Terrestrial natural capital restoration to achieve SDGs: Pilot land accounts and sustainable pasture management in Kyrgyzstan

"Natural capital is essential for Kyrgyzstan to achieve the SDGs. This is why the project is so relevant for our country," said Akmyrzaev Kubanychbek Urmatbekovich, First Deputy Chairman of the country's National Statistical Committee.

For Kyrgyzstan, a landlocked country in Central Asia, land is an essential part of its national economy. However, overgrazing and unsustainable land management are contributing to the degradation of Kyrgyzstan's pasturelands. This degradation has come at a significant cost of around $600 million, or 16 per cent of the country's Gross Domestic Product (GDP). In an effort to reverse this trend, the government has committed to a set of land degradation neutrality targets and to make green agriculture one of the key priorities of its National Green Economy Programme.

To meet these targets, a pilot project was designed to help decision-makers assess the condition of pastures and the benefits of restoration initiatives, with the goal of eventually integrating the true value of land assets into the national accounting system. The aim of the project was to demonstrate how applying a natural capital approach – using geospatial data and assessing economic aspects of land use – can foster the adoption of sustainable land management practices and support the national green economy process.

With support from the Green Growth Knowledge Partnership (GGKP), the Economics Land Degradation (ELD) Initiative and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), this project used a range of scientific methods and tools – such as natural capital accounting, remote sensing and cost-benefit analysis – to better understand the current state and economic potential of land assets for a

green economy as well as to achieve the UN Sustainable Development Goals (SDGs).

The joint project carried out by the National Statistical Committee, the American University of Central Asia (AUCA), the State Agency for Land Resources (SALR) and the Society of Soil Scientists of Kyrgyzstan, consists of 4 components:

1) Piloting Land Accounts in Kyrgyzstan.
NSC specialists made a first attempt to apply natural capital accounting to land resources, and to pilot land accounts at the national level.

2) Geo-portal of the information system of land accounts.
SALR specialists applied Geographic Information System (GIS) and remote sensing (RS) methods to develop a geospatial portal. This allows for data on land resources to be geo referenced and displayed on new maps. Additionally, AUCA specialists applied GIS and RS methods to analyse the processes of degradation of pasture ecosystems at the local level.

3) Creation and test of National Soil Information System (NSIS) in pilot territories.
The Society of Soil Scientists of Kyrgyzstan tested the creation of the National Soil Information System (NSIS) in two pilot territories.

4) Applying the ELD 6+1 step approach to improve pasture management in the Suusamyr Valley.
The ELD approach shows the economic component of land management scenarios and ascribes an economic value to the problem of land degradation. In this project, AUCA applied the ELD methodology to analyse the costs and benefits of sustainable pasture management in the Suusamyr Valley.

Achieving green growth through terrestrial natural capital restoration in India, Kyrgyzstan and Rwanda

Given the critical role that natural capital and ecosystem services play in maintaining biodiversity, enabling green growth, and achieving the SDGs, the Green Growth Knowledge Partnership (GGKP) and the Economics of Land Degradation (ELD) Initiative joined forces. Together with institutions and local experts, new methods for achieving the SDGs through terrestrial natural capital restoration were developed and applied. Country studies in India, Kyrgyzstan and Rwanda demonstrate how restoring terrestrial natural capital can create co-benefits in social and human capital that go hand in hand to achieve several SDG targets.

1 Piloting land accounts in Kyrgyzstan

Accounting for land assets is important for showing the crucial contribution and role of land in the socio-economic development of a country. Land accounts involve keeping regular records of land assets, their changes and condition in accordance with the international standard "System of Environmental Economic Accounting (SEEA)". They are useful for showing the "big picture" by mapping social, environmental and economic information at the national level. This information can then support decision-makers to develop effective tools for managing the country's natural resources.

SEEA defines land as unique environmental asset that delineates the space in which economic activities and environmental processes take place and within which environmental assets and economic assets are located.

Land accounts help countries addressing challenges such as food security, water security and climate change; and enables countries to monitor and report progress towards achieving targets set at the national and global level. Thus, by creating land accounts, a country can keep track of progress under several SDGs, such as SDG 1 "Eradicate poverty", SDG 2 "Eradicate hunger", as well as on Land Degradation Neutrality under SDG 15 "Protect and restore terrestrial ecosystems and promote their rational use, sustainable forest management, combating desertification, halting and reversing land degradation and halting biodiversity loss".

According to Kyrgyzstan's State Registration Service, as of 2019, the land area of Kyrgyzstan was 199,900 square kilometres (km). The distance from east to west is about 900 km, and 410 km from north to south. More than 41 per cent of this land area is reserve lands (usually used for livestock grazing), 33.8 per cent is agricultural land, and 12.7 per cent is forest land.[1] Agriculture is a priority area for Kyrgyzstan's development, and land resources are the most important food production assets, both for personal consumption and for income generation. Over 60 per cent of the population of Kyrgyzstan lives in rural areas. The poverty level in rural areas is higher than in urban areas, and rural inhabitants directly depend on agricultural production. Moreover, the agriculture sector accounts for approximately 12 per cent of the country's GDP.[2]

In order to actively participate in, and comply with, the international goals and processes adopted by Kyrgyzstan (SDGs , UN Convention to Combat Desertification, Convention on Biological Diversity, Aichi Biodiversity Targets, etc.) and national priorities (National Development Strategy of the Kyrgyz Republic until 2040, Green Economy Program, etc.), it is necessary to keep accounts of land resources and their conditions on regular basis. Highlighting the role our land plays conservation of biological diversity and life-sustaining activities of human beings, including socio-economic development and food security.

SEEA, which was adopted by the UN Statistical Commission in 2012, is an international statistical standard for environmental economic accounts. It is used to demonstrate the interaction between the economy and the environment and to describe changes in the stock

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1+2 *Data of the National Statistical Committee of the Kyrgyz Republic, www.stat.kg.*

of environmental assets. The standard recommends developing land accounts in physical and monetary terms. It classifies three types of land assets for land accounting: land cover, land use and land ownership.

To ensure comparability and to obtain "an overall picture" of the land assets and their use, this study applied the SEEA land accounting principles in Kyrgyzstan. The advantage of these principles is their ability to show the various types of land cover and land use at the beginning and end of the reporting period. It also shows the changes that occurred, as well as the reasons for the changes (natural expansion or reduction, managed expansion or reduction).

To date, Kyrgyzstan has kept regular records of available land resources by using the state statistical reporting form #22 "On the availability of land in the Kyrgyz Republic and their distribution by categories, owners, land users, and lands" (Land balance. Form #22).

Unfortunately, Land Balance #22 does not show the reasons for land-use changes, despite having all the necessary data. Additionally, it is not digitized and automated.

As a first step in this study, the Kyrgyz national land-use classification was combined with the SEEA-supported international land use classification.

The study made attempts to develop land assets accounts by types of land cover in physical terms. The analysis of the data revealed having no data in Kyrgyzstan for making such accounts. At the same time, there is a potential for obtaining geo-spatial data to be used for land accounting.

Thus, the national classification was adapted in line with the international one by taking into account the applicability of land cover types:

The successful experience of piloting land accounts in Kyrgyzstan demonstrated possibility to develop accounts for physical land. However, data availability is key, which is a bottleneck in the country. Geo-spatial data is needed for updating land accounts. Therefore, need to track geo-spatial data regularly and to make it accessible. On top of that satellite images is not enough to understand underlying causes, therefore field visits are needed. Field visits can provide a high level of clarity and explain reasons for changes in land cover.

FIGURE 1

Combination of the Kyrgyz national land use classification with the SEEA-supported international land use classification.
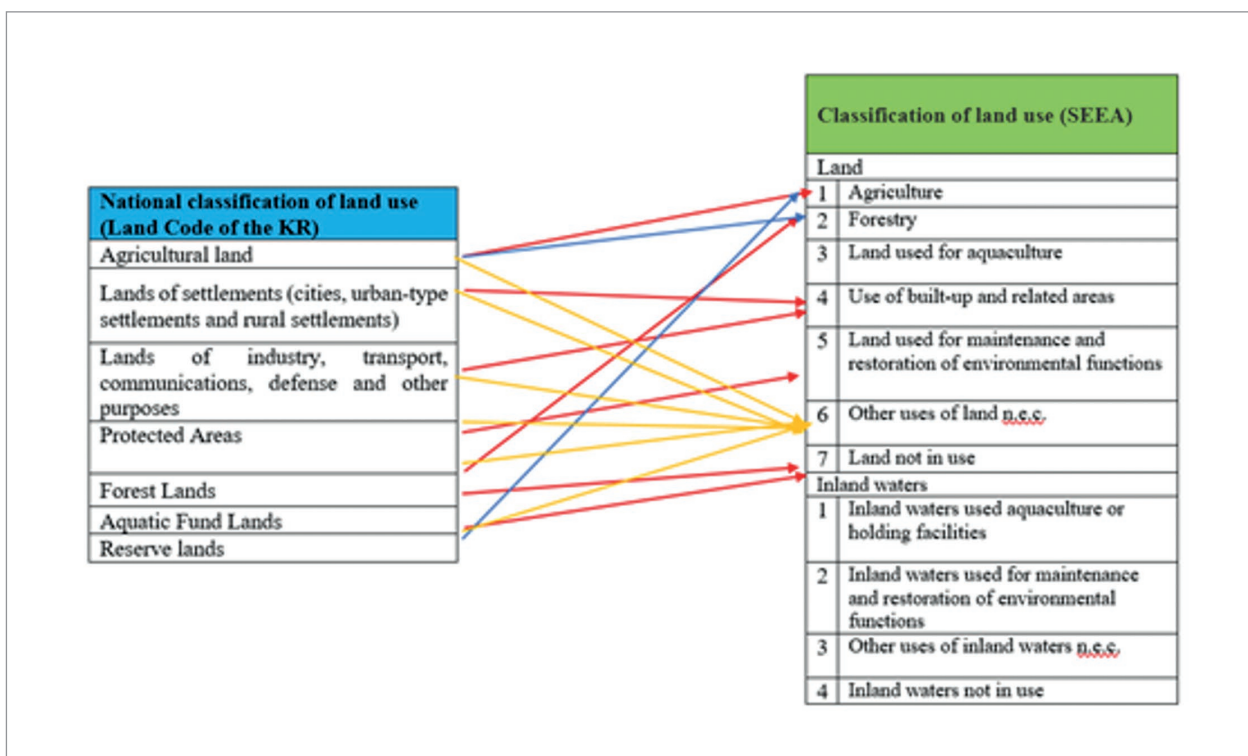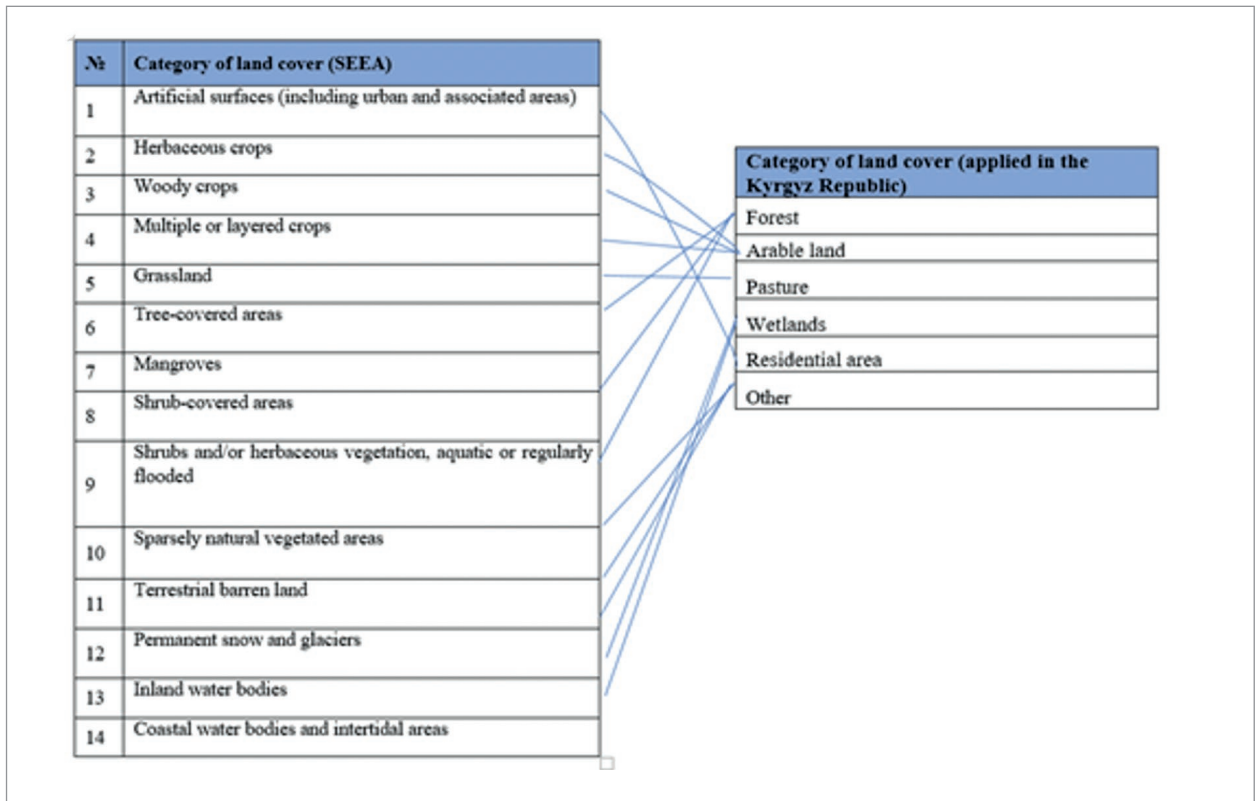
FIGURE 2

Combination of the Kyrgyz national land cover classification with the SEEA-supported international land cover classification

№	Category of land cover (SEEA)
1	Artificial surfaces (including urban and associated areas)
2	Herbaceous crops
3	Woody crops
4	Multiple or layered crops
5	Grassland
6	Tree-covered areas
7	Mangroves
8	Shrub-covered areas
9	Shrubs and/or herbaceous vegetation, aquatic or regularly flooded
10	Sparsely natural vegetated areas
11	Terrestrial barren land
12	Permanent snow and glaciers
13	Inland water bodies
14	Coastal water bodies and intertidal areas

Category of land cover (applied in the Kyrgyz Republic)
Forest
Arable land
Pasture
Wetlands
Residential area
Other

In addition, to maintain a regular inventory of greenhouse gases under the Paris Agreement and to introduce land accounts, it is necessary to develop a harmonized land classification by land cover and land use. This will help to avoid duplication and to create a sustainable approach in improving decision-making processes within the country, as well as to use international reporting on climate change, SDGs, etc.

It is necessary to transfer the collection of information to an automated and digitized process, as well as to start using new methods of data collection, namely satellite images.

To ensure regular accounting, it is necessary to develop formal mechanisms for the exchange of information and data and to identify key data providers.

Capacity building of the key stakeholders involved in the accounts developing process plays an important role in introducing regular and correct accounting in accordance with international standards.

2 Geo-portal of the land accounts information system

The first component of the pilot land accounts revealed that data is key to developing and monitoring physical land accounts. In order to meet this need, the second and third components of the project involved the creation of a data platform - a geoportal.

The data and the possibility of data exchange between different departments was pre-analysed. The Land Accounts Information System (Geoportal) was developed to accurately identify and collect the geospatial information needed for the pilot land accounts and the ELD study on pasture degradation *www.geohub.kg*

Geoportal is a fully functioning geo-information system, which is designed to automatically store, process, and provide spatial information and statistical data to all interested parties. It is intended to improve decision-making processes on land management.

FIGURE 3

Geoportal Interface
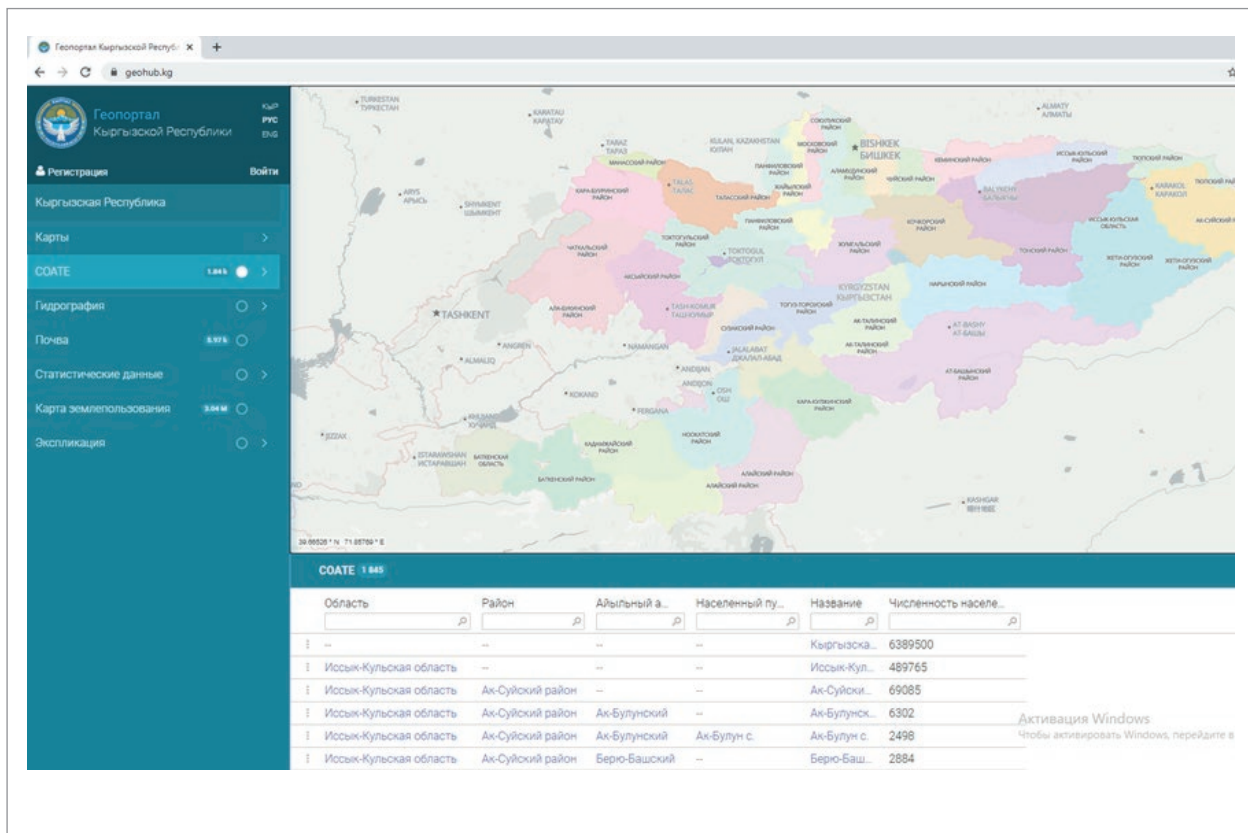
The objectives of Geoportal are to map or provide access to maps which show:

▌ land cover

▌ land balance

▌ statistical data

▌ administrative territorial border

▌ soil data

It is intended for government bodies, ministries, and departments, legal entities and individuals, interested users and information providers.

The main advantages of Geoportal are:

1. Access to data on administrative borders and land plots, land cover, soil conditions, statistics (population, livestock and vegetation) and more;

2. Access to up-to-date spatial and statistical data;

3. Mobility of access to geo-spatial data;

4. Availability of a basic cartographic base with the scale 1: 500000;

5. Providing supplementary information of interested organizations to cartographic services;

6. Regular update of geo-spatial data;

7. Access to the web resource 24 hours a day, 7 days a week;

8. Accessibility in any internet browser;

9. Access to attribute information for the objects of interest on the map;

10. Analytical tools, such as charts and graphs;

11. Map navigation; and

12. Spatial framework for all national administrative data and policies, land administration, conservation policy, and land tenure.

Cartographic layers
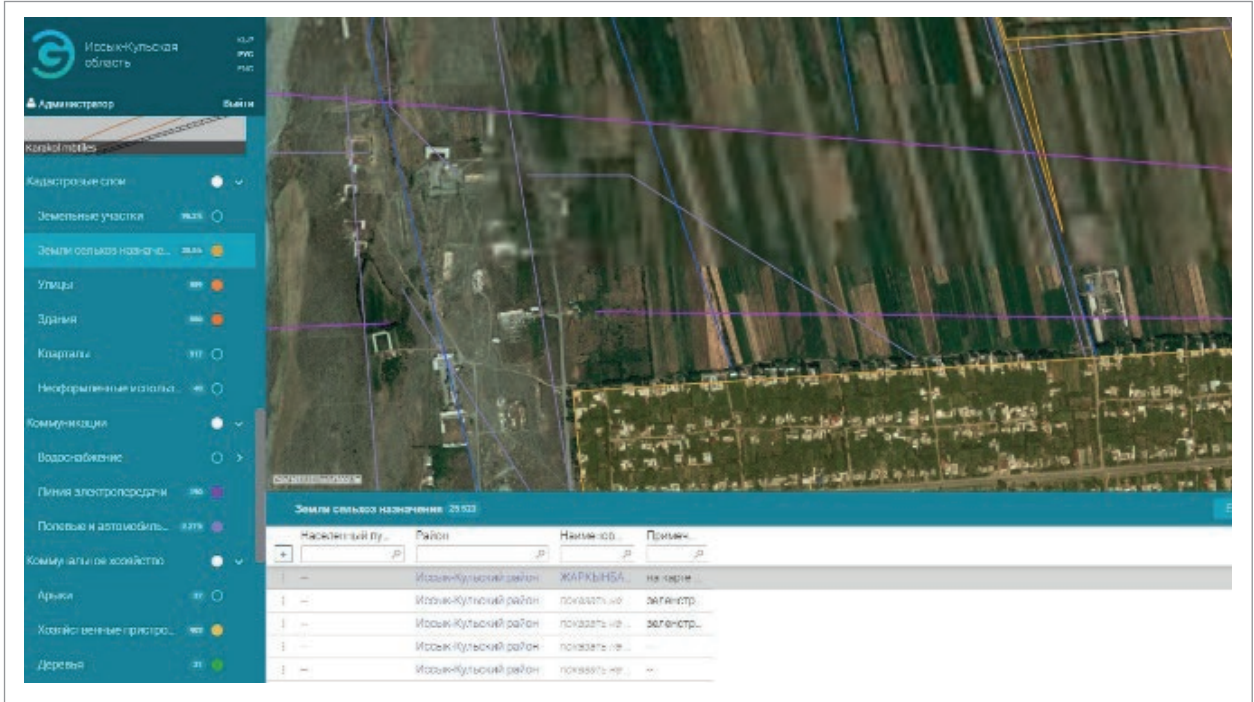
Recommendations

Based on the pilot version of the Geoportal, this study provides the following recommendations for advancing digital databases:

It is recommended that digital database projects begin with:

- the collection of national reports on all types of data (land records, land inventory data, geo-botany data, soil data, etc.),

- available practices applied in national land and water resources, and

- information on the land degradation condition in the country.

Data must be collected (and created) in the form of digital databases. This data will create preliminary rules for stratification and provide an opportunity to identify "hot spots" and "light spots". They will help to create an initial understanding of the conditions, causes and impact of land degradation in the country.

It is recommended that a National Expert Working Group is established to facilitate dialogue among all stakeholders and to further develop a programme of measures on the prevention of land degradation. In addition, to ensure regular accounting, it is necessary to develop formal mechanisms for the exchange of information and data, as well as to identify key providers of data.

Inventory and data collection is necessary to obtain comprehensive biophysical, technical and socio economic data, and to aggregate the relevant data on land degradation.

To identify stratified data on land degradation in Kyrgyzstan, it is necessary to create a number of systems, such as:

- An automated land accounting system, which in turn will include a comprehensive land inventory created on the basis of GIS and land cover;

- A system for accounting land degradation in all categories;

- A system for matching national indicators with international indicators;

FIGURE 5

Statistical information
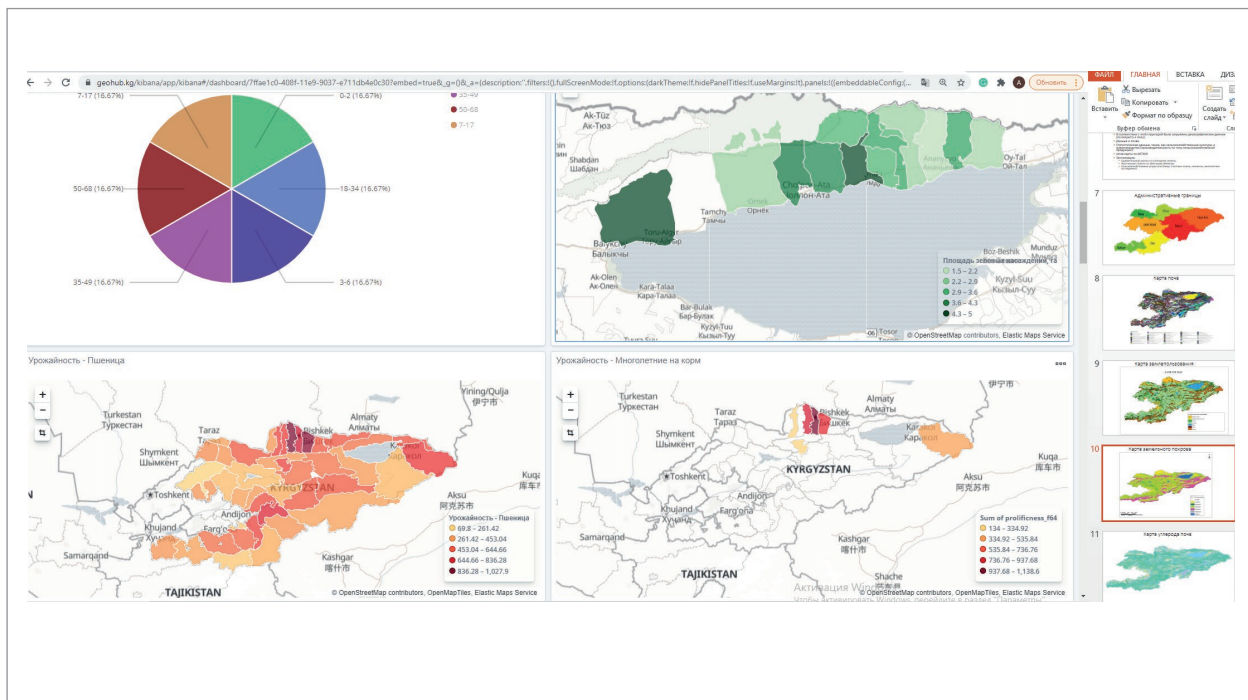
■ A system of interrelations between these systems for making various data analyses;

■ An automated accounting system which assesses the quality and carbon content in soil (absorption and emissions); and

■ An automated system of statistical data, creating data exchange between the systems.

In addition to these systems, it is necessary to develop long-term strategies, including both monitoring tools and processes (roles of relevant line ministries and departments) for data collection and assessment of the impact of land degradation and response activities.

3 National Soil Information System. Accounting of soil resources and study of the soil resources conditions in the pilot territories

In addition to the data collection work, the National Soil Information System (NSIS) was tested in two administrative districts (rayons): the Ak-Suu Aiyl Aimak (AA) of the Moscow rayon and the Kyzyl-Oktyabr AA of the Kemin rayon.

According to the 2015 inventory, the total area of the Ak-Suu AA is 34,088 ha, and according to the 2018 inventory, the total area of the Kyzyl-Oktyabr AA is 31,672 ha.

A comparative analysis of the land area and the reasons for the changes showed that the changes occurred on all land plots.

The interval between the inventory of 1994 and 2015/2018 is more than 20 years. Significant changes happened during this period, which created difficulties when conducting a comprehensive analysis of each hectare of land (see Table 1).

The analysis shows that the change in land categories is not associated with soil fertility changes, but rather with the following factors:

- Social: Transformation of arable land to backyard plots.

- Economic: Construction of agricultural buildings (wintering grounds, sheds, etc.), use of perennial plantations for arable land; temporary use of arable land previously irrigated by pumping stations as fallow land.

- Geographical: Use of fertile pasture land with optimal terrain (the determining factor) and the best herbage for hayfields.

The exception is arable lands used as fallow lands that have fertility below average and soil with moderate to high rock content. The soil properties of these lands were determined by field soil surveys

without making soil tests. Thus, an increase or decrease in the humus content without carrying out appropriate reclamation work on clearing rocks will not give the expected results.

Having analysed the data on the two pilot AAs, we can conclude that five land cover categories are similar in the two pilot territories: arable land, fallow land, hayfields, pastures, and others. Three categories have distinctive characteristics: perennial plantations, forest belts, and forests (Ak-Suu AA) forest belts, forests, and shrubs and other land (backyard land, swamps, under water, roads, stock driving roads, buildings, streets, etc.) (for Kyzyl-Oktyabr AA).

The soil type differs depending on the land categories. For example, there were no fallow lands in two territories at the beginning of the reporting period, but due to the lack of irrigation water and rocky soil, they started to be used as fallow lands. The fallow land is an example of secondary (recovery) succession. Organic matter accumulates on the fallow lands, sod layer is formed, and the soil becomes denser and more structured.

The arable land area in the Ak-Suu Ayil Aimak has decreased as it is used as fallow land due to the lack of irrigation water and the stony soil. Other areas have

TABLE 1

Comparative analysis of the land use and causes of changes in Ak-Suu Ayil Aimak

No.	Land category	Area, ha		Change	Notes
		According to the land inventory data of 1994	According to the land inventory data of 2015		
1	Arable land	5 542	5 457	- 85	1. They are used as fallow land, due to the unavailability of irrigation water, and partly because of stony soils. 2. Transformed to the category of settlements to be used for construction of residential buildings.
2	Perennial plantations	778	499	- 279	They are used as arable land, fallow land and pastures.
3	Fallow land	0	195	+ 195	Increased due to arable land resulting from the unavailability of irrigation water, and partly because of stony soils.
4	Hayfields	576	611	+ 35	Increased due to the grazing land and better herbage.
5	Pastures	9 733	9 714	- 59	Decreased due to: 1. Use for hayfields. 2. Construction of individual residential and other buildings.
6	Forest belts, forests and shrubs	1 676	1 666	- 10	Decreased due to the use as arable land, and construction of individual residential and other buildings.
7	Other lands (household lands, garden plots, swamps, under water, roads, passes, buildings/ constructions, streets, etc.)	15 743	15 946	+ 203	Increased due to: construction of buildings for agricultural purposes and transformation into household lands
	Total lands of village administration within the administrative boundaries of the district	34 088	34 088	-	-

FIGURE 6

Collection of data for NSIS
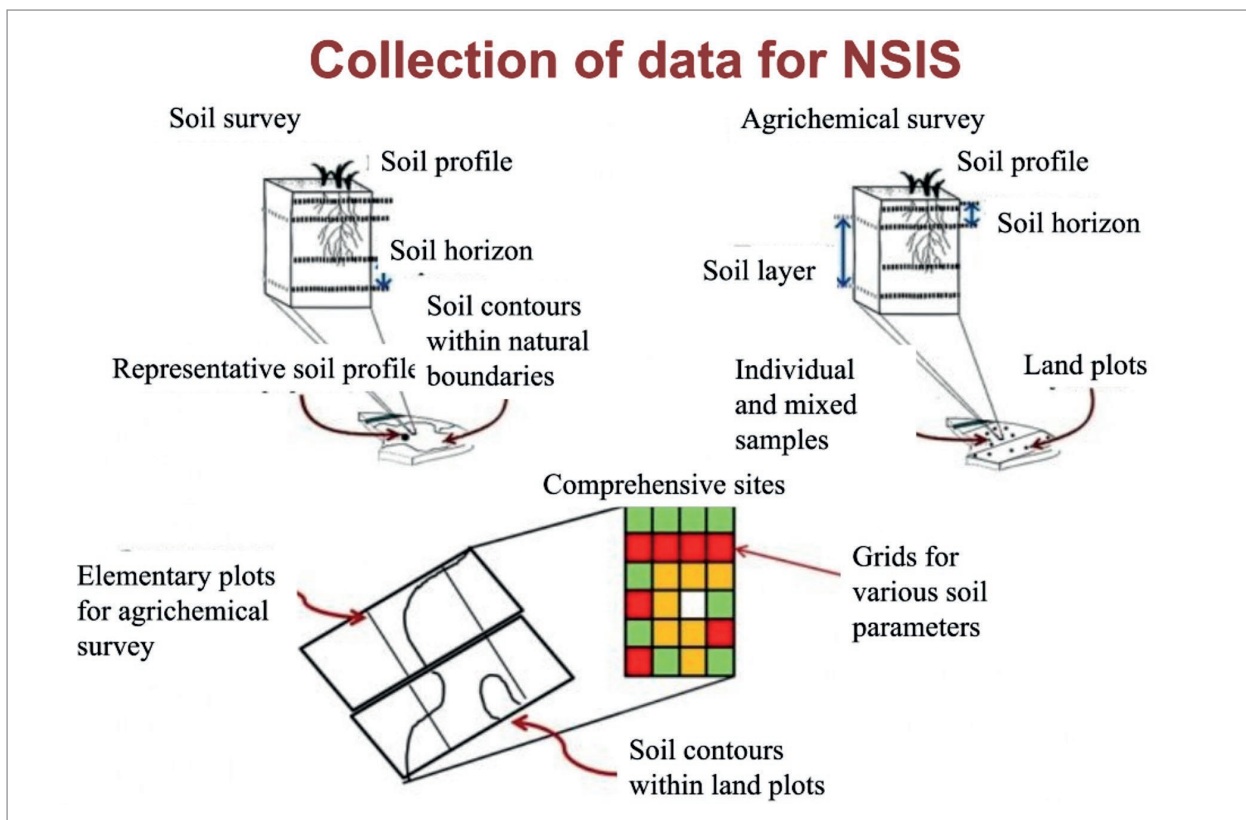
been transformed into backyard land. Decision-makers need to analyse irrigation systems and the factors relating to the availability which resulted in the non-use of these areas. If it is a deliberate application of the fallow farming system, then part of the arable land in the steppe areas was periodically left under the fallow. This method helped to restore the soil fertility and to control weeds. However, it is indicated the presence of stony soil, which means that large stones, small stones, and gravel provide drainage, retain heat, which is an advantage in terms of physical properties. Such type of soil has one problem – the lack of useful microelements. This, however, can be resolved by light or heavy fertilizer.

The Kyzyl-Oktyabr Ayil Aimak has seen an increase in pasture land due to the transfer of pasture lands from another AA. At the same time, there has been a reduction in forest belts and forests due to urbanisation. These reasons are more related to administrative decisions, as well as increases in population.

Data collection involves the active participation of land users. These actors can contribute to the collection of data, and use the feedback function for any questions they may have.

Recommendations

The pilot phase in two rayons demonstrated the usefulness of soil information and how it can help the National Statistical Committee and other agencies to monitor soil and land data.

It is therefore recommended that Kyrgyzstan establish a National Soil Information System (NSIS), so as to:

▌ Ensure the preservation of soil fertility in the country;

▌ Promote "digitalization" and "digital data management" of land at the national level.

▌ Enable Kyrgyzstan's active participation in international sustainable development programs, for example by improving the country's monitoring and reporting capacity on SDGs in order to "…strive to achieve a land degradation–neutral world" (SDG 15.3).

4 Application of the ELD approach to improve pasture management in the Suusamyr Valley, Kyrgyzstan

The Suusamyr Valley is the largest summer pasture with an approximate area of 478,000 ha. It is used for cattle grazing, and has great significance for animal husbandry as it attracts thousands of shepherds from the neighboring regions every year. There is a growing threat in this area, however, from the uncontrolled spread of shrubs, in particular the Caragana species (Caragana aurantiaca Koehne). This plant is a challenge because livestock cannot graze on areas covered by it, and its strong root system and ability to regenerate rapidly means that it spread very quickly. Unfortunately, attempts to stop its spread have been unsuccessful. Further expansion of Caragana has the potential to significantly reduce the grazing area, and in turn, the value of pasture lands.

The loss of pasture productivity in Kyrgyzstan is a threat to the social and economic well-being of the population in rural areas, where animal husbandry is the main source of income.

Mountain pastures are vulnerable to a number of natural hazards, such as climate change, landslides, mudflows, the spread of weeds, etc. Additionally, rapidly growing livestock populations put additional pressure on the pastures. Therefore, there is an urguent need for research to assess the current processes of pasture degradation in order to make informed decisions on sustainable pasture management.

Methodology of the study in Suusamyr Valley

This study applied the ELD 6+1 step approach to assess the current state of land degradation in the Suusamyr Valley.

The study used:

- Geospatial information such as satellite data and the Normalied Difference Vegetation Index (NDVI);

- Scenario development based on land degradation patterns, pressures and trends; and

- Cost-benefit analysis of different land-use scenarios to demonstrate options for sustainable pasture management and to support better informed decision-making.

Results

It is noteworthy that, despite the increasing pressure on the Suusamyr pastures due to the increase in livestock, geospatial analysis showed a gradual positive increase in the NDVI over the past 10 years with the stable NDVI values in the range of 0.83 to 0.84 over the past five years.

Economics of pasture management and land degradation in Kyrgyzstan

Pastures occupy about 45 per cent of the territory and play a key role in the well-being of the rural population. These communities make up about 65 per cent of the total population. According to experts, about 70 per cent of pastures are degraded to varying degrees. This has serious economic consequences for pasture users and rural communities.

A decline in NDVI values was revealed for 2001, 2006-2007 and 2012-2013 with the NDVI_MIN for the period 2001-0.72. During this period, the NDVI averaged about 0.79, indicating healthy vegetation and biomass productivity. Over an 18-year period, the NDVI shows an overall positive trend, which may also be representative for shrub growth.

FIGURE 7

Photo of the Caragana thicket in the Suusamyr, taken by drone during the AUCA field trip, resolution 5 cm, author of the photo - Elizaveta Khazieva

Satellite images confirmed different land cover types in the Suusamyr Valley, and showed that the bush-covered area is increasing. According to this study's estimates, in the period between 2000 and 2018, the shrub area increased by 72 per cent, or 9,802 hectares. Another estimate, based on the Google Earth Engine, gives a nearly 38 per cent increase in the total shrub area and an increase of 37,919 ha in the period from 2000 to 2019. These trends are consistent with the results of interviews with pasture users. The local pastoralists called the spread of Caragana as the most serious problem of land degradation in the

FIGURE 8

Land use benefits in the basic scenario

Suusamyr Valley. A majority of cattle breeders in thea area indicated a significant increase in shrub areas in recent years.

The following scenarios were used for the cost-benefit analysis:

1. The "Business as Usual" scenario, which does not involve any changes in land use. The main trends include: (a) an increase in livestock numbers; (b) further degradation of pastures; and (c) no investment in SLM.

2. The scenario involving land use practices which reduce grazing pressure on pastures, as well as limited investment in SLM. The main trends include: a) reduction in livestock number due to the increased livestock productivity and improved awareness of pasture degradation; b) average investment in pasture improvement and management; c) stopping the pasture degradation and increasing pasture productivity; and d) increase of livestock productivity by 5 per cent in value terms due to the improved pasture quality.

3. The optimal development scenario, which involves large investments to control Caragana and other weeds, the introduction of measures to stop pasture degradation, and a significant increase in

livestock productivity by improving pasture conditions and livestock production. Key trends in this scenario include: a) the biggest investment in pasture improvement and management; b) stopping pasture degradation and increasing pasture productivity; c) pasture productivity is improving faster than in Scenario 2 due to better land management; and d) favorable climatic conditions.

The cost-benefit analysis shows that pastures create significant economic value for pasture users by providing various ecosystem services and the basis for their economic activities. The greatest benefit of pasture is carbon sequestration. Since there are no markets in the country to reduce carbon emissions, this analysis focused on estimating the cost of other types of pasture use. The highest value of pastures is production of meat and fodder. However, the current trends suggest that the value of pastures is likely to decline in the future unless investments in pasture restoration are made, and more sustainable pasture management and animal husbandry practices are applied.

Land-use benefits from investing in sustainable land use
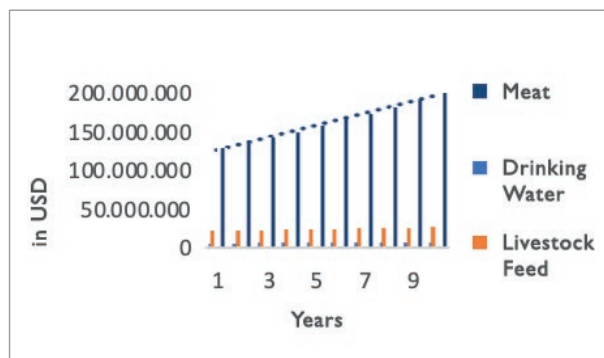
These sustainable land management measures may even increase the economic value of pastures and benefit pasture users and pasture-dependent populations.

A comparison of different scenarios shows that the current approach to pasture management leads to significant economic losses and threatens the sustainability of local communities in the long term. Investments in pasture improvement are necessary to generate economic benefits in the medium term.

However, to have an optimal economic impact, investments in pastures must be accompanied by an awareness of the risks of overgrazing by local and external pasture users, and must be combined with more reliable methods of livestock raising (with fewer but more productive animals). These recommendations are well aligned with the national objectives of LDN, in particular target (1) improvement of pasture conditions and target (3) SLM practices.

Conclusions and recommendations

1. This study revealed the great concern within the Suusamyr population about the uncontrolled spread of Caragana. In this regard, the relevant state authorities are recommended to take these issues into account when planning their activities in the Suusamyr Valley. The further spread of this shrub could lead to serious economic and environmental problems in the Suusamyr Valley.

2. There should be increased awareness for the public about the rules and regulations regarding the cutting and use of Caragana, as the majority of local communities are scared to get fines for the use and slashing of Caragana.

3. Caragana has its own intrinsic place in the ecosystem, so when addressing the Caragana problem in the Suusamyr Valley, it is necessary to take into account the special ecological value of Caragana. Policy-makers should strive to apply softer approaches in inhibiting the growth of shrubs, taking into account the interests of local communities and ecosystems.

4. The results of the study conducted by using the 6+1 ELD methodology show that investments in the sustainable pasture management in the Suusamyr Valley have a medium and long-term reasonability.

5. Analyse regulatory enactments to achieve more balanced and environmentally friendly management of pastures, without causing damage to fragile mountain ecosystems.

In summary, it is recommended that there is an investigation into the ecological value of the Caragana shrub, as well as development of softer approaches in inhibiting the growth of the shrub. Future studies should include collaboration with the local administration and pasture users to develop a comprehensive vision of the problems and develop

effective and environmentally friendly approaches in controlling Caragana and optimizing land use in the Suusamyr Valley.

Furthermore, similar studies should be conducted on other major pastures in Kyrgyzstan using modern remote sensing approaches to find out the actual trends in land degradation. Further application of the ELD 6+1 methodology is strongly recommended to make a more accurate economic analysis of the feasibility of medium and long-term initiatives on the use of land resources and SLM approaches.

Finally, the capacities of relevant agencies and organizations should be enhanced to enable them to apply modern approaches while collecting and analysing satellite data.

Synthesis

The four components of this study have contributed to demonstrating how a natural capital approach and other scientific assessments could be useful for stakeholders in adopting sustainable land use and management practices to achieve green growth.

The pilot land accounts experience demonstrated the country's capacity in developing physical land accounts and it also concluded that geospatial data needs to be regularly collected in order to utilize these accounts; with lack of data identified as the key challenge in developing monetary land accounts.

The second and third component of this project responded to this challenge by establishing two data platforms: a geographical data platform, or geoportal, for the land accounts information system; and a national soil information system, which tested soil resource account in two rural district plots. These online platforms help consolidate different types and formats of land and soil data and facilitate a nation-wide transition to digitization and digital data management of lands. This will eventually help Kyrgyzstan meet its international commitments under the United Nations Convention to Combat Desertification (UNCCD) and SDG 15, especially on target 15.3 on land degradation neutrality and target 15.9 on integration of nature's value.

The fourth components addressed pastureland restoration at the local scale –the Suusamyr Valley. Pastures are the most significant land resource in the country, covering more than 46 per cent of its territory. The remote sensing work showed that the invasion of non-edible weed species marked higher vegetation presence in the pastureland in the valley, while local communities perceive their pasturelands as being degraded. This was reconfirmed by a cost-benefit analysis on three different pasture management policy scenarios. The optimal pasture management scenario forecast that greater investments in weed removal would create greater benefits in the longer term. The results also showed that pastures generate significant economic value of ecosystem services in areas such as carbon sequestration.

Harmonizing scientific methods and adopting a participatory approach could help address the root causes of land degradation, and this could suggest appropriate policy options which could promote inclusive and green growth. These assessments also implied that the estimates generated from such an approach could contribute to the country's voluntary target of land degradation neutrality and also feed into further development of land accounts in the country.

A roadmap for developing a holistic set of land account needs to be established given the significant contribution of land to national economic growth, while more consistent knowledge management through established digital databases is essential. Stakeholders who joined the virtual workshop also agreed to recommendations made by the project team. This includes capacity building in key ministries and agencies, and resource mobilization and advocacy for a stronger interest on the land accounts. Adopting these recommendations are crucial for Kyrgyzstan to implement its green economy programme, as well as its commitment to land degradation neutrality, climate change, biodiversity conservation and the SDGs.

About ELD

The **Economics of Land Degradation (ELD) Initiative** aims to transform global understanding of the economic value of productive land, and to improve stakeholder awareness for socioeconomic arguments to improve sustainable land management, prevent the loss of natural capital, preserve ecosystem services, combat climate change, and address food, energy, and water security. ELD works at the science-policy interface, bringing a large global network of scientists, academics, business leaders, politicians, decision-makers and other relevant stakeholders together to identify solutions for sustainable land management. The Initiative is hosted by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) working on behalf of the German Federal Ministry for Economic Cooperation and Development.

For more information, see
www.eld-initiative.org

About the GGKP

The **Green Growth Knowledge Partnership (GGKP)** is a global network of organisations and experts that identifies and addresses major knowledge gaps in green growth theory and practice. Established in November 2017, the **GGKP Expert Group on Natural Capital** explores state-of-the-art methods, models, data and tools to achieve its three goals of pushing forward the knowledge frontier around natural capital and green growth; mainstreaming natural capital in global green growth activities; and supporting stronger implementation of natural capital commitments in national economic plans. The group is comprised of 26 experts from across GGKP's partner institutions, each with at least 10 years of experience working with natural capital.

For more information, see
www.greengrowthknowledge.org and
www.greengrowthknowledge.org/working-group/natural-capital