THE ECONOMICS OF LAND DEGRADATION

RESEARCH PROGRAM ON Dryland Systems

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Policy Brief

Turkmenistan Case Study Policy Brief

Rehabilitating pasturelands and undertaking sustainable land management in deserts across Turkmenistan brings both economic and environmental benefits

Political context

Independence from the former Soviet Union in 1991 presented the republics of Central Asia, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan, with severe challenges for land management with ensuing economic, social, and environmental crises. Driven by the historic development of irrigation projects, often unsupportable increases in livestock numbers on rangelands, and agricultural land conversion in steppe areas under communism, land degradation has become a serious issue in the region and threatens current and future livelihoods of rural populations. All countries have recognised this in the development of their National Action Plans for the United Nations Convention to Combat Desertification (UNCCD) and are currently developing their Nationally Determined Contributions for this and other UN conventions under the 2015 Sustainable Development Goals.

Land degradation in Central Asia

Although estimates vary and can be imprecise, land degradation is claimed to be quite extensive in Central Asia, ranging from 4-10 per cent of cropped land, 27-68 per cent of pasture land and 1-8 per cent of forested land. In total, this represents 40-66 per cent of area degraded in each country. While technologies exist to remedy this, there is a need to express the problem in terms of money, enabling governments to have common metrics. Decisions can factor in likely returns on investments for different options and sectors, both for future economic development and to safeguard and improve the livelihoods of their people.

The Economic of Land Degradation (ELD) Initiative is a global initiative that aims to support understanding of the economics of sustainable land management. Given the specific land degradation occurring in Central Asia, a regional project has been developed in 2015. This project estimates economic values of a range of sustainable land management approaches. It compares the overall value derived from existing land use with specific and feasible alternatives from each country, evaluating by including aspects beyond marketable provisioning services like food and timber. To achieve this, national scientists have been trained in new approaches to assess the value of land management options, making the project support capacity building towards the establishment of scientifically informed and locally adapted improved land management.

Photo: GIZ / Alona Reichmuth

Country summary: Turkmenistan

Turkmenistan is the second largest country in Central Asia, located in the south-west and covering 48.8 million hectares. It is mostly plains and valleys, with mountains only occurring around national boundaries. The climate is sharply continental, mostly arid with average annual temperatures from 11-15°C across the country. Temperatures can fluctuate dramatically and precipitation averages in the range 76 mm to 380 mm. Soils have low levels of soil organic matter, relatively poor and sparse vegetation cover and increasing groundwater salinity.

Per capita GDP has been steadily increasing, and in 2013 amounted to USD 18,596. This is partly due to a national emphasis on economic modernisation and diversification, with a combination of market elements and state regulation. The 'intellectual sphere' – education, science, health, culture, and social sector, and the development of fuel, energy, and agricultural industries have been the main priorities. In terms of agricultural activity, the production of animal husbandry products remains the dominant focus. More than 80 per cent (38 million hectares) of the land are pastures with year-round grazing by domesticated animals belonging to agricultural enterprises and households. As a result, livestock production is one of the major priorities of both the government and the people. According to FAO statistics, in 2008 there were 18 million heads of cattle.

Map of Turkmenistan. Source: Wikipedia

Challenges

The multifaceted impacts of human activities have had negative effects on the vegetation and value of Turkmenistan's desert pastures. Since the breakup of the Soviet Union in the early 1990s to the present time, the development of pastoral livestock production has mostly been characterised by the redistribution of property. No longer under the former pasture planning and management methods, such reallocation led to the loss of productive rotations for pastures. They remain a very fragile ecosystem, vulnerable to natural and anthropogenic drivers of degradation, the pastures of Turkmenistan now provide year-round, open-access grazing.

Excessive loads on pastures leads to over-grazing, which strips the land of its vegetative cover and results in erosion of topsoil. Currently, more than half of the desert pastures are affected by land degradation, reducing the availability of pasture. They are also threatened ecosystems: the share of pastures as a percentage of agricultural land across There is also near or complete destruction of trees and shrubs through deforestation, mechanised destruction during engineering and construction works, road paving and other construction activities that negatively impact the pasture ecosystems and lead to a loss of productivity and value. Turkmenistan decline by 1.6 per cent from 1992 to 2006. At the same time, the share of lamb and goat production, as a percentage of meat production is increasing from 35.7 per cent in 1992 to 47.9 per cent in 2013. This results in greater pressure on pastures to provide fodder, which they are increasingly unable to do.

Cattle grazing does not necessarily have to have a negative impact, but instead depends on how sustainably pastures are used. If there were moderate cattle grazing with an alternation or rotation of pasture sites, regrowth of vegetative would be possible. However, the current intensive and long-term grazing on pastures, especially in growing periods, inevitably leads to subsequent degradation of the pastures. This results in the loss of the most valuable fodder, as well as future growth, and negatively impacts both environmental and economic stability in Turkmenistan.

Key facts

More than half of the desert pastures in Turkmenistan are affected by land degradation, greatly reducing the availability of their resources. This undermines the natural provision of fodder, for which there is burgeoning demand with a growing livestock sector.

Land value could reach as high as USD 64 per hectare with cost-effective sustainable land management practice that include seasonal grazing, vegetative rehabilitation, and water systems for livestock. This would allow investments to be recovered in just three years. This is equal to a net present value of USD 440 million in the study sites after eight years of implementation.

Photo: GIZ / Alona Reichmuth

Research and findings

This study aimed to assess the change to and the current status of fodder productivity as an indicator of the degree of land degradation in the pastures of Turkmenistan, as well as conduct an economic analysis of the current scenario of land management practices, and evaluate alternative sustainable land management scenarios. Geo-botanical surveys and interviews with local residents were undertaken. Emphasis was given to desert pastures (sandy desert, gypsum desert, and clay desert) which make up 94 per cent of Turkmenistan's pastures. Gypsum deserts in particular, are susceptible to land degradation.

An economic evaluation of the value of pasture land under current degrading practices showed it to be about USD 35 per hectare. This included the market value of pasture forage, current value of livestock with year-round grazing, and commodity costs of livestock products (meat and wool). However, on-going losses of pasture productivity were estimated to be USD 0.6 million annually.

An alternative scenario is proposed and evaluated through a cost-benefit analysis. This includes the creation of artificially planted vegetation, which would raise productivity from 0.3 to 0.85 tonnes per hectare. It also involves the creation of furrows to capture surface water flow for vegetation, which could raise productivity to 0.6 tonnes per hectare, and establishing seasonal pastures (autumn-winter) to reduce pasture pressure.

In this scenario, after eight years of implementation, profits would begin to accrue, with a net present value of USD 440 million. The cost-benefit analysis shows that land value could be raised to USD 64 per hectare after eight years, bringing an additional USD 35 per hectare compared to the business-as-usual baseline. Thus, investing into affordable sustainable land management practices shows both economic and environmental benefits, through the provision of increased fodder to meet growing livestock demands, without degrading the land or reducing productivity.

Recommendations

The challenge of maintaining the natural balance and existing biodiversity alongside further development of livestock as well as desertification processes and climate change will require the accomplishment of the following interdependent and mutually complementary recommendations:

1. **Establish an organisational structure for pasture management at the national level, tasked with implementing the work necessary for sustainable land management in pastures.** This is necessary in developing a unified national system of accounting, monitoring and redistribution of pasture land between users on long-term lease conditions. This must be rooted in an understanding of what directly or indirectly leads to sustainable pasture use, including grazing techniques and standards, pasture rotation, etc.

2. **Conduct regular, comprehensive geo-botanical studies of rangelands every eight years.** This will allow for updated databases on the dynamics of fodder stocks and carrying capacities of the pastures, including data on water sources. This will require periodical cadastral evaluations.

3. **Provide rangelands with accessible, guaranteed water and fodder stocks to support the needs of herders and farmers** as they transition to sustainable land management practices. For water, this includes centralised provision of water, and the rehabilitation, reconstruction and maintenance of traditional water sources, including water wells and reservoirs. For fodder, this will require allocation and redistribution of resources in irrigated areas.

4. **Include dedicated sections on centralised water supplies for pastures and the allocation of irrigated areas for fodder production in state programs, for the development of agriculture.** An analysis of the legal and regulatory framework of land and water use, and formulation of recommendations for the legal support of these tasks will also be necessary.

5. **Develop a payment mechanism for pasture use** (direct natural-resource differentiated payment). It is important to identify the legal payment mechanism in terms of the amount (depending on pasture quality), which authorities can establish, for what, and where payments are directed and sent. This needs to be rooted in an economic analysis of the costs and benefits arising from ecosystem service use and alternative scenarios against currently degrading practices.

6. **Implement the recommended ecologically and economically viable alternatives to improve pasture productivity while maintaining the biodiversity of rangeland ecosystems**, including:
   - Improving sandy desert zone pastures through optimal year-round pastoral plant communities;
   - Establishing autumn-winter pastures through artificial sowing (mostly in gypsum desert zones and piedmont areas);
   - Improving productivity of saline rangelands in the clay desert zones, based on local surface water runoff from takyr soils;
   - Establishing saxaul forest plantations (mainly around desert settlements) that contribute to the regulation of microclimates.

Global links

Land degradation was recognised as an imminent threat to the livelihoods and wellbeing of the world's poorest people when the UN developed its Sustainable Development Goals in 2015. Secretary General Ban Ki-Moon stated that "land degradation and desertification undercut human rights, starting with the right to food, adding that nearly 1 billion people lack adequate nutrition and those living off degraded areas are among the most affected. Their situation could worsen if land degradation reduced global food production by 12 per cent as projected." The UNCCD has invited states "in accordance with their domestic legal and policy frameworks, to include provisions in their laws that facilitates the progressive realization of human rights such as the right to life, food and water in the context of combating desertification, land degradation and drought". Hence Goal 15 has been developed to *"protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss"*. A more specific target is 15.3 "by 2030 combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world".

The work undertaken in this project represent an input into the efforts to comply with Goal 15 and others linked to land (2, 3, 6, 7, 11, 12, and 13) by providing economic evidence on sustainable land management practices and alternative land uses that are needed as one of several inputs and preparatory activities to implement the concept of land degradation neutrality. It also provides tools, methods, and capacity building for economic evaluations to be undertaken in each country for each land cover and land use type, likely future requirements for land degradation neutrality.

This research has been undertaken by Murad Nepesov (Union of Economists of Turkmenistan) and Elmar Mamedov (NIDFF) with support from the ELD Initiative and CGIAR.

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