



Addressing Land Degradation in Central Asia: Challenges and Opportunities



Major Messages

- Land degradation is a major obstacle for sustainable development in Central Asia. The costs of land degradation are estimated to equal more than 6 bln USD annually in the region.
- Rangeland degradation, desertification, deforestation, abandonment of croplands, secondary salinization and soil erosion in croplands are the major types of land degradation in the region. Soil and land degradation in croplands over the last three decades is estimated to be presently decreasing annual agricultural profits in the region by about 27%.
- Major causes of land degradation in Central Asia are found to be lack of access to markets and credit, lack of extension, monoculture-cropping and insecure land tenure.
- Therefore, policy actions promoting sustainable land management in the region need to include measures to provide extended and enhanced access to extension and farmer advisory services, facilitate access to markets and credit, secure land tenure and provide opportunities for crop diversification.
- These policy actions will not only help in addressing land degradation, but also can serve as viable no-regret options for adapting to climate change in Central Asia.

Introduction

Land degradation is a major challenge for sustainable development and poverty reduction in Central Asia. Since agriculture is an important

source of rural incomes and employment in the region, declines in crop yields and livestock productivity due to land degradation have

substantial negative impacts on the livelihoods of rural agricultural households. For the same reason, land degradation may also have considerable indirect economy-wide impacts through labor and food markets. Moreover, despite a decade of strong economic growth, the problems of poverty and malnutrition are persisting in many parts of the region, especially in the rural areas. The rural poor households in Central Asia have a high dependence on agriculture for their incomes, thus, land degradation could also have undesirable distributional effects, hindering the ongoing efforts to reduce poverty and eradicate malnutrition. The national governments, research and civil society organizations are well aware of this challenge and are making significant efforts to address land degradation. However, in spite of these efforts, the extent of land degradation and its severity are continuing to increase across the region. Quite often, actions to combat land degradation in Central Asia focus on individual agronomic and infrastructural elements, while the effectiveness of sustainable land management (SLM) interventions could be enhanced by a combined implementation of agronomic, socio-economic, institutional and policy measures through mutually consistent SLM packages. Needless to say, these SLM interventions need to be guided by evidence-based solid science in their formulation.

The purpose of this policy brief is to contribute to this understanding by summarizing the latest research on economics of land degradation in Central Asia and highlighting the major research findings on the impacts

and causes of land degradation, as well as the drivers of sustainable land management and their potential impact pathways in the region.

Extent of Land Degradation in Central Asia

There have been many efforts for assessing the extent and severity of land degradation in Central Asia. According to these assessments, secondary salinization is the major land degradation problem in the irrigated areas in the region, covering an estimated 40% to 60% of these irrigated lands. The soil salinization is especially acute in the downstream areas: almost all irrigated areas in Turkmenistan, and the provinces of Uzbekistan and Kazakhstan bordering the former Aral Sea. Soil erosion by water is a key problem in irrigated sloping areas, rather than secondary salinization as in the irrigated areas located in the plains. The loss of soil fertility affects more than 11 million ha of rainfed lands in Kazakhstan, with losses of soil organic matter of as much as 40%. Finally, there is a well-established knowledge of extensive rangeland degradation mainly due to overgrazing and lack of herd mobility, especially near population settlements.

The latest research using remotely sensed satellite data shows that land degradation hotspots range between 10% of the total area in Turkmenistan and Uzbekistan to 60% of the total area in Kazakhstan (Figure 1). Cropland degradation is significant all across the region, ranging from roughly 20% of the total cropland in Kyrgyzstan to about 60% in Kazakhstan.

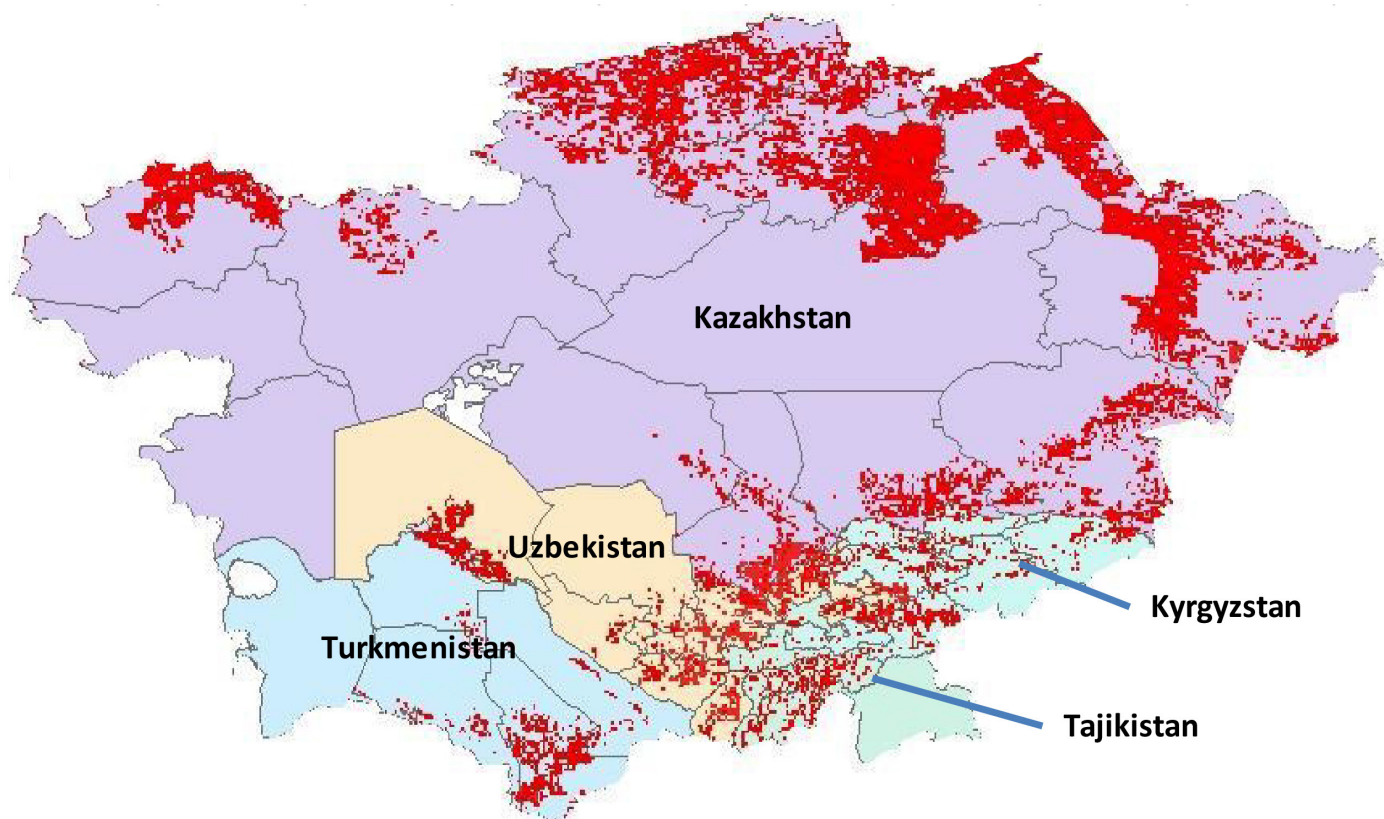


Figure 1. Land degradation hotspots in Central Asia (in red). **Source:** Mirzabaev et al. (2016), adapting from Le et al. (2016)

Causes of Land Degradation

The causes behind land degradation are numerous and complex. They include a variety of socio-economic, institutional and policy-driven factors. Numerous studies point at lack of access to markets and credit, lack of extension, monoculture-cropping, implicit subsidies for irrigation water use and insecure land tenure to be the major drivers of land degradation across the region.

More specifically, in irrigated areas of Central Asia, the main causes of soil salinization are excessive use of irrigation water and poor maintenance of irrigation and drainage infrastructure. Continued and often implicit subsidies for irrigation water and under-valuation of water, in general, create disincentives to save water. Input and output market institutions are often underdeveloped or lacking. The interaction of poverty and low access to credit markets often prevents farmers from investing in SLM technologies. Incomplete land reforms, resulting in continuing land tenure insecurity, are believed to be deterrents to SLM adoptions.



Cultivation of winter wheat using no-till in Karakalpakstan

In the rainfed areas of the region, soil erosion and fertility depletion are caused by (historical?) expansion of rainfed wheat production with intensive tillage to marginal areas and cultivation on sloping lands without soil and water conservation measures. Soil fertility depletion also results from insufficient inputs of fertilizers. Underlying these proximate causes are many factors such as lack of farmer awareness or training in the use of appropriate soil conservation practices and lack of access to credit.

Rangeland degradation is mainly driven by overgrazing, fuel wood collection (cutting of shrubs), abandonment, and lack of maintenance of rangeland infrastructure constraining greater herd mobility. Difficult economic, institutional and land tenure conditions for mobile grazing are prevalent. On the policy side, effective pasture management mechanisms are often absent and pasture leasing is not clearly regulated in most countries in the region. Institutional mandates are outdated or insufficiently defined. On the farmers' side, there is a lack of economic

and organizational capacity, particularly among individual household pastoralists, operating small herd sizes. Furthermore, the awareness of rangeland degradation issues and approaches for sustainable management is often limited.



Overgrazing near settlements and rangeland degradation

The major drivers of land degradation in mountainous areas in Central Asia are considered to be low market access, population pressure leading to cultivation of sloping, easily erodible lands without use of sustainable soil conservation technologies, poor extension and institutional limitations.

Impacts of land degradation

There are various estimates of the costs of land degradation in Central Asia. The studies range from costs of land degradation on certain crops to the effects of land degradation on regional and national scales. To illustrate, Nkonya et al. (2011) calculate that soil erosion and salinity are causing annual losses of about 25 mln USD in Uzbekistan for cotton and wheat alone. According to a World Bank assessment, the annual costs associated with land degradation in Uzbekistan amount to as much as 1 billion USD from soil salinity alone? (Sutton et al. 2007). At the regional scale, one of the widely cited estimates is that land degradation causes annual agricultural production losses worth as much as 2 billion USD (World Bank 1998). Suzuki (2003) indicates that desertification costs amounted to about 3% of the total income of Central Asian countries, i.e. about 1.6 billion USD in 2003.

However, these studies considered only the value of market-priced goods and services lost due to land degradation, mainly through lower crop yields and livestock productivity, omitting the value of other ecosystem services provided by fertile soils, such as carbon sequestration, water purification, nutrient cycling and others. Recent research assessing the total value of land ecosystem services in the region shows that the annual costs of land degradation in Central Asia due to land use and cover change alone is likely to be about 6 bln USD, most of which due to rangeland degradation (4.6 bln USD), followed by desertification (0.8



Conservation agriculture practices to address soil erosion in Karauzyak, Karakalpakstan.

bln USD), deforestation (0.3 bln USD) and abandonment of croplands (0.1 bln USD). Encouragingly, the costs of action against land degradation were found to be lower than the costs of inaction in Central Asia by 5 times over a 30-year horizon, meaning that each dollar spent on addressing land degradation is likely to have about five dollars of returns. This is a very strong economic justification favoring action vs. inaction against land degradation. Specifically, the costs of action were found to equal about 53 bln USD over a 30-year horizon for the whole, whereas if nothing is done, the resulting losses may equal almost 288 bln USD during the same period.

In addition to land use and land cover changes, land degradation also affects through lower crop productivity, and hence, lower agricultural profits. In fact, research shows that land degradation that had occurred over the last three decades since 1980s may have been responsible for about 27% losses in agricultural profitability in the region annually by 2010 than if there was no land degradation. In addition to this, increasing weather variability due to ongoing climatic changes in the region was also found to be already negatively affecting agricultural profits across the region.

The previous research clearly demonstrates that the costs of land degradation are substantial in the region, and preventing land degradation, rehabilitating and restoring degraded lands, when it is still possible, has high economic, environmental and social benefits. The next section examines the opportunities and barriers for achieving such sustainable land management in the region.

Action strategies for sustainable land management and their impact pathways

Despite those challenges outlined above, the Central Asian countries have a significant potential to successfully address

land degradation. The previous research shows there are numerous opportunities to mitigate and overcome the negative impacts of land degradation in the region through sustainable land management practices and policy actions.

Specifically, the studies demonstrate that such factors as access to extension, access to markets and credit, secure land tenure and crop diversification are major factors that are likely to help in overcoming the negative impacts of land degradation and climate change. These factors catalyze sustainable land management among agricultural producers by providing knowledge, possibilities and incentives to apply sustainable land management practices and technologies.

Presently, the surveys of agricultural producers in the region show that only 60% of them apply any conservation measure to protect and improve land and soil fertility, such as water-conserving irrigation techniques, reduced and zero tillage, mulching, use of organic manure, rotational grazing, terracing and others. SLM technologies are usually innovative approaches that are aimed to reduce the pressure of traditional unsustainable practices. Yet, such technologies are also accompanied by high uncertainty in their economic and environmental performance. Land users may not adopt these options unless they observe their costs and benefits. Accordingly, the dissemination of information on SLM technologies is necessary to tackle the problems of land degradation. Access to extension plays a vital role in adopting SLM by rural households.

Observing the performance of technologies will lead to learning effect and will further boost the expansion of SLM technologies. However, even if sufficient information is available about the SLM practices the lack of secure land tenure can be one of the major barriers for investments into such practices in the region. In most of the Central Asian countries farmers have usufruct rights for land. When farmers are uncertain about the future status of

their access to the land, they may avoid making any costly long-term investments for improving soil quality. Therefore, transparent and consistent implementation of user rights to land for a long and secure time horizon would be a vital option to promote longer term SLM investments by farmers. Secure land tenure was also found to increase agricultural profits by an average of 24% among agricultural producers in the region.

On the other hand, the experiences from the region show that private and even secure land tenure do not automatically lead to wide-scale adoption of SLM technologies. Some, but not all, SLM technologies may require sizable upfront investments and take several years before these investments are recovered through increased returns (e.g., drip irrigation, laser land levelling, terracing). There is a need for a wider package of measures to accompany land tenure security for it to be effective in terms of addressing land degradation. Therefore, measures in the form of fiscal and credit incentives to farmers would be important to reduce the burden of high initial costs and provide financial incentives to invest into SLM. Increased crop diversification and market access could also provide the farmers with incentives for sustainable land management, while also improving rural livelihoods.

The latest research on economics of land degradation in Central Asia shows that the costs of actions to address land degradation are only a fraction of the costs of inaction. The question is then why the action undertaken so far was not sufficient to address land degradation if the economic returns from sustainable land management are so high. This is likely to be because more than half of the costs of land degradation in the region are social costs, rather than private costs, i.e. the loss of many ecosystem services of land affects all the society and not only the individual landusers. However, unless public support is provided for actions promoting sustainable land management, individual landusers may underinvest in sustainable land management by considering only the private costs of land degradation in their decision making. The national governments may also face a similar decision making dilemma, as many of these ecosystem services of land provide global benefits and are not limited to national boundaries. Therefore, a wider use of such mechanism as payments for ecosystem services (PES), like those applied for forest conservation in many parts of the world, including through international participation, may need to be adapted to regional contexts and promoted.

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Contacts: A.Akramkhanov@cgiar.org, Project Coordinator, CACILM Knowledge Management II

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