

## Uzbekistan Case Study Policy Brief

**Diversifying agricultural production, retaining biomass in the field, and planting strips of forest can lead to 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, evaluated 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.



## Country summary: Uzbekistan

Uzbekistan is a landlocked country in the middle of Central Asia, covering 447,400 km<sup>2</sup>. Most of the territory is covered by plains (about four-fifths), with mountains and foothills covering the rest. The east has middle and high mountainous landscapes, which decline to the south and west and transform into plains.

There are favourable climatic conditions for the production of various agricultural products, including technical crops. Agriculture is one of the main sectors, and central to the national economy, with an emphasis on cotton and wheat production which are fully or partially delivered under state order. Cotton provides fibre, feed, oil, and fuel. A significant portion of cropland is irrigated, served by a public irrigation system.



## Challenges

Historical emphasis on maximising cotton yields has led to increasing states of soil and land degradation. Land use practices for crop production exhaust the soil of nutrients, while harvest practices deplete residual organic matter from the field leading to the loss of topsoil, the most productive layer. This also contributes to the emission of carbon dioxide and other greenhouse gases from soil organic matter. Fertiliser application to compensate for nutrient loss has led to the build up of deleterious compounds, affecting crop productivity. This degradation had led to a steady loss in land value and benefits derived from it across Uzbekistan since the 1990s.

Formal farm enterprises are private, and land is rented for 49 years from the state. Further, the centralised domestic economy for cotton and wheat means that there is no free market and very limited domestic market conditions. Fertilisers, seed, and water are also supplied at set prices. As a result, there is limited knowledge of

the actual value of produced goods, or of wider benefits provided in the agricultural landscape.

This study aimed to provide economic information and understanding of sustainable land management practices surrounding cotton and wheat production, which are very prominent in Uzbekistan agriculture. Comparing current and projected outcomes for carrying on with 'business-as-usual' against practical alternative scenarios can demonstrate the net benefits of shifting towards improved land use, which can help policy or decision-makers take informed decisions for sustainable land use planning that is also economically profitable.

## Research and findings

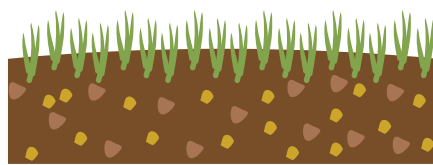
To understand the economic value of current land practices surrounding irrigated agriculture, a series of interviews have been undertaken with *dekhans* in the Bukhara District of the Tashkent Region from 2012-2014, supplemented by discussions with local management and district administrations, and rooted in available literature. Cost-benefit analyses of three feasible alternative scenarios and land use practices inclusive of wider benefits such as nutrient cycling facilitation and climate change regulation, have been performed, including:

- 1. field biomass retention** – prevention of the practice of clearing cotton (stubbing) or wheat (straw) fields after harvest, instead leaving biological residues to replenish nutrients and maintain soil productivity for future crops;
- 2. selective strip afforestation** – establishing borders of trees along field edges to improve crop yields through reducing water loss and soil erosion, while also stabilising temperatures, increasing habitat and biodiversity, and providing timber at the end of its life cycle;
- 3. crop rotation and diversification** – introducing mixed cropping on select areas of irrigated agricultural land, that enhance soil productivity, reduce land degradation, increase farmer's incomes, and provide profitable products for domestic and international markets. These include alfalfa as a livestock fodder, and other fruits and vegetables as food produce where necessary.

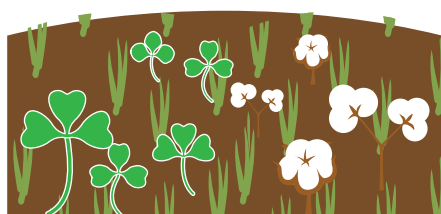
## Key facts



As 77% of arable land in Uzbekistan is used for traditional agriculture including cotton and wheat, the rest could be used for growing economically viable alternate crops like fruit and vegetables.



Leaving cotton residue on the field after harvesting rather than clearing the fields can lead to an increase in net benefits of UZS 81,638 (USD 29) per hectare in the third year. This is inclusive of valuations for enhanced carbon stocks. This scenario has a net present value of benefits in addition to those derived from business-as-usual of UZS 83,370 (USD 30) per hectare over three years, which means leaving cotton residue on the field after harvesting would be a desirable option from an economic perspective.



Establishing mixed cropping with cotton and alfalfa brings a net benefit of UZS 1.6 million (USD 578) per hectare annually, with a net present value over a 12-year period of UZS 7.7 million (USD 2,771) per hectare compared to solely cotton crops in monocultural fields. Either way, both have positive net present values of benefits additional to business as usual, which means establishing mixed cropping would be a desirable option from an economic perspective.



Integrating minor afforestation could see a net benefit of UZS 2.1 million (USD 759) per hectare over a nine-year period on top of the traditional cotton production valued at UZS 8.3 million (USD 2,977). The net present value is positive which means integrating minor afforestation could be a desirable option from an economic perspective.

*\*USD values calculated with 2014 value (1 USD = 2,780 UZS)*

Although land use mostly depends on national agricultural policy, farmers do independently try to improve soil conditions and conserve environmental resources. However, the government is a key regulator of agricultural investments. If cotton production remains central in state policy, farmers will have incentives

to produce it even if income returns are low and they could gain more from non-cotton production. To tackle land degradation, farmers need to increase coverage of land with crops different from cotton/wheat to prevent further land degradation, and will require state support to do so.

## Recommendations

- 1. Increase the effectiveness and sustainability of irrigated land use practices near Tashkent and other major cities, in terms of productivity as well as in response to the terms of international conventions regarding carbon emissions.** What may help achieve this is increasing flexibility to implement crop rotations that are both economically and environmentally rewarding, that help increase farmer's incomes as well as bolster the national economy, while also preserving the natural properties of land (nitrogen, water cycles, biodiversity, etc.). This can also ensure that the population of major cities will have sustainable supplies of food products from Uzbekistan, and act as a buffer against unnecessary reliance on degrading land practices or import markets.

The calculations of the ELD Initiative Uzbekistan study showed the potential economic value of moving beyond business-as-usual to more inclusive alternative scenarios of biomass retention, crop rotation, and afforestation. Support will be needed for the involvement of research institutes at national and international levels, to cooperate with farmers in refining and optimising beneficial crop rotation and cultivation practices across the country, while creating adaptable frameworks for localised implementation.

Further, in accordance with international conventions, Uzbekistan has pledged to reduce carbon emissions. The ability to select cost-effective crop rotations of cotton and wheat alongside fruits, vegetables, and legumes, can help increase carbon sequestration, provide adaptive measures to climate change, and assist Uzbekistan in meeting these internationally-agreed upon goals.

- 2. Raise awareness about the possible added economic benefits brought by alternative and more sustainable land management options for irrigated agriculture.** This includes the organisation of training sessions and seminars, agricultural field schools, demonstration videos, and other accessible materials to demonstrate outcomes of sustainable land management and encourage associated practices. These activities can help raise local-level awareness of farmers and managers on the possible ways to address environmental issues through their land use.
- 3. Review the implementation of market conditions on water use in agricultural practices and increase the involvement of water user associations at the local level for improved water and land management.** Water is a key element in irrigated agriculture.



Photo: GIZ / Hannes Eitter





Photo: CACILM II / Sanobar Khudayberganova

Currently there is no assessment system or metering to measure actual water consumption through the irrigation and leaching of fields. This could eventually lead to the introduction of fair water prices that support optimal water use. Water user associations are also key in usage, as they have already established frameworks at the local community level. They can contribute greatly to determining regulatory levels and being conduits for best practices.

**4. Establish mechanisms for the processing of additional agricultural products.**

Economic valuations show potential added value of diversifying a portion of agricultural land currently used for cotton or wheat production. De-emphasising short-term maximum yields of these crops can lead to increased overall returns while also bolstering the availability of subsistence foods and other services provided by the ecosystems. To support the implementation of agricultural diversification, on-the-ground technical and technological support mechanisms need to be put in place. Additional preferential financing for processing food and fodder crops can raise value at a local level.

**5. Attract international firms and markets for the export of key crop products.** Improving the sustainability of crop and land management could help meet and keep potential demand for exports to large markets like Russia. Sustained export demand could contribute to sustain or even increase prices for food products provided by farmers. Attracting international firms could help target such large markets and intergovernmental agreements could play a key role in this. Further, close cooperation with other Central Asian countries in research and practical projects within regional international programmes can support transboundary benefits and knowledge exchange on best practices.

**6. Support the involvement of the Institute of Agricultural Economics** in raising the capacity of farmers and local professionals to achieve increased economic and environmental well-being. By providing state-of-the-art understandings and the most current research, their contributions are critical to success. This can be achieved through the inclusion of new projects for assessment and development of irrigated agriculture taking into account a wide range of ecosystem services in government programmes.

## 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 was 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 Umid Nazarkulov (Research Institute for Agricultural Economics, Tashkent) and Iroda Rustamova (Tashkent State Agrarian University) with support from the ELD Initiative and CGIAR.

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