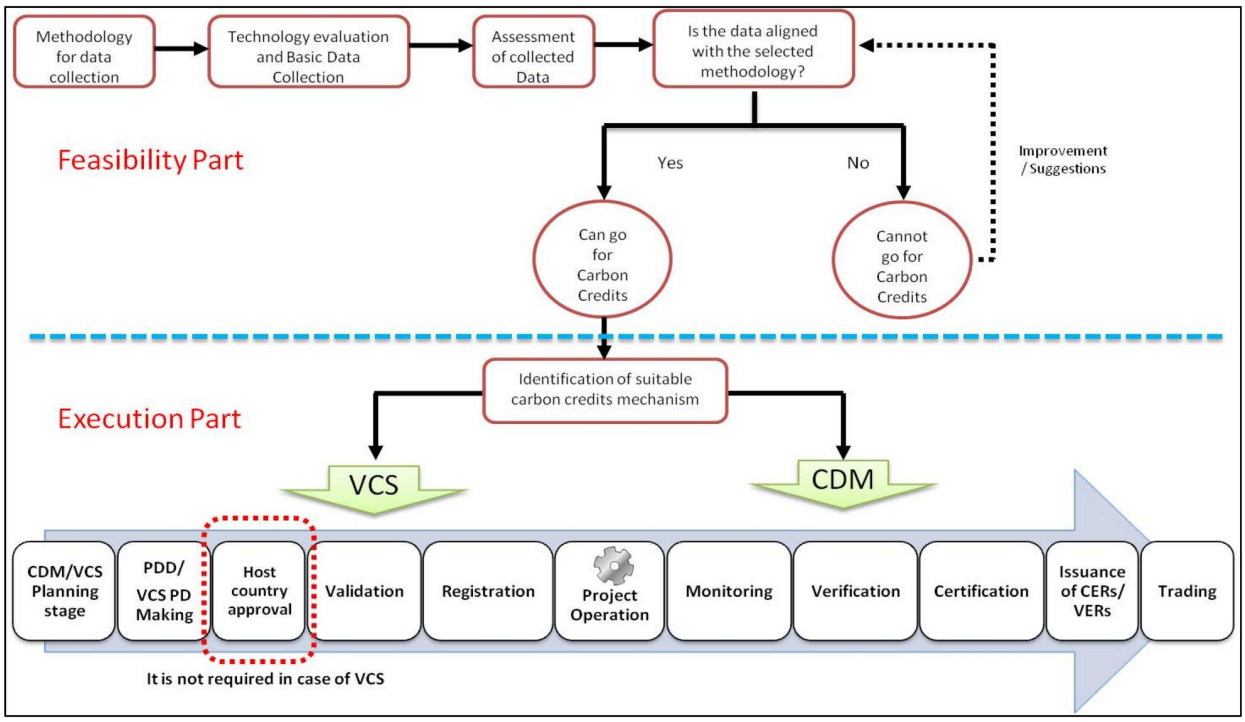
(source: www.goldstandard.org/publications/certification-process-stepbystep)

4.2.3 Verified Carbon Standard

The VCS is an international private voluntary carbon offset certification scheme. It was created by the Climate Group, the International Emissions Trading Association, and the World Economic Forum, who were later joined as founding partners by the World Business Council for Sustainable Development. The goal was to provide transparency and credibility, standardize procedures, and enhance business, consumer, and government confidence in the voluntary offset market. Although its official guidelines were only released in late 2007, the VCS has become the most popular standard in the voluntary market at the international level. It covers a wide range of activities, such as improved agricultural land management, afforestation/reforestation, revegetation, reduced emissions from deforestation and degradation, and avoided land use

conversion. The steps and stages in the VCS project cycle are presented in Figure 4-4. Once certified, these projects are eligible to be issued Verified Carbon Units (VCUs), with one VCU representing one metric ton of carbon dioxide reduced or removed from the atmosphere. Projects can monetize these VCUs in the carbon market to support and scale up their climate change mitigation activities. Detailed information can be found at https://verra.org/ and VCS - Verra

FIGURE 4-4 Project offset/credit cycle in VCM and CDM (source:Pudasaini et al.,2024)

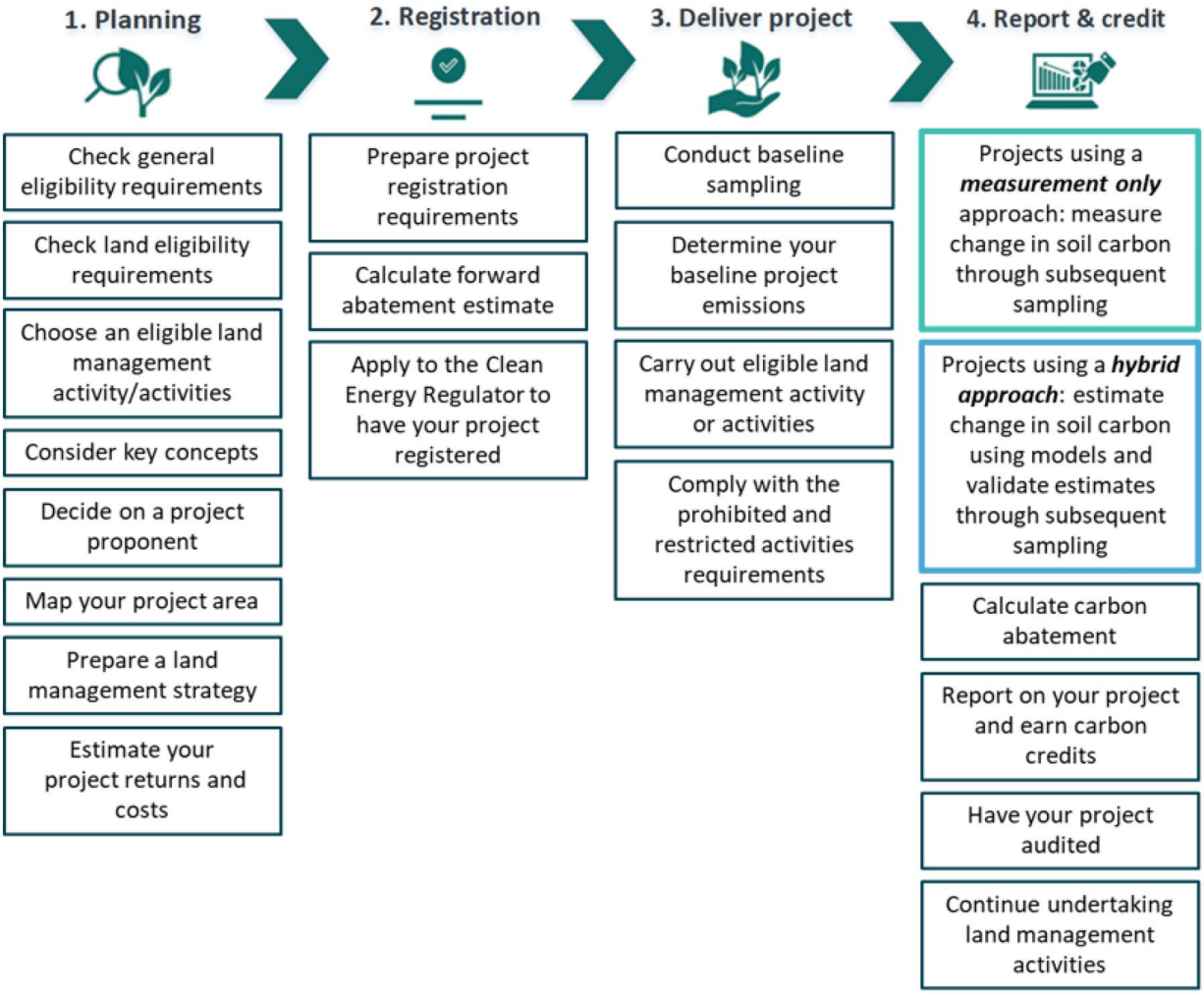


4.2.4 Australian Government – Emission Reduction Fund

The Australian Government has established the Emissions Reduction Fund (ERF) to encourage the adoption of management strategies that result in either the reduction of GHG emissions or the sequestration of atmospheric CO_2. The ERF is enacted through the Carbon Credits (Carbon Farming Initiative) Act 2011. Under the ERF, businesses, farmers and community groups can earn C credits by undertaking projects to reduce emissions or sequester carbon. A range of mitigation activities have been approved for all sectors of the economy, with the focus on activities that increase SOC stocks. Projects must comply with the Offsets Integrity Standards, which ensure that any emission reductions, in this case sequestered carbon, are additional, measurable and verifiable, eligible, evidence-based, material and conservative. Once approved and implemented, the methods can be used to generate Australian Carbon Credit Units (ACCUs). One ACCU equates to an emission avoidance or sequestration of 1 tonne of carbon dioxide equivalent (CO2-e) and can be sold to the Australian Government or in a secondary market to generate income (Paustian et al., 2019). The steps and requirements for ERF soil C project cycles are shown in Figure 4-5.

Detailed information can be found at www.cleanenergyregulator.gov.au/ERF and www.cleanenergyregulator.gov.au/DocumentAssets/Documents/Sampling%20guidance%20for%20measurement-based%20soil%20carbon%20methods.pdf

FIGURE 4-5 Steps and requirements for ERF soil C project cycles (source: Pudasaini et al.,2024)



4.2.5 Climate Action Reserve

The Climate Action Reserve Soil Enrichment Protocol (SEP) provides guidance to account for, report, and verify GHG emission reductions associated with projects which reduce emissions and enhance soil carbon sequestration on agricultural lands through the adoption of sustainable agricultural land management activities. The Climate Action Reserve—hereafter the Reserve—is an environmental nonprofit organization that promotes and fosters the reduction of GHG emissions through credible market-based policies and solutions. A pioneer in carbon accounting, the Reserve serves as an approved Offset Project Registry (OPR) for the State of California's Cap-and-Trade Program and plays an integral role in supporting the issuance and administration of compliance offsets. The Reserve also establishes high quality standards for offset projects in the North American voluntary carbon market and operates a transparent, publicly accessible registry for carbon credits generated under its standards (Ebert et al., 2022).

4.2.6 FAO's Global Soil Partnership

Global Soil Organic Carbon Sequestration Potential Map (GSOCseq v1.1) was developed based on the submissions of national experts appointed by member countries of the United Nation's Food and Agriculture Organization (FAO). Each of the appointed national experts generated national maps following a bottom-up approach that was facilitated and coordinated by the Secretariat of FAO's Global Soil Partnership (GSP). Starting in November of 2020, an extensive capacity-building program was launched, reaching over 500 participants from 119 countries through seven regional online training sessions. To further support national experts in applying the methodology to their own country database, a remote technical support platform was established as well. The methodology is based on the process-based Rothamsted Carbon Model (RothC), made freely available through the open-source R software and the R package SoilR. Countries have been using this software to model their national SOC sequestration potential for agricultural areas by predicting changes in SOC stocks over a period of 20 years under a business as usual (BAU) scenario and three Sustainable Soil Management (SSM) scenarios that vary in the degree of carbon inputs to the soil. Alongside this standardized approach, countries are encouraged to further refine and adapt the methodology to better suit their environmental condition and available database (Global Soil Organic Carbon Sequestration Potential Map – GSOCseq v.1.1, 2022).

Detailed information can be found at Global Soil partnership - www.fao.org/global-soil-partnership

Countries listed in descending order according to total SOC Relative Sequestration Rates based on the Sustainable Soil Management Scenario 3 are given in Table A1 of GSOCseq, as shown in Figure 4-6.

FIGURE 4-6 total SOC Relative Sequestration Rates based on the Sustainable Soil Management Scenario 3 given in the Table A1 of GSOCseq

Country	Total RSR SSM3 $Mt\ C\ yr^{-1}$	Mean RSR SSM3 $t\ C\ ha^{-1}\ yr^{-1}$	Map Source
Colombia	7.729 ± 3.938	0.247 ± 0.045	National Submission
Democratic Republic of the Congo (the)	7.327 ± 5.62	0.227 ± 0.059	Gap-filled
Nigeria	7.18 ± 0.912	0.11 ± 0.012	National Submission
Kenya	7.17 ± 1.1	0.177 ± 0.033	Gap-filled
Thailand	6.48 ± 2.535	0.207 ± 0.023	Gap-filled
Somalia	6.462 ± 1.155	0.137 ± 0.031	Gap-filled
Mozambique	6.315 ± 3.412	0.223 ± 0.044	Gap-filled
France	6.281 ± 6.096	0.167 ± 0.018	National Submission
Angola	6.235 ± 3.121	0.166 ± 0.028	Gap-filled
Myanmar	6.147 ± 2.722	0.201 ± 0.036	Gap-filled
Ukraine	5.895 ± 0.834	0.126 ± 0.021	Gap-filled
South Sudan	5.753 ± 0.439	0.168 ± 0.028	Gap-filled
Turkey	5.229 ± 1.88	0.102 ± 0.015	National Submission
Bolivia (Plurinational State of)	5.128 ± 3.369	0.211 ± 0.021	Gap-filled
Pakistan	5.059 ± 0.869	0.099 ± 0.015	Gap-filled
Venezuela (Bolivarian Republic of)	4.755 ± 2.876	0.195 ± 0.033	National Submission
Mongolia	4.691 ± 2.979	0.103 ± 0.013	Gap-filled
Namibia	4.639 ± 0.255	0.086 ± 0.012	Gap-filled
Germany	4.591 ± 1.418	0.181 ± 0.031	National Submission
Sudan (the)	4.289 ± 0.874	0.062 ± 0.016	National Submission
Chad	4.227 ± 0.144	0.092 ± 0.037	Gap-filled
Uruguay	3.843 ± 0.03	0.262 ± 0.063	National Submission
Spain	3.84 ± 1.715	0.123 ± 0.013	Gap-filled
Philippines (the)	3.632 ± 2.406	0.19 ± 0.014	National Submission
Zambia	3.568 ± 2.317	0.162 ± 0.028	Gap-filled
Malaysia	3.514 ± 2.888	0.436 ± 0.073	Gap-filled

FAO RECSOIL

The RECSOIL initiative, launched by FAO in 2019, aims to scale up sustainable soil management (SSM) practices globally. The primary objectives of RECSOIL are to increase SOC stocks, improve soil health, and prevent future SOC losses. This initiative targets agricultural and degraded soils and offers financial incentives and technical support to farmers, particularly smallholders, who adopt sustainable practices.

RECSOIL focuses on creating a marketplace for soil-based carbon credits, enabling the trading of these credits to support GHG mitigation efforts. The initiative's financial incentives are linked to the sequestration of CO_2, with the potential to significantly improve crop yields and resilience while restoring ecosystem services lost through traditional farming methods. The program is active in several countries, including Costa Rica, where it supports over 45 farms in implementing practices like grazing management and erosion control[16].

4.2.7 Boomitra

Boomitra is an innovative soil carbon marketplace leveraging AI and remote sensing technology to help farmers and ranchers worldwide increase soil carbon sequestration. The company enables the creation and sale of carbon credits by using satellite data and AI to measure and verify the amount of carbon stored in soils. This approach allows for monitoring soil carbon without the need for costly physical sampling.

Boomitra collaborates with over 150,000 farmers across more than five million acres globally. The company focuses on empowering smallholder farmers, with farm sizes ranging from half an acre to large ranches, by providing them with additional revenue through carbon credits. Boomitra's model ensures that most of the revenue from carbon credits goes directly to the farmers, incentivizing sustainable land management practices that improve soil health and enhance carbon sequestration.

Boomitra's technology has been recognized for its impact, winning the 2023 Earthshot Prize in the 'Fix Our Climate' category. The platform has also attracted significant investment, including $4 million from Yara Growth Ventures and Chevron, highlighting its potential to revolutionize carbon markets in agriculture by making them more accessible and cost-effective[17]

4.2.8 Regen Network

Regen Network Development Inc. (RND) is a company on a mission to build a platform designed to align economics with ecology to drive regenerative land management. Pulling on a combination of tools from the Web3 world and open-source movements, RND has set out to create the first decentralized blockchain ledger and registry program owned and operated by a community of experts and practitioners committed to ecological regeneration.

Regen Registry Overview

Regen Registry is an ecosystem service registry operating in the voluntary market that aims to support climate action by accelerating the adoption of nature-based solutions, which regenerate and restore natural ecosystems. Pulling on a combination of tools from Web3 and open-source movements, Regen Registry aims to democratize and invigorate regenerative finance by empowering communities of Earth stewards—scientists, technologists, and climate entrepreneurs—to govern the systems used to create new ecological assets.

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[16] https://www.fao.org/global-soil-partnership/resources/highlights/detail/en/c/1680243/

[17] https://boomitra.com/

The Methodology for GHG and Co-Benefits in Grazing Systems provides a holistic assessment of ecological state indicators for grasslands under regenerative grazing practices. Managed grazing, which involves carefully controlling livestock density and intensity of grazing, has been shown to provide a wide range of ecosystem benefits such as enhanced carbon sequestration, improved soil health, and increased water infiltration. This methodology combines remote sensing data with in-field measurements to provide high quality estimates of soil organic carbon stock and measures additional ecological co-benefits such as animal welfare, ecosystem health, and soil health.

Methodology process:

Step 1:	Collect in-field soil samples - Soil samples collected at strategic points across the property are tested for soil organic carbon, bulk density, and soil health variables.
Step 2:	Map soil organic carbon - Remote sensing data and the lab-tested soil samples are used to estimate soil organic carbon at unsampled locations using statistical models, machine learning, and spatial interpolation.
Step 3:	Quantify soil organic carbon stock - Percent soil organic carbon estimates are combined with bulk density measurements from the field to quantify soil organic carbon stocks and CO2 equivalent stocks.
Step 4:	Calculate creditable carbon change - Creditable carbon change is calculated by comparing the measured CO_2 equivalent stocks to the baseline year. Deductions are made to account for emissions from the project activity, such as methane emissions, and uncertainty from the soil carbon estimate.
Step 5:	Assess co-benefits - Soil health, ecosystem health, and animal welfare are assessed using a combination of remote sensing and in-field data to provide a holistic assessment of the project area beyond carbon sequestration.

Detailed information can be found at www.regen.network/; library.regen.network/v/regen-registry-program-guide/; and library.regen.network/v/methodology-library/published-methodologies/methodology-for-ghg-and-co-benefits-in-grazing-systems/version-1.0

4.2.9 Nori

Nori Inc is a Washington-based company building the software infrastructure establishing a marketplace to mobilize investment in the removal of carbon dioxide (CO_2) from the atmosphere. The purpose of the Nori platform is to host the sale of Nori Carbon Removal Tonnes (NRTs), where one NRT is a digital asset that represents one tonne of CO_2 removed from the atmosphere where the recovered carbon (C) is retained in a terrestrial reservoir for at least 10 years.

This Nori methodology relies on the Soil Metric's platform, which is the commercial implementation of a Greenhouse Gas Implementation Tool model (GGIT), that meets USDA greenhouse gas and carbon stock and flux estimation guidance (sometimes referred to as the Blue Book standards). The tool on which GGIT is based was developed by Colorado State University staff and students, with funding from and under the guidance of the US Department of Agriculture's (USDA) Natural Resources Conservation Service. GGIT directly and indirectly relies on outputs from DayCent and up to 35 other models that are maintained and used by multiple US federal government agencies to estimate the SOC stock change and GHG emissions impacts associated with changes in soil treatment, cropping and livestock management and production practices at both the field and farm-scale.

This Methodology is designed with the goal of achieving comprehensive, consistent, transparent, and conservative quantification and independent verification of the data that inform NRT issuance of projects founded on the adoption of regenerative practices in US croplands. It has been informed by the peer-reviewed guidance originally published in 2014 by USDA, and updated in 2017, which outlines multiple distinct methods that can be used to quantify GHG emissions and sinks at the field and farm entity scales. Based on the report's general guidance and GHG emissions and sink estimation method selection criteria, the Nori Croplands Methodology applies a soil sample test-informed process model method to estimate the incremental carbon removal and retention that is represented by one NRT.

Detailed information can be found: nori.com/modeling-soil-carbon; nori.com/videos; and Quantifying Greenhouse Gas Fluxes in Agriculture and Forestry: Methods for Entity-Scale Inventory (usda.gov)

4.3 Overview of carbon market schemes and initiatives in Mongolia

Mongolia is engaged in various carbon market schemes and initiatives under the UNFCCC framework to reduce GHG emissions and promote sustainable development. These include the CDM, the Joint Crediting Mechanism (JCM), Nationally Appropriate Mitigation Actions (NAMAs), and the UN-REDD Programme. Mongolia's participation in these projects has provided valuable experience in implementing market-based mechanisms for emission reductions. The country is now exploring opportunities to engage in Article 6 transactions under the Paris Agreement to further enhance its climate action efforts.

Clean Development Mechanism

The CDM is the largest regulated carbon offset market in the world. The mechanism enables developing countries to implement projects to reduce GHG emissions, because of which Certified Emission Reduction (CER) equivalent to 1 tonne of CO_2 can be traded on the international carbon market, enabling developed countries to meet their GHG emission reduction goals following the Kyoto Protocol. Five projects were officially registered with CDM in Mongolia (Table 4-1):

TABLE 4-1 CDM projects

Project titles & Registration Year	Objective	Emission Reductions per year	Implementing Parties (Credit calculation period)
Project 0786: Durgun 10 MW Hydroelectric Power Station (2007)	Reduce GHG emissions by building small-scale hydroelectric power plants to meet local energy needs with clean energy	30,400 t CO_2e per year	Mongolia and Japan (2007-2014)
Project 0787: Taishir 11 MW Hydroelectric Power Station (2007)	Reduce GHG emissions by building small-scale hydroelectric power plants to meet local energy needs with clean energy	29,600 t CO_2e per year	Mongolia and Japan (2008-2015)
Project 5977: Wind Park of 49.6 MW (2012)	Reducing GHG emissions by increasing renewable energy production	178,778 tCO_2e per year	Mongolia and Sweden (2013-2027)
Project 0295: Improving the technology of decentralized heating boilers (2006)	Reducing GHG emissions by improving the technology of small boilers	11,904 t CO_2e per year	Mongolia and Germany (2006-2016)
PoA 8142: Microfinance Program for Clean Energy Products (2012)	Reducing GHG emissions by increasing the purchase of energy-efficient electrical equipment, heaters, home, and house insulation materials, and improving boilers	50,133 t CO_2e per year	Mongolia, the United Kingdom and Sweden (2013-2033)

Source: UNFCCC, CDM website:https://cdm.unfccc.int/jsearch.HTML/

No new projects have been registered under the CDM since 2013 and there are several factors related to this situation. First, the implementing period of the Kyoto Protocol consisted of two phases and ended by 2020, and countries that implemented large-scale projects dominated the CDM market, reducing opportunity for the countries with small-scale projects and programs like Mongolia. Second, it was also related to Mongolia`s shift from a lower-income country to a lower-middle income country.

Nationally Appropriate Mitigation Actions

In line with the Copenhagen Agreement, issued by the 15th Conference of the Parties to the UNFCCC held in Denmark in 2009 on the implementation of NAMA, Mongolia expressed its implementation of NAMAs. It listed the main areas of measures to reduce GHG emissions and, in the first month of 2010, was submitted to the Secretariat of the UNFCCC.

Table 4-2 shows information about the ongoing and implemeneted projects and measures by the Ministry in collaboration with international organizations within the NAMA.

TABLE 4-2 Projects and actions in the field of NAMA

Sector/s	Name of project	Objectives/GHG emission reductions	Implementing Partners (Implementation period)
Construction	Energy Saving of buildings.	Reducing the annual growth rate of GHGes emitted by the construction industry by saving energy consumption in newly built apartments and public buildings in Mongolia's construction industry.	MCUD, MEGD and UNDP (2009-2013)
	Construction NAMA	Reducing the GHG emissions from construction industry through the implementation and improvement of NAMA. GHG emission reductions: During implementation period: 10,709 t CO_2e per year After project completion: 64,219 t CO_2e	MCUD, MET and UNDP (2017-2020)
Transportation	Green Public Transport	Identify the potentials of switching from diesel buses to environmentally friendly engines to reduce carbon dioxide emissions and improve air quality.	MEGD and GGGI (2012-2013)
Agriculture, rangeland	Improving Carbon Finance for Range-land Management in the Northeast Asia Region	Reducing the number of livestock, especially in terms of cattle by increasing its productivity.	MEGD, MOFALI and ADB (2011-2013)
Forestry-REDD+	Biodiversity and adaptation of key forest ecosystems to climate change	Improving the livelihoods of local people in some regions of ecological importance while implementing sustainable management and conservation measures that consider climate change and improving the policy and structural environment by creating the capacity to protect biological diversity.	MEGD and GIZ (2012-2022)
Energy	Joint study to im-prove the power sup-ply of Thermal Power Plants 3 and 4	Determine the scenario of the GHG emissions and NAMA of energy supply under the same conditions.	MEGD, OECC and Japan (2013)

Source: MET, 2023

Joint Credit Mechanism

The JCM is a bilateral initiative between Japan and Mongolia designed to facilitate the transfer of low-carbon technologies and support sustainable development. The JCM helps Mongolia implement advanced technologies that reduce GHG emissions while receiving financial support and technology transfer from Japan.

The Governments of Mongolia and Japan signed a bilateral cooperation document for the introduction of the JCM on January 8th 2013, and it remains the only cooperative approach in which Mongolia participates. The JCM is an internationally recognized financing mechanisms that encourages public and private organizations to work together to reduce the negative impact of climate change. Implementing projects under the JCM has been triggering investment for renewable energy use in the country, transfer of technology, and capacity building activities. The majority of projects have focused on contributing to sustainable development through synergy and co-benefit effects of involved activities, along with targets

for reduction of GHG emissions and credit sharing issues. The ultimate goal of the JCM is to reduce or remove GHG emissions through use of quantitative evaluation and application of MRV methodologies, achieving emission reductions targets both in Japan and Mongolia. Several projects within the JCM scheme of cooperation have already been implemented, including on renewable energy use, energy efficiency, improvement of heating facilities (MET, 2021).

Table 4-3 shows the list of the projects that are officially registered under the JCM scheme. Currently, nine projects are been implemented through the JCM with project capacities estimating a GHG emission reduction of 1.2 million t-CO_2 by 2030.

TABLE 4-3 Projects registered under JCM as of March 2023

Project titles/Registration Year	Objective	Emission reductions per year
MN001: Installation of high efficiency Heat Only Boilers in 118th School of Ulaanbaatar City Project (2015)	Reduce GHG emissions by creating energy savings by retrofitting old energy-inefficient boiler technologies	2016-2020: 92 t CO_2e per year
MN002: Centralization of heat supply system by installation of high-efficiency Heat Only Boilers in Bornuur soum Project (2015)	Reduce GHG emissions by creating energy savings by retrofitting old energy-inefficient boiler technologies	2016-2020: 206 t CO_2e per year
MN003: Installation of 12.7 MW Solar Power Plant for Power Supply In Ulaanbaatar Suburb (2017)	Contribute to the reduction of air pollution in the city of UB by increasing the production of clean energy and reducing the emission of GHGes	2017: 1,016 t CO_2e, 2018 2030: 12,009 t CO_2e per year
MN004: 10MW Solar Power Project in Darkhan City (2017)	Reducing GHG emissions by increasing renewable energy production	2017-2030: 11,221 t CO_2e per year
MN005: A High Efficiency and Low Loss Power Transmission and Distribution System in Mongolia (2017)	To reduce GHG emissions by reducing energy losses by upgrading power lines	2017: 12 t CO_2e 2018: 25 t CO_2e 2019: 93 t CO_2e 2020-2024: 441 t CO_2e per year 2025-2029: 685 t CO_2e per year 2030: 779 t CO_2e per year
MN006: 15 MW solar power plant system near the new airport (2023)	To reduce GHG emissions by installing large-scale solar power plant and displacing electricity generation based on fossil fuel	2019: 8,115 t CO_2e 2020-2030: 18,438 t CO_2e per year
Fuel Conversion by Introduction of LPG Boilers to Beverage Factory (2019)	By introducing the most efficient and newest model of LPG once-through boilers and vacuum type water heaters, the efficiency of the system is improved with less fuel consumption.	4,783 t CO_2e per year until 2030 based on the Bilateral cooperation agreement.
Upscaling Renewable Energy Sector Project (2018)	The project is to introduce battery storage system for utility-scale renewable energy generation.	6,423 t CO_2e per year, 160,575 t CO_2e will be reduced in 25 years.
15 MW Solar Power Project in Erdene, Dornogovi Province (2022)	The project contributes to the Mongolia government's policy of increasing renewable energy and reducing dependence on imported.	19,515 t CO_2e per year until 2030 based on the Bilateral cooperation agreement.

Source: Government of Japan - www.jcm.go.jp/mn-jp, Secretariat of the Joint Credit Mechanism between Mongolia and Japan

International voluntary carbon markets

Voluntary, regional, national, and bilateral multilevel carbon markets continue to emerge based on CDM principles and methodologies, with voluntary markets relying more on private sector initiatives than formally regulated carbon markets. In Mongolia, private entities such as XacBank, Clean Energy Asia LLC, and the Mongolian Society for Range Management have developed projects and programs that meet the voluntary carbon market requirements, in particularly energy conservation, land use, rangelands, and renewable energy sectors.

Table 4-4 provides detailed information of three projects from Mongolia that have been registered in the international voluntary carbon market: GS, Verra, and Plan Vivo.

TABLE 4-4 Projects registered in the International Voluntary Carbon Market

Voluntary Carbon Markets	Project Titles	Objective	GHG Emission Reductions	Implementing Partners (Implementation Period)
GS	The microfinance program for clean energy products consists of 6 small projects	Increase the purchase of energy-efficient electrical equipment, heaters, and home and house insulation materials for households in the neighbourhood and reduce the cost of living by improving boilers.	49,199 t CO_2e per year	XacBank LLC Micro energy credits (2012-2019)
Verra	"Tsetsii" 50 MW wind park project	Reducing GHG emissions by increasing clean energy production.	175,767 t CO_2e per year	Clean Energy Asia Ltd. (2017-2027)
Plan Vivo	Pasture, Nature Conservation, and climate change in Mongolia	Improve rangeland management based on the participation of herder households to increase the carbon removal capacity of 77,000 hectares of rangeland; protect biodiversity; and support household livelihoods.	100,000 t CO_2e per year	Mongolian Society for Range Management NGO and University of Leicester, UK (2015-2019)

Source: Mongolian Forestry Society, 2022

Pastures, Conservation and Climate Action (PCCA) Plan Vivo project of Mongolia

The Pastures, Conservation, and Climate Action (PCCA) Plan Vivo (PV) project in Mongolia is a community-led initiative focused on carbon sequestration, biodiversity conservation, and improving livelihoods across three distinct sites: forest steppe, steppe, and desert steppe environments. During Phase I (2015-2019), herder communities implemented improved grazing management practices, sequestering 107,000 tCO_2 and enhancing local ecosystems. Phase II (2019-2029) aims to further these efforts, with projected sequestration of up to 166,204 tCO_2. As stated in the latest annual report (2022) on the PV website, the amount assigned to participants reached 284,360 USD after the sale of 60,527tCO_2 PV credits[18]. The amount received by participants accounts for the 30% allocated to MSRM for management, monitoring and reporting (calculated after deduction of any bank and PV issuance fees).

[18] https://www.planvivo.org/pastures-conservation-climate-action

TABLE 4-5 Summary of sales in Year 7 (2021-2022)

Local bank charges ($)*	-
PV issuance fees ($)*	-
Total sales after deductions ($)*	-
Amount assigned to participants (70%)	284,360 $
Mongolian Society for Range Management (30%)	121,869$

*Charges and fees reported for internal monitoring purposes only, thus not published. This table is slightly modified from project annual report.

Key components include:

1. **Carbon sequestration:** Achieved through reduced grazing pressure and restoration of traditional seasonal mobility.
2. **Biodiversity conservation:** Protecting species such as the Mongolian gazelle and key grassland habitats.
3. **Livelihood improvements:** Enhancing income through the collaborative processing and marketing of livestock products.

The project engages 120-140 herder households across three regions (Arkhangai aimag: Ikh Tamir soum, Tov aimag: Undurshireet soum, Bayanhongor aimag: Bogd soum), covering 78,500 hectares, and continues to reinvest financial benefits from emission reduction certificates into the community.

4.4 Article 6 of the Paris Agreement

Article 6 of the Paris Agreement provides a framework for countries to voluntarily cooperate in the implementation of their NDCs. It includes three mechanisms:

1. **Article 6.2 - Cooperative Approaches:** This article allows countries to engage in cooperative approaches involving the use of Internationally Transferred Mitigation Outcomes (ITMOs). The ITMOs can be traded between countries to help achieve their NDCs. The framework requires robust accounting to prevent double counting of emissions reductions.

2. **Article 6.4 - Sustainable Development Mechanism (SDM):** This article establishes a centralized mechanism to generate tradeable emission reduction credits from projects that reduce or remove GHG emissions. This mechanism replaces the CDM from the Kyoto Protocol.

3. **Article 6.8 - Non-Market Approaches (NMAs):** This part of the article acknowledges the role of non-market approaches in achieving climate and sustainable development goals, including finance, technology transfer, and capacity building.

Mongolia's activities related to Article 6

Mongolia has actively engaged in bilateral agreements to support its climate goals under the Paris Agreement, specifically using the provisions of Article 6. The agreements with Japan, the Republic of Korea, and Singapore focus on various aspects of climate cooperation, including emissions reductions, sustainable development, and capacity building. These initiatives utilize both market and non-market approaches to enhance Mongolia's climate resilience and mitigation capabilities.

- **Japan:** The long-standing cooperation, beginning in 2013, focuses on GHG emissions reduction projects, highlighting energy efficiency and renewable energy initiatives.
- **Republic of Korea (2022):** The Memorandum of Understanding with Korea emphasizes the use of Article 6 mechanisms, particularly in enhancing capacities for GHG reduction, MRV systems, and adaptation strategies.
- **Singapore (2023):** The agreement with Singapore focuses on the framework for authorizing mitigation activities and the transfer of ITMOs, aligning with Mongolia's NDCs.

Other partnerships, such as those with Rio Tinto Mongolia and tech-based project developer, URECA, are also aligned with these frameworks, focusing on comprehensive climate actions, including carbon credit accessibility and international best practices. These activities showcase Mongolia's proactive stance on leveraging international cooperation to meet its climate targets under the Paris Agreement.

5. GENERAL STRATEGIC POLICY RECOMMENDATIONS

Carbon sequestration initiatives in Mongolia

Mongolia's vast rangelands offer a unique opportunity for carbon sequestration, a process crucial for mitigating climate change and enhancing sustainable land management. This chapter outlines the enabling factors necessary for the success of carbon sequestration initiatives, the engagement of stakeholders, the development of robust MRV systems, and the establishment of comprehensive governance frameworks. The aim is to integrate these initiatives into Mongolia's broader policy framework, addressing both environmental and socio-economic challenges.

Enabling factors

The feasibility of carbon sequestration initiatives relies on several enabling factors, including the relatability to traditional herding practices, low risk and administrative burden for herders, and compatibility with other initiatives. These factors ensure that the initiatives are practical and attractive to local stakeholders.

Stakeholder engagement

Effective stakeholder engagement is critical for the success of the carbon market. This involves identifying key stakeholders, such as governmental bodies, local authorities, herders, NGOs, and private sector entities, and tailoring engagement strategies to their levels of interest and impact. Transparency, capacity building, and partnership development are key components of this strategy.

MRV

A robust MRV system is essential for tracking the effectiveness of carbon sequestration efforts. The system includes remote sensing, field surveys, and community-based monitoring. It ensures that all data collected is accurate, verifiable, and transparent, thus maintaining the integrity of the carbon market.

Governance and institutional frameworks

Establishing a strong institutional framework is crucial for overseeing carbon market initiatives. This includes forming governing bodies, developing coordination mechanisms, and implementing legal safeguards to protect all stakeholders, especially vulnerable groups such as smallholder and women herders.

5.1 General principles and enabling factors

This section discusses the necessary enabling factors to ensure the feasibility of carbon sequestration initiatives on Mongolian rangelands. It covers the design, setup, and governance of these initiatives, as well as engagement with herders and other stakeholders, advisory services, and knowledge sharing associated with operating a rangeland carbon sequestration scheme. The observations in this chapter are primarily based on experiences from initiatives focusing on result-based biodiversity enhancement on grasslands.

The feasibility of the scheme relies on a range of factors, some of which depend on the socio-economic context in which the initiative takes place. The following enabling factors are key to the overall feasibility of result-based schemes:

1. **Relatability for involved herders:** The extent to which the initiative makes sense to herders and its connection to ongoing herding activities. The initiative should align with traditional herding practices and local knowledge to ensure acceptance and participation;

2. **Low risk for herders:** Ensuring that herders are not at high risk of not receiving the expected payment, especially if the initiative is strictly result-based and payments are made based on the amount of carbon sequestered at the end of the initiative. Mechanisms to provide interim payments or risk-sharing arrangements can mitigate this risk;

3. **Simplicity and limited administrative burden:** The scheme should be simple to understand and participate in, with minimal administrative requirements for herders. Clear guidelines and support for compliance with the rules of the scheme are essential to encourage participation;

4. **Low transaction costs:** Reducing economic and knowledge barriers for herders to adopt the scheme. This includes minimizing costs associated with participation, such as expenses for monitoring, reporting, and verification (MRV) processes;

5. **Coherence and compatibility with other initiatives:** Ensuring the scheme is compatible with other parallel initiatives, policies, and regulations. Coordination with existing environmental and agricultural programs can enhance the effectiveness and acceptance of the carbon sequestration initiative;

6. **Low uncertainties in carbon sequestration potential:** Addressing uncertainties regarding the actual potential for carbon sequestration on the rangelands and ensuring robustness in MRV methods. Accurate and reliable measurement techniques are critical for the credibility of the scheme;

7. **Fair baseline and target setting:** Establishing fair baselines and targets that consider the current state of rangelands. Degraded areas with low carbon content have higher carbon sequestration potential compared to well-managed lands closer to carbon saturation. The scheme should not inadvertently disadvantage herders by practicing good agricultural practices.

By addressing these enabling factors, the feasibility of carbon sequestration initiatives on Mongolian rangelands can be significantly enhanced. The successful implementation of such schemes will contribute to sustainable rangeland management, climate change mitigation, and the overall well-being of herding communities in Mongolia.

The likelihood of success and overall feasibility of an initiative among Mongolian herders largely depends on management practices and agro-climatic conditions. Success rates will be higher where the potential for carbon sequestration is significant, such as in degraded, overgrazed grasslands, where changes occur faster and the total amount of carbon sequestered leads to higher rewards. On such lands, the reward-to-transaction cost ratio is more favorable, making uptake and permanence more likely.

In these areas, the availability of nutrients and the impact of water on carbon sequestration capacity will influence the rate of success. All other factors being equal, the potential for success will be lower in areas with lower precipitation and limited biomass growth due to water scarcity. However, even smaller increases in carbon sequestration in such arid areas can have significant climate impacts due to their large geographic coverage. From a public policy perspective, these areas are desirable targets for carbon sequestration initiatives due to their overall climate benefits.

Such considerations need to be factored in when designing reward schemes. The more specific the knowledge on the potential for sequestration at a regional (or even better, at smaller level), the more

straightforward the design of the initiative becomes. This specificity allows for more transparent determination of targets and a fair and transparent reward scheme.

5.2 Stakeholder mapping

Effective stakeholder mapping is crucial for identifying and understanding the roles, interests, and potential impacts of different groups involved in MDCM. This mapping helps tailor engagement strategies and prioritize actions based on the stakeholders' influence and interest levels.

Key stakeholder groups

High Interest - High Impact

1. **Civil Society Organizations:** These groups, including community-based organizations and NGOs, play a crucial role in advocacy, awareness, inclusiveness and mobilization. Their deep involvement in environmental and community issues makes them highly invested in the success of carbon market initiatives.
2. **Governmental bodies:** National and regional government agencies are responsible for policy formulation, regulatory oversight, and implementation support. Their interest and impact are high due to their control over regulations and public resources.
3. **Local authorities and agencies:** At the provincial and municipal levels, these entities are involved in land management, land tenure, and rural development planning. They have a vested interest in the economic and environmental outcomes of carbon market projects.
4. **Herders and rural communities:** As the primary participants in carbon sequestration projects, these groups are crucial for the practical implementation of sustainable land management practices.
5. **Agricultural and livestock associations:** These associations represent the interests of farmers and herders, advocating for supportive policies and providing a platform for collective action.
6. **Environmental NGOs and advocacy groups:** These organizations focus on conservation, sustainable land management, and climate change mitigation. They provide expertise, raise awareness, and facilitate community engagement.

Low Interest - High Impact

1. **Private Sector entities:** Including carbon offset aggregators, project developers, and financial institutions, the private sector can significantly impact carbon market initiatives through financing, technical expertise, and project implementation capabilities. However, their interest varies based on market conditions, regulatory frameworks, and potential returns on investment. They are categorized as having low interest but high impact, as their engagement depends on the attractiveness of the market environment.
2. **International organizations and donors:** These entities provide funding, technical assistance, and guidance. Their involvement is critical for capacity building and ensuring the market's alignment with international standards. However, their interest can fluctuate based on geopolitical and economic factors.

Low Interest - Low Impact

1. **Academic and research institutions:** While they contribute valuable research and data analysis, their direct influence on market dynamics is limited. They primarily play a supportive role in providing evidence-based insights.
2. **Local communities and individuals:** This includes pastoralists, farmers, and residents in proximity to project sites. Although directly affected by carbon market initiatives, their individual influence on the market's broader direction is relatively limited.

Stakeholder engagement strategy

The stakeholder mapping highlights the need for differentiated engagement strategies:

- **High Interest** - High Impact: Engagement with these stakeholders should be proactive and continuous, involving them in decision-making processes and ensuring their voices are integral to policy and project development.
- **Low Interest - High Impact:** These stakeholders require targeted engagement efforts to increase their interest and participation. This might include creating more favorable regulatory conditions, offering incentives, and highlighting potential returns on investment.
- **Low Interest - Low Impact:** Engagement with these groups should focus on information dissemination and capacity building, ensuring they are informed and can participate meaningfully if opportunities arise.

This comprehensive stakeholder mapping and engagement strategy ensures that the diverse interests and influences of all groups are effectively managed, supporting the overall success and sustainability of MDCM (Table 5-1).

TABLE 5-1 Stakeholder mapping

High Interest	• Civil society organizations	• Governmental bodies • Local authorities and agencies at provincial and municipal levels • Herders and rural communities • Agricultural and livestock associations • Environmental NGOs and advocacy groups
Low Interest	• Academic and research institutions • Local communities, including pastoralists, farmers, and residents in proximity to potential project sites	• International organizations and donors, and bilateral aid agencies • Private sector entities including carbon offset aggregators, project developers, and financial institutions
	Low Impact	High Impact

5.3 Stakeholder engagement

Stakeholder engagement is a critical component in the successful implementation and sustainability of MDCM. This section outlines the strategies and considerations necessary to engage all relevant stakeholders, with a focus on removing barriers to participation, optimizing engagement factors, and ensuring a comprehensive and inclusive approach.

The engagement strategy includes a diverse array of stakeholders such as rangeland user groups, local governors, land managers, government agencies, environmental NGOs, academic institutions, private sector entities, and international organizations. Each stakeholder group has a unique role, from policy formulation and regulatory oversight to on-the-ground implementation and monitoring. The involvement of these stakeholders is crucial to building a robust carbon market framework that is responsive to the needs and capacities of all parties involved.

Engagement strategies

- **Removing barriers to uptake:** Effective engagement begins with addressing the barriers that hinder herder participation. Key barriers include financial concerns, increased transaction costs due to MRV requirements, and the complexity and uncertainty associated with carbon sequestration initiatives. To mitigate these barriers, it is recommended to simplify the MRV processes, provide clear and accessible information, and offer financial and technical support to reduce the initial burden on herders. Additionally, allowing herders to form groups to act as single projects can reduce administrative costs and complexities.
- **Consultative and participatory approaches:** The engagement strategy emphasizes consultative and participatory approaches, ensuring that all stakeholders, especially rangeland user groups, are involved in decision-making processes. This includes conducting regular consultations, workshops, and forums to facilitate dialogue, share insights, and collaboratively develop market mechanisms. These participatory methods are designed to build trust and foster a sense of ownership among stakeholders.
- **Information sharing and transparency:** Transparent information-sharing mechanisms are essential for building trust and ensuring informed participation. Regular updates on policy changes, market conditions, payment calculations, and project performance should be provided through accessible channels. This transparency helps mitigate uncertainty and allows stakeholders to make informed decisions regarding their involvement in the carbon market.
- **Capacity building and advisory services:** A comprehensive capacity-building program should be implemented to enhance stakeholders' understanding and skills. This includes training on carbon market dynamics, sustainable land management practices, and the use of MRV technologies. Advisory services should be made available to provide ongoing support, helping stakeholders navigate the complexities of the carbon market. These services should be locally based and trusted by herders to ensure relevance and effectiveness.

Fostering collaboration and partnerships

- **Building multi-stakeholder partnerships:** The strategy emphasizes the importance of building partnerships among stakeholders. This includes collaborations between government agencies and academic institutions for research, partnerships between NGOs and rangeland user groups for on-the-ground support, and engagement with the private sector for investment and market development. These partnerships are crucial for leveraging resources and expertise, facilitating comprehensive and coordinated actions.

- **Coordination mechanisms:** To streamline stakeholder interactions and ensure cohesive action, coordination mechanisms such as steering committees or working groups are recommended. These groups can focus on specific areas such as policy development, MRV, and community engagement, ensuring that all aspects of the carbon market are effectively managed and aligned with stakeholder interests.

Feedback and continuous improvement

- **Structured feedback mechanisms:** Developing structured feedback mechanisms is vital for continuous improvement. Stakeholders should have opportunities to provide input on the carbon market's performance and their experiences. This feedback should be systematically collected and analyzed to inform ongoing adjustments to policies and practices.
- **Adaptive management:** An adaptive management approach should be adopted, integrating stakeholder feedback into the market's evolution. This approach allows for the flexible adjustment of strategies and actions in response to emerging challenges and new insights, ensuring the market's resilience and long-term success.

Conflict resolution and safeguards

- **Conflict resolution framework:** A clear conflict resolution framework should be established to address any disputes that arise among stakeholders. This framework should include procedures for mediation, arbitration, and legal recourse, providing a fair and transparent process for resolving issues.
- **Ethical standards and safeguards:** Implementing ethical standards and safeguards is essential to protect the rights and interests of all stakeholders, particularly vulnerable groups. This includes ensuring equitable benefit-sharing, protecting land tenure rights, and maintaining high standards of transparency and accountability in all transactions.

By addressing barriers, promoting inclusive participation, and ensuring continuous improvement, the strategy aims to build a resilient and inclusive market that supports sustainable land management and climate action. Therefore, representatives from these groups should be invited to participate in interviews, surveys, and discussions throughout the scheme's development (Table 5-2).

TABLE 5-2 The stakeholders involved in a carbon market scheme in Mongolia may include

	WHO	WHY
1	Governmental bodies	Responsible for policy formulation, regulatory frameworks, and oversight of environmental and agricultural sectors.
2	Local authorities and agencies at provincial and municipal levels	Involved in land management, land tenure, and rural development planning.
3	Herders and rural communities	Whose livelihoods depend on rangelands and whose participation is crucial for the success and sustainability of any carbon market scheme
4	Agricultural and livestock associations	Representing the interests of farmers, herders, and other stakeholders involved in land use practices.
5	Environmental NGOs and advocacy groups	Working on conservation, sustainable land management, and climate change mitigation, providing expertise and facilitating community engagement.
6	Academic and research institutions	Specializing in environmental science, economics, and policy analysis, contributing knowledge and technical support for feasibility studies and impact assessments.
7	International organizations and donors, and bilateral aid agencies	Providing funding, technical assistance, and best practices guidance for the development and implementation of carbon market initiatives
8	Private sector entities including carbon offset aggregators, project developers, and financial institutions	Which may invest in or provide financing for carbon sequestration projects and related infrastructure.
9	Civil society organizations	Representing diverse interests and advocating for transparency, equity, and social safeguards in carbon market schemes
10	Local communities, including pastoralists, farmers, and residents in proximity to potential project sites	Whose perspectives, needs, and concerns must be considered in decision-making processes to ensure equitable and sustainable outcomes.

Vulnerable groups are included in the list under two specific categories: (1) herders and rural communities and (2) local communities, including pastoralists, farmers, and residents in proximity to potential project sites. Both groups represent vulnerable populations whose involvement and protection is critical in ensuring that the carbon market scheme is inclusive and fair.

5.4 Capacity-building for participants

Effective capacity building is essential for all participants in MDCM for carbon sequestration in rangeland, including rangeland user groups, local governors, land managers, project developers, and other stakeholders. This comprehensive approach is designed to equip all participants with the necessary knowledge, skills, and resources to engage effectively and sustainably in the carbon market.

Training and education programs

The capacity-building initiative should start with extensive training and education programs. These tailor-made training modules are intended to cover the fundamentals of carbon sequestration, including the science behind carbon storage in grasslands and practical methods for monitoring and measuring carbon levels. Emphasis on sustainable land management practices, such as rotational grazing and soil conservation techniques, is crucial to enhance soil health and carbon storage capacity.

It is recommended that participants, including local governors and land managers, receive specialized training in utilizing modern technologies like remote sensing, GPS, and data management tools. This training is crucial for ensuring accurate data collection and monitoring, thereby enhancing the credibility of the carbon market.

Technical support and financial literacy

A robust technical support framework should be established, providing guidance materials, workshops, and consultations with experts in agronomy, ecology, and carbon market dynamics. This support will assist all participants, including rangeland user groups and local governors, in addressing technical challenges and optimizing their practices for better environmental and economic outcomes.

The program should also include financial literacy training, covering aspects such as the valuation of carbon credits, market mechanisms, and financial management. This will empower participants to understand the economic benefits of the carbon market, manage project revenues effectively, and plan for sustainable growth.

Organizational development and leadership training

The program should focus on enhancing organizational skills among rangeland user groups, land managers, and local governors. Training should cover effective group organization, governance structures, and decision-making processes. Leadership development initiatives will empower individuals in these roles to coordinate activities, advocate for their communities, and engage in strategic planning, ensuring cohesive and efficient project implementation.

Gender and inclusivity

The capacity-building program must emphasize gender inclusivity and equity. Gender sensitization workshops are recommended to promote equal participation of men and women in all aspects of the carbon market. Ensuring that the benefits of the market are accessible to all, including underrepresented groups, will foster a more inclusive and equitable community engagement.

Communication and advocacy

It is essential to develop effective communication and advocacy skills for interacting with a wide range of stakeholders, including policymakers, investors, and the public. The training should focus on these areas, enabling participants, particularly local governors and land managers, to articulate their needs and interests clearly and advocate for supportive policies and resources.

Monitoring and evaluation skills

Training in monitoring and evaluation (M&E) techniques is crucial for ensuring the effectiveness of projects. This includes establishing M&E frameworks, collecting and analyzing data, and reporting on the outcomes of sustainable practices and carbon sequestration. These skills are vital for making data-driven decisions and demonstrating the project's value to stakeholders.

Legal and policy frameworks

Understanding the legal and policy frameworks governing carbon credits and land use rights is critical for all participants. The training should cover participants' rights and obligations, as well as strategies for engaging in policy advocacy. This knowledge will enable local governors, land managers, and rangeland user groups to navigate the regulatory landscape effectively and advocate for supportive policies.

5.5 Choosing approach

In the rangeland carbon sequestration market, schemes can be categorized into result-based, action-based, and hybrid approaches. Each type has distinct methodologies for generating and verifying carbon credits, with unique advantages and disadvantages (Table 5-3).

TABLE 5-3 Market approaches comparison

Scheme type	Basis	Verification	Pros	Cons
Result-Based	Actual carbon sequestered	Rigorous measurement and monitoring	High accuracy; incentivizes performance	Technically complex; delayed financial returns
Action-Based	Implementation of practices	Simpler, practice-focused verification	Easier to implement; quicker financial returns	May not reflect actual carbon sequestration; less precise
Hybrid	Combination of practices and outcomes	Both practice and outcome verification	Balanced approach; flexible	Resource-intensive; intermediate accuracy

Choosing between result-based, action-based, and hybrid schemes depends on the specific goals, resources, and capacities of the stakeholders involved. Result-based schemes offer accuracy and real impact but are complex and slow to reward. Action-based schemes provide quicker and simpler rewards but may lack precision. Hybrid schemes strive to balance these aspects but require careful implementation and verification.

For selling carbon credits in established carbon markets, result-based schemes are generally the most accepted due to their rigorous verification and demonstrated impact on carbon sequestration. Hybrid schemes are becoming more recognized, especially in voluntary markets, due to their balanced approach. Action-based schemes are less commonly accepted in formal markets but may find a place in smaller or voluntary initiatives where simpler implementation and quicker returns are prioritized.

The choice between a voluntary carbon market, an ETS, or a carbon tax for the Mongolian rangeland carbon market depends on several factors, including the specific goals, economic context, and the capacity for implementation and enforcement.

VCM is likely the most suitable approach initially for Mongolia. Here's why:

1. **Capacity-building:** It allows for the gradual development of monitoring, reporting, and verification systems without the immediate pressure of regulatory compliance.
2. **Stakeholder engagement:** Easier to engage local herders and companies who might be more receptive to voluntary participation than mandatory regulations.
3. **International support:** Voluntary markets can attract international funding and support, leveraging global interest in climate action.

Starting with a VCM offers Mongolia a flexible, scalable approach to activating both companies and herders in carbon sequestration efforts. It provides a pathway to develop the necessary infrastructure and capacity, which could later evolve into more formal mechanisms like an ETS or carbon tax as the market matures and regulatory capacities strengthen (Table 5-4).

TABLE 5-4 Potential carbon market roadmap of Mongolia

Carbon market types	Result/reliance					
	Volunteer		Compliance		MRV	Year
	Domestic	International	ETS (D/Int.)	Tax (D/Int.)		
Result-based	yes	yes	yes	yes	high	2030<
Hybrid	yes	yes	no	no	medium	2030
Action based	yes	no	no	no	less	2025

5.6 Payment and reward calculation

The payment and reward calculation framework are essential for ensuring fair and transparent compensation to rangeland user groups, the primary participants in MDCM. This framework is designed to incentivize sustainable practices by recognizing both the immediate actions taken by herders and the long-term benefits, such as carbon sequestration and enhanced ecosystem services, provided by rangelands.

Given the seasonal nature of herders' income, which typically peaks in spring (from cashmere) and autumn (from meat sales), the framework aims to provide financial support during the winter, when income tends to be lower. This seasonal adjustment can be achieved by timing payments to coincide with periods when herders face higher expenses and lower income. For example, upfront payments for implementing sustainable practices could be scheduled for late autumn or early winter, helping to bridge the income gap during this challenging season.

To simplify the payment calculation and enhance clarity for herders, the use of proxy indicators is recommended. These indicators, such as grazing intensity, water source conditions, and the extent of bare soil, are directly linked to the management activities of herders. By focusing on these easily measurable proxies instead of more complex outcomes like biodiversity levels, herders can better understand how their actions influence payments and identify ways to increase their rewards. For instance, maintaining optimal grazing intensity can serve as a proxy for ecosystem health, leading to clear and actionable feedback for herders on how to maximize their benefits.

The proposed hybrid system, which combines action-based rewards with results-based outcomes, can be tailored to provide these seasonal benefits. Immediate payments for actions such as implementing rotational grazing or winter fodder management could be issued in the winter, offering crucial financial support when it's most needed. As these practices lead to measurable improvements in carbon sequestration and biodiversity, additional payments could be made in the spring or autumn, aligning with other income peaks.

This system also recognizes the multifunctionality of rangelands, which play a crucial role in Mongolia's rural economy and cultural heritage. Beyond carbon sequestration, rangelands provide critical ecosystem services like soil erosion control, water regulation, and biodiversity conservation. To ensure these co-benefits are adequately rewarded, the payment calculation incorporates indicators linked to these services. For instance, payment adjustments could be made based on the improvement in water retention capacity of the soil, reduction in erosion rates, or increased vegetation cover.

Given the variability in carbon sequestration potential across different regions, the payment structure must reflect these differences. In areas where the capacity for carbon sequestration is lower, higher payment rates per ton of carbon sequestered may be necessary. This approach ensures that herders in less fertile regions are not discouraged from participating due to lower inherent carbon storage potential. For instance, herders in arid regions might receive higher per-ton payments than those in more temperate zones where carbon sequestration is more easily achieved.

Timing of payments is another critical component of the framework. To balance immediate financial support with performance-based rewards, a phased payment system is recommended. Herders could receive an initial payment—such as 50% of the expected reward—when they commit to and implement sustainable practices. The remaining balance would be paid after verifying the results, such as the actual amount of carbon sequestered. This approach provides upfront financial support, reducing the economic burden on herders, while also ensuring that long-term environmental goals are met.

Moreover, the scheme should account for the broader economic benefits of sustainable rangeland management, including increased livestock productivity, enhanced soil fertility, and improved water holding capacity. These benefits can encourage herders to maintain sustainable practices beyond the formal project period, ensuring the longevity of the project's impacts.

To ensure transparency, the system should include clear and accessible reporting mechanisms. Regular updates on payment calculations, carbon credit generation, and distribution should be provided to all stakeholders. These reports would include detailed performance metrics and financial flows, fostering trust among participants.

Finally, the framework must comply with both national regulations and international carbon market standards to safeguard the interests of all participants. Standardized contracts should clearly outline terms of participation, payment schedules, responsibilities, and dispute resolution provisions to ensure smooth project implementation. A government agency like the MECC could be nominated to generate and enforce these contracts, ensuring consistency, transparency, and fairness across the MDCM.

By combining immediate action-based rewards with long-term, results-based compensation, and recognizing the multifunctional benefits of rangelands, this payment and reward framework aims to support sustainable land management and ensure the integrity and success of MDCM.

5.7 Ensuring permanence

Ensuring the permanence of carbon sequestration efforts is crucial for the long-term success of MDCM. Given that improvements in grazing management and associated increases in carbon sequestration are long-term exercises that can easily be reversed, a comprehensive strategy is required to maintain these benefits over time. This section outlines the necessary mechanisms to ensure the stability and security of increased carbon stocks, focusing on the role of rangeland user groups as the main project participants.

1. Long-term commitment and management plans

It is essential to establish comprehensive management plans that outline sustainable grazing practices, land management techniques, and restoration activities. These plans should be developed in collaboration with rangeland user groups, ensuring they are practical and culturally appropriate. Long-term commitments from participants, supported by contractual agreements, will solidify the intention to maintain carbon sequestration efforts over extended periods.

2. MRV systems

A robust MRV system is critical for tracking carbon stocks and ensuring the integrity of carbon credits. The MRV framework should include periodic assessments using remote sensing technology, ground surveys, and independent audits to verify carbon levels and detect any changes in land use or management practices that could affect carbon permanence.

3. Legally binding agreements

Participants should enter into legally binding agreements that stipulate the terms and conditions for maintaining carbon sequestration activities. These agreements should outline the responsibilities of each party, the duration of commitments, and penalties for non-compliance or premature cessation of activities.

4. Financial incentives, penalties, and fraud prevention

The scheme should include financial mechanisms that provide both positive incentives for maintaining carbon sequestration and penalties for failing to uphold commitments. This can include creating a buffer pool of carbon credits as a safeguard against potential losses of carbon stocks and implementing penalties for non-compliance to deter actions that threaten the permanence of sequestered carbon.

Additionally, to safeguard the integrity of the scheme, robust measures should be in place to prevent and address fraud. This includes implementing rigorous monitoring and verification processes to detect any false reporting or manipulation of data related to carbon sequestration. Penalties for fraudulent activities should be clearly defined and enforced, ensuring that any attempt to undermine the system is met with strict consequences. By including these safeguards, the scheme can maintain credibility and trust among all stakeholders.

5. Risk mitigation and management

Comprehensive risk assessments should be conducted to identify potential threats to carbon permanence, such as wildfires, overgrazing, or climatic changes. Based on these assessments, contingency plans should be developed to mitigate risks, including establishing firebreaks, implementing early warning systems, and creating response protocols for emergencies.

6. Community engagement and capacity-building

A thorough understanding of herders' perspectives and perceptions is essential to eliminate or reduce disincentives. Engagement strategies should be tailored to address their concerns and highlight the long-term benefits of carbon sequestration practices.

Continuous education and capacity-building programs are essential to ensure that rangeland user groups understand the importance of permanence and are equipped with the necessary skills. These programs should cover advanced land management techniques, climate resilience strategies, and the legal aspects of carbon market participation.

Encouraging community ownership of carbon sequestration projects fosters a sense of responsibility and long-term commitment. Involving local leaders in decision-making processes and ensuring the benefits of projects are clearly communicated and accessible to all community members are crucial for sustained engagement.

7. Governance and institutional support

A robust institutional framework is necessary to oversee the implementation and enforcement of permanent measures. This includes establishing dedicated bodies or committees responsible for coordinating activities, monitoring compliance, and resolving disputes. Institutional support should also extend to providing technical assistance and facilitating access to necessary resources.

Ensuring that carbon market initiatives align with national and regional policies on land use, agriculture, and environmental protection is crucial for long-term success. This integration helps create a supportive regulatory environment that encourages sustainable practices and provides a framework for enforcement.

Combining monetary and non-monetary compensation is recommended to incentivize participation and ensure permanence. This includes both short- and long-term incentives, such as immediate financial rewards for initial efforts and ongoing payments for sustained carbon sequestration.

Ensuring the reliability of MRV systems while managing costs is critical. Utilizing cost-effective, smart compliance testing methods, such as randomized compliance testing, and aligning MRV processes with other policies can help reduce administrative burdens and increase feasibility.

5.8 Governance and institutional arrangements

The governance and institutional arrangements section outlines the frameworks and structures necessary to effectively manage MDCM for rangeland carbon sequestration. This section emphasizes the importance of clear roles, responsibilities, and coordination mechanisms among various stakeholders to ensure the market's integrity, transparency, and sustainability.

1. Institutional framework and roles

Establishment of governing bodies

It is recommended to establish a central governing body responsible for overseeing the entire carbon market framework. This body, potentially housed within a relevant governmental ministry such as the Ministry of Environment and Climate Change, will be tasked with policy formulation, regulatory oversight, and overall market administration. The governing body will ensure that the market operates in alignment with national and international standards, providing a stable regulatory environment for all participants.

Roles of key institutions

Governmental bodies: Responsible for policy and regulation, these bodies will develop and enforce standards for carbon accounting, MRV processes, and compliance. They will also facilitate coordination between various stakeholders and provide funding or incentives where necessary.

Local authorities and agencies: At the provincial and municipal levels, these entities will be crucial for on-the-ground implementation of carbon market projects, including land management and local stakeholder engagement. They will work closely with rangeland user groups to ensure adherence to sustainable practices and local regulations.

Advisory and technical support institutions: Academic institutions and research bodies will provide essential technical support, including data analysis and research on best practices in carbon sequestration and sustainable land management. These institutions will also contribute to capacity-building efforts.

2. Coordination mechanisms

Steering committees and working groups

To ensure effective coordination among stakeholders, the establishment of steering committees and specialized working groups is recommended. These committees will focus on key areas such as MRV, stakeholder engagement, policy development, and financial mechanisms. Each group will include representatives from the central governing body, local authorities, rangeland user groups, private sector entities, and NGOs. Regular meetings and reporting will facilitate communication and alignment of activities.

Inter-agency collaboration

Fostering collaboration between different government agencies is crucial for seamless integration of carbon market initiatives with other national policies, such as those related to agriculture, rural development, and environmental protection. Inter-agency collaboration will also help streamline regulatory processes and reduce administrative burdens for participants.

3. Legal and regulatory framework

Development of clear regulations and guidelines

The governing body must develop comprehensive regulations and guidelines covering all aspects of the carbon market, including carbon credit certification, MRV standards, and compliance requirements. These regulations should be clear, accessible, and regularly updated to reflect evolving best practices and market conditions.

Legal safeguards and dispute resolution

Establishing legal safeguards is essential to protect the rights of all stakeholders, particularly vulnerable groups such as smallholder and women herders. This includes ensuring transparent processes for land tenure, benefit-sharing, and compensation. A formal dispute resolution mechanism should be in place to handle conflicts, with procedures for mediation, arbitration, and, if necessary, legal adjudication.

4. Financial and technical support

Funding mechanisms

To support the implementation and sustainability of carbon market projects, a range of funding mechanisms should be established. These may include public funding, international grants, and private sector investments. The central governing body should facilitate access to these funds, particularly for smallholder and women herders and community projects.

Technical assistance and capacity building

Continuous technical assistance and capacity-building programs are essential for maintaining high standards of implementation and compliance. This includes training in MRV processes, sustainable land management practices, and the legal aspects of participating in the carbon market. Technical support institutions should work closely with local authorities and rangeland user groups to deliver these programs effectively.

5. Transparency and accountability

Public reporting and accountability measures

Transparency in all processes is vital for the credibility of the carbon market. The governing body should implement strict accountability measures, including regular public reporting on project outcomes, financial flows, and compliance records. This transparency helps build trust among stakeholders and ensures the market operates in a fair and efficient manner.

Independent oversight and auditing

An independent oversight body or auditor should be established to review and verify the operations of the carbon market. This body will be responsible for conducting regular audits, assessing the effectiveness of governance structures, and providing recommendations for improvement.

In summary, the governance and institutional arrangements for MDCM are designed to create a structured and transparent framework that supports sustainable carbon sequestration practices. By establishing clear roles, strong coordination mechanisms, comprehensive legal and regulatory frameworks, and robust support systems, the market can achieve its goals of environmental sustainability and socio-economic development.

5.9 Potential sources of funding

The development of a domestic voluntary carbon market for rangeland carbon sequestration in Mongolia presents a unique opportunity to leverage a diverse range of funding sources. This section outlines potential funding avenues, including public funding, private sector investment, and voluntary carbon market mechanisms, essential for the successful implementation and sustainability of the market. These sources can be combined to support agricultural soil carbon projects effectively.

Public funding

Public funding is crucial, particularly in the early stages of developing a voluntary carbon market. Governmental support can help establish foundational infrastructure and encourage stakeholder participation. Key public funding sources include:

- **National government programs:** The Mongolian Government can allocate resources to support carbon sequestration initiatives as part of broader environmental and agricultural policies. Funding could cover initial project setup, Monitoring, Reporting, and Verification (MRV) systems, and capacity-building programs. Integrating carbon sequestration efforts with existing agricultural support schemes can also provide immediate financial relief to herders while promoting sustainable practices.
- **Regional and international development funds:** Organizations such as the Asian Development Bank (ADB) and the Green Climate Fund (GCF) provide financial support for projects that enhance climate resilience and sustainable land management. These funds can be instrumental in the initial development and scaling of voluntary carbon market projects.

Private sector funding

The private sector plays a pivotal role in financing voluntary carbon market projects, particularly through corporate sustainability initiatives. Key avenues include:

- **Corporate Social Responsibility (CSR) and sustainability initiatives:** Companies seeking to enhance their environmental credentials may invest in carbon sequestration projects as part of their CSR strategies. This can include direct funding, technical support, or in-kind contributions to demonstrate commitment to sustainability.
- **Supply chain management:** Companies involved in agricultural supply chains can support carbon sequestration projects to improve the sustainability and resilience of their supply chains. Investments in such projects can help ensure long-term soil health and productivity, reducing risks associated with supply chain disruptions.
- **Carbon offset purchases:** Businesses and individuals looking to offset their carbon emissions can purchase credits from rangeland carbon sequestration projects. This creates a revenue stream for project developers and incentivizes the adoption of carbon-friendly practices among herders.
- **Green bonds and climate bonds:** Financial institutions and corporations can issue green bonds and climate bonds to raise capital specifically for projects with positive environmental impacts, including carbon sequestration. These bonds attract investment from environmentally conscious investors and can provide substantial funding for project development.

Voluntary carbon markets

Voluntary carbon markets offer a flexible platform for trading carbon credits, allowing for innovative approaches to funding carbon sequestration projects:

- **Voluntary carbon credits:** The sale of carbon credits generated from verified carbon sequestration projects can provide significant funding. National standards similar to VCS and the GS ensure the credibility of these credits, making them attractive to buyers seeking high environmental integrity.
- **Engagement with international standards and platforms:** Leveraging international voluntary carbon market platforms can enhance market access and visibility. Engaging with these platforms helps ensure that Mongolian projects meet global standards, attracting international buyers and investors.

Technical assistance and research grants

Technical expertise and research are vital for the success of voluntary carbon market projects. Key sources of support include:

- **International research grants:** Grants from bodies such as the Global Environment Facility (GEF) and the World Bank can fund local research capacity, laboratory infrastructure, and technical training. These grants are critical for developing the necessary scientific and technical foundations for project implementation.
- **Technical assistance programs:** Partnerships with international organizations like the UNDP and the FAO can provide essential technical assistance. These partnerships offer resources and expertise to support the development and implementation of carbon sequestration projects.

In-kind support from stakeholders

In-kind contributions from various stakeholders are crucial for the practical implementation of carbon sequestration projects:

- **Technical assistance from experts:** Experts can provide valuable technical guidance and training on best practices for carbon farming and sustainable land management.

- **Local community involvement:** Herders and farmers can participate in pilot projects, applying new techniques and contributing to local knowledge. Their involvement is critical for the success and sustainability of these initiatives.
- **Support from NGOs and community groups:** These organizations can facilitate outreach, education, and logistical support, helping to mobilize resources and build community ownership of projects.

Challenges and considerations

While the potential for funding is substantial, several challenges must be addressed:

- **Capacity-building:** Strengthening technical and institutional capacity is essential for effective project management. This includes developing MRV systems, training local stakeholders, and establishing governance structures.
- **Market access:** Ensuring access to both domestic and international voluntary carbon markets is crucial for maximizing the potential of SOC projects. Mongolia should engage with international platforms to facilitate market entry.
- **Regulatory framework:** Developing a supportive regulatory environment is key to the success of voluntary carbon market projects. This includes establishing clear guidelines for carbon credit certification, MRV processes, and compliance.

This comprehensive approach to funding seeks to utilize a combination of public, private, and market-based sources to support the development and sustainability of MDCM for rangeland carbon sequestration. By leveraging these resources effectively, the country can enhance its environmental stewardship and contribute to global climate change mitigation efforts.

5.10 MRV system

The MRV refers to how participants' climate actions and GHG emissions are reliably measured, how they are required to report these to authorities, and how authorities verify their accuracy. MRV is integral to carbon market schemes, as it is the step that quantifies the impact of climate actions, i.e. the result.

- **Monitoring** refers to the quantification of GHG emissions or removals and includes collection of data as well as calculation methods.
- **Reporting** establishes how participants are required to record and communicate monitoring data to relevant authorities and/or government entities.
- **Verification** refers to the process of establishing the truthfulness and accuracy of reporting.

MRV is at the core of ensuring that the scheme has environmental integrity, that is, that its incentives for mitigation and removals are real, additional, measurable, permanent, avoid carbon leakage, and avoid double-counting.

The MRV system will include the following components:

1. Monitoring methodology including frequency and parameters
2. Reporting and data management
3. Verification and validation
4. Adaptive management

1. Monitoring methodology

Remote sensing and geospatial analysis: High-resolution satellite imagery and drone surveys will monitor land use changes, vegetation cover, and soil health. Utilizing remote sensing technology and field surveys to monitor land use changes and verify the implementation of sustainable practices.

Field surveys and soil sampling: On-ground field surveys and soil sampling will provide detailed soil health and carbon content data. Trained teams will conduct periodic surveys, collecting soil samples and assessing rangeland conditions, working closely with local pastoralists.

Community-based monitoring: Local communities will be trained and involved in data collection and reporting. This empowers communities, ensures continuous monitoring, and provides real-time data. Pastoralists will use simple tools to record grazing patterns, livestock numbers, and rangeland conditions.

2. Data management and reporting

A centralized, user-friendly database will store all monitoring data, ensuring transparency and accessibility. Regular quarterly and annual reports will update stakeholders on progress, achievements, and areas for improvement, covering carbon sequestration levels, rangeland health, and socio-economic impacts. These reports will be shared with government agencies, local communities, and international partners to maintain engagement and support. The National Registry System holder will be responsible for managing the centralized database and overseeing data reporting. This organization will ensure that all monitoring data is accurately recorded, stored, and shared with stakeholders, maintaining transparency and accountability throughout the process.

3. Verification and Validation

Independent verification and validation of monitoring results are essential to maintain the credibility of the carbon market. Third-party auditors—Verification and Validation Bodies (VVBs)— will be engaged to review monitoring data and verify the reported outcomes. These auditors will conduct periodic site visits, cross-check data from multiple sources, and ensure that the monitoring process adheres to international standards. Their findings will be documented in verification reports, providing assurance to all stakeholders that the scheme is achieving its objectives. Engaging third-party organizations ensures independently verified carbon sequestration outcomes.

4. Adaptive management

The monitoring process will be adaptive, facilitating continuous learning and improvement and the data collected will refine rotational grazing and herd size management practices. Feedback from local communities and stakeholders will inform decision-making, ensuring responsiveness to changing conditions and challenges.

A key challenge is designing MRV systems that sufficiently and accurately measure the impact of climate actions at acceptable cost to project participants (namely herders and farmers) and the administrator. There is a trade-off here: high stringency MRV can deliver accuracy but is associated with high costs (financial and time), which can reduce voluntary participants' uptake and the overall impact of the scheme.

Selecting monitoring parameters

Choosing transparent, relevant, and relatable parameters or indicators is key to ensure herders' acceptance and uptake. Indicators need to be site-specific, as carbon sequestration in rangeland soil is highly dependent on the context. In rangelands where management practices are static, biomass carbon stocks will be in an approximate steady-state, meaning carbon accumulation through plant growth is roughly balanced by losses through decomposition and fire (IPCC, 2019).

Considering the correlation between enhanced rangeland biodiversity and the capacity to sequester carbon, similar, or even the same, indicators could be considered as proxy indicators for carbon sequestration on rangelands.

A monitoring scheme can be based on a combination of:

1. Sampling through direct measurements.
2. Use of proxy indicators.
3. Registration of herding activities or indirect indicators of herding activities that have the potential to increase carbon storage.

The latter are more appropriate than solely measuring soil carbon as an indicator for assessing the contribution of specific practices to maintain or enhance soil carbon levels. There needs to be a balance between the costs involved and the robustness and reliability of the monitoring system. Additionally, benefits for different stakeholders must be considered.

It has been argued that enhanced biodiversity could be used as a proxy indicator for carbon sequestration, due to the interlinkages between biodiversity, different grazing management schemes, and carbon sequestration. However, the link between herding activities and changes in carbon storage is still uncertain due to the scarcity of scientific evidence on the link between biodiversity protection, grazing, and carbon sequestration. Both direct carbon measurement options and proxy indicators need further research.

5.11 Approaches to compliance and fraud in a voluntary carbon market scheme

In MDCM, maintaining credibility and preventing fraud are essential. The following strategies focus on transparency, stakeholder engagement, and ethical practices to encourage compliance:

1. **Transparent reporting and verification:** Transparency is key in a voluntary scheme. The market will implement clear reporting protocols and encourage third-party verification to ensure data accuracy. This approach builds trust among participants and stakeholders, fostering confidence in the carbon credits' validity.
2. **Voluntary standards and best practices:** Promoting best practices through voluntary standards can enhance project quality. Participants are encouraged to adhere to guidelines on sustainable land management and carbon measurement, with potential recognition for high-standard projects, adding credibility and appeal.
3. **Stakeholder engagement and education:** Engaging stakeholders through training and capacity-building programs is crucial. These initiatives will educate participants about benefits of compliance, risks of fraud, and ethical standards expected within the market, fostering a culture of integrity.

4. **Ethical guidelines and fraud prevention:** Even in a voluntary market, fraud prevention is important. The scheme will establish ethical guidelines and conduct regular data reviews to identify and address discrepancies. Encouraging ethical behavior and accountability helps prevent misconduct and maintains market integrity.
5. **Public reporting and transparency:** Regular public reporting on market activities and outcomes will enhance transparency. By openly sharing information about carbon sequestration achievements and participant activities, the market can build broader trust and encourage participation.

In a voluntary carbon market, promoting transparency, ethical behavior, and adherence to best practices is vital. These approaches ensure the market's credibility, prevent fraud, and encourage wider participation, supporting long-term success and sustainability of the scheme.

5.12 Scheme evaluation

The evaluation of MDCM is integral to understanding its effectiveness in promoting sustainable land management and enhancing socio-economic development. This section outlines the methodologies, key performance indicators (KPIs), and potential challenges associated with the evaluation, ensuring that the carbon market contributes meaningfully to environmental sustainability, socio-economic upliftment, and gender inclusivity, aligning with the Sustainable Development Goals (SDGs).

Evaluation objectives and methodologies

The primary objectives of evaluating this scheme are to assess overall impact on carbon sequestration, evaluate effectiveness of sustainable land management practices, understand socio-economic benefits for local communities, and identify areas for improvement. These objectives are crucial for informing policy decisions and refining the carbon market's approach.

A mixed-methods approach will be employed, integrating both quantitative and qualitative data collection and analysis. Quantitative methods will include remote sensing technologies, field surveys, soil sampling, and socio-economic surveys. These will provide concrete data on changes in vegetation cover, biomass, soil carbon content, and socio-economic indicators such as household income and employment levels. Qualitative data will be gathered through interviews, focus group discussions, and participatory observations, offering valuable insights from key stakeholders including government officials, local leaders, and community members.

Key Performance Indicators (KPIs)

The evaluation will be guided by a set of KPIs across environmental, socio-economic, and institutional dimensions:

Environmental KPIs:

1. **Carbon sequestration levels:** Measurement of total carbon sequestered in grasslands.
2. **Vegetation cover and biomass:** Analysis of changes in vegetation cover and biomass.
3. **Soil health:** Evaluation of soil organic carbon content, nutrient levels, and soil structure.

Socio-Economic KPIs:

1. **Household income:** Assessment of changes in income for participating pastoralists and landowners.

2. **Employment and livelihoods:** Analysis of job creation and improvements in livelihoods.
3. **Community engagement:** Measurement of community participation in the carbon market.

Institutional KPIs:

1. **Policy implementation:** Evaluation of policy and regulatory frameworks supporting the carbon market.
2. **Capacity building:** Assessment of training and capacity-building initiatives.
3. **Stakeholder collaboration:** Analysis of collaboration and partnerships between various stakeholders.

Challenges and considerations

- **Geographical and climatic challenges:** Mongolia's vast and remote landscapes present logistical challenges for data collection and monitoring. Remote sensing and community-based monitoring can mitigate some of these challenges, but field surveys in remote areas may still require significant resources. Additionally, Mongolia's semi-arid climate and extreme weather conditions necessitate careful consideration in evaluating the impact of sustainable land management practices.
- **Socio-economic diversity:** The diverse socio-economic context of Mongolia requires tailored evaluation methods to account for differences in rangeland use agreement, grazing practices, and community engagement. This ensures a representative assessment of the carbon market's benefits and challenges.
- **Data integration and management:** Integrating data from multiple sources requires robust data management systems. Ensuring data accuracy, consistency, and accessibility is crucial for effective evaluation. Advanced data analytics tools and a centralized database will facilitate efficient data integration and analysis.

Gender and Sustainable Development Goals (SDGs)

Gender considerations are vital in the evaluation process, particularly in assessing the impact of the carbon market on women's participation in sustainable land management and decision-making processes. Promoting gender equality aligns with SDG 5 (Gender Equality), and efforts should be made to ensure women have equitable access to the benefits generated by the carbon market, including income opportunities and capacity-building initiatives.

The carbon market's alignment with other SDGs, such as SDG 13 (Climate Action) and SDG 15 (Life on Land), will be assessed by examining its contributions to climate change mitigation and biodiversity conservation. The market's effectiveness in reducing carbon emissions and enhancing ecological health is critical for sustainable development.

Safeguards and continuous improvement

To safeguard against potential negative impacts, the evaluation will include a comprehensive analysis of the environmental and social safeguards in place. This includes ensuring that the rights of local communities, particularly indigenous, vulnerable and nomadic groups, are respected and that projects do not lead to land displacement, loss of traditional livelihoods and herding methods, land tenure loss, or any other related negative impacts.

The evaluation process will be adaptive, incorporating feedback mechanisms to continuously improve the carbon market scheme. Regular stakeholder meetings, workshops, and consultations will provide opportunities for discussion and feedback, fostering a collaborative approach to improvement. Data-driven adjustments to policies and practices, such as refining grazing schedules and herd size management, will be made based on evaluation findings.

Capacity building and training initiatives will be critical for the effective implementation and monitoring of the carbon market. The evaluation will identify gaps in capacity and inform targeted training programs, ensuring the sustainability of the carbon market scheme.

By employing a mixed methods approach and considering the unique geographical, climatic, and socio-economic context of Mongolia, the evaluation of the carbon market will provide valuable insights into its effectiveness and impact. Addressing challenges and incorporating lessons learned will enhance the robustness of the evaluation. Through adaptive evaluation and continuous improvement, the carbon market scheme will evolve to better meet its goals of mitigating climate change, promoting sustainable land management, and improving the livelihoods of Mongolia's rural communities, while also advancing gender equality and contributing to the SDGs.

5.13 Conclusion and recommendations

Carbon sequestration initiatives in Mongolia present a vital opportunity to address both climate change and socio-economic challenges. For these initiatives to be successful, it is essential to strengthen institutional support, enhance stakeholder engagement, and ensure financial sustainability.

The following policy recommendations are proposed:

1. **Strengthen institutional support:** Establish dedicated governing bodies to oversee carbon market initiatives, ensuring they align with national policies and are supported by a comprehensive legal framework.
2. **Enhance stakeholder engagement:** Develop tailored engagement strategies for different stakeholder groups to maximize participation and ensure transparency.
3. **Build capacity and knowledge sharing:** Implement comprehensive training programs to equip local stakeholders with the necessary skills and knowledge.
4. **Ensure financial sustainability:** Explore diverse funding sources, including public funding, private investments, and voluntary carbon markets, to support ongoing and future projects.
5. **Implement robust MRV systems:** Develop cost-effective and accurate MRV systems to ensure integrity and credibility of the carbon market.
6. **Establish a legal framework:** Develop and implement a legal framework that supports carbon market activities, including enforcement of contracts, regulation of carbon credit transactions, and protection of stakeholder rights.

6. SCHEME DESIGN

6.1 Summary of MDCM

The proposed MDCM for carbon sequestration in rangelands is a national level, voluntary crediting mechanism in Mongolia. The main implementers and project participants will be herder household communities in officially organized groups. The minimum number of households to be included in each group is ten according to the Law on the Legal Status of the United Federation of Herder Households, with implementation having begun from 1st July 2024. According to the Law, federation of herder households can be expanded to soum (local) federation and province federation. There are now (as of October 2023) almost 98,000 herder households belonging to approximately 1,600 pasture users groups (PUGs) across Mongolia that are implementing RBRM plans[19]. These groups can participate individually or in a program of activities (PoA) in MDCM, with the latter being most common.

The MDCM scheme will be developed according to general principles of carbon markets.

1. Organizing herders into communities

The initial phase involves organizing herders into PUGs or similar governance structures. This organization is based on traditional grazing areas and is crucial for streamlining communication and decision-making. The organized herders, now project participants, collaborate to map and agree on rangeland boundaries with neighboring groups, ensuring cooperative management and conflict avoidance. As mentioned above, the minimum number of households each PUG shall include is ten according to the Law on the Legal Status of the United Federation of Herder Households.

2. Mapping ecosystem states and developing grazing plans

This step entails creating detailed maps that depict the ecosystem states, recovery classes, and grazing boundaries. These maps include spatial information on ecological sites, seasonal rangeland use, and rangeland conditions. The maps are developed using Ecological Site Descriptions (ESDs) with input from soum land managers, rangeland specialists, and PUG representatives. The goal is to assess the rangeland's current condition and formulate a comprehensive grazing plan that maintains the ecosystem's health.

3. Preparing and submitting project documentation

Project participants prepare necessary documents for project registration, including:

- **Modality of Communication (MoC):** A document detailing the communication framework for the project.
- **Rangeland Use Agreement (RUA):** Outlining terms and conditions for land use, accompanied by four annexes.
- **Project Design Document (PDD) and Validation Report:** These documents outline the project's objectives, methodologies, expected outcomes, and safeguards to ensure sustainable practices.
- **Sustainable Development & Safeguards Assessment Report (AR):** Evaluates the project's social and environmental safeguards.

These documents are submitted to the Carbon Market Office (CMO) along with a registration fee.

[19] National federation of pasture user groups of herders - http://en.greenmongolia.mn/post/132995.

4. Document review and approval by CMO

The CMO reviews the submitted documents for completeness and compliance. This includes publishing the draft PDD and Safeguards AR on the CMO website for a 30-day public comment period. VVBs use public feedback to validate the PDD, and the CMO reviews and may request revisions to the SD & Safeguards AR. Upon satisfactory review, the CMO approves the project registration. The CMO can request help from the environmental units of the soum and aimag (province) level to review the submitted documents for completeness and compliance.

5. Implementation of the grazing plan

Upon approval, the improved rangeland management plan is implemented. This plan includes various activities such as rotational grazing, fodder preparation, animal breeding, animal health management, and marketing strategies. The project participants follow technical recommendations provided by rangeland and animal breeding officers. The RBRM should follow the State and Transition Model (STM) recommendation.

6. Monitoring project implementation

Continuous monitoring of the project's implementation is undertaken by the project participants. This involves data collection on grazing practices, vegetation recovery, and compliance with the grazing plan. Multi-Party Monitoring (MPMs), including organizations such as NAMEM and ALMGaC, conduct annual assessments to ensure compliance and progress.

7. Reporting and verification

Regular reports submitted by project participants include:

- Monitoring Report: Details on the implementation and adherence to the grazing plan.
- SD & Safeguards Monitoring Report: Updates on social and environmental safeguards.
- Non-permanent Risk Report (if any): Details any risks affecting the permanence of project outcomes.
- Verification Report: Summary of the verification process conducted by VVBs, ensuring data accuracy.

8. Issuance of carbon credits

Based on the verified monitoring reports, the CMO issues carbon credits to the project participants. These credits are quantifiable representations of the carbon sequestration achieved by the project.

9. Recording in the National Carbon Market Registry System

The final step involves the CMO notifying the results and recording the issued carbon credits in the National Carbon Market Registry System. This registry maintains a transparent record of all issued carbon credits.

Additional methodological and monitoring details

Methodological approaches: Project participants choose a methodological approach for measuring SOC:

- **Approach 1:** On-site measurements to document baseline and project SOC stocks.
- **Approach 2:** Calculation approaches using peer-reviewed datasets, parameters, and models to estimate SOC stocks. Project owners need to prove that the research results are conservative and applicable to the project site and management practice.

- **Approach 3:** Applies default factors to estimate SOC changes, relating to the general Tier 1/2 model described in the IPCC Guidelines for National Greenhouse Gas Inventories (IPCC 2019). If possible, the Tier 2 approach as outlined in the IPCC Guidelines should be applied. Applicability of SOC reference values (SOC_{REF}) to be used in connection with IPCC impact factors shall be transparently demonstrated for the project area.

Note: All projects must have photo-point assessment during the baseline assessment, during the implementation, and at end of the project.

Monitoring:

- The impact of management in different seasonal rangelands is assessed using methods such as photo-point monitoring and regular assessments.
- Long-term monitoring data from NAMEM and ALMGaC are reported to relevant stakeholders, including herders and local government, to update ESD documents as necessary.

Project applicability conditions:

- Projects must adhere to specific conditions, including no land use change from grassland, no increase in grazing livestock numbers, and no application of inorganic nitrogen fertilizers.

These detailed steps and additional methodological considerations ensure that the carbon sequestration projects are scientifically sound, transparently managed, and effectively contribute to sustainable rangeland management in Mongolia.

Given its domestic nature, the MDCM aims to engage national enterprises actively, encouraging their participation through incentives aligned with emerging international regulations such as the Carbon Border Adjustment Mechanism (CBAM). Exporters, under CBAM, are required to pay taxes unless they can demonstrate the purchase of high-quality carbon credits that meet EU standards. To facilitate this, the MDCM scheme will adhere to internationally recognized high standards, allowing participants to voluntarily opt for the most suitable options. This approach not only ensures environmental integrity but also aligns Mongolia's carbon market with global best practices, enhancing its credibility and attractiveness to national enterprises.

6.2 Objectives and basic principles

Defining clear objectives for carbon market schemes is a complex process that requires careful consideration of multiple factors. The objective of MDCM for rangeland carbon sequestration is established with a focus on enhancing gender inclusiveness and food security, along with the primary goal of carbon sequestration. The key objectives are as follows:

1. **Enhancing carbon sequestration:** To significantly increase the amount of carbon sequestered in rangelands through the adoption of improved grazing practices and the restoration of degraded lands.
2. **Economic incentives:** To provide economic benefits to herders and project participants, ensuring equitable access and opportunities for both men and women. This includes fostering the adoption of sustainable practices that enhance carbon storage capabilities.
3. **Environmental sustainability:** To prioritize the maintenance and enhancement of rangeland ecosystem health, promote biodiversity, and reduce land degradation, thereby contributing to the overall sustainability of the environment.

4. **Measurement and verification:** To establish robust systems for the MRV of carbon sequestration. This ensures transparency and credibility in the quantification and certification of carbon credits.
5. **Policy support:** To align the objectives of the MDCM with national policies on climate change and sustainable development. This alignment ensures coherence with broader environmental goals and commitments.
6. **Gender inclusiveness:** To actively promote gender equality by involving women in decision-making processes, providing equal training and resources to men and women, and addressing specific barriers that women may face in participating in carbon market activities.
7. **Enhancing food security:** To integrate carbon market initiatives with strategies aimed at improving food security. This includes promoting sustainable agricultural practices that enhance rangeland productivity, support livestock health, and ensure a stable food supply for communities.

Primary objective of MDCM

The primary objective of the MDCM is to mitigate climate change by incentivizing enhanced carbon sequestration practices and accelerating resilience-based rangeland management. The MDCM also seeks to promote the sustainable use of natural resources, improve the livelihoods of rural communities, ensure gender inclusiveness, and enhance food security. Furthermore, the MDCM aims to contribute to Mongolia's commitments under international climate agreements.

Basic principles for high-quality carbon credits

To ensure the issuance of high-quality carbon credits, the MDCM adheres to six fundamental principles in the planning and implementation of projects, including the calculation, monitoring, and verification of GHG emission reductions or removal enhancements. These principles are designed to instill confidence in the quality of MDCM carbon credits:

1. **Relevance:** The selection of GHG sources, sinks, reservoirs, data, and methodologies must be appropriate to the needs of intended users and accurately reflect GHG emission reductions or removal enhancements within or related to the project boundary.
2. **Completeness:** All relevant GHG emissions and removals, along with supporting information for criteria and procedures, must be comprehensively included.
3. **Consistency:** Data collection and GHG emission reduction or removal enhancement calculations must enable meaningful comparisons with related GHG information.
4. **Accuracy:** Data collection and calculations must be correct, credible, and acceptable, minimizing biases and uncertainties to the greatest extent possible.
5. **Transparency:** Sufficient, appropriate, and verifiable GHG-related information must be disclosed, enabling intended users to make decisions with reasonable confidence.
6. **Conservativeness:** Conservative assumptions, values, and procedures must be employed to ensure that GHG emission reductions or removal enhancements are not overestimated.

6.3 Eligibility

Setting stringent eligibility criteria is crucial for ensuring the integrity and effectiveness of the MDCM scheme. This approach helps to avoid negative externalities, reduce scheme costs, and increase the likelihood of permanence. The MDCM adheres to the resilience-based rangeland management principles of Mongolia, focusing on sustainable and resilient land use practices to ensure long-term carbon sequestration and rangeland health.

Eligibility criteria:

1. **Project location:** The project must be located within Mongolia.
2. **Land use type:** Eligible lands include rangelands and rangelands used for grazing livestock.
3. **Community organization:** Herders must be organized into official groups such as PUGs or Herder Household Associations. These groups form the foundational units for implementing and managing carbon sequestration projects.
4. **Group participation:** Soum (district) and province-level associations can participate as project implementers, either individually or as a collective bundle, or under a Program of Activities (PoA).
5. **Pasture Use Agreement:** Herder household associations must secure formal rangeland use agreements with local government authorities, ensuring legal compliance and the adoption of sustainable rangeland management practices.
6. **Inclusiveness:** All eligible herder groups must have agreements signed by all members above 18 years of age, ensuring comprehensive gender inclusiveness and representation in project activities.
7. **Stakeholder engagement:** Projects must actively engage local stakeholders, including herders, local communities, and government authorities. Free, Prior, and Informed Consent (FPIC) of indigenous and local communities is mandatory to uphold their rights and participation.
8. **Legal compliance:** Compliance with existing and new laws governing land use, environmental protection, herder associations, and climate change mitigation practices is a prerequisite for eligibility.

6.3.1 Additionality

Additionality is a fundamental requirement for ensuring that carbon sequestration activities generate benefits that would not have occurred in the absence of the carbon market incentive. For Mongolia's Pasture Carbon Sequestration Market, additionality is defined and demonstrated through the following criteria:

1. **Baseline and historical practices:**
   - Establish a baseline of current and historical land use and grazing practices to illustrate that proposed changes are new and additional;
   - Demonstrate that existing practices do not achieve the same level of carbon sequestration as anticipated under the project.
2. **Enhanced management practices:**
   - Implement improved grazing management techniques, such as rotational grazing, which are not part of traditional or existing management practices;
   - Introduce sustainable practices like reseeding degraded areas with native grasses, controlled grazing intensity, and timing adjustments to enhance carbon sequestration.

3. **Legal and regulatory framework:**
    - Comply with new laws and regulations promoting resilience-based rangeland management and carbon sequestration, including the Law on the Legal Status of the United Federation of Pastoral Households and the Law on Reducing the Negative Effects of Climate Change on Traditional Animal Husbandry.

4. **Financial and technical support:**
    - Secure funding and technical assistance that would not be available without participation in the carbon market;
    - Demonstrate that without the carbon market incentives, herders or associations would lack the financial capacity to implement and maintain improved rangeland management practices.

5. **Carbon sequestration projects:**
    - Introduce new technologies or methods for carbon measurement and monitoring not previously utilized in Mongolia;
    - Demonstrate quantifiable increases in soil organic carbon or above-ground biomass that exceed historical levels.

6. **Community engagement and capacity building:**
    - Include training and capacity-building programs for herders on sustainable practices that were not previously available;
    - Enhance community participation in carbon sequestration efforts through education and awareness initiatives facilitated by the carbon market framework.

7. **Environmental and socio-economic co-benefits:**
    - Highlight additional benefits such as improved biodiversity, water retention, and reduced soil erosion resulting from new management practices;
    - Emphasize socio-economic benefits like improved livelihoods for herders, better livestock health, and increased productivity from enhanced rangeland management.

8. **Demonstrating lack of pre-existing initiatives:**
    - Provide evidence that similar carbon sequestration projects or programs were not in place before the introduction of the carbon market;
    - Show that the project introduces new elements or significantly scales up existing initiatives.

9. **Gender inclusiveness:**
    - Ensure the active participation of both men and women in all aspects of the project;
    - Provide targeted support and training for women herders to overcome barriers to participation;
    - Document and track gender-specific impacts and benefits to ensure equitable distribution.

To achieve and demonstrate additionality, the scheme must allow for the measurement of baseline conditions at the project's inception. This includes documenting gender-disaggregated data, introducing innovative practices or technologies, proving the financial necessity of carbon market funding, and implementing robust monitoring systems to quantify carbon sequestration gains and track gender-specific impacts.

Note: Technical subcommittee on consideration of AFOLU sector projects and activities need to finalize the additionality requirement.

6.3.2 Co-benefits and considerations

The implementation of the rangeland carbon sequestration scheme in Mongolia is expected to yield numerous co-benefits beyond carbon sequestration. However, it's important to acknowledge potential disadvantages and considerations to ensure a balanced approach. These can be classified into local and broader categories:

Local benefits

1. **Improved soil health:** The scheme enhances soil structure, water retention, and nutrient availability, which are crucial for promoting healthier plant growth, particularly in Mongolia's arid and semi-arid regions.
2. **Increased livestock productivity:** Healthier rangelands result in better livestock health and productivity, which are vital for the livelihoods of nomadic herding communities.
3. **Water management:** Improved soil structure and water retention capabilities facilitate better water infiltration and reduced runoff, essential for managing limited water resources in Mongolia's dry climate.
4. **Soil erosion control:** Enhanced soil structure reduces the risk of erosion, preserving topsoil and maintaining long-term land productivity, particularly in wind-prone landscapes.
5. **Economic benefits and livelihoods:** Financial incentives from the carbon market provide additional income to local communities, improving economic stability. Engaging communities in sustainable practices fosters a sense of stewardship and strengthens community cohesion. Improved rangeland productivity and reduced input costs enhance the economic viability of herding and farming operations, supporting rural communities.

Broader benefits

1. **Biodiversity conservation:** Healthier soils support a diverse range of plant and animal species, contributing to greater ecosystem resilience in Mongolia's unique steppe and grassland ecosystems.
2. **Climate resilience:** Soils with higher organic carbon levels are better equipped to withstand extreme weather events, such as droughts and harsh winters (dzuds), enhancing the resilience of agricultural systems to climate variability.
3. **Ecosystem services:** Healthier soils contribute to ecosystem services such as pollination, pest control, and water purification, supporting broader environmental sustainability and the well-being of Mongolian communities.

Potential disadvantages and considerations

1. **Initial costs and resource allocation:** Implementing the scheme may require significant initial investments in training, infrastructure, and monitoring, which could strain limited local resources and require external funding.
2. **Risk of over-dependence on carbon markets:** Relying too heavily on carbon market revenues could make communities vulnerable to market fluctuations and reduce incentives for diversified economic activities.
3. **Social equity concerns:** There is a risk that the benefits of the scheme may not be evenly distributed, potentially favoring wealthier or more connected individuals and exacerbating existing inequalities within communities.

4. **Management and enforcement challenges:** Ensuring compliance with sustainable practices and maintaining the integrity of the carbon sequestration scheme may be challenging, particularly in remote areas with limited governance structures.
5. **Potential for misalignment with local practices:** Introducing new practices through the scheme could sometimes conflict with traditional herding practices, leading to resistance from local communities if not managed sensitively.

6.3.3 UNDP high integrity and SDGs

In addressing climate change and promoting sustainable land management, MDCM for carbon sequestration in rangeland integrates the UNDP High-Integrity Carbon Markets Initiative. This initiative ensures that carbon market activities are both environmentally and socially responsible, contributing to broader goals of sustainable development and climate resilience.

Eligibility criteria

The eligibility criteria for participation in MDCM emphasize organized community involvement, legal and regulatory compliance, and sustainable rangeland management. Aligning with UNDP's high integrity principles, the criteria ensure accurate carbon accounting and the implementation of social and environmental safeguards. Participants must demonstrate that their projects are real and verifiable, ensuring that carbon credits generated are impactful and contribute to national climate action plans.

Additionality

The principle of additionality is crucial in the carbon market. Projects must prove that activities result in additional carbon sequestration that would not have occurred without the carbon market incentive. This aligns with UNDP's focus on integrity, requiring projects to demonstrate verifiable climate impacts and alignment with broader climate goals. By incorporating innovative practices and securing necessary financial and technical support, projects can ensure they meet these rigorous standards.

Co-benefits

MDCM provides numerous co-benefits, including biodiversity conservation, soil health improvement, and enhanced water resource management. These benefits are consistent with UNDP's high integrity principles, which emphasize the importance of social and environmental safeguards. The market's initiatives also promote gender equality and community empowerment, ensuring that all stakeholders, including women and Indigenous Peoples, are fairly represented and benefit from the projects.

Contribution to Sustainable Development Goals (SDGs)

MDCM supports several SDGs, such as No Poverty (SDG 1), Gender Equality (SDG 5), and Climate Action (SDG 13). UNDP's high integrity principles underscore the importance of aligning carbon market activities with the Paris Agreement goals and national climate pledges, ensuring that projects contribute to global efforts to combat climate change while promoting sustainable development and human rights.

By integrating the UNDP High-Integrity Carbon Markets Initiative, MDCM ensures that its activities are both effective and responsible. This alignment not only supports Mongolia's climate goals but also promotes social equity, environmental sustainability, and economic development.

MDCM aligns with and supports several SDGs, including:

TABLE 6-1 Relevant SDGs

SDG	Relevance
SDG 1: No Poverty	By improving livelihoods and providing additional income through carbon credits, the market helps reduce poverty among herder communities.
SDG 2: Zero Hunger	Enhanced rangeland management leads to healthier livestock and better food security for herder families.
SDG 5: Gender Equality	Ensuring active participation of both men and women and providing targeted support for women's involvement promotes gender equality.
SDG 6: Clean Water and Sanitation	Improved water resource management practices contribute to better water quality and availability.
SDG 8: Decent Work and Economic Growth	The carbon market creates new economic opportunities and promotes sustainable livelihoods.
SDG 13: Climate Action	By increasing carbon sequestration and enhancing climate resilience, the market directly addresses climate change mitigation and adaptation.
SDG 15: Life on Land	Conservation of biodiversity and sustainable land management practices protect terrestrial ecosystems.
SDG 17: Partnerships for the Goals	The market fosters collaboration among herders, local governments, and international organizations, enhancing partnerships to achieve sustainable development goals.

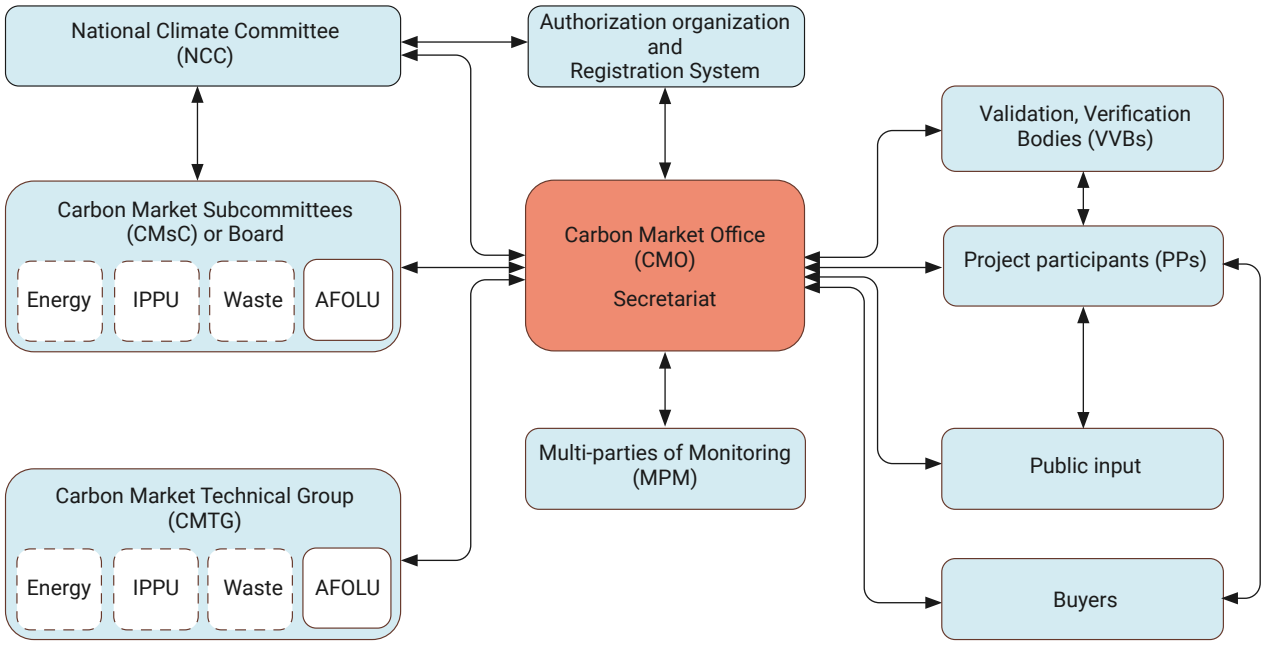
6.4 MDCM management structure

The MDCM will be overseen by the Ministry of Environment and Climate Change (MECC), which will ensure alignment with Mongolia's NDC and other national climate policies. A dedicated Carbon Market Office (CMO) will manage the day-to-day operations of the MDCM, including project registrations, approvals, and the issuance of carbon credits.

The National Climate Committee (NCC) will act as a high-level decision-making body. This committee will coordinate the MDCM's activities, ensuring that the mechanism supports national development priorities such as land restoration, rural community benefits, and food security. It will be supported by subcommittees and a professional council to provide technical and policy guidance (Figure 6-1).

Key decisions will begin with submission by the CMO to the relevant sector subcommittee. If approved, they will be presented to the NCC for final approval, following a step-by-step process.

FIGURE 6-1 MDCM Management Structure



Implementation framework

The MDCM program is managed by the Carbon Market Office (CMO), a public organization responsible for day-to-day operations and administrative tasks. The CMO operates under the supervision of the following bodies:

1. **National Climate Committee (NCC)**

   Task:

   - The NCC supports the authorization organization in making high-level and strategic decisions concerning national climate change initiatives and carbon market matters. The committee evaluates progress, challenges, and investment opportunities across the various sectors defined in Mongolia's NDCs.

2. **Carbon Market Subcommittee for the AFOLU Sector (CMsC-AFOLU)**

   Tasks:

   - The subcommittee provides recommendations to the NCC on project registration and carbon credit issuance, following the standards established by the CMO.
   - It advises on criteria for project registration, issuance of credits, and the registration of VVBs.
   - The subcommittee makes recommendations on the approval or cancellation of MDCM methodologies, tools, and emission factors. These decisions are communicated to the NCC.
   - It also provides guidance on registration, suspension, and revocation of VVBs.
   - The subcommittee undertakes any additional tasks as directed by the NCC.

   Membership:

   Composed of experts from government sectors, academic institutions, the private sector, NGOs, and other relevant stakeholders as deemed appropriate by the NCC.

3. **Carbon Market Technical Group for the AFOLU sector (CMTG-AFOLU)**

Tasks:

- The technical group revises or develops MDCM methodologies, tools, and emission factors. It also advises on the cancellation of approved methodologies and tools, with decisions communicated to the CMsC-AFOLU.
- It provides advanced technical expertise to support the CMsC and CMO when needed.

Membership:

The group includes experts and academics from government sectors, educational institutions, the private sector, NGOs, and other relevant entities as deemed appropriate by the CMsC-AFOLU.

Additional Entities:

- Verification and Validation Bodies **(VVBs):** Independent entities responsible for validating and verifying project activities and emissions reductions.
- Project Participants **(PP):** Entities or individuals implementing the MDCM projects.
- Third Parties for Monitoring **(MPMs):** Organizations or entities engaged in monitoring projects to ensure compliance with established methodologies and reporting standards.
- **Public input:** Mechanisms for involving the public and receiving feedback on project activities and methodologies.

Current Status:

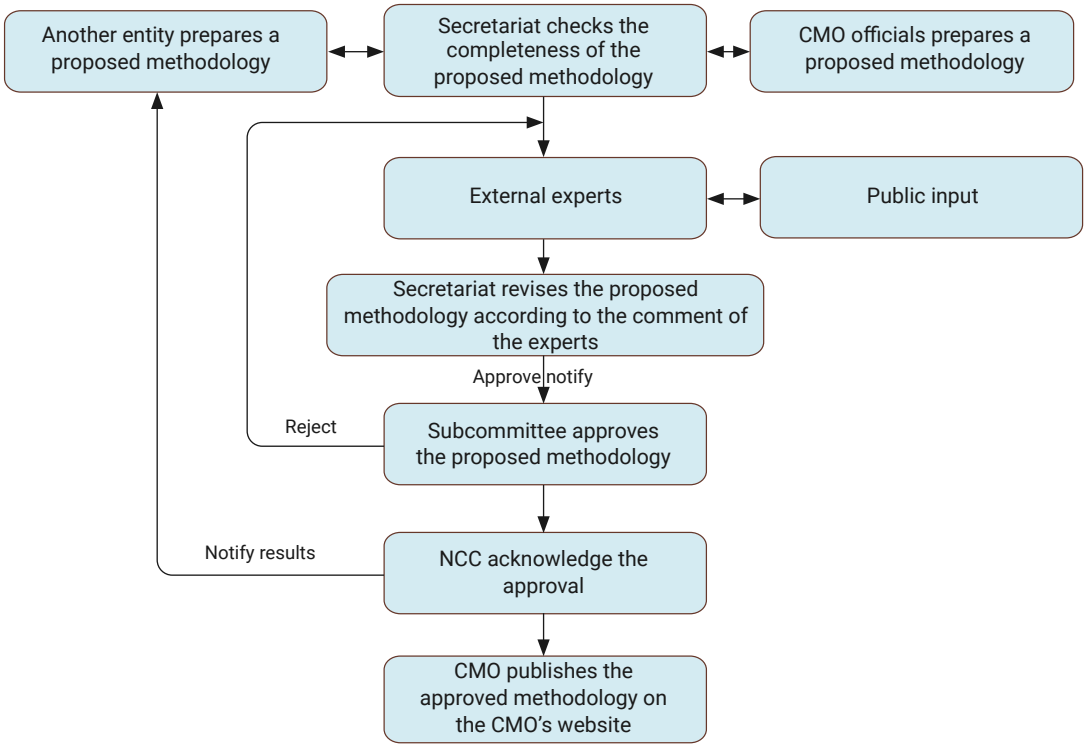
The Ministry of Environment and Climate Change (MECC) is responsible for the implementation of these policies and oversees national climate reporting to the UNFCCC, ensuring alignment with international climate agreements.

The National Climate Committee (NCC), re-established in 2023, chaired by the Deputy Prime Minister, coordinates climate action across sectors and regions. The NCC has the authority to establish sub-committees and professional councils to support its work. A professional council was established on April 1, 2024, consisting of 22 members, to provide expertise and guidance on national climate strategies. The NCC also engages local governments through its provincial branches, ensuring climate initiatives are implemented nationwide.

6.5 Development of MDCM methodology

A methodology for MDCM can be proposed by CMO officials or other external entities. The process for developing and approving a methodology is designed to ensure transparency, scientific rigor, and stakeholder engagement. The steps are as follows (Figure 6-2):

FIGURE 6-3 Procedures for MDCM Methodology Development



6.5.1 Steps for methodology development and approval

1. Preparation of proposed methodology:

- **CMO officials or external entities:** A proposed methodology may be prepared by CMO officials or other entities using the specified form provided by the CMO.
- **Submission by external entities:** If another entity drafts the proposed methodology, it must be submitted to the CMO, including contact details such as address, phone number, and email.

2. Completeness check by CMO:

- **Secretariat role:** The CMO, acting as the secretariat, determines whether the proposed methodology is complete. The result of this completeness check is communicated to the methodology proponent within XXXX (TBD) [20] working days of receipt.

3. Review by external experts and public consultation:

- **External review:** A methodology that passes the completeness check is reviewed by external experts or the CMTG-AFOLU sector. The CMO may invite the methodology proponent to answer questions if deemed necessary.
- **Public input:** Simultaneously, the proposed methodology is made publicly available on the CMO's website for XXXX (TBD) calendar days to gather public comments.

[20] TBD -To be determined. The red XXXX or highlighted numbers of days, years and percents will be determined when MDCM is officially operationalized, and guidelines are developed.

4. Revision of proposed methodology:

- **Incorporation of feedback:** The CMO may revise the proposed methodology based on feedback from external experts and public comments.

5. Subcommittee consideration:

- **CMsC-AFOLU sector:** The proposed methodology is then considered by the CMsC-AFOLU sector. If the subcommittee does not approve the proposed methodology, the CMO may request additional reviews from external experts with further input from the methodology proponent. The revised methodology is then resubmitted to the subcommittee for reconsideration.

6. Presentation to NCC:

- **Approval notification:** Upon approval by the CMsC-AFOLU sector, the methodology is presented to the NCC. The CMO notifies the methodology proponent of the result.

7. Publication and payment:

- **Publication:** Approved methodologies are published on the CMO's website, making them available for public use and reference.
- **Compensation:** The CMO compensates external experts or the CMTG-AFOLU sector for their contributions to the review process.

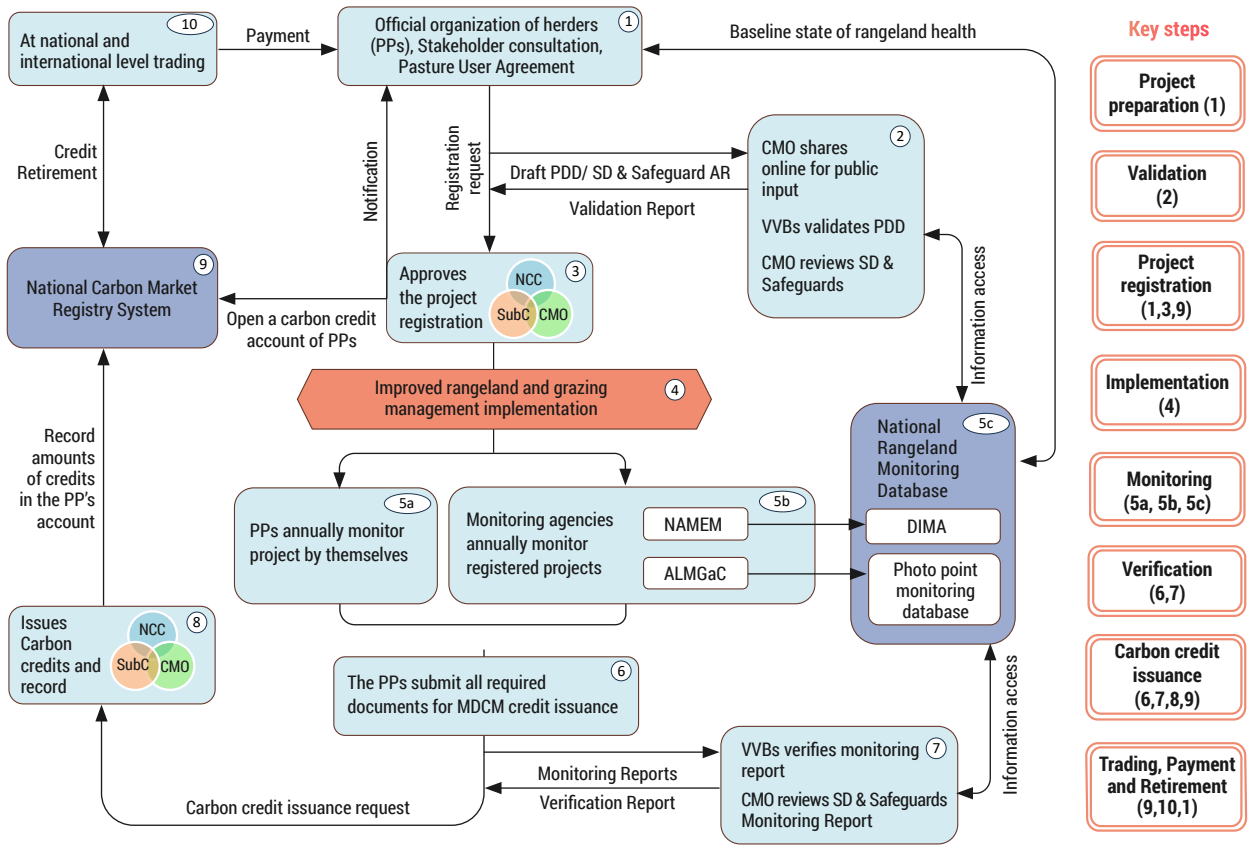
6.5.2 Validity of methodologies

It is important to note that the PDD of a proposed project under the validation process must not be based on a previous version of a methodology whose validity has expired for more than XXXX (TBD) calendar days. This ensures that the projects are based on the most current and accurate methodologies available.

6.6 Development of MDCM project

The development cycle of a MDCM project consists of two primary phases: (1) the MDCM project registration process and (2) the carbon credits issuance process. Each phase involves specific steps and documentation requirements to ensure the integrity and success of the project. The detailed process for rangeland carbon sequestration projects is shown in Figure 6-3.

FIGURE 6-4 Project development cycle of MDCM in rangeland carbon sequestration projects (Abb:NCC – National Climate Committee, SubC – Subcommittee or Board, CMO -Carbon Market Office)



6.6.1 Project registration process

The first phase in the MDCM project development cycle is the registration process. Project participants must prepare and submit all required documents to the CMO to request project registration. The necessary documents and steps include:

1. Modality of Communication (MoC): This document outlines the communication framework and structure for the project, specifying how project participants will communicate with the CMO and other relevant entities.
2. Request for project registration: A formal request submitted by the project participants seeking registration under the MDCM.
3. Draft PDD and validation report: The PDD outlines the project's objectives, methodologies, and expected outcomes, along with a validation report to ensure compliance with MDCM standards.
4. Social and environmental safeguards Assessment Report (AR): This report assesses the social and environmental safeguards in place, ensuring that the project adheres to the required standards for sustainable and responsible development.
5. Rangeland Use Agreement (RUA): A legal agreement detailing the terms and conditions of land use, including several annexes specifying conditions and obligations.

6.6.2 Project submission and approval

Upon preparing the documents, project participants submit them to the CMO, accompanied by the necessary registration fee. The CMO reviews the submissions for completeness and compliance, and the process includes the following:

1. **Publication and review:**
    - The CMO publishes the draft PDD and SD & Safeguards AR on its website for public viewing and feedback.
    - VVBs validate the PDD, and the CMO reviews the SD & Safeguards.
2. **Project approval:**
    - The CMO evaluates the submission and, once satisfied, approves the project registration.
    - If the request for registration meets the completeness and compliance requirements, the CMO forwards the project proposal to the CMsC-AFOLU sector within XXXX (TBD) working days of receiving the complete request. If the subcommittee approves, the project is then proposed to the NCC for final approval.
    - The NCC makes a final decision on the project request within XXXX (TBD) working days of receipt. The date of the NCC meeting is recognized as the official project registration date.

The CMO notifies the result and opens a carbon credit account for the project participant in the registry system.

6.6.3 Carbon credits issuance process

The second phase of the MDCM project development cycle involves the issuance of carbon credits. This process includes ongoing monitoring, reporting, and verification to ensure that the project achieves the planned carbon sequestration and other environmental benefits.

1. **Monitoring and reporting:**
    - Project participants monitor the implementation of the project and compile data into reports, including the Monitoring Report and SD & Safeguards Monitoring Report.
2. **Request for carbon credit Issuance:**
    - Participants submit a request for carbon credit issuance, along with the Monitoring Report, Non-permanent Risk Report (if any), and Verification Report.
3. **Verification and issuance:**
    - VVBs verify the monitoring reports, and the CMO reviews the SD & Safeguards Monitoring Report.
    - Upon verification, the CMO issues carbon credits to the project participants and records the amount of carbon credits in the registry system.
        1. Upon successful completion of the completeness check, the CMO proposes the project to the Subcommittee on Consideration of AFOLU Sectors Projects and Activities within XXXX (TBD) working days. If the subcommittee agrees, the project is proposed to the NCC for final approval.
        2. The NCC decides on the issuance request within XXXX (TBD) working days of receipt. The decision date is recognized as the official carbon credits issuance date.

4. Notification and record keeping:

- The CMO notifies the result and records the carbon credits in the project's account within the National Carbon Market Registry System.

Accessing forms and documentation

- All necessary forms and documentation templates can be downloaded from the CMO's official website.

This structured approach ensures transparency, accountability, and adherence to the standards set forth by the MDCM, facilitating successful project development and the accurate issuance of carbon credits.

6.7 Greenhouse gas reporting for MDCM project

The amount of GHG emission reductions as stated in the PDD and the GHG monitoring report shall be entered as an integer. However, two decimal places number is used for calculation of GHG emission reductions, and the results shall be rounded down to the nearest integer. Example is as follow:

TABLE 6-2 Example of GHG reporting

Baseline Emission	1,505.85 $tCO_2eq.$
Project Emission	245.20 $tCO_2eq.$
Leakage Emission	100 $tCO_2eq.$
Emission Reduction/Carbon sequestration	1,160.65 $tCO_2eq.$
Displayed value (round the decimal and display it as an integer)	**1,160 $tCO_2eq.$**

6.8 Monitoring system

6.8.1 Objective of monitoring

The objectives of monitoring MDCM projects by the CMO are as follows:

- Verify that the implementation of the MDCM project aligns with the specifications outlined in the PDD or the GHG Monitoring Report;
- Collect information on any changes in project details and provide appropriate guidance in the event of alterations to project activities;
- Examine the management and mitigation of significant environmental impacts resulting from the MDCM project implementation;
- Identify problems and obstacles encountered during the project's implementation and respond to inquiries from project owners or participants, providing necessary support and solutions.

6.8.2 General procedures of monitoring

The monitoring of MDCM projects is carried out through a systematic process by the CMO and authorized third parties. The procedures are as follows:

1. **CMO monitoring:** The CMO, as the program administering organization, assigns its staff to conduct monitoring activities. This involves regular visits, assessments, and evaluations to ensure compliance with project guidelines and objectives.
2. **Third-Party monitoring:** Authorized third parties, with cooperation agreements with the CMO, may also carry out monitoring activities. These third parties act on behalf of the CMO, following established protocols and guidelines to assess project performance and compliance.

6.8.3 Specific procedures for monitoring of rangeland carbon sequestration projects

Implementation of improved rangeland management

Upon approval, the improved rangeland management plan, including livestock grazing strategies, is implemented. This plan encompasses various activities such as rotational grazing, fodder preparation, animal breeding, animal health management, and marketing strategies. Project participants are encouraged to follow technical recommendations from rangeland and animal breeding officers, as well as recommendations based on the State and Transition Models (STM).

Monitoring system

Monitoring is essential for generating carbon credits in market-based projects. The significance of the MDCM lies in its connection to established national and local monitoring networks—NAMEM and ALMGaC—which assess rangeland health conditions (Figure 6-5). All monitoring data can be stored in national and local-level databases, as explained in Section 3.3 of this report.

Validation and Verification Bodies (VVBs) can access this system with special permission to conduct project validation and verification. The monitoring methodology may follow existing decisions made by national and local monitoring systems, and, if needed, further elaboration can be added to align with specific MDCM requirements.

Monitoring approach for SOC sequestration

Monitoring changes in Soil Organic Carbon (SOC) under the MDCM involves assessing carbon stocks in rangelands through various methodologies. SOC changes are critical for quantifying greenhouse gas emission reductions, and project participants can choose from three approaches:

1. **Direct measurement (Approach 1):** SOC is directly measured from statistically sufficient soil samples. This approach follows established sampling and analysis protocols to ensure accuracy and meet uncertainty standards, providing direct data on SOC level changes over time.
2. **Modeling and literature (Approach 2):** If direct measurement is not feasible, SOC values can be derived from validated models or data published in peer-reviewed literature. The project must demonstrate that the models or data are applicable and reliable for estimating SOC changes.
3. **IPCC default factors (Approach 3):** When direct SOC data is unavailable, project participants can apply default factors from the IPCC guidelines. These factors offer a standardized method for estimating SOC changes based on assumptions about land use, management practices, and organic input. Evidence of rangeland improvement or deterioration is necessary for selecting the appropriate factors and ensuring accurate estimates.

Project participants who apply the first two approaches—direct measurement of SOC or the use of validated models—can perform monitoring themselves, and this is fully acceptable under the MDCM. These approaches allow for flexibility, if they meet MDCM's standards and provide adequate data. For consistency and transparency at the national level, project participants applying Approach 1 and Approach 2 are recommended to implement Photo Point Monitoring (PPM). This method provides visual evidence of rangeland conditions and validates SOC change calculations.

Furthermore, when using IPCC default factors (Approach 3) to estimate SOC changes, it is crucial to provide evidence of rangeland condition has improved or deteriorated. This ensures the appropriate selection of management (F_{MG}) and input (F_I) factors under the IPCC guidelines. In cases where direct SOC data is unavailable, IPCC default factors offer a standardized method for estimating SOC changes, which can be applied using the following equations:

$$SOC_0 = \sum(SOC_{REF} \times F_{LU} \times F_{MG} \times F_I) \qquad \text{(Equation 1)}$$

$$SOC_t = \sum(SOC_{REF} \times F_{LU} \times F_{MG} \times F_I) \qquad \text{(Equation 2)}$$

Where:

SOC_{REF} = reference soil organic carbon stock for mineral soils [tC ha^{-1} in 0-30 cm depth] (IPCC 2019 Table 2.3)
F_{LU} = land use factor in stratum y [dimensionless]
F_{MG} = management regime factor before project starts in stratum y [dimensionless]
F_I = input of organic amendment factor before project starts in stratum y [dimensionless]

The key challenge in applying **Approach 3** lies in selecting the appropriate **management (FMG)** and **input (FI)** factors from IPCC 2019 Guidelines Tables 2.3 and 6.2. These factors depend on proving whether rangeland conditions have improved or worsened, which is essential for accurate SOC change estimation.

To validate SOC changes and provide evidence of rangeland condition changes, the following key monitoring systems[21] are employed:

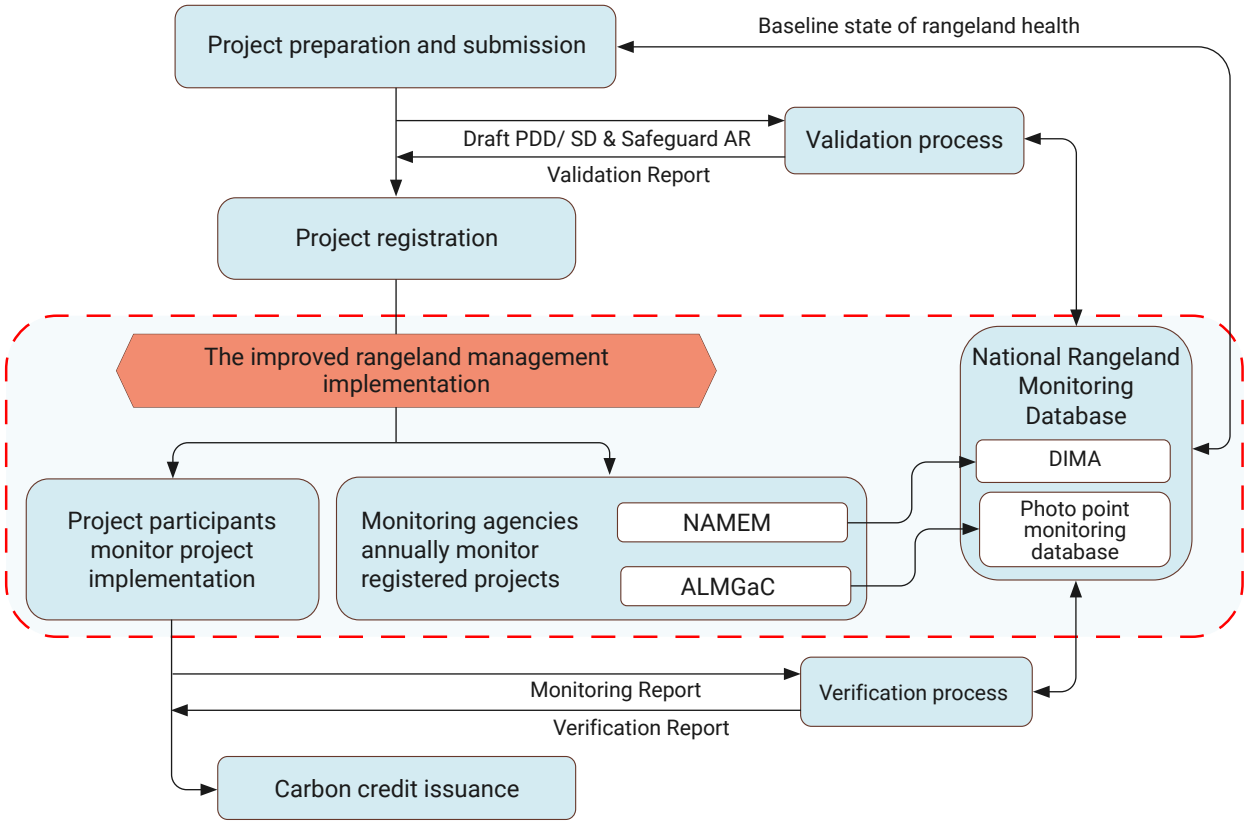
1. **Photo Point Monitoring (PPM):** Implemented by ALMGaC, PPM visually tracks changes in rangeland conditions, such as vegetation cover and plant dynamics. This method provides clear evidence of how grazing management affects rangeland health. PPM is closely linked with State and Transition Models (STMs) and Ecological Site Descriptions (ESDs), which classify rangelands by their ecological state. These tools, developed under the Green Gold Project, funded by the Swiss Agency for Development and Cooperation, have been adopted by Mongolia's national monitoring system, with the Mongolian Federation of Pasture User Groups (MFPUG) playing a central role in their development and national adoption.
2. **National rangeland assessment by NAMEM:** NAMEM conducts long-term monitoring across 1,600 sites, providing essential data on vegetation trends, ground cover, and overall rangeland health. This data is crucial for selecting appropriate management and input factors for SOC estimation.

[21] The State and Transition Models (STMs), Ecological Site Descriptions (ESDs), and the National Rangeland Monitoring System are broadly explained in Section 3.3 of this report

Additional monitored parameters

While SOC is the primary parameter for sequestration projects, other important factors, such as livestock numbers, household income, and other socioeconomic indicators, are monitored to evaluate the broader impacts of rangeland management activities.

FIGURE 6-5 Monitoring process for MDCM carbon sequestration projects



Financial contributions to monitoring systems: Although the monitoring networks of NAMEM and ALMGaC are state-financed, project participants may contribute financially to enhance the capacity and quality of these national systems, further improving monitoring efficiency.

Integration with ongoing research: As of October 2024, MFPUG is conducting research to link SOC data with ESDs under the STM framework. This research will allow project developers to apply more precise, locally derived SOC reference values, reducing reliance on IPCC default factors. The future integration of this research will significantly improve the accuracy of SOC estimates in Mongolia's rangelands.

Ensuring transparency and accuracy: By combining data from these monitoring tools—PPM, NAMEM's national rangeland assessment, and future SOC research from MFPUG—the MDCM ensures that SOC change calculations are based on robust, scientifically validated data. These monitoring activities provide transparency and accuracy at the national level, ensuring that MDCM projects are implemented as planned, with accurate reporting and adherence to environmental and project-specific standards. They also facilitate continual improvement and accountability, helping to address issues effectively and promptly.

6.9 Validation and verification

8.1 Validation

Validation is a systematic, independent, and documented process designed to evaluate a GHG assertion within a GHG project plan and the GHG calculations in the PDD. This evaluation is conducted against the agreed MDCM project validation criteria and conforms to ISO 14064-3 standards. The process ensures that the project design and proposed methodologies align with the standards and expectations of the MDCM.

- **Validation body:** The process is performed by a VVB, which is an independent entity registered with the CMO.
- **Outcome:** Upon completion of the validation process, the VVB issues a validation report. This report certifies that the GHG emission reduction project meets all the necessary MDCM project registration criteria established by the CMO.

8.2 Verification

Verification, like validation, is a systematic, independent, and documented process. It focuses on evaluating GHG assertions in the GHG Monitoring Report against agreed verification criteria. This process also adheres to the ISO 14064-3 standards and is essential for ensuring the credibility and accuracy of the reported GHG emission reductions.

- **Verification body:** The verification process is also conducted by a VVB, which is responsible for assessing the data and calculations provided in the GHG Monitoring Report.
- **Outcome:** After the verification process, the VVB issues a verification report. This report certifies the amount of GHG emission reductions, ensuring they meet the carbon credits certification criteria as set by the CMO.

8.3 Access to procedures

The detailed procedures for both validation and verification are outlined in the "Manual for MDCM Validation & Verification." This manual, which needs to be developed by the CMO, provides comprehensive guidelines and protocols for conducting validation and verification processes. It can be downloaded from the CMO's official website.

6.10 Renewal of crediting period

The crediting period defines the duration over which a project can generate and claim carbon credits. This period varies depending on the methodology and project type. For soil carbon sequestration projects under the MDCM method, the crediting period must be at least 5 years (TBD) and can extend up to a maximum of 20 years (TBD). This extended period ensures the long-term sustainability and permanence of carbon sequestration efforts.

Renewal of crediting period

Project participants can request the renewal of the crediting period for registered MDCM projects. The request must be submitted at least XXXX (TBD) days before the current crediting period's expiration date.

The following steps are involved in the renewal process:

1. **Recalculation of GHG emission reductions:**

   The expected amount of GHG emission reductions, as stated in the registered PDD, must be recalculated using the latest version of the applied methodology. This ensures that the projections reflect the actual situation at the time of renewal.

2. **Validation of revised PDD:**

   The revised PDD must be validated by a VVB to confirm the accuracy and compliance of the updated information.

The specific terms and conditions for renewal, including the duration of each renewal and the total allowable duration, are subject to further specification and will be defined according to the MDCM guidelines. The number of years and the number of times that the project is eligible for renewable classified by project type as shown in the Table 6-3.

TABLE 6-3 Renewal of crediting period

Project type	Renewal of Crediting period		Duration of the frame-work (years)
	Number of years	Number of times	
Improved rangeland management projects	5 (TBD)	2 (TBD)	20 (TBD)

6.11 Changes to registered project

After a project has been registered under the MDCM, any changes to the details of the activities described in the PDD must be communicated to the CMO prior to submitting a request for carbon credits issuance. Changes are categorized into two main types:

6.11.1 General changes

General changes refer to modifications that do not impact the amount of GHG emission reductions. These include:

- **Change in project participant:** Alterations to the individuals or entities participating in the project.
- **Change in project owner:** Transfers of ownership or shifts in the responsible entity.
- **Change in project coordinator:** Updates to the person or group coordinating project activities.
- **Change in crediting period:** Adjustments to the crediting period are allowed; however, the crediting start date must not exceed XXXX (TBD) years from the day following the project registration date.

6.11.2 Changes requiring revalidation

Changes that significantly affect the GHG emission reductions require revalidation. These changes include:

- **Addition of project activity/methodology:** Introducing new activities or methodologies that were not originally included in the PDD.

- **Increase in GHG emission reductions:** If the increase in the amount of GHG emission reductions exceeds XXXX (TBD) tCO_2 eq/y or if there is an increase of more than XXXX % (TBD) compared to the expected reductions stated in the registered PDD.

Project participants must document all changes in the GHG monitoring report, allowing a VVB to assess the modifications. Evidence supporting the changes must be provided to both the VVB and the CMO.

6.11.3 Revalidation process

If a registered project requires revalidation, the project participants must revise the PDD to reflect actual implementation. The revised PDD must then be validated by a VVB according to the procedures outlined in the 'Manual for MDCM Validation & Verification,' which is to be developed by the CMO.

- **Submission for revalidation:** Project participants must submit a request for registration following the process detailed in Figure 6-4. This includes downloading and completing the Post-Registration Changes Request Form, available on the CMO's website (needs to be developed).

6.11.4 Request for deviation

In cases where the implementation of project activities deviates from what is stated in the PDD, the project participants must notify the CMO and obtain approval before the completion of verification. Such deviations may include:

1. **Change in the value of a non-monitored parameter:** Adjustments to values that are not directly monitored but are used in calculations;
2. **Change in the monitoring method:** Modifications to the methodologies used for monitoring project activities;
3. **Change in the equations used in calculations:** Updates to the equations applied in GHG calculations;
4. **Change in the constant value used in calculations:** Revisions to constant values used within the project's calculations.

Project participants are required to report these deviations to ensure continued compliance with MDCM standards and to maintain the integrity and accuracy of the project's GHG emission reduction claims.

6.12 Carbon credits exchange

Project participants or those interested in exchanging carbon credits from MDCM projects must conduct transactions through the National Carbon Market Registry System. The exchange of carbon credits can be managed by the account holder or, alternatively, the account holder can authorize the CMO to handle transactions on their behalf. The steps for carbon credits exchange are as follows:

1. **Informing CMO:** The user authorized by the account holder must inform the CMO of the name, account number of the account holder intending to purchase, and the amount of carbon credit.
2. **Document review:** The CMO reviews the accuracy and completeness of the submitted documents.
3. **Transfer or retirement of credits:** Upon successful document verification, the CMO transfers the carbon credits to the users or retires the credits for offsetting purposes.

6.12.1 Procedures for opening an account in the registry

Before engaging in carbon credits exchange within the registry, project participants or those wishing to exchange credits must open an account with the CMO. The account opening process includes submitting specific documents depending on the entity type:

For individuals (this list needs to be proposed by the CMO and approved by the NCC)

1. Letter requesting to open an account specifying the user's email address
2. A copy of the ID card or passport

For juristic persons (this list needs to be proposed by the CMO and approved by the NCC)

1. Letter requesting to open an account specifying the user's email address
2. Copy of ID card or passport of the authorized person.
3. Copy of ID card or passport of the attorney.
4. Work certificate issued by the company

In the case of a government agency, government organization, state enterprise or state agency (this list needs to be proposed by the CMO and approved by the NCC)

1. Letter requesting to open an account specifying the user's email address
2. Name, address and copy of an act or relevant evidence demonstrating the establishment of the agency.
3. Power of Attorney (System user)
4. Copy of the ID card or passport of authorized person.
5. Copy of the ID card or passport of attorney.

Note: In cases where an individual, juristic person, or government entity wishes to authorize a CMO administrative officer to perform transactions in the registry system, a letter of intent must be submitted to the CMO.

The CMO will review the request and the submitted evidence for account opening, notifying the users of the results within 15 working days.

6.12.2 Procedures for carbon credit exchange

The procedures for exchanging carbon credits in the National Carbon Market Registry System are as follows (Figure 6-6), assuming both buyer and seller agree to trade credits through the CMO registry:

Document preparation: Project participants or their consultants prepare all necessary documentation for the carbon credits exchange;

Request for transfer: Formal request to transfer carbon credits from the seller to the buyer;

Invoice: Detailing the transaction between project participants (sellers) and buyers;

Letter of Intent (if needed): Required if a Trading Certificate is needed, often for tax deduction purposes;

Proof of payment: Evidence of payment, such as a bank receipt or transaction confirmation.

Submission to CMO: Submit the prepared documents to the CMO for processing.

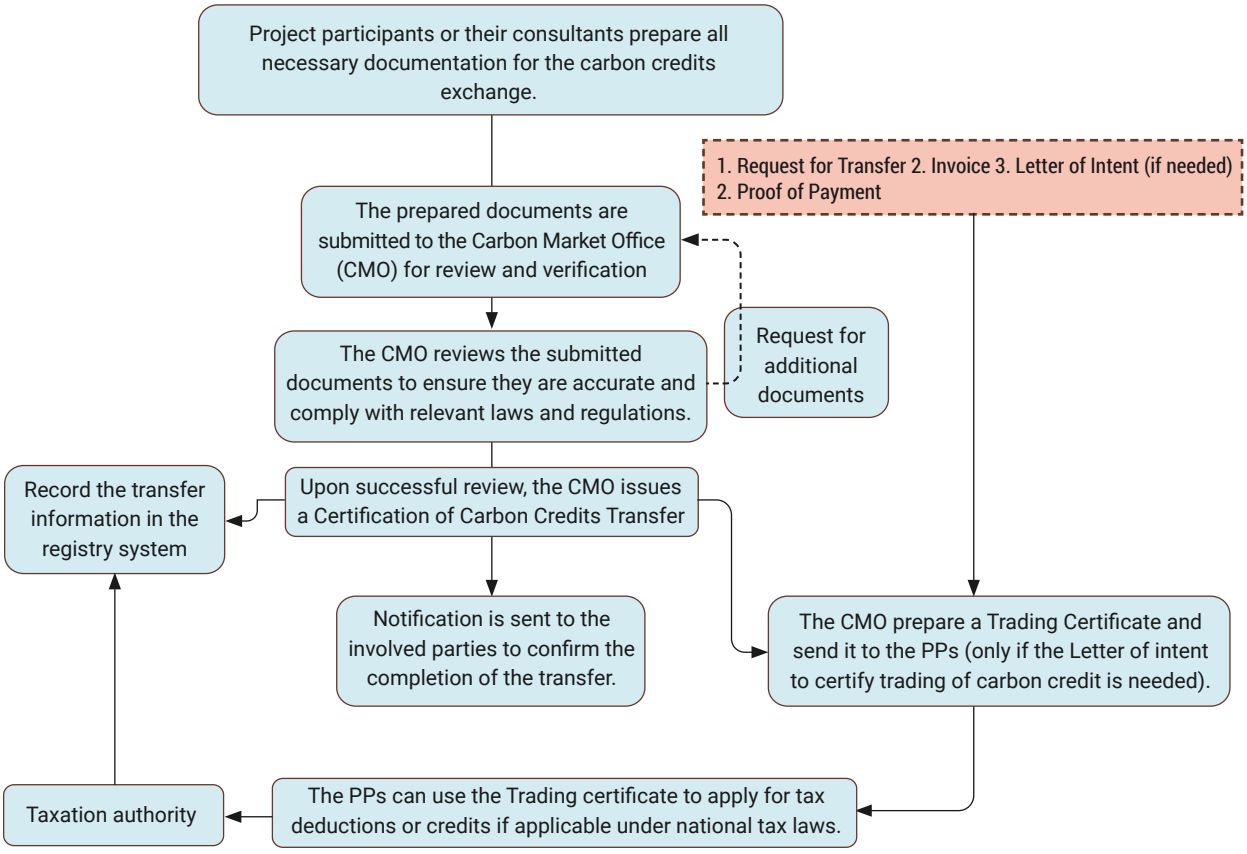
CMO review: The CMO reviews the documents for accuracy and compliance with laws and regulations, aiming to complete this review within XXXX (TBD) working days.

Certification and notification: Upon successful review, the CMO issues a Certification of Carbon Credits Transfer and notifies the project participants or their consultants.

Final steps: The Trading Certificate is issued, which can be used for tax deductions. The entire process, from document submission to the issuance of the Trading Certificate, is designed to be completed within XXXX (TBD) working days, depending on the project's specifics.

This structured process ensures a transparent, efficient, and legally compliant exchange of carbon credits, supporting the development and recognition of carbon reduction projects in Mongolia.

FIGURE 6-6 **The procedures for exchanging carbon credits**



6.13 Channels for documents submission to Carbon Market Office (CMO)

Requests and documents could be submitted to CMO through 3 channels as follows:

1. By electronic mail
2. Via online system through the website
3. By post

6.14 Review of this guideline

This MDCM scheme guideline can be reviewed at any time to improve the rules, methodology, specifications and efficacy in line with the current situation.

6.15 Elements in general methodology

The methodology outlines the framework for quantifying changes in GHG emissions and SOC stocks through the adoption of resilience-based rangeland management practices. It includes key elements such as defining the scope and structure, project and spatial boundaries, and specific monitoring and sampling protocols. The methodology addresses issues like double counting, project buffering, and leakage. It also includes approaches for emission reduction quantification and ensures the monitoring of parameters to validate project outcomes. The development of specific activity modules under this general methodology is also necessary, although not within the scope of this consultancy.

MDCM general methodology should be structured as follows:

1. Methodologies scope and structure
2. Definitions
3. Applicability
4. Project intervention boundaries
5. Spatial boundaries/Land management plan/Stratification
6. Temporal boundaries
7. Carbon pools/Greenhouse gases/ GWP
8. Double counting and benefit overlap
9. Project buffer
10. Emission reduction quantification approaches
11. Uncertainty
12. Leakage
13. Monitoring
14. Monitoring parameters
15. Eligible soil sampling protocols

The activity modules under this general methodology also need to be developed.

7. CONCLUSION

Mongolia's Domestic Carbon Market (MDCM) offers a vital opportunity to leverage rangeland carbon sequestration for both national climate goals and international carbon market participation. By aligning the MDCM with global standards, exploring collaborations per Article 6 of the Paris Agreement, and building strong institutional frameworks, Mongolia can create a transparent, credible system for carbon credit generation and trading. Through strategic investments in Monitoring, Reporting and Verification (MRV) systems, stakeholder engagement, and financial mechanisms, the MDCM can support sustainable rangeland management, enhance livelihoods, and position Mongolia as a proactive player in the global climate agenda. Strengthening capacity at the national level will be key to unlocking the full potential of the MDCM and ensuring long-term success in meeting both domestic and international climate commitments.

8. POLICY RECOMMENDATIONS

Comprehensive legal framework for carbon market activities

1. Develop a comprehensive legal framework to support the development and operation of its carbon crediting and marketing mechanism. This could involve updating or harmonizing existing laws and policies, such as the Law on Air and the Climate Change Law (under development), ensuring alignment with Mongolia's NDC, National Adaptation Plan, and Vision 2050.
2. The legal framework should clearly define carbon credit ownership and transfer rules, ensuring clarity for all stakeholders.
3. Establish enforcement and dispute resolution mechanisms to ensure compliance and resolve conflicts, strengthening Mongolia's legal foundation for carbon markets.

Strengthen institutional capacity and coordination

1. Establish a Carbon Market Office (CMO) ideally under the Ministry of Environment and Climate Change to manage MDCM operations. Clear roles and responsibilities should be defined for the CMO as a secretariat.
2. It is also important to define the roles and responsibilities of the National Climate Committee (NCC) for implementing high-level oversight, the subcommittees responsible for overseeing the project registration and carbon credit issuance process, and the technical advisory groups tasked with developing and approving methodologies, tools, and emission factors for calculating project results and greenhouse gas emissions and sequestration.
3. Additionally, designating Validation and Verification Bodies (VVBs) and monitoring organizations is crucial to ensure all carbon projects meet established standards, enhancing transparency and accountability in the carbon market.

Comprehensive documentation, registry, and communication systems

1. Develop clear guidelines, online forms and a detailed methodology framework to standardize carbon market activities, including project registration, MRV compliance, GHG emission reduction quantification, and carbon credit issuance.

2. Accessible documentation is essential to ensure transparency and encourage participation from all stakeholders.
3. Establish a national carbon market registry system within the CMO would enable tracking of all credits, registrations, and transactions, providing verifiable records for national and international reporting, including to the UNFCCC.
4. Finally, creating a public communication channel would foster stakeholder engagement, promote transparency, and build trust in the carbon market system.

Monitoring, Reporting, and Verification (MRV) systems

1. Upgrade national MRV systems to comply with the requirements of the PA and international carbon market standards, ensuring accurate monitoring of emissions reductions and carbon credits.
2. Strengthen national and local monitoring networks, such as NAMEM and ALMGaC, to enhance grassland condition tracking and support carbon accounting efforts.
3. Leverage cost-effective MRV technologies, such as remote sensing and field surveys, to make monitoring more efficient and accessible, particularly in remote areas like rangelands.
4. Support the involvement of NGOs and the private sector by providing training and resources to help increase capacity and foster a diverse pool of qualified actors for monitoring and verification processes.

Strengthen SOC measurement capacity and research

1. Enhance capacity to measure Soil Organic Carbon (SOC) by addressing gaps in human resources and technical capabilities. This will improve the accuracy of carbon sequestration assessments in rangelands.
2. Support research on the sequestration potential of rangelands and the effectiveness of various land management practices to contribute to better carbon accounting and policy development.
3. Promote technological innovation, such as remote sensing and GIS, to further enhance monitoring and verification processes.
4. Encourage gender-focused research on roles and challenges in rangeland management to ensure equitable participation and benefit-sharing in carbon market activities.
5. Collaboration with research institutes will be essential in driving these efforts forward.

Develop financial mechanisms and incentives

1. Create a voluntary carbon pricing system to incentivize emissions reductions and establish a foundation for more formal mechanisms like an ETS or carbon tax.
2. Establish a reward system based on the accuracy of carbon credit and soil organic carbon assessment and calculation methodology.
3. Expand green finance initiatives, including loans and grants, to support sustainable investments. Strengthen the National Green Taxonomy to provide clear guidelines for sustainable projects, encouraging investments that generate carbon credits or reduce emissions.
4. Public-private partnerships (PPP) can mobilize funding for key projects, while gender-specific financial products can help address barriers faced by women in carbon market participation.

Strengthen stakeholder engagement and capacity building

1. Actively engage herder communities, the private sector, and government agencies in MDCM planning to ensure equitable distribution of carbon market benefits. Develop gender-responsive strategies to promote women's equal participation in decision-making and capacity-building.
2. Outreach campaigns should raise awareness of carbon markets and sustainable land management.
3. Provide training to key actors, such as government officials and local authorities, in areas like MRV and carbon accounting will build capacity.
4. Finally, integrating gender perspectives and ensuring gender-specific indicators in MDCM activities will promote inclusive participation and equitable outcomes.

Strategic international cooperation

1. **Bilateral and multilateral engagement:** Strengthen Mongolia's engagement in international climate initiatives to gain access to technical assistance, funding, and global carbon markets. Collaboration with donor organizations and countries can provide the expertise and resources.
2. **Align with global standards:** Ensure that the MDCM aligns with global standards such as the IPCC, the Gold Standard and Verified Carbon Standard and relevant ISO standards.
3. **Article 6 collaboration:** Mongolia could explore collaborations under Article 6 of the Paris Agreement, focusing on Internationally Transferable Mitigation Outcomes (ITMOs) to enable carbon credit trading while safeguarding national climate goals. By defining the credits contributing to Mongolia's NDC and those eligible for international trading through the Carbon Market Participation Strategy, the country can ensure transparency and compliance with international standards.

9. REFERENCES

1. Action Plan of the Mongolian Agenda for Sustainable Livestock, 2019
2. Asian Development Bank, Thematic assessment (summary): Climate Change (2023)
3. Batjes, N. H. (1996). Total carbon and nitrogen in the soils of the world. European Journal of Soil Science, 47, 151–163. https://bsssjournals.onlinelibrary.wiley.com/doi/10.1111/j.1365-2389.1996.tb01386.x
4. Boston Consulting Group https://www.bcg.com/publications/2023/why-the-voluntary-carbon-market-is-thriving
5. Bulgamaa Densambuu, Tuvshintogtokh Indree, Ankhtsetseg Battur, and Sumjidmaa Sainnemech (2018), State and Transition Models of Mongolian Rangelands
6. Chang, X., Bao, X., Wang, S., Wilkes, A., Erdenetsetseg, B., Baival, B., Avaadorj, D. O., Maisaikhan, T., & Damdinsuren, B. (2015). Simulating effects of grazing on soil organic carbon stocks in Mongolian grasslands. Agriculture, Ecosystems and Environment, 212, 278–284. https://doi.org/10.1016/j.agee.2015.07.014
7. Conant RT, Paustian K. Spatial variability of soil organic carbon in grasslands: implications for detecting change at different scales. Environ Pollut. 2002; 116:S127–S135. doi:10.1016/S0269-7491(01)00265-2.
8. Ebert, C., Gorguinpour, K., Osman, S., Raven, H., Remucal, J., Wescott, S., Zavariz, B., Allen, J., Goodson, T. C., Lp, R., Chambers, A., Cox, D., Christian, O., Shell, D., Dubuisson, M., Gehrig-Fasel, J., Haugen-Kozyra, K., Newcombe, K., Ramlow, M., … Campbell, N. (2022). Soil Enrichment Protocol Reducing emissions and enhancing soil carbon sequestration on agricultural lands Acknowledgements Reserve staff (alphabetical) Financial and Technical Support.
9. Ecosystem Marketplace and Bain websites
10. FAO. (2019a). Measuring and modelling soil carbon stocks and stock changes in livestock production systems: Guidelines for assessment (Version 1). In Livestock environmental assessment and performance (LEAP) partnership. Rome, Italy: FAO. 170 pp. Licence: CC BY-NC-SA 3.0 IGO.
11. Food Revolution National Movement of Mongolia, 2023
12. Fourth National Communication of Mongolia (2024)
13. Fuss, S., Lamb, W. F., Callaghan, M. W., Hilaire, J., Creutzig, F., Amann, T., … Minx, J. C. (2018). Negative emissions – Part 2: Costs, potential and side effects. Environmental Research Letters, 13, 063002. https:// doi.org/10.1088/1748-9326/aabf9fSmith, 2016; Smith et al., 2008
14. Global Soil Organic Carbon Sequestration Potential Map – GSOCseq v.1.1. (2022). In Global Soil Organic Carbon Sequestration Potential Map – GSOCseq v.1.1. FAO. https://doi.org/10.4060/cb9002en
15. Global soil organic carbon sequestration potential map (GSOCseq v1.1) - Technical manual. (2022). In Global soil organic carbon sequestration potential map (GSOCseq v1.1) - Technical manual. FAO. https://doi.org/10.4060/cb2642en
16. GOLD STANDARD FOR THE GLOBAL GOALS Soil Organic Carbon Framework Methodology. (2020). https://www.goldstandard.org

17. Government of Japan - https://www.jcm.go.jp/mn-jp, Secretariat of the Joint Credit Mechanism between Mongolia and Japan

18. https://boomitra.com/

19. https://icapcarbonaction.com/en

20. https://nori.com/modeling-soil-carbon

21. https://verra.org/; VCS - Verra

22. https://www.cleanenergyregulator.gov.au/ERF

23. https://www.fao.org/global-soil-partnership/resources/highlights/detail/en/c/1680243/

24. https://www.planvivo.org/pastures-conservation-climate-action

25. https://www.regen.network/

26. Kalpana Pudasaini, John Rolfe, Thakur Bhattarai & Kerry Walsh (2024) Comparison of major carbon offset standards for soil carbon projects in Australian grazing lands, Carbon Management, 15:1, 2298725, DOI: 10.1080/17583004.2023.2298725

27. Lal, R., Smith, P., Jungkunst, H., Mitsch, W., Lehmann, J., Nair, P. K., … Ravindranath, N. H. (2018). The carbon sequestration potential of terrestrial ecosystems. Journal of Soil and Water Conservation, 73, 145A–152A. https://doi.org/10.2489/jswc.73.6.145A The carbon sequestration potential of terrestrial ecosystems (jswconline.org)

28. Law on Livestock Tax, 2021

29. Law on Reducing the Negative Effects of Climate Change on Traditional Animal Husbandry, 2024

30. Law on the Legal Status of the United Federation of Pastoral Households, 2024

31. Ministry of Environment and Tourism of Mongolia, 2023; Mongolian Forestry Society, 2022

32. Mongolia's Updated Nationally Determined Contribution (NDC) was approved by the Government Decree No.407 of November 2019

33. National GHG Inventory, (2023), Climate Change Research and Cooperation Center

34. National report on the rangeland health of Mongolia (2018), (2020)

35. Paustian, K., Collier, S., Baldock, J., Burgess, R., Creque, J., DeLonge, M., Dungait, J., Ellert, B., Frank, S., Goddard, T., Govaerts, B., Grundy, M., Henning, M., Izaurralde, R. C., Madaras, M., McConkey, B., Porzig, E., Rice, C., Searle, R., … Jahn, M. (2019). Quantifying carbon for agricultural soil management: from the current status toward a global soil information system. In Carbon Management (Vol. 10, Issue 6, pp. 567–587). Taylor and Francis Ltd. https://doi.org/10.1080/17583004.2019.1633231

36. Ruddiman, W. F. (2005). Plows, plagues and petroleum: How humans took control of climate (Vol. 240). Princeton, NJ: Princeton University Press.

37. Sanderman, J., Hengl, T., & Fiske, G. J. (2017). Soil carbon debt of 12,000 years of human land use. Proceedings of the National Academy of Sciences of the United States of America, 114, 9575–9580. Soil carbon debt of 12,000 years of human land use | PNAS

38. Smith, P. (2012). Soils and climate change. Current Opinion in Environmental Sustainability, 4, 539–544. https://doi.org/10.1016/ j.cosust.2012.06.005 Soils and climate change - ScienceDirect

39. Smith, P., Soussana, J. F., Angers, D., Schipper, L., Chenu, C., Rasse, D. P., Batjes, N. H., van Egmond, F., McNeill, S., Kuhnert, M., Arias-Navarro, C., Olesen, J. E., Chirinda, N., Fornara, D., Wollenberg, E., Álvaro-Fuentes, J., Sanz-Cobena, A., & Klumpp, K. (2020). How to measure, report and verify soil carbon change to realize the potential of soil carbon sequestration for atmospheric greenhouse gas removal. In Global Change Biology (Vol. 26, Issue 1, pp. 219–241). Blackwell Publishing Ltd. https://doi.org/10.1111/gcb.14815

40. UNDP's High-Integrity Carbon Markets Initiative, 2023

41. UNFCCC, CDM website:https://cdm.unfccc.int/jsearch.HTML/

42. Vision-2050 Mongolia's long-term development policy, 2020

43. Website of National federation of pasture user groups of herders - http://en.greenmongolia.mn/post/132995

44. Website of National Statistical Office - https://www.nso.mn/en/statistic/statcate/48171307/table-view/DT_NSO_1001_022V1

45. World Bank (2024) State and Trends of Carbon Pricing

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DISCLAIMER

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SCALA responds to the urgent need for increased action to cope with climate change impacts in the agriculture and land use sectors. The twenty million euro programme will support at least twelve countries in Africa, Asia and Latin America to build adaptive capacity and to implement low emission priorities.

Country support includes strengthening policies, adopting innovative approaches to climate change adaptation, and removing barriers related to information gaps, governance, finance, gender mainstreaming and integrated monitoring and reporting. To achieve this shift, the programme will engage the private sector and key national institutions.

SCALA supports countries to develop the capacity to own and lead the process to meet targets set out in their National Adaptation Plans and Nationally Determined Contributions under the Paris Agreement, and to achieve the Sustainable Development Goals. The SCALA initiative builds on another FAO-UNDP led programme, Integrating Agriculture in National Adaptation Plans (2015-2020) which is currently phasing out.

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www.fao.org/in-action/scala/en

United Nations Development Programme
www.adaptation-undp.org/scala

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