



Food and Agriculture
Organization of the
United Nations

Integrated land use management systems in Uzbekistan

Part 1

Case studies and governance recommendations

Literature review



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Food and Agriculture Organization of the United Nations

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Abbreviations

ALU-FR	Albert-Ludwigs-University of Freiburg, Germany
CAC	Central Asian countries
CADI	FAO's Central Asian Desert Initiative (CADI)
CACILM	Central Asian Countries Initiative for Land Management
CBD	UN Convention on Biological Diversity
EM	ecosystem management
ES	ecosystem services
EUR	Euro, currency of the European (Economic) Union
FAO	Food and Agriculture Organization of the United Nations
GDP	gross domestic product
ICARDA	International Center for Agricultural Research in the Dry Areas
ILUM	integrated land use management
ILU(M)S	integrated land use (management) systems
INRM	integrated natural resource management
IPCC	International panel on climate change (expert body)
LUCC	Land degradation due to land use and cover change
MoU	memorandum of understanding
PPP	public-private partnership
USD	US dollar, currency of the United States of America
UZS	uzbek som – currency in Uzbekistan
WCA	water consumer association
WUA	water user associations now called WCAs.

Executive summary

A contribution to the Central Asian Desert Initiative (CADI) “Conservation and sustainable use of cold winter deserts in Central Asia” project

- This report on integrated land use management systems (ILUMS) in Uzbekistan is a contribution to the Food and Agriculture Organization of the United Nation’s activities under the Project “Central Asian Desert Initiative (CADI) – Conservation and sustainable use of cold winter deserts in Central Asia” which addresses the problem of overuse and degradation of cold winter deserts by developing integrated approaches for preservation and sustainable use of cold winter deserts Uzbekistan, Turkmenistan, and Kazakhstan.

Review of ILUM and its governance in Central Asia and Uzbekistan

- Land use in Central Asia and in Uzbekistan is practiced in a marginal environment under the influence of a dry climate and is characterized by conflicts and synergies between the forestry sector and the agricultural sector in which livestock is of particular importance. Overuse or inappropriate use of natural resources such as soils, forests, rangelands, and especially of water has led to widespread land degradation. Uzbekistan stands out for rapid *desertification* processes that are epitomised by the drying out of the Aral Sea due to *unsustainable irrigation* practices. The problem of *overuse* and *degradation* is aggravated by the historical legacy of this region, i.e. sectoral fragmentation and economic specialization under the Soviet Union when Uzbekistan became the main supplier of cotton, and, after the collapse of the Soviet Union, the conversion of a centrally organized economy to national economies with the attendant need to develop new institutions on various levels. To address problems that are intrinsically linked to conflicting land uses and institutional fragmentation, there is a need to develop holistic ways of managing natural resources in an integrated manner through integrated land use management systems (ILUMS).
- Key elements of ILUMS are the need to consider multiple land uses simultaneously and to place people and their livelihoods at the centre, to think across traditional discipline and sector boundaries and to bring governance and policy into play at multiple levels. Initiatives to promote ILUMS in Central Asia can build on experiences with ILUMS in dryland areas around the globe and on regional experiences with, e.g. agroforestry systems.
- To set up ILUMS is not just a matter of supporting or introducing sustainable land use practices. According to most authors on the subject, *good governance* is a prerequisite for successful development and implementation of ILUMS. While some details may differ, what all good governance paradigms have in common is a call for increased public or local *participation and power sharing* in

governing natural resources. In the context of Central Asia, *co-management* has emerged as a promising form of governance. Co-management is a concept that refers to the sharing of management and decision-making power between state and non-state actors.

- ILUM approaches suitable for application in Uzbekistan or already in practice include agroforestry systems which combine trees, crops and/or livestock for enhanced productivity or ecosystem services. Rangeland management for livestock and water resources management for irrigation under dryland conditions are the two sectors that are most severely affected by overuse and degradation and therefore in great need of good governance schemes. While institutional transition and development of the livestock sector is lagging, Uzbekistan has made progress in integrated water management through the establishment of water consumer associations.
- Land use governance in Uzbekistan is a bricolage of modified Soviet era organizations and new institutions that are often inadequate such as the Dehkan and Farmers' Association that was created to assist private farmers or the mahalla organizations that were revamped to distribute welfare at the local level. There is a need for the Uzbek Government to foster collaborative relationships at all levels through adapting co-management practices with more agencies given to organizations at community level.

Co-management in the Bukhara and Navoi regions

- In the Bukhara (Karakul district) and Navoi (Nurota district) regions, desert pastures are the predominant landscape; highly relevant for livestock production and complemented by (a small fraction of) irrigated agricultural land leased out to commercial farmers. Social problems (unemployment, out-migration) esp. among younger populations undermine the development of the agricultural - sector, despite its relevance for gross regional product.
- Co-management in the Forest Fund area is trialled in the pilot study sites. Dehkan or other farmers can individually lease forest land (through *tickets*) for grazing, afforestation or (in irrigated lands) for crop, fruit, or vegetable farming for 3 to 49 years. Irrigated plots remain reserved for commercial farmers organized in clusters. Being able to herd livestock in leased (forest) land is a critical livelihood strategy for dehkan farmers in the pilot communities.
- However, in both study sites the quality and quantity of grazing and agricultural sites has dramatically shrunk. Especially dehkan farmers find themselves competing with cluster farmers for diminishing resources in ways perceived as unfair and adding to a *general mistrust* against government and commercial farmers. A situation worsened by severe water problems fuelled by outdated or broken infrastructure (leakage, efficient pumps /distribution etc.), and a culture of water overuse or theft led to water being wasted, lost, or salinized.
- Nonetheless and partly triggered by recent national reforms, farmers in the regions have developed interesting collaborative arrangements like livestock cooperatives or the Farmers Council Centralized Accounting scheme in Nurota

contributing to more resource efficient and sustainable land use. In comparison, other cooperative structures, such as the water user associations, remain limited in terms of their contribution to ILUMS. A severe lack of funding for innovation and infrastructure adds to the overall persistence of unsustainable practices.

Key ILUM governance recommendations

- Co-management agreements in Uzbekistan and the region will play a vital role for rural and sustainable development vis-à-vis climatic change. However, the private lease based 'co-management' practices found in Uzbekistan, and the pilot regions, need to open more avenues for local participation and ownership in resource governance. Governments may foster more collaborative relationships and with that ILUMS at all levels, inter alia, by
 1. granting more agency to local level organizations (incl. mahallas, forest departments or associations);
 2. securing tenure and land /natural resource use rights for longer periods and for smaller plots;
 3. offering more flexibility in leases, beyond cotton or wheat and sectoral cluster arrangements;
 4. fostering more public–private collaboration and benefit sharing (in monitoring, management, or maintenance);
 5. considering collective use right approaches to leasing for achieving economies of scale;
 6. reconsidering allocation approaches based on farm size or sector considerations;
 7. strengthening capacity-building efforts for farmers (organizations) on ILUMS;
 8. increasing state budgets for staff, infrastructure and operations in rural settings drawing on public–private partnership (PPP) or international support schemes.

- Regarding the specific co-management practices found in the two pilot regions and the challenges elaborated, the report also provides a set of more concrete management related recommendations for transitioning agricultural practices into more energy, water and resource saving practices as well as for ways of making different actors and organization work collaboratively on ILUM.
 - *Local workforce and state supported employment*: provide job opportunities for farmers in monitoring activities in forest lands or through other governments supported local services (e.g. Local farmers council of accounting).
 - *Investments in forest land and water infrastructures*: Modernization and investments in the water and forestry (monitoring) infrastructures and staff will not only address natural resource depletion (theft, uncontrolled) overuse

but also flush additional income into the system to raise working morale of public staff and farmers and better equipment and infrastructure.

- *Collaborative patrolling and monitoring*: farmers may support patrolling at low costs (e.g. Horses) and many more feasible collaborative approaches may be identified in open dialogue leading not only to more sustainable ILUMS but also long-term trust building.
- *Protection through use addressing* the demand side of resource depletion, monitoring and control measures need to be complemented by strategies that support the sustainable use of protected resources, e.g. through afforestation for firewood. Such use rights help create ownership and responsibility supporting monitoring efforts and are best combined with training in more sustainable use practices (esp. on water).
- *Lessons learning and sharing* enhance learning from successful field trials and collaborative approaches by establishing more ties among farmers as between farmers and the forestry department employing existing organizational networks or services – ideally financially supported by the state or international donors.
- *Building trust into the leasing system address* the culture of informal deals and corruption by building trust and accountability into co-management approaches, esp. through more transparency and collaborative orientation in ILUM governance processes.

Background on the CADI project and analysis

This report and the underpinning analysis is a contribution to the Food and Agriculture Organization of the United Nations (FAO) country specific activities under the Project “Central Asian Desert Initiative (CADI) – Conservation and sustainable use of cold winter deserts in Central Asia” (Project Symbol: MTF/SEC/012/UOG). The project is jointly implemented with the State Committee of Forestry of the Republic of Uzbekistan as main Partner and coordinated through the University of Greifswald and implemented through Michael Succow Foundation and FAO. The Project addresses the problem of overuse and degradation of cold winter deserts through overgrazing, firewood collection and infrastructure development, by developing approaches for ecosystem-based management and participatory co-management agreements and strengthening of technical capacities of Central Asian countries such as Kazakhstan, Turkmenistan and Uzbekistan for preservation and sustainable use of cold winter deserts. The project includes four specific outputs: (1) Obtaining evidence-based knowledge on ecosystem services (ES) and biodiversity of the deserts for its application in land use management; (2) Introducing multi-stakeholder-based sustainable land management for deserts; (3) Creating conditions for improved management and establishment of protected areas; and (4) Developing a joint vision for conservation and sustainable use of deserts in Central Asia through network establishment.

In July 2019, the Food and Agriculture Organization of the United Nations (FAO) and the University of Freiburg (ALU-FR), acting through its Chair of Silviculture, Institute of Forest Science, Faculty of Environment and Natural Resources, concluded a memorandum of understanding (MoU) to provide a framework for cooperation between the two organizations with the overall goal of strengthening sustainable forestry and rural development in line with the FAO Country Programme Frameworks in the region and the Strategic Objectives, particularly including the following thematic areas:

1. Developing and strengthening technical capacities at national and regional level, stimulating inter-disciplinary approaches, and disseminating state-of-the-art knowledge and experience in the field of forestry, natural resource management and rural development.
2. Raising engagement of prospective young professionals in multi-stakeholder processes and dialogues on the management of forests and other natural resources.
3. Mobilising academic knowledge and information resources to directly benefit stakeholders on the ground.
4. Providing technical support to various projects in Central Asia within the specific area of expertise.

In accordance with Article 2 (2.1) of the MoU, in September 2019, representatives of the University of Freiburg conducted a working visit to Uzbekistan to consult on matters of mutual interest to capitalize on mutual comparative advantages. The working visits consisted of two workshops and deliberations on concrete action/work plans, a field trip

to a forestry organization with subsequent debriefing in the FAO-SEC office in Ankara, Türkiye. As a result of this working visit, the representatives of FAO, ALU-FR, and the national partners of FAO in Uzbekistan agreed to collaborate within the context of the Project “Central Asian Desert Initiative (CADI) – Conservation and sustainable use of cold winter deserts in Central Asia” in two pilot sites located in Uzbekistan.

This report and the recommendations related to the governance and economics of land use in Uzbekistan marks the output 1 of a cooperation between FAO and the University of Freiburg in the CADI project following the broader objective of developing the technical capacities of key involved stakeholders in the region, including their training.

In this effort to provide evidence-based and practical expertise and capacities to FAO and partners in this project, the University of Freiburg drew on its own extensive academic and practical experience and capacity in relevant fields of (agro)forestry and integrated land use systems complemented by access to a pool of experts on the topic and the region. Combining expert interviews with extensive literature review, internationally and in the region, and stakeholder workshops and interviews, as well as meetings with government representatives and focused field visits to the pilot sites, the team from the University of Freiburg – supported by local staff and consultants - was able to compile this comprehensive report on land use in Uzbekistan offering key insights and recommendations for more integrated and sustainable land use practices vis-à-vis the challenges faced in the country and Central Asian region. We wish to extend our deep gratitude to all partners in Uzbekistan and globally, especially the experts, national consultants as well as stakeholders in the pilot region and Tashkent which shared their experience and wisdom with us.

This report seeks to provide a thorough, evidence-based review and analysis of the governance of collectively used public forest lands, and the respective management systems integrating forestry and livestock, plus agriculture, in Uzbekistan, and especially the two pilot regions of Bukhara and Navoi.

In concrete this **output** offers a:

1. structured review of the international knowledge on the governance of collectively used public forest lands, and management systems that integrate forests, trees, and livestock, as well as rain-fed and irrigated agriculture;
2. in depth review of local knowledge on the above listed issues;
3. field trip-based analysis of two pilot sites regarding stakeholders and relevant formal and informal institutions for different land uses about options and barriers for implementation;
4. All of which inform:
5. the elaboration of governance guidelines and elaboration of recommendations for two pilots.

Field visits

To increase the practical relevance of this literature review and especially the recommendations deriving from it, we visited and analysed two pilot sites where FAO is operating and implementing the CADI project for several years: namely the Bukhara region (Karakul district) and Navoi (Nurota district). In two subsequent **field trips**

undertaken in October and November 2021 our national partners have visited the villages of Karakul (Bukhara) and Chuya (Navoi/Nurota) and the surrounding forestry areas for collecting relevant data. Transect walks through the forestry areas (video-recorded/ photographed) were complemented with workshops, focus group discussions, and targeted interviews with representatives from, e.g. the district forestry department, district water and agricultural departments, dehqan as well as commercial farmers and their associations as well as the FAO counterparts in the project.

Limitations

The work on this report took place under exceptional conditions and high time pressure. Amidst a global pandemic, the core team of researchers was impaired to travel and conduct field research and data gathering. With the support and input by the national counterparts and consultants this core limitation could be addressed to a certain extent. Despite the shortcomings derived from the critical time constraints, including for hiring and training national staff in Uzbekistan, the report in our view provides a solid and comprehensive basis for better understanding the major challenges and opportunities for integrated land use and its governance in Uzbekistan – as for the two pilot regions and districts.

The report is the result of research and analysis conducted solely by the authors and reflects understandings and interpretations by this team of experts and consultants, and not necessarily that of FAO or its country partners.

1. Introduction

This is a literature review on land use and integrated land use management systems in Uzbekistan. The review aims to synthesize and examine the state of knowledge and the scope for establishing various integrated resource and land use management strategies such as types of agroforestry systems and integrated pastoral management for the sustainable management of forest and agricultural resources in Uzbekistan.

The review also aims to explore land use governance in Uzbekistan delving into the governance structures, formal and informal institutions, their transformations, and path dependencies that shape the post-socialist realities for Uzbekistan.

The report will reflect upon the land use governance and management practices in Uzbekistan against the key principles and suggestions made in the international academic literature on integrated land use systems and governance in semi-arid regions. Drawing on the experiences made in two pilot sites in Uzbekistan (Bukhara and Navoi) with co-management regimes around livestock herding and agricultural use in forest areas, the report seeks to elaborate governance guidelines and recommendations tailored to the specificities and socio-economic and ecological challenges of the two pilot regions.

1.1 Existing land use systems in Uzbekistan

In this section, we review the main three land uses in Uzbekistan, agriculture, livestock, and forestry considering their role for an integrated land use management (ILUM). ILUM, by definition, combines different productive land use systems, such as forestry and agriculture, and integrates several management goals within the same landscape unit (ICARDA, 2017; Sayer *et al.*, 2013; van Ginkel *et al.*, 2013).

❖ Agriculture

Agriculture in Uzbekistan is one of the main contributors to the economy, employing one third of the active labour force accounting for more than 20 percent of the gross domestic product (GDP) (Sutton *et al.*, 2007; Tadjibaeva *et al.*, 2015). Box 1 highlights this key importance for the GDP of the country covering the major agricultural statistical numbers. The importance of the agricultural sector in these countries, however, goes far beyond its contribution to the GDP and economic output. It provides the social context in which rural households – which constitute most of the population - can subsist and sustain their existence (Kandiyoti, 2002). Nationwide, almost three-fourth of sown area is allocated to cotton and wheat. In Bukhara and Navoi provinces (the case study areas for this report) cotton and wheat occupy over 80 percent of total sown area. Sown area is in relative scarcity in Uzbekistan: on average there were only about 0.23 ha of sown area available per rural inhabitant (Tadjibaeva *et al.*, 2015).

Box 1: Recent statistics on agriculture in Uzbekistan (Dec 2021)

In 2020, the total volume of agricultural, forestry and fishery products (services) amounted to UZS* 260.3 trillion. Of this, the volume of agriculture and livestock, hunting and services in these areas amounted to UZS 251.8 trillion, forestry – UZS 6.7 trillion, fisheries – UZS 1.8 trillion. 96.7 percent of the gross agricultural output was accounted for by agriculture and livestock, hunting, 2.6 percent by forestry and 0.7 percent by fisheries. For the republic, analysis by economic categories shows that 68.0 percent of the total volume of agricultural output was produced by dekhkan farms, ** 27.8 percent by farms and 4.2 percent by organizations engaged in agricultural activities.

The share of agriculture, forestry and fisheries in GDP was 28.2 percent.

In 2020, Bukhara region accounted for UZS 23 974.0 billion (9.2 percent of the total) and Navoi region for UZS 11 900.0 billion in agricultural, forestry and fishery products (services).

Agricultural products – represents the total volume of agricultural production in the reporting period, determining the total value of agricultural and livestock products produced on farms, dekhkan (personal assistant) farms and organizations engaged in agricultural activities.

By the end of 2020, the volume of agricultural production reached UZS 249.8 trillion, including UZS 123.6 trillion of crops products (49.5 percent) and livestock products UZS 126.2 trillion (50.5 percent).

* ca. UZS 10 000 = USD 1, or UZS 12 000 = EUR 1

** Dekhan farmers are operators of dekhkan farms. Dekhan farms are legally registered, small farming enterprises governed by the Law on Dekhan Farms (1998). Dekhan farmers have access to the land through life-long leaseholds with inheritable possession rights. Dekhan plots are usually located near the operator's homestead. The maximum plot size of a dekhkan farm for crops is 0.35 ha on irrigated land and 0.5 ha on rain-fed land. In addition, pastureland of up to 1 ha can be included.

Source: Statistics Committee of the Republic of Uzbekistan.2020

After becoming independent in 1991, Uzbekistan made sustained efforts to become self-reliant in food grain and achieve food security while moving from a centrally planned to a market-oriented economy. The most recent relevant land reforms along with the previous reforms are reviewed and discussed in the later section of this review (chapter 4). About cotton and wheat production, which make up the largest share of agricultural production, area- and production-based state quotas exist, with compulsory sale to the state at fixed prices, preferential credits for input supply and agricultural norms to regulate cropping patterns and agricultural practices (Hornidge *et al.*, 2015).

Additionally, farmers engage in rice, fruit, and vegetable production for commercial purposes, as well as for home consumption. Consequently, three types of agriculture can be identified: (a) (large-scale) state-planned agriculture (i.e. cotton and wheat); (b) (small to medium scale) commercial agriculture (i.e. rice, sunflowers, vegetables), as well as (c) (small-scale) subsistence agriculture (i.e. fruits and vegetables) (*ibid.*). Table 1 summarizes the types of agricultural producers in Uzbekistan.

The large 'private' farms responsible for cotton and wheat targets are subjected to direct state control more than the other farm types, but also reap more benefits from the remains of the Soviet system, including access to organizations providing knowledge support (traces of science) and to lobbying support by politicians especially after they grew with land consolidation. Because of their more marginal position, the other farm types can focus more directly on profit-making (Hornidge *et al.*, 2015).

Table 1: Main agricultural producers in Uzbekistan

	Shirkats (Agricultural Co-operatives)	Private Farm		Dehkan Farm	
		Crop growing	Gardening and Horticulture	Livestock Rearing	Peasant farming
Production specialization	Crops	Crops	Vegetables, potatoes, melons; orchards	Livestock, including poultry	Subsistence agriculture
State Procurement	Cotton and winter wheat	Cotton and winter wheat	No state procurement	No state procurement	No state procurement
Additional Production	Maize, sunflower, rice, vegetables, etc.	Maize, sunflower, rice, vegetables, etc.	Winter wheat and fodder crops	Fodder crops, maize, winter wheat, vegetables, potatoes, melons, and rice	Any agricultural crops and livestock, including poultry
Form of Land Tenure	Permanent possession: based on territory of former <i>kolkhozs</i> and <i>sovkhozs</i> which is about 1.500 ha	Long-term lease (10-50 years); minimum 10 ha	Long-term lease (10-50 years); minimum 10 ha	Long-term lease (10-50 years); minimum 10 ha; 0.33 ha per a head of conventional cattle with a minimum of 30 heads of conventional cattle (10 ha)	Lifetime inheritable possession; maximum 0.35 ha
Input Subsidies	Direct input subsidies from the state and debt write-offs for all cropping activities	Direct input subsidies from the state and a special credit at low interest rates (5 percent annual) only for cropping activities under state procurement	None	None	None
Form of Labour	Family contracts (pudrats)	Family workers and hired labour	Family workers and hired labour	Family workers and hired labour	Family workers

Source: Uzbekistan National Information and legal portal. www.norma.uz.2021

Although the Uzbek Government focuses on diversifying agriculture, there exist many challenges mainly pertaining to the very limited rights of farm owners (farmers) to use leased land beyond the state order procurement system. There exists a genuine risk of farmland confiscation either by local authorities (under the pretext of non-fulfilment of planned tasks, inefficient use of land or in a “voluntarily-compulsory order” – in the form of waiver of rights to use land), or during the so-called “aggregation and disaggregation” of farms initiated from Tashkent (Yusupov, 2019). Furthermore, the pricing system under the existing state orders procurement systems make the cultivation of cotton and wheat unprofitable for most farmers (Petrik and Djanibekov, 2016). The difference between government procurement and domestic market prices for wheat can sometimes exceed 3-fold (Yusupov, 2019). In addition, the existing system of land quotas for crops that are obligatory for farmers does not allow them to optimize the production structure and management approach considering soil features and climate, water availability, staff qualifications, etc. Often, lands for cotton and wheat would be more productive for other crops, but farmers cannot use production, because land allocated for cotton and wheat cannot be used for other purposes (ibid.).

The mandatory state procurement orders also affect livestock production adversely by limiting size of cultivation areas for forage crops (UNDP, 2010b).

❖ **Livestock**

The livestock sector is one of the most important agricultural sectors of Uzbekistan accounting currently for 46.3 percent of the gross national agricultural output (Yusupov, B. Yu *et al.*, 2010). Rangelands represent about 50 percent of the total area of the country (Gintzburger *et al.* 2005), however more than 40 percent of rangelands are estimated to be degraded due to overgrazing, fuelwood overharvesting, and unsustainable agricultural practices (Shaumarov, *et al.*, 2012; Holland 2010; CACILM 2006). ICARDA (2021) in their latest assessment of land degradation found that 1.6 million hectares of productive rangelands have been degraded between 2009 and 2018 in central and southern Uzbekistan. In terms of ecosystem losses, which would amount to a sum of USD 6.6 billion.

Most livestock production in Uzbekistan depends on grazed pasture as a primary source of fodder. Details on livestock production in Uzbekistan are provided in the following section.

A major part of the livestock output is produced by smallholder (dehkan) farmers owning the farm size of 0.15 hectares on average, making it an important source of income and food for rural families (Shaumarov *et al.*, 2012). In 2016, 4.7 million households possessed 12 million cattle heads, from which 4 million were cows (Zorya *et al.*, 2019). Livestock and its role in the form of animal traction, production of manure and use as a cash reserve, in addition to the production of meat and milk, makes it a key sector of the economy (Toderich *et al.*, 2008). Livestock in Uzbekistan is mostly represented by karakul sheep, cattle, goats, camels, horses etc. (ibid).

The integration of crops and livestock is a traditional practice underpinning the (smallholder) farming system in Uzbekistan, however the low productivity in the livestock sector is limiting its contribution to livelihood, food security, and the export

economy (Yuldashbaev /USDA, 2011). The main constraints on the livestock sector that push livestock farmers to shift towards crop production, are as follows:

Insufficient feed resources

The lack of land and low feed crop yields are known to affect the feed supplies for the livestock farmers (Noila, 2008). Additionally, the administrative restrictions on feed crop cultivation, to grow more cotton and wheat, along with water scarcity for irrigation of feed crops make it even more challenging for farmers to secure sufficient feed for their livestock (Yuldashbaev /USDA, 2011). There is also a shortage of high-quality feed such as compound feed, cottonseed meal and cake in the market at an affordable price for the farmers. As a result, straw and corn are the main feed ingredients in the animal diet, which are of low nutritional value (Yusupov *et al.*, 2010).

Lack of land areas and turnover

Currently, there is a lack of inter-farmland turnover due to restrictions on land subleasing, which makes it difficult for the farmers to expand their land plots by purchasing inefficient plots (Yuldashbaev/ USDA, 2011). However, the new decree that allows for land subleasing might enable farmers to increase their capacity by expanding their farmland. However, the government still rigorously regulates the use of land allocated to the farmers for crop production and strictly restricts the farmers to use the allocated land only for the designated purposes.

Lack of credit resources

Another factor that adversely affects the livestock sector in Uzbekistan is the lack of credit to the farmers for operating and expanding their livestock operations. Farmers are very limited in their ability to get loans against their land plots as mortgage (Yuldashbaev / USDA, 2011; Yusupov *et al.*, 2010). This is once again linked to the insecure land use rights of the farmers in Uzbekistan. The establishment of the microfinance facilities may improve the access to micro-loans with preferential interest rates (Ibid).

Difficult access to inputs and services

There is a lack of storage and processing services for agricultural outputs. The situation is aggravated by lack of competitive input and service supply markets (Yuldashbaev /USDA, 2011). Although the Government of Uzbekistan has been working towards improving the overall livestock sector efficiency through creating incentives for livestock farmers such as state pension etc. there is still a long way to go to secure the livelihoods of livestock farmers by improving their land use rights as well as securing irrigation water facilities in the local pastures among other considerations. The pastoral management in Uzbekistan particularly from the governance perspective, is discussed in the later section of this review.

❖ Forestry

The forest land in Uzbekistan is managed mainly by the State Committee on Forestry (Goskomles)(SCF) under the Ministry of Agriculture of the Republic (MoA) of Uzbekistan, the further responsibilities are distributed among other governmental/state organizations as well, such as the State Committee on Nature Protection, and other institutions (Republican Scientific Production Center for Decorative Gardening and Forestry, Khokimiyat¹ of the Tashkent Region, etc.). Altogether they manage up to 93.5 percent of forest lands in Uzbekistan (Worbes *et al.*, 2006).

In Uzbekistan, as in other countries of Central Asia, forests' main function is protection. Forests play a crucial role in combating desertification, preventing erosion and other natural disasters, as well as protecting irrigated agricultural land and pastures from degradation. There are three main forest types in Uzbekistan: 1. drought and salt resistant forests, notably of Saxaul in the desert regions, with very sparse tree cover; 2. mountain forests, including juniper, in the south and east of the country, currently under pressure from grazing and fuelwood demand, and often situated in vulnerable ecosystems; 3. tugai or riverine forests, which have been badly damaged by irrigation projects for cotton and resulting salinity. The total area of the State Forest Fund is 11.1 million ha, including an area of forest plantation of 3.25 million ha (UNECE/FAO, 2021).

The forestry fund comprises forest lands, i.e. land intended for afforestation, and non-forest lands, where afforestation requires additional reclamation. Forest lands include categories such as forest-covered areas, open artificial plantings, sparse forests, fire sites, perished stands, cut sites, groves and abandoned sites. Non-forest lands include arable lands, hayfields, pastures, marshes, sands, and other lands.

The State Committee for Forestry is responsible for the development of the state and prospects of forestry, scientific and technological progress in the field, the organization of rational use, reproduction, protection and conservation of forests, management of hunting, nature reserves and natural parks, strengthening ecological and other useful properties of forests.

In terms of forest management, forest inventory constitutes a major component of the management plans made by the Research and Development Forest Enterprise of the Main Forestry Department in accordance with Article 16 of the Forest Law of Uzbekistan. Another responsibility of the forest service is the management and protection of the tugai forest reserves, which are very rapidly depleting in the last 20 years, because they are the main source of wood for the rural population, and thus experiencing an enormous deforestation pressure (Treshkin, 2001). The dominant tree species of tugai forests are poplars (*Populus euphratica* and *P. pruinosa*; (Ozolin, 1990)). Although tugai trees are characterized by higher wood density and thus produce higher quality timber, the poplar trees often succumb to a stem rot which worsens the wood quality.

The forest service also establishes and manages tree plantations such as ash and elm trees along with poplar. These plantations are usually irrigated (Worbes *et al.*, 2006).

¹ Khokimiyats operate at region and district levels.

The farmers also engage in tree planting in their farms especially fruit and nut trees and work in close collaboration with the regional forest department. In some areas of Uzbekistan, especially in the more arid regions where farmers concentrate on rearing livestock (Müller, 2006), forest farming provides them with an alternative feed resource.

Uzbekistan, like the other Central Asian countries (CACs), has adopted several laws to protect the environment, and forests accordingly, to address the increasing hazard of land degradation in the form of salinization, overgrazing etc. Some other major challenges within the forest sector are: Increasing the forests' contribution to protection of fragile ecosystems, notably around the Aral Sea; protecting existing forests from degradation and pressures from grazing and excessive fuelwood harvesting; increasing forest area, for protection and wood production; improving livelihoods of forest dependent people; improving effectiveness of forest sector institutions, notably by ensuring that regional forest administrations and managers have adequate equipment (UNECE/FAO, 2019).

1.2 Major challenges to land use in Uzbekistan

Central Asia, overall, is a region exceptionally affected by changing climate, warming faster than the global average according to IPCC projections (Hoegh-Guldberg *et al.*, 2018, Xenarios *et al.*, 2018). Both aridity and temperature are projected to rise across all CAC. This makes the region and especially its farmers particularly vulnerable to climate change impacts due to its “baseline” physical geography (dominated by temperate deserts and semi-deserts), the consequential social, economic, and institutional upheavals following the independence and the relatively low development level due to a main economic focus on monoculture exports prior to 1991, resulting in a missing socio-economic safety net (Lioubimtseva and Henebry, 2009). Additionally, the overexploitation of forest resources in the region and the connected deforestation and forest degradation result in lower land resilience against environmental stress driven by climate change, such as drought, storms, and heat waves (UNECE /FAO, 2019).

A study on land degradation in Uzbekistan by Aw-Hassan *et al.* (2015) estimates that about 26 percent of croplands and 17 percent of rangelands in the country have experienced considerable degradation over the last three decades. Additionally, the arid and semi-arid climate makes the country vulnerable to frequent droughts (Gupta *et al.* 2009). As previously mentioned, the agricultural dependence on the irrigation water causes a huge imbalance between the availability and the growing demands of water, putting further pressure on the available resources (Cai *et al.* 2003). The land appropriation of irrigated agriculture, especially for the cultivation of cotton, took its toll on the natural land and water resources in the region (Dubovyk *et al.*, 2013). The authors found that cropland degradation in the northern part of Uzbekistan, as well as the lower reaches of the Amu-Darya River, occurred due to lower canal density and high demand for water use (*ibid.*). Over a period, the constant withdrawal of the irrigation water for crop production has resulted in the shrinkage of the Aral Sea further causing the groundwater tables to rise only to be depleted at a higher rate (Spoor and Krutov 2003). Furthermore, the intensive monoculture cotton production on irrigated lands

during the past decades has led to increased soil salinity and water logging (Micklin, 2007).

Abdullaev (2005) and Ibrakhimov *et al.* (2007), note that besides poor natural drainage conditions (low-lying location, relief flatness) in some parts of Uzbekistan, the shallow water tables result from losses from the irrigation network and overuse.

Additionally, more than 50 percent of farmlands in Uzbekistan are estimated to be affected by wind erosion to varying degrees (CACILM 2006; Pender *et al.* 2009). About 19 percent of the irrigated area of Uzbekistan is affected by water erosion (Bucknall *et al.* 2003). Irrigated lands in many provinces of Uzbekistan such as Karakalpakstan, Horazm and Bukhara provinces are highly salinized (Bucknall, *et al.* 2003; Pender *et al.* 2009). Altogether, it is reported that waterlogging and salinization result in a loss of about 30 000 ha of land in Uzbekistan (Bucknall *et al.* 2003; Pender *et al.* 2009). Inappropriate irrigation practices over many years are the major cause of secondary soil salinization (ICARDA 2003). Overall, salinization in Uzbekistan and in Central Asia as a whole, has been recognized as a threat that is leading to declining crop production (van Dijk *et al.* 1999; Bucknall *et al.* 2003; Kushiev *et al.* 2005, Mirzabaev *et al.* 2020).

Another major cause of land degradation in Uzbekistan is overgrazing. Pastures make about half of the country's territory. However, in the past decades, extensive degradation of pasture lands is witnessed due to overgrazing, lack of maintenance of pastures and other human activities (ICARDA, 2003).

Although the severity of land degradation in Uzbekistan is duly recognized, Aw-Hassan *et al.* (2015) points out that there are only a few published studies on spatial assessment of this problem (see Dubovyk *et al.*, 2013 and Le *et al.*, 2014). It is highlighted in the literature that cropland degradation and its drivers have not been studied within quantitative data-based frameworks in Uzbekistan (Aw-Hassan *et al.*, 2015).

Nevertheless, land degradation in all its forms, as briefly discussed above, is undoubtedly a major problem for the sustainable development in Uzbekistan. Additionally insecure land rights and uncertain land use policies may also impact the rural livelihoods linked with agriculture. Djalilov *et al.* (2016) studied constraints and incentives for the adoption of agroforestry on degraded cropland in Uzbekistan. They conclude that there is a need for higher land use flexibility, more security of land tenure and tree plantation ownership, increased farmer education about alternative systems and practices, and most importantly, also improved institutional support.

Globally, in response to the widespread and increasing degradation, there has been growing emphasis on the need to conserve and sustainably manage natural resources in an integrated manner (FAO, 2020). This has given rise to the concept of *Integrated Natural Resources Management* (INRM), which drives the need to take a holistic integrated approach in utilisation of natural resources, and to be conscious of the interactions among the different components of the resource base. Within any given ecosystem, stocks of natural resources (natural capital) yield useful flows of services and amenities at different spatial and temporal scales. Consequently, the management

of natural capital has impacts on a range of stakeholders, from farmers to communities, to international concerns (ibid.).

To sum up, there is a need to establish a comprehensive knowledge base on the extent of land degradation, on the drivers for land use changes, and on the scope of integrated land use management so that policy makers and land resource managers may use the knowledge for designing policies and programmes to overcome the impacts of agricultural land use on environmental, economic, and social dimensions of sustainable development.

2. Integrated land use management systems

The general concept of *integrated* management of land and other natural resources has been elaborated under several different concepts and understandings. This section summarizes the most prominent of these to clarify what is meant by these terms, giving a first comprehensive idea of the practical implications of this concept.

Table 2: Concepts of integrated land use

<p>Integrated natural resource management (INRM)</p>	<ul style="list-style-type: none"> - INRM started as a systems-based research paradigm aimed at breaking down barriers between typically siloed approaches to management of economic development, conservation, agriculture, and forestry. The term was first introduced by the Consultative Group on International Agricultural Research (CGIAR) in 1999. - "Integrated natural resource management is a conscious process of incorporating multiple aspects of natural resource use into a system of sustainable management to meet explicit production goals of farmers and other uses (e.g. profitability, risk reduction) as well as goals of the wider community (sustainability). (CGIAR, 2000) - As this definition indicates, the key concept of INRM is that multiple resource management goals need to be considered simultaneously to achieve results. This was further defined by CGIAR as: "stakeholder-driven processes of adaptive management and innovation, to improve livelihoods, agroecosystem resilience, agricultural productivity and environmental services, at community, eco-regional and global scales of intervention and impact" (CGIAR Task Force on INRM, 2001). - More detailed information on INRM definitions and interpretation can be found in (Tengberg and Valencia, 2017) and (German, Mowo, and Opondo, 2013).
<p>Integrated land use systems (ILUS)</p>	<ul style="list-style-type: none"> - Another concept closely related to INRM is the idea of integrated land use systems. Specifically developed in the context of dryland development research, this concept also calls for simultaneous consideration of both socioeconomic and biophysical elements of land use, specifically through participatory development of land use goals (Reynolds <i>et al.</i>, 2007; van Ginkel <i>et al.</i>, 2013). - The ILUS concept is still a popular framework for conducting development and land use research in an integrative manner, particularly in dryland contexts (Schwarz, 2021).

<p>(Integrated) ecosystem management (EM)</p>	<ul style="list-style-type: none"> - Another key term used to describe integrated approaches to conservation and development work is the Ecosystem Approach (EA), a framework agreed upon by all UNEP Convention on Biological Diversity member countries in 1995 at the Malawi Conference of Parties (Fee <i>et al.</i>, 2009). More focused on conservation than previous approaches, EMA is defined as: - "a process that integrates ecological, socio-economic, and institutional factors into comprehensive analysis and action in order to sustain and enhance the quality of ecosystems to meet current and future needs" (Munang <i>et al.</i>, 2011). - The approach is further broken down into 12 key principles by UNEP (UNEP, 2000)
<p>Landscape approach</p>	<ul style="list-style-type: none"> - A term that frequently used to refer to integrated land use frameworks is 'landscape' approaches. This term developed to emphasize a focus on 'multifunctional' management of land across a large (landscape) scale (Sayer <i>et al.</i>, 2013). This concept is closely related to the ecosystem approach as well as the Sustainable Land Management paradigm described by Schwilch <i>et al.</i>, 2012.

Source: Schwarz, K. 2021. *Integrated land use practices for improved natural resource management in temperate deserts in Central Asia. Masters Thesis. Albert Ludwigs Universität Freiburg*

❖ Synthesis of key commonalities

The concepts described above are highly like one another and can all be described as integrated approaches to land use or resource management. For simplicity, this paper will use the umbrella term of ILU(M)S, following the example of (Schwarz (2021). Key elements are summarized below.

1. multiple land uses need to be considered simultaneously;
2. people and livelihoods should be centred;
3. thinking across traditional disciplines and sectors is necessary;
4. governance and policy at multiple levels may come into play.

Some of the various aspects that are typically identified as important in ILU(M)S include:

1. policy, infrastructure, market access, lack of services, price distortions;
2. farm/resource management innovation and practices;
3. social capital development;
4. socioeconomic and biophysical aspects need be considered;
5. research – iterative process of stakeholder-driven research.

(Schwarz, 2021, van Noordwijk, 2019, Tengberg and Valencia, 2018, van Ginkel *et al.*, 2013)

Box 2: ILU(M)S in practice - the example of Agroforestry

A typical example for ILU(M)S is agroforestry. Agroforestry is the purposeful combination of woody perennials with agricultural crops (i.e. silvoarable system) and/or livestock (i.e. silvopastoral system or silvopasture) on the same management unit. When combining all three components we speak of agrosilvopastoral systems. In practice the possible combinations of all components are manifold, and may, in fact, also include aquatic system components. Important to note is that integration of practices may also take place within a larger landscape as the broader management unit, where different system components may exist next to another, including competing land uses. This holistic thinking around integrated land use (management) systems is recently discussed under the so-called landscape approach gaining attention and traction in the numerous recent land and ecosystem restoration efforts. In addition, one can take a temporal approach to integration, meaning that different land use practices and components are interchanged over time. For example, a silvopastoral approach to a forest site may only be applied during a certain season of the year – e.g. during fructification of trees – left untouched for the remainder of the year to recover (adopted from Schwarz 2021)

Source: Schwarz, K. 2021. Integrated land use practices for improved natural resource management in temperate deserts in Central Asia. Master's Thesis. Albert Ludwigs Universität Freiburg

2.1 Why integrated land use?

The above definitions give a sense of the thinking and key principles of sustainable land use associated with ILU(M)S and similar approaches. However, it is also useful to understand why proponents of these systems find them necessary.

According to some researchers, interventions based on sectoral approaches often do not work to provide lasting benefits to rural households. One commonly cited reason is that because "human–environmental (H–E) systems are coupled, dynamic and co-adapting" (van Ginkel *et al.* 2013: 754), intervening in just one element (for example, introducing a new agricultural practice) is unlikely to have a predictable positive effect on the system as a whole (which includes ecological changes, political and institutional frameworks, other economic activities, etc). Horizontal and vertical integration are therefore both necessary to achieve positive outcomes and have interventions be implemented (van Ginkel *et al.* 2013).

Sayer *et al.* (2013) argue that integrated approaches are necessary in managing land because large areas of land or landscapes are most accurately understood as providing multiple benefits and services to multiple interest groups. As such, land use inevitably leads to conflict, which can best be managed in an integrated framework that provides space for complexity and negotiation. Without this space, it will be extremely difficult to make sustainable or stable decisions on land use issues.

Other benefits from integrated land use typically presented in literature include:

1. restoration of productive landscapes (Schwarz 2021);
2. increased agricultural productivity;
3. income diversification;
4. provision of ecosystem services;
5. increased resilience of ecosystems and social systems to global change;
6. contains built in element of learning (Tengberg and Valencia 2018).

❖ **Factors of success: governance**

Sayer *et al.* (2013) conducted a survey of development practitioners active in integrated rural development work to identify key challenges and important prerequisites for success. Results indicated that poor governance and institutional weakness were the primary obstacles facing these projects. Given the importance of allowing for meaningful negotiation between competing stakeholders on a given land management unit, improvement of local institutions is one primary prerequisite for successful ILUS implementation. In terms of governance, Sayer argues that meaningful stakeholder engagement, participation, and community trust are also necessary prerequisites.

All assessments of ILUS projects agree that meaningful community participation is an extremely important element of integrated land use planning (Fee *et al.*, 2009; Tengberg and Valencia, 2018; van Ginkel *et al.*, 2013).

The importance of governance and institutions in determining success or failure of integrated land use management will be further outlined and discussed in a later section.

❖ **Integrated LU approaches for drylands**

Many development researchers and practitioners have argued that integrated approaches to land or resource management are particularly well suited for use in fragile dryland socio- and ecological-systems. These arguments are summed up in a research article by Reynolds *et al.* (2007) who present a 'dryland development paradigm' closely reflecting integrated land use approaches.

Drylands are unique in that they tend to represent highly marginal populations, in terms of ecology, economics, and politics. They are characterized by 5 key factors: *high variability, low fertility, sparse populations, remote locations* far from markets, and *low prioritisation* by policymakers (Reynolds *et al.* 2007: 848). The authors argue that the above characteristics make dryland particularly vulnerable to negative consequences stemming from traditional approaches (cf. table in *ibid.*)

More recent work by other researchers provides further evidence and more arguments in support of the idea that drylands are particularly in need of more integrated approaches to land management (e.g. van Ginkel *et al.* 2013, Schwarz 2021).

To feed a growing population, land use approaches focused on mechanisation and intensification, disrespecting the capacities and limitations of the ecosystems may

create more negative environmental and social consequences than these ecosystems could carry. Already today severe soil degradation, declining availability of freshwater, and biodiversity loss pose a major threat to livelihoods for rural farmers across the globe, and particularly in drylands (Liniger *et al.*, 2017; Mirzabaev *et al.*, 2019; WOCAT, 2007),

For the dryland ecosystems dominating most of Central Asian landscapes, ILUS have provided a significantly higher level of ecosystem services and restorative effects (including soil fertility and water availability) when compared to intensive (monofunctional) production systems. They exhibit higher resistance and resilience not only to biophysical stress vis-à-vis the changing climate but also regarding the livelihood strategies (esp. related to the diversification in produce) available for rural farmers. In this respect, ILUS offer beneficial alternatives to conventional methods of land use that seem inefficient, inappropriate, and not sustainable against the backdrop of the environmental and climatic challenges of the decades to come (Dixon *et al.*, 1994; ICARDA, 2017; WBGU – German Advisory Council on Global Change, 2020, Schwarz 2021, van Ginkel *et al.*, 2013).

❖ **International patterns and examples of successful ILU(M)S**

In the past several decades, projects incorporating the concept of integrated land use systems have been successfully developed in a wide variety of ecological and cultural contexts, and at varying scales.

One large scale project is the African Highlands Initiative, which is an international "research-for-development" programme based in the eastern African highlands (Ethiopia, Uganda, Kenya, and United Republic of Tanzania). This project is explicitly informed by an INRM approach, with a focus on enhancing adaptive capacity, supporting sustainable agricultural development, and engaging in participatory research and evaluation. (German *et al.*, 2013). This project was founded by the CGIAR, continues to operate, and has resulted in tangible improvements in agricultural production and land management in the project area. CGIAR funded ILUS projects have also operated in several other national contexts (CGIAR, 2000).

Under the label of the CBD's ecosystem management (EM) approach, ILUS have also been implemented in advanced country contexts, including Germany, United States of America, and Canada, among others. While implementation of EM in these contexts has been restricted to the high-level political framework level, some meaningful changes in public land management have already taken place in line with the framework (Fee *et al.*, 2009).

ILUS have been particularly popular in dryland areas, where fragile ecological and social systems present particularly challenging development problems. The International Center for Agricultural Research in the Dry Areas (ICARDA) has been particularly active in promoting and developing projects based on an integrative approach. Successful ILUS projects have so far been implemented in Morocco, South Asia, Kenya, and the Andean Altiplano in Peru and Bolivia (Plurinational State of) (van Ginkel *et al.*, 2013)

While these select examples represent just a small portion of total ILUS activities around the world, they illustrate the increasing influence and positive assessment of ILUS-based development projects – particularly in drylands. After several decades of research and implementation, ILUS researchers have developed a set of best practices for successful project implementation.

2.2 Integrated land use in Central Asia

To identify integrated land use systems suitable for application in the Central Asian cold desert region, it is necessary to first understand the unique conditions that define this area.

❖ Ecology and climate

Central Asia is a large region with a diverse variety of landscape and climate zones. These include high mountains in Tajikistan and Kyrgyzstan, irrigated lowland agricultural regions in Uzbekistan and Turkmenistan and arid deserts. In general, the climate of the region is marked by cold winters and semi-arid to arid precipitation (Gintzburger *et al.*, 2005). In general, poor soils combine with these climatic factors to severely limit the potential for crop production in much of the region. Those areas that do produce food crops are dependent on irrigation (Mueller *et al.*, 2014).

Most of the land in Central Asia (65 percent) can be described as steppe or dry rangeland and are used for semi-nomadic or nomadic livestock production (Gintzburger *et al.*, 2005). Forests, which previously made up a much larger portion of land in Central Asia have been reduced to about 4 percent of total land area. Arable land makes up a further 11 percent (Mueller *et al.*, 2014).

While the ecosystems described above present many challenges, Central Asia also enjoys several advantages in terms of natural resources. First, the region supports relatively high levels of biodiversity, with a high number of rare and endangered species of plants and animals. This diversity is also reflected in agricultural crops: the region is home to a wide variety of cold-adapted crop varieties (Maikhuri *et al.*, 2015).

Another advantage is the storage of precipitation in glaciers and snowfields which means that water is in sufficient and stable supply (Djumaboev *et al.* 2020).

As described in the previous section, drylands represent one of the most fragile ecosystems in which to manage agricultural and natural resources. The cold climate found in Central Asia is another major challenge for land use, limiting crop varieties and leading to shortened growing seasons.

❖ History and culture

In addition to climatic characteristics, Central Asia is characterized by a shared history and several distinct cultural groups with their own agricultural traditions. These social

and cultural elements have both positive and negative effects on the region's land use and agricultural development.

In many ways the socio-cultural characteristics of the Central Asian cold desert region have been beneficial to the population of the area. For example, various groups of nomadic herders have developed sophisticated knowledge about how to effectively herd livestock in the specific climatic conditions of the region (Gintzburger *et al.*, 2005).

The region's shared history as a part of the Soviet Union also provides some strengths. For example, Soviet and local scientists conducted advanced research on rangeland management in cold dry climates, monitoring and scientifically managing large areas of rangeland for livestock production. While much of the Soviet era infrastructure has vanished, some degree of scientific knowledge and training in this area still exists in the region (Gintzburger *et al.*, 2005).

On the other hand, the Soviet legacy has also left the Central Asian cold desert region with numerous negative developments. For example, upon the collapse of the USSR in 1991, energy systems ceased functioning, forcing many communities to resort to massive deforestation to meet basic energy needs. In addition, Soviet-managed pastoral management systems were also significantly disrupted by a sudden lack of transportation and infrastructure maintenance (Robinson, Jamsranjav, and Gillin, 2017). In addition, Soviet crop production led to a massive increase in irrigation and in production of water-intensive crops like cotton. This led to a major overuse of water resources and rapid degradation of soil and rangeland quality (Mueller *et al.*, 2014). Currently, over half of cropland and about half of grazing land is degraded ((Strikeleva *et al.*, 2018).

The ecological and socio-historical conditions that characterize the Central Asian cold desert region make it unique in terms of specific land use opportunities and challenges. Recent research has identified numerous ILUS techniques that are likely to be relevant given these specific conditions.

❖ **Relevant INRM approaches for Central Asian contexts.**

Several recent studies have attempted to identify a set of practices, landscape scale activities, and political approaches that are particularly well suited for INRM application in Central Asian and Uzbek contexts.

Local and technical practices

In a recent FAO report, Ibrakhimov identifies numerous local-scale INRM compatible practices applicable in Central Asia, and specifically Uzbekistan. These include afforestation and reforestation, rotational grazing, reseeding rangelands, planting salt and drought tolerant species, and integrated crop-livestock-rangeland management systems at a farm level (Ibrakhimov, 2004: 45,46). While these practices represent a good starting point, meaningful application of the INRM or ILUS principles also requires activities at a larger, landscape scale.

Landscape scale activities

Schwarz (2021) provides more information on the types of landscape-level practices likely to be applicable in Central Asia. He divides these into suites of practices: silvopastoral agroforestry, silvoarable agroforestry, multi-level systems, water management, and others. Each of these broader categories includes a list of practices that fit into the various categories and are more specific. (Schwarz, 2021). In sum, agroforestry provides a particularly promising set of practices in the context of Uzbek drylands (Djanibekov *et al.*, 2015, IUCN, 2018).

Socio-cultural practices and historical pathways

Integrated land use as such may not be a commonly used term or concept in Central Asian contexts, in part because practical implementation is limited and scattered across the region. Considering a long (state driven) agricultural practice to cluster agricultural production spatially and economically, farmers still often see forestry and farming as two separate practices for two different income strings. This hampers awareness being raised among farmers about the multi-functional use and respective multiple positive effects and benefits of agroforestry systems, why adoption remains low (Djalilov *et al.*, 2016; Djanibekov *et al.*, 2016a). However, agroforestry as a specific application of ILU(M)S is well known and studied in Central Asia and there are numerous efforts to mainstream the approach as a viable alternative to monoculture and intensive agricultural practice, especially through the Central Asian office of the World Agroforestry Centre (ICRAF).

Agroforestry practices in Central Asian countries

Rather than offering one LU practice, agroforestry systems may be seen as a whole set of different ways how different land use components may be integrated in a landscape. The agroforestry practices most relevant in Central Asia today, though rarely practiced, include alley cropping, silvopasture, tree shelterbelts or windbreaks as well as live fences around fields or pastures, fruit-based agroforestry, kitchen (home) gardens, managed woodland for non-timber forest products and riparian buffers. (Djanibekov *et al.*, 2016b; Thevs *et al.*, 2017, Schwartz 2021). See next chapter for a contextualization in Uzbekistan.

Political activities

In addition to practices and management systems, political activity is an indispensable element of any ILUS. Given the nature of integrated management, just listing, and following a set of approved *integrated* practices at a local scale is insufficient to truly implement ILUS. Rather, the entire political framework surrounding natural resource management must be shifted to align with an integrated approach. Ibrahkimov (2021) explains the national and international level policy programmes that promote or use an integrated approach to land use. These include continuing to reform the Pasture Law, as well as aligning national policies with respective international commitments (including UN conventions on biodiversity, desertification, or climate change). Schwartz (2021) adds that for the widespread adoption a coherent (legal) definition and terminology for ILUMS and agroforestry is key. In practice the legal frameworks in place have restricted the distribution of ILUMS until recently. In Kyrgyzstan, for instance, and to prioritize food security, it was illegal to plant trees on agricultural land, until recently. Tree plantings were reserved for low productive land only. Since the lifting of this law

food trees on /next to fields gain traction and national strategies encompass agroforestry as a keyway forward (esp. in Kyrgyzstan and Kazakhstan) (Djanibekov *et al.*, 2016b, Schwartz, 2021).

Participation

Finally, to effectively implement ILUS/INRM in Central Asia, meaningful local and community participation is essential. While establishing political frameworks is necessary, they can only be effective if community members and local institutions are given a real voice and ownership in decision-making and management on natural resource management. State agencies must therefore be willing to share power in such multi-level collaborative governance arrangements. In addition, local community members must be given clear roles and incentives for participation in (co-)management arrangements.

Decision support tools for ILUS

In seeking to manage natural resources in a high desert context, policymakers in Central Asia would benefit from the use of international decision support methodologies and tools to combat land degradation. An example of such a tool is the DESIRE tool for combating desertification. This is a well-developed methodological approach designed to help select and implement land use projects in various dryland contexts. In line with INRM, the DESIRE tool incorporates community participation and simultaneous consideration of various land use priorities (Schwilch *et al.* 2012). While the use of this methodology is contingent on sufficient capacity in state or non-governmental organizations, it may prove highly useful in selecting and prioritising specific land use projects.

3. Land governance – an international review

3.1 Why governance is important for ILUS

Most of the literature on ILUS supports the view that good governance is an essential prerequisite for specific ILUS project and policy development.

To help explain why this is the case, and how policymakers can integrate good governance principles into their land use management, the following section presents a short overview of relevant governance theories, followed by a review of current research on best practice governance principles specific to integrated land use or natural resource management. Co-management is identified as a good paradigm for good governance of land use. Next, a critical review of examples of international governance in various land use sectors is presented. To set the stage for a detailed exploration of land use governance in Uzbekistan, the section concludes with in depth case studies of land use governance in two Central Asian countries: Mongolia and Kyrgyzstan.

As section 2 shows, numerous integrated land use practices appear promising in the context of Uzbekistan and Central Asian cold desert regions. However, as the literature described above also makes clear, integrated management of land or other natural resources requires more than just the right practices. Because adopting an integrated approach is only possible in a context of well-designed policy frameworks and meaningful participation, the quality of governance in integrated land use systems is of high importance. For example, many scholars argue that truly integrated management of natural resources is more likely to emerge under open or common property regimes than under traditional private or state ownership (Rohlmann, 1993). To understand why, it is necessary to closely examine the basic principles of governance.

Definition(s) of governance

Despite its importance as a concept in development research and practice, governance is difficult to define. Gisselquist *et al* (2012) define the term using the following three-part formulation: "(1) the process (or manner) through which (2) power (or authority) is exercised (3) to manage the collective affairs of a community (or a country, society, or nation)" (Gisselquist, 2012) (p 3).

While this concept was originally applied primarily to describe the actions undertaken by states (The World Bank, 1992; UNDP and CO-TRAIN, 1997), more current interpretations of governance take a broader perspective. Modern theories state that governance cannot simply be reduced to the formal actions of governments at various

levels, but also includes the actions of formal and informal institutions, community members, and NGOs, among other actors (Kardos, 2012).

❖ **Basic land governance categories**

To develop a set of best practices for governance in the land use sector, it is useful to begin with some basic concepts. These include various ownership regimes and the idea of property as a bundle of various right. In dealing with land governance, it is necessary to understand the basic framework of various ownership regimes. The 4 basic types of land ownership regimes typically identified in the literature are as follows:

- *State ownership* – state controls land, all associated property rights.
- *Private ownership* – land is divided among various owners who maintain all property rights in individual parcels.
- *Open access* – no control of land, property rights non excludable.
- *Common Property regime* – community controls and manages land/resource through internal governance mechanisms, dependent on clear membership criteria etc (Ostrom, 1990).

According to CPR theory, under certain conditions, CPR be the best framework for achieving good environmental and social outcomes, because local communities and institutions can most effectively manage land and other natural resources (Ostrom, 1990, Agrawal, 2001).

While the above classification scheme can help provide useful context, it is not sufficient to develop a nuanced understanding of a given natural resource management system. Another useful concept is the understanding of property as a bundle of rights.

In many contexts, property can be best understood as a bundle of specific rights (Schlager and Ostrom, 1992). Various use rights are often divided up among numerous stakeholders. Schlager and Ostrom identify 5 key types of land rights:

1. Access – the right to enter a given area.
2. Withdrawal – the right to remove resources from an area.
3. Management – the right to transform a natural resource and control internal use patterns.
4. Exclusion – the right to c control who has access to a land resource.
5. Alienation – the right to sell or lease any of the other rights.

For example, in the case of a government-owned forest, local stakeholders may have formal or informal access or harvest rights, while the state or local government may retain the right to develop or sell the land.

In most cases, land use rights are not all held by the same actor. Often, local users maintain access and withdrawal rights, while the other three types are held exclusively by the state. Many innovative approaches to land governance are based on the concept of transferring at least some management or exclusion rights to land users and away from states. This type of approach is typically associated with arrangements including

participatory management, local ownership, co-management systems and continued state ownership with use contracts or leases that incorporate some local decision-making structures (Crewett, 2012).

As Zimmermann (2007) points out, a failure to recognize property as a bundle of various rights can often lead to a highly inefficient use and management of resources, particularly when customary common property land use systems exist. If a state, for example, takes complete control of all property rights in a forest to control timber harvesting (a withdrawal right), local resources users who have traditionally held access or withdrawal rights may suddenly be excluded. By eliminating the assumption that the state is the only entity capable of managing land, communities can empower to contribute their local knowledge to resource management.

Following this logic, modern concepts of 'good governance' tend to call for more complex systems with increased participation, as is described below.

❖ **Global trends in land use governance**

In general, the trend within the academic literature has tended towards encouraging increasing levels of participation and local management of land and other natural resources. In practice, recent research describes a mixed picture. On one hand, international frameworks, political mobilisation, and national level policies have continued to increase their focus on participation and community management. On the other hand, increased social and economic pressure on land, exacerbated by climate change and corruption in many contexts, has caused some governments to revert to or strengthen policies based on strong centralized control (Cotula *et al*, 2019).

In this complex context, it is more important than ever to ensure that efforts to improve natural resource management continue to incorporate principles of good governance.

3.2 'Good governance' in the land use sector

As the name suggests, 'good governance' is inherently a normative concept. As such, it has been defined in different ways by a wide variety of international organizations, including the UN, the World Bank, the African Development Bank, the European Commission, the International Monetary Fund, and the Organization for Economic Cooperation and Development. Each of these organizations has their own take on the term, reflecting their various political and organizational priorities (Gisselquist, 2012).

However, based on decades of research, a broad consensus has emerged regarding the attributes of good governance. One widely cited article summarizes the key elements of good governance as follows: "(1) democracy and representation, (2) human rights, (3) the rule of law, (4) effective and efficient public management, (5) transparency and accountability, (6) developmentalist objectives, and (7) a varying range of particular

political and economic policies, programmes, and institutions (e.g. elections, a legislature, a free press, secure property rights)." (Gisselquist, 2012).

Specific principles of good governance have also been developed for the land use or natural resource sector.

Zimmermann (2007) is one commonly cited source for governance guidelines for public land management. This paper argues that states should develop and implement explicit public land management policies in line with public policy priorities. This is aimed to prevent states from enacting arbitrary or excessively centralized land management systems. As the authors argue:

"Good governance in managing public land first of all means establishing a sound policy regarding how government should intervene in land matters. The most critical element in guiding improvement in this area is the formulation of an explicit public land management policy in line with land policy and fiscal policy that sets out clear objectives related to economic growth, equity and social development, environmental sustainability and transparent fiscal policy." (Zimmermann, 2007).

The authors argue that government ownership of land should only be considered when it is necessary. Instead, alternatives including decentralisation, common property, and INRM should be incorporated whenever possible.

Lockwood *et al.* (2010) present a set of slightly different good governance principles specifically developed for natural resource management contexts:

1. *Legitimacy* – “acceptance and justification of shared rule by a community” (pg. 12).
2. *Transparency* – all management decisions should be directly accessible to stakeholders (pg. 14).
3. *Accountability* – individuals or institutions must be identified and held responsible to stakeholders for decisions and other outcomes (pg. 15).
4. *Inclusiveness* – stakeholders must be able to meaningfully participate and influence decision-making processes (pg. 16).
5. *Fairness* – “respect and attention” should be given fairly to the views and preferences of all stakeholders (pg. 18).
6. *Integration* – various governance actors and institutions should coordinate across levels and sectoral boundaries (pg. 20).
7. *Capability* – governance and management actors must be able “to effectively deliver on their responsibilities” (pg. 21).
8. *Adaptability* – actors and institutions must be able to anticipate and manage changing conditions, threats, and opportunities (pg. 22).

In addition to these general principles. Lockwood *et al* also present the potential problems with 'too much' local control (entrenchment of local hierarchies/ power centres). As they argue, good governance requires a balance between various levels, benefitting from the advantages of local communities, governments, and other institutions.

While some details may differ, what all GG paradigms have in common is a call for increased public or local participation and power sharing in governing natural resources. The next section describes various governance arrangements that have been developed in this direction.

3.3 Concepts of participatory management

As the concept of good governance has gained popularity in the field of natural resource management, researchers and policymakers have experimented with a variety of participatory governance arrangements. Many of these are based on the idea of common property resource management as a potentially optimal solution for land use problems (discussed above, see also Robinson, Jamsranjav, and Gillin, 2017).

Participatory governance arrangements can be situated along a continuum in terms of the level of participation and the degree to which stakeholders can influence outcomes:

1. **Community management** – this is where community has complete control of local resources (Ballet *et al.*, 2009).
2. **Co-management** – this is where management powers and responsibilities are divided between various actors, typically between governments and local community members or resource users. This can take a variety of forms, which will be described in detail in the next section (Parsons *et al.*, 2021) (Cronkleton *et al.*, 2012), (Ballet *et al.*, 2009).
3. **Government management with community consultation** (e.g., community representation on land use planning boards, public hearings, comment periods participatory evaluation (Gardner, 2016). These can sometimes be more symbolic than meaningful; comments can easily be ignored by governments.
4. **Central government co-management with local and municipal governments** (not actually based in community but still more likely to be effective due to increased local context knowledge). This is often also referred to as *decentralisation* (Larson and Soto, 2008).

In all these examples, the mere existence of a participatory mechanism does not ensure success. For example, if some key stakeholder groups choose not to engage in the participatory process (for any number of reasons), or if community power dynamics lead to one group achieving dominance or control of the process, participatory governance can at worst be even less democratic than more traditional state governance (Akbulut and Soylu, 2012). Participatory governance arrangement can also be harmful if developed in a way that ignores or undermines community institutions (Kamoto, Clarkson, Dorward, and Shepherd, 2013). Even pure community management can be undemocratic if severe power imbalances exist within a local community.

In general, communities and governments both have advantages in effectively governing natural resource use. Local communities benefit from a high degree of detailed and up to date local knowledge, flexibility in responding to change, and reduced transaction costs in implementation and monitoring. Governments, on the other hand, have access to more resources, including trained staff, software, and equipment, and are less influenced by local power dynamics and social pressures (Ballet *et al.*, 2009).

Given these concerns, it is helpful to develop governance mechanisms that can take advantage of the benefits offered by various levels (community, local government, national ministries). Because it enables interaction and synergies between various governance levels, co-management is often cited as an effective approach in dealing with natural resource issues in developing contexts. The following section provides more detail on this approach.

3.4 Co-management as ILUM

Definition

Co-management is a concept that refers to the sharing of management and decision-making power between state and non-state actors. In one widely accepted definition, co-management describes "a situation in which two or more actors negotiate, define, and agree amongst themselves to equitably share the management functions, entitlements, and responsibilities for a given territory or set of natural resources" (Subroto *et al.*, 2017).

In this approach to natural resource management, neither the community nor the state controls all access, management, and other use rights (Parsons *et al.*, 2021). Co-management can be further conceptualized as a way of managing relationships between various institutions and actors rather than of managing natural resources in a more traditional sense (Natcher, Davis, and Hickey, 2005). In practice, co-management can take a variety of forms. In strong cases, non-governmental groups share joint (and equal) authority with representatives of government agencies, with agreement between both groups necessary to enact management changes. In weaker cases, nongovernmental actors are restricted to function as relatively weak advisory bodies still subject to final governmental decision-making authority (Parsons *et al.*, 2021). Because it helps to enable meaningful cooperation between resource users and governments across sectors, co-management is often associated with integrated land and resource management (Duda and Ph, 2017).

Examples

One of the earliest examples of co-management was developed in the US in the 1970s, after a court decision based on Indigenous treaty rights forced government fishery managers to include Indigenous peoples in all levels of fishery decision-making and management in the Pacific Northwest (Parsons *et al.*, 2021). River management in New Zealand, (Parsons *et al.*, 2021), community co-management of forests in Latin America

(Cronkleton, Barry, *et al.*, 2012), and forest management in Bangladesh (Subroto *et al.*, 2017) are other recent examples.

Benefits

When properly implemented co-management is an effective and equitable tool for managing a wide variety of natural resources. As described above, both communities and governments offer different advantages in managing natural resources. The concept of genuinely shared power between the state, communities, and civil society is a key element to co-management that sets it apart from purely community or state driven management (Cronkleton *et al.*, 2012).

Potential Issues

Successful implementation of co-management is dependent on specific conditions and institutional frameworks. For example, local power dynamics must be considered – only when a power sharing arrangement is in the interests of all actors will it be able to function effectively (Zhu *et al.*, 2014). Another potential issue with co-management is that governments can sometimes limit the extent to which all management rights are devolved to communities. This can result in a situation in which community members face increased regulator or administrative hurdles without in return gaining access to meaningful management rights or power *vis a vis* the state (Cronkleton *et al.*, 2012) (Cronkleton *et al.*, 2012).

In general, the success or failure of co-management systems is completely dependent on the specific institutional and local context in which they are being implemented (Ballet *et al.*, 2009). Research into the contexts most suitable for co-management provides insights into best practices for setting up effective co-management policy frameworks. The next section presents examples from several natural resource management contexts to highlight the strengths and weakness of various governance models and reflect the positive potential of co-management approaches.

3.5 Land use governance in various sectors

The benefits of co-management can most easily be seen when compared with other approaches in real world applications. This section presents international examples of various natural resource governance approaches in several sectors. Examples of traditional management are followed by more participatory alternatives, revealing the strengths of co-management as a good compromise between extremes, particularly in the case of ILUS. Finally, these examples are used to develop a set of best practices for co-management in cold desert areas.

❖ Water management- drought

Centralized governance

Water and irrigation management is one of the most common natural resource challenges faced across the world. Throughout history, many various approaches to governing these resources have been tried. In the modern era, one approach favoured by highly centralized governments has been top down, central ministry governed irrigation management. Central Asia during the Soviet era is one good example of this. As small farms were collectivised, water rights also came under the control of the Communist state. Input from local communities was not considered. This led to the construction of several large-scale irrigation projects aimed at commodity cotton production, which in turn led to the issues with land degradation described above (Strikeleva *et al.*, 2018). China provides another case of centralized, government-controlled water management, although in this case central control takes the form of allocation of resources to regional and local governments. While these other institutions have some control of decision-making, centralized financing mechanisms provide strong incentives to align with national goals (Habich-Sobiegalla, 2018). While this system has proven more effective than Soviet irrigation management in terms of outcomes, the lack of local autonomy has led to suboptimal governance of water resources.

Privatized governance

Another approach to water resource management is privatization. Proponents of this approach argue that privatizing water rights leads to increased efficiency and water access, particularly among marginalized groups (Galiani *et al.*, 2005). Chile represents one famous example of this. In 1981, the national government passed a new law privatizing water right. This law assigned specific water usage rights to farmers and other land users based on land ownership and crop needs. The law successfully reduced water consumption with the intent of making more water available for copper mining activities. However, the actual needs of local land users were often ignored in the allocation of usage rights, leading to political conflict and degradation of traditional agricultural landscapes (Prieto, 2015). In general, privatization of water bears a high risk of cementing local power dynamics and potentially excluding marginalized water users (Trawick, 2003).

Participatory governance

As described in earlier sections, participatory governance is often viewed as an alternative to traditional state or private models, allowing for both flexibility and equity in managing resources. In the context of water management, this can take the form of formal transfer of water management rights to associations of water users (Trawick, 2003) or *de facto* management of local water resources through traditional institutions. Proponents of fully participatory approaches argue that local communities have the most deep and accurate knowledge of water needs and hydrological limitations, face low transaction costs, and are likely to prioritize equity among community members (Yu, 2012). Despite these advantages, in practice many fully participatory water policies have been unsuccessful. In China, one study found that participatory water governance had been ineffective due to rent seeking by government officials as well as a failure to

adequately incorporate local institutions (Yu, 2012). Similar outcomes have been observed in Africa (Page, 2003).

Co-management

In response to the combined issues faced by water management in systems of state control, privatization, or local community management, co-management has been proposed as an integrative solution. In the context of water, this typically means that management rights and responsibilities are shared between the state and local communities. Numerous studies have shown co-management to be highly effective in irrigation contexts, through bringing together local community context and expertise with hydrological expertise from governments (Frey *et al.*, 2016) (Garces-Restrepo *et al.*, 2007).

One example of water resource co-management can be seen in New Zealand, where management of rivers is governed through a power sharing arrangement between local governments and Indigenous groups (Parsons *et al.*, 2021). Numerous examples of successful co-management schemes can be found across the world (Grover and Krantzberg 2013) including Central Asia (Wehrheim *et al.*, 2008; Strikeleva *et al.*, 2018). At its best, inclusion of multiple governance stakeholders can ensure careful and informed consideration of all relevant management factors in the context of water resources.

❖ **Forestry**

This section provides examples of various management regimes in a forestry context.

Centralized governance

Forestry is the sector in which centralized state management is the most common worldwide. In many countries, all forested land is owned and managed by federal and state governments. For example, in Africa, 93.7% of forested land is owned and managed directly by the state (Barrow *et al.* 2016). The situation is similar in most post-Soviet states (Djanibekov *et al.*, 2015). In these contexts, management of forest resources is done by state bureaucrats. This mode of forest governance, however, has many downsides. First, states often do not actually have control over access and usage of forests, leading to degradation and forests that only exist on paper. In addition, conflicts can often arise between state law enforcement and local communities dependent on the forest for survival (Anderson 2000). These issues have led many to call for decentralisation of forest control and management (Contreras-Hermosilla, Gregersen and White, 2008).

Privatized governance

Some economists have argued that privatization of forests presents several advantages when compared with other governance regimes. These include increased efficiency, incentives toward land stewardship of private land, higher risk tolerance on the part of private owners, and economic opportunities for small landholders (Scandizzo, 2015). These ideas echo general market-oriented principles. Evidence for this in practice is mixed. For example, in Armenia, privatization initiated by the World Bank was touted as benefiting small landowners and promoting conservation. However, a recent study found that the actual effect was weakening of state and community institutions and an

increase in extractive forestry to the detriment of local populations (Burns, Krott, Sayadyan, and Giessen, 2017). Similar results have been observed in Guatemala, where outcomes were more strongly influenced by community level institutions than privatization (Gibson *et al.*, 2012).

Participatory governance

In the past several decades, forest management discourse has shifted strongly toward participatory or community management of forest resources (Gilmour 2016). As in other sectors, the idea is that local communities and institutions are best suited to manage forest resources sustainably and equitably. Recent studies in Ethiopia and Guatemala have argued that forest condition and social wellbeing have increased because of shifts toward community management of forest resources, with or without formal management rights (Gibson *et al.*, 2012, Siraj *et al.*, 2018).

Despite these successes, however, fully participatory management has also had negative results in some contexts. One international review of participatory forestry found that in many cases, inadequate local institutions, state unwillingness to cede management authority, and a lack of meaningful community participation have led to outcomes worse than those under traditional state forestry (Tole, 2010). Similar results have been found in Central Asia, where one study provides evidence that participatory forest management is ineffective in Kyrgyzstan due to insufficient local capacities, economic disincentives, and top-down government institutions (Ulybina, 2019).

Co-management

When compared with the approaches described above, co-management presents several key advantages, primarily in that it provides incentives for both state governments and local communities to prioritize stewardship of forests (Cronkleton, Pulhin, *et al.*, 2012) (Cronkleton, Barry, *et al.*, 2012). However, as usual, certain conditions need to be met for co-management of forests to be effective.

❖ **Grazing- pastoral systems**

Centralized governance

Responding to concerns about the tragedy of the commons, particularly the perceived inability of local communities to sustainably manage rangelands, some governments have chosen to implement highly centralized systems of pasture governance (Behnke and Freudenberger, 2013). The strongest examples of this approach come from the countries of the former USSR. In these contexts, the Soviet government nationalized livestock herds and grazing lands, converting traditional livestock management systems into large scale collective farms. In Kazakhstan, for example, the government aimed in the 1930s to eliminate nomadic livestock herding and replace it with 'modern' sedentary farming practices. The results were catastrophic and included the loss of 92percent of the national sheep flock between 1929 and 1933 (Hobbs *et al.*, 2008). After this failure, the USSR responded by reverting to a form of state organized nomadic pastoralism. This model was much more successful, leading to scientific management of pasture and directing resources to local communities for transporting and managing livestock.

In the end, however, centralized management of land in these regions led to major problems with land degradation and collapsed upon the end of the USSR (Robinson *et al* 2017).

Privatized governance

Privatized rangeland governance was also pursued in response to concerns about overuse of open access grazing lands. During the 1970s and 1980s, many governments and NGOs pursued privatization of rangeland to remove incentives for overuse. Often, this was pursued through enclosure and marketization of previously common land, made possible through increasing central government authority and capacity to govern land tenure (Behnke and Freudenberger, 2013). While privatization in some ways incentivized good management, it was also associated with negative social and ecological consequences, including reduced livestock yields resulting from small plot sizes, land consolidation (to the detriment of poor households), and incentives toward crop production in poorly suited areas. One strong example of this process can be seen in the East African drylands, where land tenure systems have effectively transferred land rights from nomadic herders to sedentary farmers, with negative effects on livestock production systems (Mwangi, 2009; Feng, *et al.*, 2018).

Participatory governance

Pasture and rangeland governance is one of the sectors in which participatory management systems have found the greatest popularity. This is since many communities have developed sophisticated common property regimes for managing and maintaining pastureland (Herrera *et al.*, 2014).

Successful examples of participatory governance can be found in a variety of contexts, including the European Alps (Baur and Nax, 2018) (van Gils *et al.*, 2014;) Casari, 2007), the Atlas Mountains (Dominquez, 2014), and Central Asia (Robinson and Fabian 2014). However, in contexts where traditional management systems have deteriorated or been damaged by many years of privatization of government control, communities are not always able to manage pasture lands effectively and sustainably without scientific or material support by states and other actors.

Co-management

In contexts where local communities do not necessarily have the capacity to manage pasture resources in a completely participatory or community driven way, co-management is often proposed as a reasonable and effective compromise. One recent example of successful co-management of rangelands can be seen in Kenya, where local community organizations have forged partnerships with government and other actors to augment local community institutions (Kanyuuru *et al.*, 2017)

The above framework for understanding the options for land governance is illustrated quite clearly in the analysis of specific case studies from Central Asia, where many of the approaches outlined above have been tried. Many of the pastoral governance systems described above are relevant to the Uzbek context. The system of Pasture management in Uzbekistan is described in detail in the following section.

As shown above, state ownership, privatization, participatory governance, and co-management have all been tried in Central Asia and Uzbekistan, to varying degrees of

success. The following case studies provide a closer look at pasture and land use governance in two other Central Asian countries. This information helps to contextualize the Uzbek context and provide material for comparison.

3.6 Case studies from Central Asia

The success or failure of any governance framework is determined by the specific institutional, social, and ecological context. In Central Asia, several key factors must be considered when designing governance frameworks and institutions for the region.

The first key factor is the shared history and political and landscape legacy left behind by the Soviet Union. These include state ownership of forest and agricultural lands, top-down state-oriented management structures, extensive deforestation resulting from the collapse of the Soviet system in the early 1990s, and erosion of traditional institutions for land management (Robinson *et al.*, 2017; Ulybina, 2019). Second, the region's harsh climate characterized by cold temperatures and low precipitation means that grazing and forest landscapes are easily degraded (Gintzburger *et al.*, 2005). Third, the countries of Central Asia are characterized by a broad variety of institutions and policy frameworks that have emerged in the past several decades. These range from privatization, state ownership and control of land resources, various participatory and co-management systems. As such, it is important to remember that each national context must be looked at individually when making designing policies or institutions. With these shared factors in mind, the following case studies on land use governance in Mongolia and Kyrgyzstan can be used to help illuminate the situation in Uzbekistan.

Each of these case studies represents a successful governance framework for managing pastoral systems in a central Asian context. For each case, this section describes the policy and ecosystem context, assesses the effectiveness of land use governance, identifies entry points and key barriers, and finally presents a set of lessons learned. Cases are analysed through the lens of integrated land use management as outlined in previous sections.

❖ **Pastureland management and governance in Mongolia:**

Background

Mongolia is a large country (1.56 million sq. km) with a small population of only 2 million and limited agriculturally productive land (Hannam, 2014). The primary landscapes in the country are grassland steppe and desert. While the country is rapidly industrialising, grazing and livestock production remains a key sector of the economy. Due to harsh climatic conditions (temperature extremes, low precipitation), agricultural and grazing land in Mongolia is highly susceptible to degradation, erosion, and desertification (Hannam, 2014). While the amount of productive grazing land has continued to decrease over the last several decades, livestock numbers continue to increase. As a result, Mongolia has made efforts to design a policy framework to incentivize more sustainable management of grasslands.

Traditionally, management of pastureland in Mongolia was informal, with the landscape being used as a common property resource. In the past, Mongolian herders cooperated through customary neighbourhood groups, which varied by region but served to regulate key resources like water and migration routes (Tumur, 2021, page 45). Membership in an organization was typically determined through use of seasonal camping areas and water sources.

Policy context: and governance responses

Contemporary issues involving pastoral land management in Mongolia can be linked to the dramatic social and political changes that occurred after the collapse of the Soviet Union in 1990. During the Soviet era, all land in Mongolia was placed under direct state ownership. During the transition period (1990-1993), livestock management in Mongolia was transitioned from large herding collectives called *negdels* toward a system of private ownership of herds by smallholders. Because marketization was not accompanied by government support and environmental regulation, and state-owned land was still freely available, many smallholders responded to market stresses by increasing their herd sizes (Tumur, 2021). This increase in numbers, combined with the lack of management by either community groups or the state led to unbalanced pasture utilisation and increased degradation.

In response to these issues, the government of Mongolia passed a new Land Law in 1994. This law was intended to regulate and manage pasture utilisation and introduced a leasing system for winter campsites used by groups of households. While intended to help control overuse of land, this system was criticized for leading to inequality of access between wealthy and poor herding families and for leading to insecure land tenure rights among informal participants (Robinson *et al.*, 2017).

Community groups

In the absence of official policy or institutions for community management or controlled access, local communities (assisted and advised by donor countries and NGOs) have responded by organising themselves into "herder" or "pasture user" groups. Herder groups tend to be smaller and focused on small scale livelihood improvements and management of local resources like water or winter pastures. Pasture user groups, on the other hand, are organized across a larger geographical territory and are explicitly intended to help manage pasturelands to avoid degradation (Hannam, 2014). These groups represent an informal governance approach that works in parallel to official institutional structures.

Pastureland law

Following several years of disastrous weather in which about 30percent of the national herd was lost, the government of Mongolia requested help from international donors and NGOs in developing a new national Pastureland Law (Robinson *et al.*, 2017). This proposed law would create a system of long-term pasture leases managed by national or local government that could be purchased by herder or pasture user groups. A second category of common use resources would also be created to manage non-leased areas. While this law is supported by numerous international organizations, many national politicians and stakeholders oppose the new law as too inflexible and too like privatization to be acceptable in a traditionally nomadic culture like that in Mongolia (Robinson *et al.*, 2017). Other opponents argue that there is insufficient institutional

capacity to effectively manage such a complex programme, and that enforcement of existing policies would be more effective. As a result of intense conflict over this law, it has as of 2021 still not passed or been implemented.

How successful is pasture governance in this context?

Evidence on the success of the Mongolian pasture governance system is mixed. On the one hand, recent research has presented evidence that the Pasture User Groups have had a positive social impact at a community level, particularly those developed as a part of the World Bank funded Green Gold project (Tumur, 2021).

However, other evidence suggests that in general, despite a positive social impact, the pasture user groups do not necessarily have a positive impact on land degradation issues (Addison, *et al.*, 2013; Robinson *et al.*, 2017).

Entry points and financing

In Mongolia, one key entry point for participatory governance of natural resources has been the independent activities of NGOs, which for several decades have been implementing their own projects to help develop and support pasture user groups. While government political action is likely to be necessary to achieve progress on a national level, a lack of political will and high level of controversy regarding land reform have made major political progress unlikely in the short term.

Key barriers

As mentioned above, one of the key barriers to improved pasture governance is the stalled progress of a new national pasture law. Public opposition to any movement toward privatization is a key element contributing to this. Another set of barriers are issues with inequality among herders, with wealthier herders taking advantage of gaps or loopholes in the current policy framework. Finally, many pastoralists feel the draft pasture law is too limiting. This concern is unique to the Mongolian context.

Lessons learned

Mongolia represents a case where the state is not heavily involved at all in managing land use, but rather leaves much of its natural resource management decisions in the hands of open access users. Also, preliminary evidence seems to show that, while pasture user groups are good for social outcomes, they are not necessarily better in terms of environmental outcomes. In general, this case shows that sometimes government control or action is necessary to achieve best environmental outcomes. However, participation should still be seen as a positive and necessary element for effective integrated management.

Reflecting upon the context of Uzbekistan, this case indicates that some level of state institutional structure is extremely helpful in achieving environmental goals. Uzbekistan should continue to develop and pursue its national pasture legal framework to avoid the weak state influence that has led to pastureland overuse in Mongolia.

❖ **Grazing management and governance in Kyrgyzstan**

Background

Kyrgyzstan represents a case quite different from that of Mongolia. While the two countries share a history of Soviet socialism, their landscape and policy contexts are strikingly different. First, Kyrgyzstan is a highly mountainous country, with 90 percent of the land area located above 1500 m in elevation (Egemberdiev *et al.*, 2013). This topography has led to a grazing system divided among summer, spring-autumn, and winter pasture areas. Like other post-Soviet contexts in Central Asia, pastoralism in Kyrgyzstan followed a trajectory of traditional community-managed grazing followed by centrally planned, collectivised grazing, followed by a reversion to smallholder management in the post-Soviet era, accompanied by new policy and institutional experiments (Egemberdiev *et al.*, 2013). During this era, Kyrgyzstan has been characterized by a unique openness to international cooperation and finance along with a decentralized government structure (Robinson *et al.*, 2017).

Policy context:

Pasture leasing

In terms of grazing policy, Kyrgyzstan presents an interesting case because it has experimented with several different institutional arrangements over the past several decades. First, soon after independence, the country implemented a leasing approach for pasture that operated through rental of large, defined parcels of land to individuals or groups of users. Crucially, parcels could only be rented by legal entities. This effectively excluded informal collective user groups (with shifting membership) from access to the system (Robinson *et al.*, 2017). The need to individually rent each seasonal pasture led to high transaction costs, and enforcement of exclusive contracts was ineffective.

Common property management

In response to the issues described above, the government of Kyrgyzstan decided to try a new approach. Strongly influenced by internationally funded, successful pilot projects in local, participatory management of resources (and pressure from the World Bank), a new Law on Pastures was developed and implemented. International consultants were highly involved in the writing of the law, which was also supported by key national level pasture officials. In general, the new law made use of environmental discourses which argued that the old leasing system was insufficiently flexible and hindered livestock movement, leading to increased degradation near settlements (Robinson *et al.*, 2017).

The primary changes caused by the new law were the repeal of old pasture leases, the organization of pasture management based on allocation of land to village governments and the creation of pasture user associations responsible for allocating pasture tickets and sustainably using the grassland resource. Finally, a national pasture union was created to represent the interests of the local groups at a national level (Robinson *et al.*, 2017).

How successful is pasture governance?

While government pasture staff argue that pasture management in Kyrgyzstan has been highly successful under the new policy framework (Egemberdiev *et al.*, 2013), most observers agree that the results have been mixed. The new co-management system is in many ways better than old leasing system because it is participatory and more flexible but could still be improved to achieve better environmental and management outcomes (Robinson *et al.*, 2017; Crewett, 2012; Crewett, 2015).

Entry points and financing

In Kyrgyzstan, the new pasture policy framework was entirely planned, implemented, and financed by international actors including the World Bank, which was particularly influential.

This had benefits in terms of getting innovative community and participatory management, but the rapid speed of implementation prevented the development of a nuanced set off institutions informed by and acceptable to local communities.

Key barriers

Administrative fragmentation, lack of services, and lack of rule enforcement remain major issues particularly as far as they continue to hinder migration to seasonal pastures. Lack of migration has been identified as a key driver of environmental issues (Crewett, 2012; Robinson *et al.*, 2017: 229)

Lessons learned

We can learn a lot about both leasing and community management from the case of Kyrgyzstan. On one hand, this case shows that autonomous community organizations have the potential to be culturally acceptable in Central Asian contexts. However, it also provides a cautionary tale about the dangers of implementing policy systems entirely informed by outside actors (Robinson *et al.*, 2017). Conflation of local government and pasture user organizations is also a source of distrust within the system, since many community members see it as little more than a tool of local government (Robinson *et al.*, 2017). In general, the case of Kyrgyzstan shows that, while more gradual change might be better, participation does seem to help with social and environmental outcomes. Less centralization also seems good, although rule enforcement and scientific expertise at national or regional level does seem helpful.

In the context of Uzbekistan, it is useful to draw from this example that increased participation will have positive effects (particularly if it takes the form of autonomous community organizations) but may not be sufficient to achieve positive environmental outcomes. In addition, the case of Kyrgyzstan recommends against rapidly changing policy frameworks implemented from outside, as these can also lead to mistrust and other problems.

Each of the above case studies, while different, provides useful context within which to situate a detailed account of land use management approaches and its governance in Uzbekistan. This account is elaborated on in the following sections 3 and 4.

4. Integrated land use management in Uzbekistan

4.1 Agroforestry systems and practices in Uzbekistan

Many of the ILUS projects and practices applicable in Central Asia in general are well suited for the specific context of Uzbekistan. The following sections present and contextualize distinct ILUS approaches for application in Uzbekistan.

The term “Agroforestry” may be new but its central idea that revolves around planting trees and agricultural crops in close combination with one another is an ancient practice that farmers have used throughout the world (Nair, 1993, pp 3). It remains the main land use management practice for a long time. Agroforestry can be understood as the sustainable integration of trees with food crops and livestock on the same unit of land (Djanibekov *et al.*, 2015). Farmers in Central Asia have been practising different fruit-and-nut based agroforestry systems for a long time (Ibid).

Over the recent decades, the scope of agroforestry has expanded, and many different activities now come under the umbrella term of “Agroforestry.” In the following section, we review various types of agroforestry systems that may be relevant from Uzbekistan’s perspective: (i) *Agri silvicultural*, (ii) *silvopastoral* and (iii) *agrosilvopastoral*. We briefly present and discuss the key features of these types and specific sub-types and elaborate on the challenges related to their applicability.

❖ **Agri silvicultural systems**

Agri silvicultural systems combine trees with cultivation of food crops. This farming system is very diverse and flexible as the crop does not necessarily have to be a cereal, but can even be shrubs, medicinal herbs, decorative plants, or fodder mixtures. The number of trees and crops can be more than one per one plot. Following are some of the common practices that are already existing in Uzbekistan and some that can be adopted by the farmers under suitable conditions.

Alley cropping

In alley cropping (also known as hedgerow intercropping), trees are planted in rows and common crops are grown in the aisles between them. One of the main advantages of intercropping is that farmers diversify their production and get annual harvest from crops, while waiting for the trees to mature and start producing as well. An example of this type of cropping system could be winter wheat intercropped with Walnut trees, which provide dry fruit and fuelwood. Walnut is in fact the second largest nut crop in Uzbekistan (Mirzaev *et al.*, 2004) as the country provides a favourable climate to grow walnuts (Sangirova *et al.*, 2020). Farmers can also plant forage crops or grass mixes among the fruit trees. This enables them to harvest grass for fodder, while getting fruits

as the other stream of income (e.g. production of juices, sales of fresh fruit from farm). Over time, trees may cast shade over the plot though and thus farmers may have to switch to shade resistant crops.

Shelterbelts and windbreaks

The use of trees as windbreaks and shelterbelts is a widespread practice in many drylands agricultural systems practiced widely, for instance, in Northern Kazakhstan and broadly promoted during the Soviet era throughout the whole region (but often also cut down during times of fuelwood shortage). In drylands, effects of winds on agricultural crops are often obvious from the physical deformation of plant parts and their growth forms. Indirect effects concern the water balance of plants and moisture content, erodibility, and other properties of the soil (Skoupy, 1991; Sheikh and Khaliq, 1982). Strategically planted trees can mitigate these ravaging effects of winds. Windbreaks can increase in crop yields by 10-20 percent in Uzbekistan (Tupitsa *et al*, 2006).

❖ Silvopasture systems

Silvopasture systems integrate the trees and grazing livestock operations on the same land. These systems are intensively managed for both forest products and forage, providing both short and long-term income sources. This involves the incorporation of the native tree species having high fodder values in rangelands. They can either be scattered irregularly or arranged according to some systematic pattern.

Reforestation of pasture shelterbelts and fixating moving sands

Pasture shelterbelts entail the planting of shrub species on hummocky sands in desert regions to prevent wind erosion of sand and dust storms, increase soil moisture and provide fodder and shelter for livestock. The fodder shrubs – in the case study in Uzbekistan they consist of saxaul, circassian and kandym – are planted as shelterbelts around pastures. The case area in Uzbekistan is in the Karakum desert. Vegetation cover is sparse and bio-physical conditions are harsh with heat and drought occurring in summer. Due to overstocking, seasonal use, and lack of pasture rotation the pasture capacities are often exceeded in the case area in Uzbekistan. The forage shrubs are planted in strips as live fences around a pasture, with a density of 600 – 1200 plants/ha and 25 m wide. On the one hand, the planted shrubs are providing necessary food for the animals, on the other, they are also creating an improved environment for the natural vegetation to recover by taking off foraging pressure, improving the microclimate, contributing to soil humidity, preventing soil deflation, and reducing wind speed. The system is suited for regions with annual rainfall between 100 and 250 mm and on flat to hilly topography.

Protein and fodder banks

This involves growing the native tree or shrub species to produce protein rich fodder on farms or rangelands for fodder production. The fodder kept in this manner especially

acts as a reserve supplement during the dry periods, when other sources of feed are limited. This is a feasible agroforestry practice in many dryland areas, where there is high population pressure and high feed scarcity. This can be a viable option for Uzbekistan if different trees or fodder species – especially those that are drought tolerant and do not need much water – are planted around homestead or backyards as clumps. The trees can be closely planted, where land is in very short supply. Adequate protection against roaming livestock is essential in establishing such fodder banks.

Live fences

Living fences can help keep out domestic or wild animals. However, in Uzbekistan, they are planted on one side of a larger windbreak to limit access and protect the windbreak from browsing. Most plants are short, rarely over 2 m high, and the fence is dense and impenetrable. Trees or shrubs are planted closely together in one or more rows. Planting fodder species as live fences can additionally provide fodder, while serving the primary objective of fencing and windbreaks in wind prone areas.

❖ Agrosilvopastoral systems

Apiculture (beekeeping)

Simply put, apiculture is the maintenance of honeybees and hives that provides farmers with honey, beeswax etc., along with crop pollination services. In drylands, bees are important pollinators of both wild plants and agricultural crops (Klein *et al.*, 2007; Ollerton *et al.*, 2011) and are particularly abundant and diverse (Kazenel *et al.*, 2020).

Honey and honey-based products have a long tradition as a food source in Uzbekistan (Abdiniyazova *et al.*, 2016) and beekeeping is more popular in the Karakalpakstan region in Uzbekistan, than other regions. Nevertheless, it is a feasible activity that can provide alternate livelihood income among other benefits to the rural population.

In recent times, there has been some interest and efforts of the Government of Uzbekistan to promote beekeeping in collaboration with the FAO. In one such collaboration, the FAO's Technical Cooperation Programme called – Support to sustainable Apiculture Development, a series of training, exchange visits of technical personnel to other countries and transfer of relevant technologies to the Uzbek beekeepers is provided. The programme was geared towards providing necessary education and timely information to the beekeepers to prevent loss of bees. In 2013, a private company called *InfoCapital Group LLC* launched a communication and public awareness campaign in Uzbekistan. This component was implemented within the framework of the Food and Agriculture Organization of the United Nations (FAO) and Main Forestry Department (MFD) under ministry of Agriculture and Water Resources (MAWR). The purpose of this project was the development of industry through the development of the NWFP a comprehensive national strategy and its implementation by activating two priority sectors – beekeeping (apiculture) and medicinal and aromatic herbs (MAH). This will efficiently manage the NWFP resources and ensure their growing contribution to food security and livelihoods of local communities, as well as in the national economy. Most recently, in March 2021 a seminar was held in Tashkent on the

implementation of a new project that will assist women beekeepers in adapting and managing an application for beekeeping in Uzbekistan. The project is called: AI-Driven Climate – Optimized Beekeeping for Women in Uzbekistan (UIIKOP).

The interest of the Uzbek Government to promote beekeeping is a welcoming step towards empowering women and smallholder farmers and agricultural diversification. However, the interest must translate to creating incentives and knowledge portals, infrastructural as well as financial support to smallholder farmers and women.

Home gardens and fruit tree orchards

Home gardens or small subsistence farms are a very common existing agroforestry practice in the whole region, and in Uzbekistan. In a nutshell, families grow fruit trees along with vegetable beds. This fruit-based agroforestry approach is often practiced at scales from 0.1-100 ha, the latter only were aimed at commercial use (Djanibekov *et al.*, 2016b). These systems provide a wide range of produce for the farmer's use and the system components mutually benefit each other. Trees in this practice provide fruit, diversity of fodder, and fuelwood. Along with protection against wind, their foliage may also enhance soil properties and water distribution.

Pistachio plantation

This system is aimed at the restoration and improvement of productivity of degraded areas in the foothill zone by the establishment of pistachio orchards. During the first years, intercropping with drought-resistant crops such as safflower, peas, melons, gourds and alfalfa is conducted to bridge the first uneconomic period of the tree plantation. Alfalfa could be especially important for improving soil conditions as a nitrogen fixer. Later the system may be transformed to silvopasture or fodder plot, hence adding another management type and turning it into a multi-level system. The hilly lands in which the demonstration site is located are representative of a large portion of the country in Uzbekistan and they are widely at risk of desertification due to anthropogenic pressures and unsustainable land use (livestock). This multilevel orchard system with the native tree species pistachio is promising to be able to let the land recover and flourish again. The Pistachio trees grow in exceptionally dry conditions without irrigation which make them very well suited for recovering ecosystem services in such harsh conditions. In the long run, pistachio agroforestry is expected to be much more profitable compared to previous uses, which was mostly sedentary pastoralism. This is due to the long stability in revenue, with the trees having a very long lifespan (more than 1000 years). Therefore, planting pistachio orchards may be an investment for future generations of the land user as well. The local population used to lack additional revenue sources outside of livestock production. Pistachio plantations are of exceptional importance for people living in the areas where almost no other fruit bearing species would grow without supplementary irrigation. With a return rate of investment of estimated 500 – 600 percent, in the long run, pistachio production is expected to be much more profitable than livestock production in this region, as well as more environmentally friendly.

❖ Opportunities and challenges of agroforestry systems

Agroforestry systems as part of integrated land use management systems, offer a great potential to provide sustainable livelihoods to the rural population and an important avenue for the sustainable development of the land use sector vis-à-vis environmental change and challenges. Agroforestry allows for agricultural diversification, strengthening livelihood options for farmers. Studies based on Uzbekistan (see Djanibekov and Khamzina 2016; Djanibekov, 2015) found evidence for the integration of trees on farms being a viable option to manage agricultural production risks by diversifying land use activities. In areas where irrigation water was scarce, agroforestry was shown to produce the highest income among land uses (Djanibekov *et al.*, 2015). In another study, Djanibekov (2013) showed that seven-year rotation afforestation practices reduced the domestic household energy expenditure because of the increased availability of the fuelwood.

Agroforestry systems are also known for reclaiming degraded lands, which makes them suitable and sustainable land management practices. Khamzina *et al.* (2012) concluded in their study, that afforestation of highly salinized marginal croplands with fast growing trees in Khorezm, Uzbekistan increases vegetation growth and rehabilitates soil. Moreover, planting trees on degraded pastures can provide leaves and branchlets as an alternative source of fodder, along with rehabilitating degraded lands (Djanibekov *et al.*, 2015). Furthermore, agroforestry is known to increase biodiversity through agro-ecological matrices (Jose, 2009).

Agroforestry is often an economically viable land use option for irrigated drylands but is subjected to various socio-political constraints at the farm level (Djalilvov *et al.*, 2016). Most apparent being the lack of secure land tenure and restrictive policy environment (*ibid.*). Additionally, there is a lack of knowledge about benefits of novel agroforestry practices among the farmers. Djanibekov (2015) found in his farm surveys that farmers lacked knowledge about the range of ecosystem services provided by the various agroforestry practices and thus perceived the novel practices as not important. Another constraint towards adopting agroforestry in Uzbekistan is that the market for (fruit) tree products is not much developed as compared to crop and livestock commodities (Djanibekov *et al.*, 2015), despite the potential premiums that may be derived from numerous of them. Additionally, water scarcity is a major constraint. Some of the agroforestry practices discussed above, may not produce desired results were sufficient water is lacking. Finally, the restrictive agricultural policies and state-owned procurement of cotton (and wheat) in Uzbekistan reduce the farmer's ability to adopt agroforestry practices (Djanibekov *et al.*, 2010).

❖ Conclusion and recommendations

Despite the opportunities of agroforestry systems for rural development the pertaining constraints, as discussed in the previous section, make the adoption of agroforestry practices in the context of Uzbekistan still quite difficult. There is a need for numerous policy interventions such as increased land use flexibility, improved land tenure and tree plantation proprietorship security and greater institutional support (Djalilvov *et al.*, 2016).

It is believed that when farmers are certain about their land possession, they are much more willing to make long-term investments, such as agroforestry (Djanibekov, 2015). Hence there is a need to modify agricultural and land use policies along with establishing new institutions to provide farmers with subsidies and support in adopting relevant agroforestry practices. This holds particularly true where the systems integrate livestock and trees. Only where land tenure and land use rights of the farmers are secured by the Government sufficient flexibility and particularly security (of high up-front investments and for loans) will unfold the potential for sustainable land use and rural development in the country.

Knowledge sharing about best practices and increased awareness and training in agroforestry practices is another aspect that must be developed (Djanibekov *et al.*, 2016). However, overcoming long established mono-functional and clustered approaches and practices is not happening via new land reforms alone. It needs a joint effort with local practitioners willing to pioneer and trial integrated systems and sharing results right in the field with all relevant actors as a basis for diffusion. Systems need to be put in place that allow for knowledge exchange also from the rural sites to where decisions are made in the capitol (incl. regular field visits).

Bearing in mind the major barriers for agroforestry adoption by farmers being the high initial investments and delayed income generation (Djanibekov *et al.*, 2012), simple and affordable financing facilities for pioneering smallholder farmers will be key. Land and income tax exemptions may, for instance, raise the financial attractiveness for shifting to agroforestry during the initial years of practising and will also help boost farmers' morale (Kan *et al.*, 2008).

4.2 Pastoral management in Uzbekistan

This section presents the review of the status of natural rangelands in Uzbekistan. The main goal is to explore the socio-economic and policy environment that may pose challenges towards the adoption of a more sustainable land use system.

❖ 2.3.1 Introduction

Natural rangelands of Uzbekistan occupy 23 million ha - nearly half of its geographic territory, and supply over 30 percent of the country's meat output, 60 percent wool, and provide food and shelter for more than 2 million rural people (Shaumarov and Birner 2013). Over 40 percent of natural pastures in Uzbekistan are currently being degraded and have reached different levels of degradation (Ahmedov *et al.* 2009; Mahmudov, 2011; Shaumarov. M, *et al.* 2012; Holland 2010). Over the years, many factors such as mismanagement of livestock, overgrazing, soil erosion and desertification, water salinity etc. have decreased the land productivity by 25-30 percent (Shaumarov and Birner 2013; Ahmedov *et al.* 2009). Such pastoral degradation may have direct implications for livelihood of rural households, for regional food security and for the soil carbon balance (Shaumarov and Birner 2013).

Many scholars believe that the dryland pastures were better managed during the Soviet era in comparison to the current times (Holland, 2010; Shaumarov and Birner, 2013).

This is intriguing because the pastures were common-pool resources, which were effectively managed under a highly centralized Soviet regime. The pastureland management during the Soviet times was successful in generating several socio-economic benefits for the rural population. The land degradation issues were tackled much more effectively at the regional scales than are currently (Holland, 2010). A retrospective study conducted by Shaumarov and Birner, 2013 highlights the main reasons for conducting successful pasture management as: (a) *making intensive use of agricultural research*, and (b) *setting-up effective institutional structure*. This contrasts with the current situation where the pasture area has decreased over time by about 40percent, due to intensive and unlimited grazing, and hence overgrazing, abolishment of pasture rotation and lack of their reclamation practices (Yusupov *et al.* 2010, UNDP 2010(b)).

In this section we explore the possibility of collective action in pasture management in Uzbekistan to understand better how the past can inform the current pastoral land use practices for a more sustainable and productive system.

❖ **Collective action in pasture management**

In recent times, overgrazing, seasonal use, and the lack of migratory (rotational) grazing systems have led to the abandonment of some pasturelands and degradation of others in Uzbekistan (Schwarz, 2019). The pasture degradation situation is quite the same for the rangelands from other Central Asian countries (Mirzabaev *et al.* 2016). Although, in many parts of the world, local communities are conserving large areas of dryland pastures through sustainable management practices or cultural belief (Gudka, M *et al.* 2014), some researchers think that only long-term individualized access rights can encourage sustainable management and investment in Central Asia (Robinson and Fabian, 2014). There are apprehensions though, that such tenure rights may lead to fragmentation of grazing systems, further reducing the livestock mobility and eventually loss of access to pastures by poorer households (*ibid*). Hence the possibility of developing a co-management system in pasture management notes a viable option worth being explored toward more integrated systems of land management.

The literature suggests that there are a variety of ways through which co-management of dryland pastures can take place such as group tenure over a large area; combination of pastureland use with protected areas management; or local level institutional arrangements with community-based natural resource management (CBRM) approaches (Fernandez Gimenez 2002; Bedunah and Schmidt 2004; Berkes 1991; Jentoft 1989; Pinkerton 1989). However, in many cases, pertaining to socioeconomic and political factors, it becomes difficult to foster stakeholder participation in decision-making, conflict resolution and equitable benefit sharing, which are the main components of any co-management strategy.

In this section, we explore the scope for the co-management of pastures in Uzbekistan especially by taking clues from Kyrgyzstan, where collective action in pasture management is in place. In doing so, one must be aware of the similarities and the differences in the land tenure rights and overall political environment in these two countries that share a similar Soviet history but might have very different post-independent realities.

In Uzbekistan, most livestock are owned by private households, whereas most pastures are held by state farming enterprises with whom these households must negotiate access. This contrasts with the Kyrgyz example, where initially a similar pasture leasing system was introduced. However, given the conflicts over pasture between collective herding groups (unable to take out contracts) and leaseholders, combined with the high transaction costs associated with the leasing system, led to its abolishment in 2009 and facilitated the adoption of the common pasture management model (Robinson and Fabian, 2014).

The sustainable management of natural resources mostly revolves around the involvement of local communities or resource users and gives them a certain degree of autonomy. Such an impetus has seen Uzbekistan to facilitate the formation of water consumer association (WCAs) to share the regulation and management of on-farm irrigation water. This is discussed and reviewed in more detail in the next section. However, it is worth noting that the agricultural policy of Uzbekistan primarily focused on staple crop production in arable land areas to strengthen the food security (UNDP 2010a) whereas institutional transition and development of livestock sector in Uzbekistan lagged in the country priorities (UNDP 2010b). This is also reflected in the fact that pasture management has received scant coverage in the international scientific literature (Mirzaboev *et al.*, 2016; Shaumerov and Birner, 2013). The post-independent agricultural reforms as discussed in the previous section clearly suggest the government's efforts to restructure state farms, state ownership of land, reforms to transfer land from collective farms to private farming use (IAMO 2008). However, given the major contribution of smallholder (*Dehkan*) farmers in the country's GNP via livestock production and related activities (Yusupov *et al.*, 2010), it is important to initiate the co-management programmes in pastoral and silvo-pastoral management. It is however worth mentioning that co-management in pastures is not being discussed here as a panacea for improving the overall feed sufficiency for the livestock sector. We are focusing on the potential institutional changes for the adoption of good governance practices to balance the ecological and economic goals.

- The Kyrgyz example of pasture management demonstrates the following key **aspects** in adopting the co-management practices:
 - management of the rotating systems in pasture management;
 - dispute and conflict management;
 - boundary management;
 - capacity development of resource users to exercise decision-making power.

However, before incorporating the above mentioned and generalized aspects of co-management of pastures, it is important to have a good understanding of the constraints that may be encountered in designing and implementing co-management arrangements in Uzbekistan. Such as:

- The lack of shared understanding of the interests and challenges faced by the herders in different parts of Uzbekistan. Having such shared understanding among all stakeholders is a must and must be developed to the extent necessary.

- Although pastureland represents about 50 percent of the total area of Uzbekistan and can be considered the main livelihood generation activity for a significant population (Shaumerov *et al.*, 2012), there is a lack of assessment of the value of this ecosystem. This information gap must be filled by conducting a nationwide survey including ecosystem valuation techniques as well as socioeconomic study in the pastoral population of Uzbekistan.
- As the literature suggests, the current regulatory and administrative systems do not allow for the co-management arrangements for pastures. Hence, there is a need to design a feasible framework pertaining to the legal systems that in turn facilitate the devolution of powers to the farmers /herders for managing common pastures. This may also require some form of restructuring that allows for smooth flow of inner workings of all the governmental agencies involved. Additionally, viable technical, institutional and policy options must be developed collaboratively for sustainable rangeland management.
- Many farmers increase the number of cattles to improve their income and livelihood, which may lead to pasture degradation. Providing alternative income generation options to the farmers who solely depend on animal husbandry may facilitate the success of co-management of pastureland.
- Sharimov *et al* (2012) point out in one of their studies that the policymakers of Uzbekistan perceive the dry grasslands as degraded marginal areas that offer poor returns on development investment. There is a lack of information on the behaviour and perception of agropastoral towards rangeland degradation and its impact on their livelihood income. Hence it is of utmost importance for policy makers and the farmers/herders to create not only a common understanding but also a technical knowledge database to inform the sustainable management of pastures in Uzbekistan.

❖ **Strategies for dryland pasture co-management**

Shaumerova and Birner (2013) in their historical analysis of dryland pastoral management in Uzbekistan through the lens of political economy, demonstrate that pastoral management was far more successful in Soviet era than it is now mainly because the Soviets were able to use agricultural research effectively to achieve a fairly successful management of CPRs at a massive regional scale throughout Central Asia. The political decision-making of the Soviet Politburo for the use of pastoral resources was informed by the technical and agricultural research.

Reflecting on the Soviet era, particularly regarding its effective pasture management in Uzbekistan, there are the following strategies that can be adopted for improving the current practices in pasture management:

1. Empowering dryland communities through capacity building and skill development.

After the independence, many local pastoral communities lost their skillful shepherds due to migration (Shaumerova *et al.*, 2012). This may have also led to the loss of traditional knowledge accumulated through generations. Although, it might not be possible to recover this unique knowledge and experience in current times, it is imperative to empower the communities to use the technical knowledge related to assessment of the water cycle combined with vegetative seasonality in distance pasturelands. (UNDP/GM 2007). This will help the farmers/herders to build a network of knowledge over time and thus use the land in a more integrative manner.

2. Incentives and investment

Mirzabaev *et al.*, (2016), in their assessment of challenges and opportunities associated with rangelands in Central Asia, found that migratory/rotational grazing through pooling of resources among small-scale pastoralists can increase household income. Hence, they assert that incentivizing collective action through facilitating the access to remote pastures can reduce the degree of overgrazing within community pastures.

Along with suitable incentives, the government should encourage local innovation strategies which aim to promote sustainable land management. One such example is the app called “pastoral”, which is a “prototype digital livestock management platform and experimental policy proposal that aims to assist with the development of Uzbekistan's pasture land by incentivizing sustainable grazing practices” (<https://karakoram.co/our-projects/pastoral>)

Such innovation may mean increased investment in knowledge creation and dissemination, facilitating better access to microfinance and other services for business opportunities such as eco-tourism etc.

4.3 Integrated water management in Uzbekistan

❖ Introduction

Due to very low annual precipitation rate, irrigation for cultivated crops is essential for agriculture in Uzbekistan (World Bank Institute 2007). About 96 percent of the total cropped land in the country is irrigated and agriculture consumes about 93percent of available water resources (ADB, 2016 Sector assessment Report; Schlüter *et al.*, 2010). The Uzbek economy strongly depends on agriculture, which contributes about 23 percent to the national GDP (World Bank 2009). Such dependency on irrigation water creates a huge overlap between water management and agriculture in Uzbekistan, thus making water management always a subordinate to the needs of agriculture (Yalcin and Mollinga, 2007). With the underlying goal to understand the potential opportunities and structural constraints linked with the integrated resource management paradigms in

Uzbekistan, this section explores the evolution of “Water users association” (WCAs),² which is a formal institution based on collective action in irrigation water management. We do this by analysing the policy interventions and actors involved in the evolution of WCAs in the country through review of both contemporary and historical literature, focusing particularly on the evolution of integrated water resources management (IWRM) in post-Soviet Uzbekistan.

This section is structured as follows. Firstly, we briefly discuss the land–water nexus that dominates Uzbekistan and its economy. Secondly, we examine the evolution of IWRM in Uzbekistan. This includes an attempt to understand the path dependence of the newly created institutions because in Uzbekistan, the path dependencies have been known to strongly shape the large-scale irrigation infrastructure (Sehring, 2009). Thirdly, we focus on examining the challenges and constraints associated with the new neoliberal approach towards water management following with the lessons, from the governance perspective that can be adapted for the integrated land use management in Uzbekistan.

❖ Land–water nexus in Uzbekistan



Irrigated agriculture is one of the most important sectors of the Uzbek economy (Hamidov *et al.*, 2015). In Uzbekistan, the water and agricultural organizations work in a cluster, and dominate agricultural planning (Morgounov and Zuidema, 2001). The nexus aspect is particularly important from the management perspective because externalities associated with the use of these resources may as well be linked and may pose constraints towards the overall goal of sustainable development in Uzbekistan.

Moreover, the land–water nexus, which enables agricultural production in Uzbekistan has led to a dominance of the organizations in spatial governance of resources (van Assche and Djanibekov, 2012). The agro-water cluster including the ministry of land reclamation and water resources, and the ministry of agriculture, along with the central research institutes in Tashkent, have played a highly influential role in *land use planning* and decision making particularly around cotton cultivation (Collins, 2006; Wall, 2006; Trevisani, 2007), thus impacting the water management in the country.

Furthermore, on one hand, control over irrigation water distribution directly impacts agricultural production in general (Veldwisch *et al.*, 2011). On the other hand, agricultural policies in Uzbekistan are known to directly impact irrigation water use and distribution. Abdullaev *et al.*, (2006) note that the increase in the farm size as part of farm restructuring has increased the competition for water use between the family plots and farmlands, which is one of the challenging water problems of irrigated agriculture in Uzbekistan (Abdullaev *et al.*, 2006). The water demands and water-use practices of private farmers and Dehkan farmers vary depending on the associated crops they grow, for example Cotton (and Wheat) for private farmers, fruits, vegetables, rice etc for

² Water Consumers’ Association (WCA) are non-governmental, non-profit organizations created by water consumers and act as legal entities to coordinate water relations, as well as provide representation and protection of common interests. WCAs are governed by the ‘Water and water use’ law, revision of which in December 2009 replaced water user associations (WUAs) with WCAs.

Dehkan farmers (Veldwisch *et al.*, 2011). See Table 3 in the subsequent section for the specific linkages between land and water reforms, which firmly assert the land–water nexus.

❖ Evolution of integrated water resource management in Uzbekistan

Reforms in the water sector are linked closely to the land reforms in a Post-Socialist Uzbekistan.

In the colonial times, prior to Soviet occupation, all the canals and ditches were owned and collectively controlled by local communities (Abdullaev *et al.*, 2006). The state *per se* had a marginal role in decisions on water allocation at the farm level (Hamidov *et al.*, 2015). Local mirabs (water managers) were solely responsible for water distribution to dehkan (peasant) farmers and operation of on-farm (secondary and tertiary) irrigation canals (Rakhmatullaev *et al.*, 2011). In the Soviet times, the role of the State in water management increased significantly, to boost the Soviet Union's economy through cotton production (Hamidov *et al.*, 2015). The state played a significant role in the expansion of irrigated land in Uzbekistan. With the advent of new technologies and advanced engineering, additional 3 million ha agricultural land was brought under irrigation. The water management authorities at the state level were created that were responsible for the delivery of water to collective (kolkhozes) and state (sovkhozes) farms, which then became responsible for on-farm water distribution and maintenance of irrigation systems (Wegerich, 2005).

In the post-Soviet Uzbekistan, the agrarian reforms were initiated where state and collective farms got restructured, however the state control persisted. The Ministry of Agriculture and Water Resources was now in charge of managing water from the country's main canals (Hamidov *et al.*, 2015). Yet, there was a huge gap in the understanding of who should manage the on-farm irrigation, which in the Soviet times, was managed by collective and state farms (Jumaboev *et al.*, 2013). The dissolution of collective farms into private, family-based enterprises through land reforms subsequently uncovered the need for the land and water management to structurally adjust (Trevisani, 2008; Veldwisch, 2007; Veldwisch and Spoor, 2008; Veldwisch and Mollinga, 2013). Hence, the Decree No. 8, in 2002 aimed to address this gap by introducing new institutions and governance structures – namely, an irrigation service fee (ISF) and the water user association (WUA) (Hamidov *et al.*, 2015). The rationale was to transfer the responsibility of on-farm irrigation water management to local farmers. This can be considered as the most significant institutional reform in the water sector where the water management shift occurred from an administrative and territorial approach to a watershed management approach in managing the water resources (Veldwisch and Mollinga, 2013). The irrigation water sector thus has evolved into an integrated water resources management, wherein the water management follows the basin principle. In simpler words, the water is managed by the organizations according to hydrologic or hydraulic boundaries instead of administrative ones (Wegerich, 2004). Furthermore, the water allocation and maintenance responsibility had been transferred to the water users through the introduction of water user associations (WUAs). These WUAs were established to operate and maintain the irrigation and drainage infrastructure of the former collective farms (Wegerich, 2000; Zavgorodnyaya, 2006).

Table 3: Historical reform of land and water management in Uzbekistan

Periods	Institutions for Water management	Irrigation system development	Land use farming system	Total irrigated area (per farm in hectare)
Pre-Soviet Occupation	Mirab* system: communities play important role	Small-scale irrigation canals	Smallholder land ownership: subsistence farming	Less than 1 ha
Early Soviet Period (1920-1950)	Some elements of old system plus increase of state role	Construction of new irrigation canals	Collectivization of land use	300–500
Late Soviet Period (1950-1990)	State controlled water management (WM)	Large-scale irrigation canal system	Collective (kolkhoz) and state (sovkhoz) farming	1500–2000
Early Post-Soviet Era (1990-2000)	State-controlled WM until farm level.	Unclear rules at the former kolkhoz and sovkhoz levels.	No major construction works Slow transformation from collective farms to individual family renting (shirkat)	1500–2000
Mid post-Soviet Era (2000-2008)	Creation of WCAs (with Decree No. 8 in 2002) to manage water at farm level	Hydrographic (canal) principles	Individualization of irrigated land parcels	1–50
Late post-Soviet Era (Since 2008)	Completion of on-farm irrigation system transfer to local WCAs	Hydrographic (canal) principles	Land optimization reforms	40–100

* The word Mirab has Arabic origin, meaning “head of water”.

Source: **Hamidov, A.** 2016. *Impact of agricultural land use in Central Asia: A review.* *Agron. Sustain. Dev.*, 36(6), 23. <https://doi.org/10.1007/s13593-015-0337-7>

❖ Water consumer association (WCAs)

In the literature, WCAs have been defined as “a voluntary, nongovernmental, non-profit entity established and managed by groups of farmers located along one or several watercourse canals” (Gunchinmaa and Yakubov 2010, p. 166).

At the beginning of the water reform, the rationale was that water users would act collectively to manage and maintain irrigation systems on which they depended but which they were not able to maintain by themselves at the level of individual farms. Later the name of the water association was changed from water user association (WUA) to water consumer association (WCA). This change in terms can be attributed to the revision of Water and Water Use law of Uzbekistan in December 2009. Distinctions between these two terms were clarified as follows: water users do not affect the actual amount of available water (e.g. fisheries and hydropower), whilst water consumers reduce the actual amount of available water (e.g. irrigation and drinking) (Hamidov *et al.*, 2020: 22). Hereon, we use the term WCA for the purpose of this review.

As members of the WCAs, the group of farmers and other water users living in and around one or more hydrological subsystems or watercourses, collectively manage, operate, maintain, and develop a local irrigation and drainage system (Moss and Hamidov, 2016). The WCA by-laws regulate the functioning of the association. The members are responsible for ensuring reliable distribution of water across all water users; determining and collecting irrigation service fees; resolving conflicts and disputes in a transparent and democratic manner and lastly, maintaining, renovating, and improving the irrigation system in the WUA operational area (*ibid.*)

The nation-wide establishment of WCAs is a new institutional arrangement in the irrigation sector of Uzbekistan. Although it has a very promising premise especially from the good governance perspective, the WCAs face a lot of challenges for fulfilling the promise of a devolved, transparent, fair, and effective institution of collective action. Many scholars believe that because the Soviet patterns of behaviours and mental models dictated by the command economy still dominate Uzbekistan and inhibit the decentralisation reforms and processes (Hamidov *et al.*, 2020; Sehring 2009; Abdullaev and Rakhmatullaev 2015). The WCAs are lost in the ambivalent process of “transition” (Herrfahrdt-Pähle and Pahl-Wostl, 2012; Veldwisch and Mollinga, 2013).

A study conducted by Moss and Hamidov (2016) reveals that Uzbekistan’s WUAs lack the funding, water user representation and resources to tackle the major structural problems confronting the post-socialist irrigation system. This argument is in line with the existing literature that the lack of financial and human resources of the water management organizations such as WCAs have resulted in the poor functioning and maintenance of the irrigation and drainage network in Uzbekistan and other Central Asian countries (see Sehring, 2008; Veldwisch and Spoor, 2008; Veldwisch, 2010; Wegerich, 2010; Hornidge *et al.*, 2011). There are various other limitations associated with the WCAs such as the problems associated with water fee collection. There are frequent discussions about the fairness of the amount of water service fees among different water consumers with varied needs, for e.g. the fee differences between people who depend on pumped water and people taking gravity water (Veldwisch and

Mollinga, 2013; Wegerich, 2000). Zavgorodnyaya (2006) in her study found that there is a discontent among the water consumers about the fees levied on them. Sometimes, the collected amount is not enough to cover the costs of water supply services, which in turn makes it difficult to provide the required services, making farmers even more reluctant to pay the water service fees.

The collective action literature provides evidence that the “participation” of the resource users in decision-making is a significant factor that influences the effective management and implementation of rules (Speer, 2012). In the case of WCAs, the participation of members in the management of water resources is bare minimum. In fact, scholars have found that often, no WCA meetings are held, and the state established WCAs are instead built on personal leadership, thus lacking transparent management with rules and regulations (Wegerich, 2000; Zavgorodnyaya, 2006). In most cases, the chairperson of the WCA is not an elected representative but is appointed by the regional governor (*hokim*) (Wegerich, 2000). It is widely believed that despite WCAs being *de jure* non-governmental farmers’ organizations, most users believe that they are *de facto* state run (Hamidov 2015).

Another critique about the evolution and implementation of the WCAs in Uzbekistan, is that although it incorporated huge influence and support of the external factors such as international developmental community and donor agencies it lacked the engagement of the local farmers (Zavgorodnyaya, 2006; Veldwisch, 2008; Abdullaev *et al.*, 2010).

Given the weak institutional design of an otherwise promising institution, the WUAs in Uzbekistan now merely operate as an institutional vehicle for the Government to complete state targets for cash crops, which permits only minimal participation of the water consumers in decision-making for water management and allocation (Moss and Hamidov, 2016). Nevertheless, as noted by Veldwisch and Mollinga (2013), the WCA in its current state provides an opportunity to mediate between hierarchical state control and incipient individualized farming.

4.4 Conclusion and recommendations

In a post socialist Uzbekistan, the evolution of WCAs indicates the potential of collective action for the sustainable use of natural resources. However, the literature clearly highlights the limitation of such attempts towards devolved and decentralized practices, policies, and institutions. The WCAs in Uzbekistan, although following a westernized concept of collective action, functions within the wider socio-political landscape of continued state control (Veldwisch and Mollinga, 2013). This is because the political past of Uzbekistan still shadows the workings within the governmental organizations and related institutions. Hence, the national and international researchers, international development officials along with Uzbek Government authorities need to calibrate their own expectations before the implementation of any such collective action intervention. In the context of integrated water resources management, Hamidov *et al.*, (2015) state that the maintenance of irrigation canals in the post-socialist context does not allow for the collective action in water management solely among water users as is practiced in

some other parts of the world however, it may present a case of co-production (Ostrom, 1996), where the state and users need to cooperate. This would mean striking a fair balance of shared roles and responsibilities among the state and the farmers. As discussed in the second chapter of the review, it is a widespread belief among the Uzbek people that the Central government passes on its burden to the local organization in the name of decentralisation. Hence, it is imperative that prior to any co-management interventions in Uzbekistan, the resource users must be supported financially and be given training and technical know-how to sustainably manage and monitor the resources. As an example, the previous studies have reiterated that the infrastructure needs to be improved to an acceptable level before it can be successfully transferred to local farmers (Hamidov 2007).

There is also a significant need to ensure the Land rights of the farmers as it is known that the insecure land rights reduce the incentives for farmers in actively engaging in management of the WUA (Wegerich, 2000).

There is a need for Uzbek policymakers to experiment with the design and implementation of co-management practices and modify them for the post-socialist land and water reforms, acknowledging the constraints of path dependence on their choices. Hamidov *et al* (2020) states along the same line of argument that the new generation of Uzbek policymakers needs to be more open to the institutional innovations, shared beliefs, and new perceptions to shape the institutional changes and improve resource management in Uzbekistan.

The regular top-down approach in policy implementation does not allow adequate space for collaborative management practices. The active engagement and collaboration of the informed local resource users with the State is desired to develop institutional capacities and innovative approaches for land use management but as Veldwisch *et al* (2011) express, in the specific case of Uzbekistan and other Central Asian countries the decentralisation policies developed in society-centric policy processes may not work as expected. The land–water policy or institutional reforms in Uzbekistan must consider the underlying impacts of Soviet history in policy processes that still shape the socio-political context in Uzbek society (Zikos and Thiel, 2013; North, 1990).

The broader topics of political economy such as institutional and social trust, elitism, informal networks, favouritism etc may further highlight the socio-cultural and political context pertaining to irrigation management. However, such topics are currently beyond the scope of this review. Nevertheless, we stress on the need for conducting research on such topics prior to policy interventions for integrated land use management including irrigation water management. This will help in gaining a better understanding of the social fabric of Uzbek society in post-socialist reality and affirm the factors that may limit or expand the capacities of resource users to co-operate and collaborate in collective actions.

5. Overview land use governance structures in Uzbekistan

In this section, a broad overview of the governance structure, particularly regarding land use management is discussed. Agriculture can be considered as one the major land use in Uzbekistan, hence in this review, most of the discussion within land use governance pertains to agriculture.

To understand the land use governance in post-socialist Uzbekistan, it is important to not only analyse the institutional designs and their current implications on the rural livelihoods but also adopt an evolutionary perspective to explore the process of transformation of these institutions post-independence. In this regard, we particularly focus on the land tenure in Uzbekistan and the associated reforms.

Institutions can be seen as mechanisms to bring coordination within organizations and rules in decision-making (van Assche and Djanibekov, 2011). They can have an informal nature (customs, traditions, codes of conduct), as well as formal rules (constitutions, laws, property rights) (North, 1991). In Uzbekistan, informal economy, patronage networks, kinship, and collectivist traditions still widely exist (see e.g. Poliakov 1992; Ilkhamov 2007; Urinboyev and Svensson 2013). Hence in this review we examine the interplay between informal governing networks and the formal legal–institutional system governing the land use management in Uzbekistan.

The section is structured as follows. First, we review the formal institutions known to be linked with the land use. Although the public administration system is centralized in Uzbekistan, it also extends from the central tier to the local tiers (Bektemirov and Rahimov 2001). We elaborate on the transformations of some of the institutions post-independence. Second, we review the role of informal institutions in the Uzbeki society and in land and water resources management. Informal networks are known to undermine formal institutions (Collins. 2002), hence we draw upon the insights of the state-society literature to understand the dynamics of informal institutions and parallel politics steered by the Clans in land use management, if any. Lastly, we discuss the gaps in Land use governance in Uzbekistan that may undermine the sustainable development goals and thus need to further evolve.

5.1 Formal structures and legislation

The political system and policy environment of Uzbekistan continues to revolve around agriculture (Hornidge *et al.*, 2015). Although the reliance on agriculture has pushed for various agrarian reform over the years, the partial modification of pre-soviet institutions has resulted in a complex mismatch of policies and interests. The agrarian scholarship highlights that the agricultural reforms and legislation in Uzbekistan are the results of contradictory priorities and objectives (Kandiyoti, 2002, 2003;2002; Spoor, 2009; Trevisani, 2007; Zanca, 2010). This has unfortunately left the rural agricultural population even more vulnerable (Kandiyoti, 2004).

With the primary goal of food sovereignty and security in mind, the government started reforming its national economy and agriculture. It was a challenging task to move from a centrally planned economy to a market-oriented economy. There were several land reforms undertaken in this regard (Veldwisch 2008; Trevisani 2008; Lerman 2008). On its transitional journey from a socialist to a market economy, Uzbekistan embarked upon the policy reforms following the western discourse of good governance and decentralisation (Urinboyev ,2018). While in the early years after independence, the reforms focused on the dissolution and stepwise semi-privatization of the large-scale state and collective farms (sovkhozes and kolkhozes), Since late 2008, several rounds of consolidation have led to the creation of several cotton-wheat farms of 75–150 ha (Djanibekov *et al.* 2012).

Governance provides the foundation for successful management, however there is no 'blueprint' solution for either governance or management, thus making it a chaotic undertaking in Uzbekistan (Dukhovny *et al.*, 2008). Moreover, governance in post-socialist Uzbekistan is administered through a complex institutional framework. Kandiyoti (2004), in his analysis states that the complexity arises from the fact that market reforms in Uzbekistan have only brought a slight modification in the institutions from the Soviet era (also see Kyle and Chabot, 1997).

Broadly speaking, several scholars share the line of argument that the frequency of reform and the lack of clarity in implementation criteria have resulted in a high degree of uncertainty about land use rights (Hornidge *et al.* 2011; Djanibekov *et al.* 2010; Oberkircher and Hornidge 2011; Eichholz *et al.* 2012). However, many scholars claim that the transition from a socialist to a market economy may be seen as to be complex, given the Soviet legacy and its internal power structures, weak institutions, and entrenched subnational political networks (see Ilkhamov 2004; Markowitz 2008; Melvin 2004). However, throughout back-to-back reforms, one thing remained the same and that is state ownership of the land.

Over the years, the Uzbek Government is making efforts to bring in new institutional actors such as semi-governmental structures, civil society, foreign donor agencies and NGOs in Uzbekistan, the governmental institutions still retain many features of the command economy, and this chaos is diluting the roles and functions of the organizations that were vehicles of social welfare (Kandiyoti, 2004). In a similar study, Urinboyev (2018), examines the feasibility of local governance in executing the various administrative and legislative reforms. He explores the responsibilities of local governments and the involvement of communities in the governing process based on the principles of good governance, such as transparency, accountability, rule of law, voice, democracy, and accountability. He found out that the local state administrations share subordinate relations with the central government. Other scholars have also shared the opinion of the hierarchical form of governance in Uzbekistan (Hornidge *et al.*, 2015; Djanibekov *et al.*, 2012; Eichholz *et al.*, 2012). Local government reform is interpreted merely in terms of citizens' active participation in local government, but other key conditions for local self-government (i.e. autonomy of local self-government structures from the state) are neglected (Ilkhamov 2004; Urinboyev 2015) and the persistence of authoritarian style administrative practices hinder the local government reform in Uzbekistan.

❖ **Land legislation in the Republic of Uzbekistan**

The Republic of Uzbekistan is taking several measures in the field of efficient use of land and water resources, prevention of degradation of agricultural lands, the introduction of new lands and other important areas.

The legal and regulatory documents adopted in this direction will be relevant to all participants who are producers of agricultural products, i.e. farms and dehkan farms, as well as agricultural enterprises. The following table provides information on the most important regulatory documents adopted in the field of land resources management.

Table 4: Main legislative acts of the Republic of Uzbekistan on land resources

Name of document	Year of adoption /document number	Sectors addressed
On measures to ensure equality and transparency in land relations, reliable protection of land rights and their transformation into market assets	08.06.2021/ Decree No.6243	Agriculture. Construction. Business. Forestry
On privatization of non-agricultural land	13.08.2019/ Law No.552	Non agriculture
On approval of the Regulation on the procedure for land use in rural areas	30.10.2014/ Resolution No.301	Agriculture, Forestry. Industry, Military, Communication, Transport
On improving the system for determining the normative value of agricultural land	18.08.2014/ Resolution No. 235	Agriculture
On approval of the Regulations on horticultural and viticultural shirkats	01.03.2011/ Resolution No. 51	Agriculture
On amendments and additions to some legislative acts of the Republic of Uzbekistan in connection with the deepening of economic reforms in agriculture and water management	25.12.2009/ Law No. 240	Agriculture, Irrigation
On privatization of land plots occupied by buildings and structures of legal entities and citizens	24.07.2006/ Decree No.3780	Agriculture, Industry
On approval of the Regulation on land monitoring in the Republic of Uzbekistan	23.12.2000/ Resolution No. 496	All sectors
On approval of the Land Code of the Republic of Uzbekistan	30.04.1998/ Law No. 598-I	All sectors
On measures to increase the efficiency of land use	29.11.1994/ Resol. No. 575	Agriculture Forestry, Fishery
About the procedure for registration of materials on withdrawal of the parcels of land in the Republic of Uzbekistan and their transfer for non-agricultural needs	27.05.1992/ Act No. 248	Agriculture, Non-agriculture

Source: collected by authors from www.lex.uz (National Legislative Database) and other sources.2021

Some of these pieces of legislation have expired or been updated. It should be noted that the mentioned normative documents of the agricultural sector on the management and regulation of land and water resources are also applicable to lands belonging to forestry and fisheries.

❖ National forest governance

The government of Uzbekistan has been making efforts to combat degradation and protect the forests through various legislative acts since Uzbek independence. However, there is a significant need to combat administrative inconsistencies and strengthen the administrative capacities of the institutions involved (Worbes *et al.*, 2006). In this context, attention needs to be paid for strengthening the laws relating to land use and water resource management (Saigal, 2003). For example, there is no legal definition of the composition of forests in the Uzbek “Law About Forests” that was adopted on April 15, 1999 (Worbes *et al.*, 2006). This excludes the existing agroforestry practices from being part of the state forest funds such as trees planted as windbreaks, trees and shrubs which are planted for other purposes on agricultural land; private trees in gardens and household areas etc., (ibid). Such exclusion of forest formation may hinder the rehabilitation and land use management efforts in Uzbekistan to a large extent.

Although the Uzbek Government is working towards the goal of sustainable forest management, there is a significant need for developing a national consensus on the role of forests, policy goals and availability of resources necessary to achieve them, flowing from high level political will to achieve sustainable forest management.

Many legislative and normative acts of the country relate to the use, lease, or return of forest lands, as well as the regulation of forest lands in general. The earliest legislation on forest use was passed in 1999 and was followed by numerous additional amendments and improvements. The most important of these documents are listed below.

Table 5: **Basic normative documents on forestry management**

<u>Acts</u>	<u>Year of adoption /number</u>	<u>Type of document</u>	<u>The main highlight</u>
On approval of the Regulation on the procedure for lease of land plots of the State Forest Fund	2019/ Resolution No. 993	Resolution of the Cabinet of Ministers	<u>Lease of state forest fund land</u>
On approval of the Regulation on the establishment of the maximum allowable use norms for grazing livestock on pastures, ensuring the exchange of pastures and the procedure for their management	2019/ Resolution No. 689	Resolution of the Cabinet of Ministers	<u>Norms for grazing, Pasture management</u>
On Pastures	<u>2019/ Law No.538</u>	<u>Law</u>	<u>General pasture management</u>
On regulation of the use of trees and shrubs on lands not included in the State Forest Fund and further improvement of the procedure for issuing permits in the field of their use	<u>2019/ No.43</u>	Resolution of the Cabinet of Ministers	Regulations on planting, care, cutting and registration of trees and shrubs
On additional measures to improve the activities of state forestry bodies and the use of natural resources of border areas of forestry	<u>2018/ No.717</u>	Resolution of the Cabinet of Ministers	<u>Improving the activities of state forestry bodies</u>
"On Amendments and Addenda to the Law of the Republic of Uzbekistan" On Forests	<u>2018/ No.475</u>	<u>Law</u>	<u>Amendments and Additions to the Forest Law</u>

<u>Acts</u>	<u>Year of adoption /number</u>	<u>Type of document</u>	<u>The main highlight</u>
On measures to further improve the use of flora	<u>2015/ No.278</u>	Resolution of the Cabinet of Ministers	<u>Forest use fees and regulation of payment</u>
On Forests	<u>1999/ No.770-I</u>	<u>Law</u>	<u>General pasture management</u>
On approval of certain normative acts on forest protection of the Republic	<u>1999/ No.506</u>	Resolution of the Cabinet of Ministers	<u>Forest fire safety and deforestation</u>

Source: Collected by authors from www.lex.uz (National Legislative Database), www.norma.uz (Information and legal portal).2020

Rule Enforcement

Land use rules in Uzbekistan are enforced by state officials, overseen by a council of ministers. The Republican Council for Coordination of Activities for Early Detection and Prevention of Violations of Land Law³ is a council of various authorities tasked with supervising and stopping violations of land use law.

The aim of this council is to introduce an equal, transparent, and market-based system of land allocation for all, ensure stability in land ownership and legal relations, protect land, guarantee the property rights of landowners, as well as determine the economic value of land and make it free to function as an object of civil law. There are also regional councils for coordination of activities aimed at early detection and prevention of violations of land law, which are the territorial divisions of the above-named organizations. The chairpersons of the regional councils are the chairperson of the Council of Ministers of the Republic of Karakalpakstan and regional governors.

❖ **Land tenure in Uzbekistan**

The government of Uzbekistan gradually restructured the land tenure system after independence, as part of revamping the agricultural sector. Throughout the three decades of independence, the country has gone through several farm restructures and land reallocations (Zorya *et al.*, 2019). In the first such land reform during 1992-1997, the state farms (*sovkhoses*) were de-collectivized, meaning the state farms were dissolved and added to the *Kolkhoses* or the Collectives farms (Trevisani, 2007). This reduced the government's financial responsibility, transferring it to cooperatives (Bobojonov *et al.*, 2013). The *kolkhoses* were large farms run by their members, though

³ According to Presidential Decree number ПФ-6243 of the Republic of Uzbekistan on date 08.06.2021 "On measures to ensure equality and transparency in land relations, reliable protection of land rights and their transformation into market assets".

the operations were controlled by local authorities of the Ministry of Agriculture and Water.

In the second wave of farm restructuring during 1998-2002, farms were fragmented into small production units. *kolkhozes* were transformed into *shirkats*, a mix of cooperatives and joint-stock companies (Lombardozi, 2020). The *Shirkats* over time lost their efficiency and were not regarded as profit-making organizations anymore (Djanibekov *et al.* 2012).

In the third phase during 2003–2008, the de-collectivization of *shirkats* took place, through the transfer of land lease agreements to individual farm enterprises or *farmers* (hereon private farmers) (Trevisani, 2007). The fourth phase of reform between 2008/2009 and 2016 was triggered by the unsatisfactory performance by those fragmented farms, hence the government again decided to re-consolidate the farms. Land productivity and efficient use of land were seen as the priorities for the government (Djanibekov *et al.*, 2010). This created a dual farming system where *dehkan* (smallholder farmers) with an average of 1 ha land; rearing livestock and practising horticulture coexisted with large individual farms (private farms), with 40-60 ha in average; growing cotton and wheat under the state order system.

The most recent farm restructuring⁴ that was adopted in the year 2019, seeks to increase the size of cotton and wheat farms to the average of 100 ha. The idea is to increase the farm size of the wheat and cotton producers to optimize the use of farmland by reallocating the land to more efficient farmers, along with improving crop rotation options (Zorya *et al.*, 2019, see table 6).

⁴ The Resolution of the Cabinet of Ministers No. 14 from January 11, 2019.

Table 6: Changes in land tenure in Uzbekistan through agricultural farm restructuring

	First stage 1992-1997	Second stage 1998-2002	Third stage 2003-2008	Fourth stage 2008/09-2015	Fifth stage 2016-2019	Sixth Stage 2019-present
	Decollectivization of state farms	Partial fragmentation	Complete fragmentation	Farm consolidation	Production specialization	Farm expansion
Main transformation process	Transformation of <i>sovkhozes</i> into <i>kolkhozes</i>	Transformation of <i>kolkhozes</i> into <i>shirkats</i> . Land lease to individual farms	Complete transformation of <i>shirkats</i> into individual farms	Farm reconsolidation (farm-size optimization)	Fragmentation and optimization of production	Farm reconsolidation (farm-size optimization)
Dominant farm types	Kolkhozes, sovkhozes	Shirkats, individual farms	Shirkats, individual farms	Individual farms, cotton-grain producers	Individual farms of different specialization	Individual farms, cotton-grain producers
Main policy objectives	Expansion of wheat area and yields, reorganization of state farms	Specialization of newly established individual farms	Development of non-cotton/wheat producing sectors, and livestock farms	Increased and stable cotton yields, relocation of cotton fields	Relocation of cotton and wheat fields, increased area of high value crops, multiprofile farms	Optimising use of farmland; Increase farm size of Cotton and Wheat producers (efficient farmers); improving crop rotations option

Source: Djanibekov, U., Dzhakypbekova, K., Chamberlain, J., Weyerhaeuser, H., Zomer, R., Villamor, G., and Xu, J. (2016a). Agroforestry for landscape restoration and livelihood development in Central Asia. ICRAF Working Paper 186. World Agroforestry Centre East and Central Asia, Kunming, China, 2015, 1–31. <https://doi.org/10.5716/WP14143>

The Uzbek agrarian reform was motivated by the international agenda of privatization and structural revamping as a move towards creating a post-independence identity (Kandijoti, 2003). However various scholars share the view that the path dependence on the Soviet legacy has been one of the main hindrances for the well-intentioned reforms to yield optimal results and the governance system is somewhat “lost in transition” (Veldisch and Mollinga 2013; Djanibekov *et al.*, 2010; Schlüter *et al.*, 2010; Hamidov *et al.*, 2020; Hornidge *et al.*, 2015).

Nevertheless, the government's commitment towards diversification and modernization of agriculture production can be very well perceived through the Presidential Decree No.2460 on agriculture sector reforms and development for 2016-2020 (IFAD, 2017). If the structural issues are addressed in agriculture governance by providing a more flexible system and secure land tenure to the farmers, this decree could translate to more opportunities for agroforestry interventions especially in the horticulture and livestock sector. This can be an enabling policy towards integrated land use management in Uzbekistan. It may further lead to enhancement of rural incomes and secure livelihoods especially for dehkan and smallholder farmers, who are the main contributors towards livestock output and horticulture products.

There is a significant need for dehkan and smallholder farmers to get effectively integrated into value chains along with the major players that shape the functioning of value chains such as traders/buyers, processors, exporters, and other private players. Additionally sustainable and encouraging partnerships must be forged between smallholder farmers and the private sector through investments (IFAD, 2017).

5.2 Nexus between central and local government

As a follow up to the previous discussion, we briefly review the relationship between local and central government in Uzbekistan.

In Uzbekistan, the local government is formed by the appointed or elected representatives every 5 years. They respectively form an administrative body, which is a local state administration and a legislative body which is an elected local council at the regional (oblast) and district (rayon) levels. They are responsible for implementing the governmental policies in the provinces and represent the executive and regulatory bodies of the state at the regional, district, or city/town levels (Urinboyev, 2018). Bektemirov and Rahimov 2001, points out to the fact that although the heads of the local state administrations are appointed by the central government after the seeking the approval of the corresponding local councils, such approval is merely symbolic in nature and does not necessarily support the democratic principles (Bektemirov and Rahimov 2001).

Although there have been reform initiatives in local government administration over the years, the persistence of authoritarian style administrative practices has done little to improve the subordinate relations between the central and the local government, which still strongly persist. The lack of cooperation, citizens' active participation and autonomy of local self-government structures from the state have been mostly neglected (Ilkhamov 2004; Urinboyev 2015). This translates to the lack of capacity of local governments to adequately address the needs and concerns of the resource

users/farmers and the citizen's interests get lost in the top-down policy formulation and implementation. Another reason for the subordinate status of the local governments is the lack of financial autonomy (Abdukhalilov, 2007).

Hence, to make the administration more democratic, there is an urgent need for the central government to make the local governments financially independent and allow them some agency to put across local issues from the local perspective, which can then be used as the point of departure for the policy discourse. This will significantly establish the institutional trust among the local citizens and will thus strengthen the efforts of reform initiatives taken by the government of Uzbekistan ever since their independence.

5.3 Sub-district level governance institutions

❖ Mahalla committees

*Mahalla*⁵ committees, although existed as part of the state farms, collective farms, and enterprises during the Soviet era, they were duly modified and given a new legal status as citizens' local self-government bodies after the independence (Urinboyev 2018; Giffen *et al.* 2005). *Mahalla* committees are community-driven organizations responsible for reaching out to the members of the community and assisting in social welfare programmes including conflict resolution, overall community upkeep, etc. (Bektemirov and Rahimov 2001; Urinboyev 2011a) It can be seen as an example of devolution of the social benefits distribution system to the neighbourhood level (Kandiyoti, 2004). It functions under the law on Institutions of Self-Government of Citizens (the Mahalla Law of 1999).

After independence, when the *mahalla* was vested with new meanings and functions, it became an example of a decentralized form of self-government (Kandiyoti, 2004). It was given the responsibility of social welfare distribution in 1994. One year later, it was recognized in the country's constitution as governing bodies that were constituted by the elected representatives approved by the hokimiyat. The elected representatives were men that held good status and respect in the society, except for one seat reserved for the women's representative candidate. Over the years *mahallas* were given more power towards their role in society, which also reflected the central government's commitment towards new and democratic institutions through the increase in total national expenditure, which increased from 42 per cent in 1991 to 53 per cent in 1997 (UNDP 1998 in Kandiyoti, 2004). The Law on Citizen's Self-Management (1999) vested mahallas with the social responsibilities beyond just social welfare such as assisting authorities in law enforcement etc. However, this devolution was met with criticism because as previously mentioned, the central government had delegated many tasks along with service delivery responsibilities to the local governments without providing adequate funding and corresponding resources (Urinboyev, 2018; Kandiyoti, 2007). In fact, this move was believed to be motivated by the need to cut administrative costs, thus making this decentralisation process not as successful (Noori 2006).

⁵ Mahalla means a traditional forum of self-governance at the neighbourhood community level. Traditionally, it was governed by a council of elders. Mahalla in its current usage is understood as a social unit/community with mechanisms of self-governance.

Although lacking in the actual capacity in terms of power and financial independence to promote local democracy and participation, these *Mahalla* committees remain the main link between state-society relations in Uzbekistan (Urinboyev, 2018).

Literature also suggests that there can be two kinds of *Mahalla* system: Local self-government (administrative mahalla) and the informal mahallas (social mahalla). Urinboyev (2018) clarifies that some informal autonomy can be seen in social mahalla unlike its counterpart. The leaders in social mahalla are elected by mahalla (neighbourhood) residents during informal gatherings in mosques or teahouses (guzar). The social mahallas function informally and autonomously and thus are a genuine citizen self-government institution (Urinboyev 2014; 2018). They offer a community-based alternative dispute resolution mechanism and provide a space for informal governance of everyday life and social relations. The analysis of scholarly literature shows that for many Uzbeks, social mahallas are more legitimate and easily accessible than the formal state institutions (Aminova and Jegers 2011; Masaru 2006; Sievers 2002; Urinboyev 2011b, 2013a, b).

5.4 Dehkan and farmers' association

The Dehkan and Farmers' Association⁶ is a network of farmers (dehkan and private), which was formed in accordance with Decree No. 168 of the Cabinet of Ministers in 1998 (Kandiyoti, 2004). It is a membership association that works for safeguarding the rights of the members and plays a monitoring role in ensuring adequate standards of land use management. However, some scholars see this as a contradictory mandate due to the heterogeneity in the composition of the association (see Kandiyoti 2004; Spoor, 2003). The members vary in their farm size, interests, and capacities. This by itself makes the function of this institution limited and daunting. Kandiyoti, 2004, when interviewed heads of this association for his research on post-Soviet Institutional design in Uzbekistan, found that although they are aware that such heterogeneity exists and that the scope of this organization may change with the future land reforms in the country. They, nevertheless, asserted one unifying similarity among the members and that is they all work on their own long-term leased land. The association works on behalf of the state authorities as a regulatory body along with aiding its members. As part of their duty, they defend the legal rights and interests of dehkans and private farmers; work in close relationship with the corresponding (K)*hokimiyats* regarding the land provision or withdrawals based on their reports, etc. However, ground realities paint a different picture, where the association doesn't have much agency. It is merely maintaining the "modified" command economy by taking on mediation duties that would have been performed by enterprise managers in the Soviet era. (Kandiyoti, 2004). Following is an excerpt from Kandiyoti (2004), which emphasizes on the previous statement and is worth noting.

⁶ This section relies heavily on the work of one author- Denis Kandiyoti and particularly their study "*Post-Soviet Institutional Design, NGOs and Rural Livelihoods in Uzbekistan, 2004*". The Uzbek agricultural literature does mention the Dekhan farmer association here and there, but there is hardly any other study done on the association through institutional perspective.

Box 3:Kandiyoti (2004) on dekhkan and farmer association

“The Dekhan and Farmers’ Association has been set up to help protect the rights of its members. Let us take the case of an independent farmer who has leased land through a shartname with the shirkat. This farmer must now transact separate contracts with input providers (machine tractor parks, petrol, irrigation, chemical fertilizer, and bank credit) and with crop buyers. The association is only supposed to step in when a member’s rights are infringed during these transactions; the association is obliged to intervene if a farmer does not receive payment in time or is unable to access irrigation services in time. However, the association has no sanctions at its disposal and only has an advocacy role” (page 14)”

Source: Kandiyoti, D. 2004. *Post-Soviet Institutional Design, NGOs, and Rural Livelihoods in Uzbekistan. Civil Society and Social Movements Programme Paper, Number 11. United Nations Research Institute for Social Development.*

The author further states that none of the branches of associations are adequately funded. This further limit the ability to perform their assistance duty towards the members. Although, organizations such as the Dekhan and Farmers associations have the potential to become very useful institutions for providing the agro-technical extension services, legal and business advice, and conflict resolution assistance. Its current ambiguous mandate and weak financial status makes it a hollow institution (Kandiyoti, 2004).

5.5 Women’s committee of Uzbekistan

A key state institution that exists in Uzbekistan for women empowerment is the Women's committee of Uzbekistan (WCU) (ADB, 2014). Although the structure of this organization was already in place during the Soviet era, it was given an NGO status only after the independence in 1991 (Azizova *et al.*, 2017). It works at all levels of governance right from the province to the mahalla level.

Despite having the NGO status, this organization can be considered partly governmental as the salaries for core personnel up until the district level come from the public funds (Kandiyoti, 2004). These public (governmental) funds do not translate to the operational budget and like any NGO, the Women’s committee also must fend for itself. This is another example of the “modified” soviet institutions which are hollowing out or getting lost in transition because of the weak institutional structure.

In its current form, the women’s committee engages in various activities related to strengthening gender equality; providing legal support to the womenfolk; and enhancing economic opportunities for women. It serves as a conduit for informing governmental policies about women’s priorities and recommendations (Kandiyoti, 2004). They may work at the community level in collaboration with other institutions such as Famers Councils, National Association of Non-governmental Organization of Uzbekistan, and local district authorities (Azizova *et al.*, 2017). In early 2018, the committee underwent substantial restructuring of its mandate, in addition to the previously mentioned

activities, the committee now has an additional focus on identifying women in need of assistance (Presidential Decree, 2018b; WCU, 2018a).

Many scholars believe that agricultural workload for women has increased over time, whereas their remuneration and voice have diminished with each agrarian reform (Kandiyoti, 2002; Tursunova, 2012; Azizova *et al.*, 2017). FAO is one of the UN agencies that has worked elaborately in collaboration with the Ministry of Agriculture of Uzbekistan focusing on the women in the land use sector. They have been involved in gender assessment in Uzbekistan and strengthening the role of women in rural development (FAO, 2002; FAO 2016; FAO 2019). In one of the FAO database reports, it is reiterated that female participation in farming activities remains high, however women are either restricted to being casual labourers thus earning piece-wage rates or even worse, they are employed as unpaid family labourers (FAO, 2013).

Having a weak financial status significantly limits the scope and capacity of this highly relevant organization. The Women's committee, given its NGO status, has no operational budget and relies on grant money to execute projects. The problem is that raising grants is not easy because donors consider it a governmental organization. This is because of the institutional ambiguity that was previously discussed. The lack of sufficient funds means that the activities of the committee are severely restricted (Kandijoti, 2004). Hence there is a significant need to make this organization mainstream by supporting its financial infrastructure and enabling it to deliver services and work successfully on its mandate including in the land use sector in Uzbekistan.

5.6 Land administration institutions and implementation

This section summarizes the general context in which land management and governance takes place in Uzbekistan. At the local level, land users often interact primarily with representatives of local administrative offices who implement many land use policies. These in turn respond to policy and administrative decisions made at the national level by administrative government entities. In defining and implementing land use policies. The roles of the various institutions and actors are defined by statute.

In general, responsibility for land management in Uzbekistan is shared by the Cabinet of Ministers and the local state authorities⁷. Relevant national agencies responsible for development and implementation of land use policy include the State Committee for Land Resources, Geodesy, Cartography and State Cadastre, the State Committee for Ecology and Environmental Protection, State Committee on Forestry.

Individual use or leasing land rights for forest and pasture lands are granted by the local *Khokims* (state officials), who are also responsible for confiscating the lands in case the farmers are not obliging by the legal rules. The state bodies working at the provincial and town levels share the responsibility of monitoring and maintaining the state land cadastre, overseen by the national agencies listed above.

⁷ Taken from the FAO database webpage https://www.fao.org/gender-landrights-database/country-profiles/countries-list/land-tenure-and-related-institutions/en/?country_iso3=UZB

Land use administration officials at the local level control access to specific pasture and forest resources through a system of leasing. Details on how the leasing system for pasture and forest land works from a user perspective are presented below.

❖ **Norms and terms of pasture use**

Grazing and haying of livestock is conducted in accordance with the approved norms and terms of use of pastures, depending on the type of pastures, as well as the type and number of livestock grazed on a particular plot of pasture. Norms and terms of pasture use are determined based on pasture inventory and geobotanical survey materials.

The law stipulates pastures being lands with a natural cover of plants that are food for livestock. Pastures are divided into desert, semi-desert, foothill, mountain, and plain, irrigated, and non-irrigated pastures. Pastures are a national treasure and are protected by the state. Mountain pastures are seasonal and are used only at certain times of the year. Legal entities and individuals can use pastures by permanent possession, lease, as well as temporary use of land plots. On the lands of the forest fund, pastures are used with the permission of the state forestry bodies. To rationally use and protect pastures, pastures are divided, considering the maximum load on the plot, and periodic and consistent use of plots is organized.

Pasture protection includes a system of legal, organizational, economic, and other measures aimed at the rational use of pastures, their reproduction and restoration for the specified purpose:

- establishment of rules, norms, and standards for the use of pastures, their reproduction and restoration;
- establishment of restrictions and prohibitions on the use of pastures;
- prevention and elimination of unauthorised use of pastures, destruction of plants;
- Inventory of pastures;
- implementation of geobotanical survey of pastures;
- monitoring of pastures;
- control over the use of pastures, their reproduction and restoration.

According to the Law on Forests, legal entities and individuals are allowed to conduct activities such as special use of flora objects, haymaking, grazing of livestock and timber collection. The use of pastures in the Republic of Uzbekistan is regulated by the Law of the Republic of Uzbekistan dated 20.05.2019 No.538 "On pastures".

Pastures can be given for permanent possession, lease, and temporary use by the decision of local state authorities. On the lands of the forest fund, pastures are used with the permission of the state forestry bodies. Permits are received through an online portal of the State Committee of Forestry of the Republic of Uzbekistan (<https://ruxsatnoma-urmon.uz/#faqs>).

Fees for the use of pastures are collected in the form of land tax or rent. Restrictions and bans on the use of pastures are established by specially authorised state bodies (Davergeodezkadastrkom, State Ecological Committee, State Committee for Forestry) for the purpose of reproduction and restoration of degraded pastures, protection of rare and endangered species of plants and animals listed in the Red Book.

The right to use pastures is terminated in the following cases:

- liquidation of a legal entity or death of an individual;
- pasture expiration;
- when used for other purposes or not used wisely;
- when pasture lands are taken away for state and public needs;
- voluntary abandonment of pasture use.

❖ **Forest use terms**

Forest land users primarily interact with local forestry officers representing State Forestry Fund sites for leasing of plots of land. According to the law, State Forest Fund plots may be leased to legal entities and individuals. There is a fee for forest use. Forest use can be permanent or temporary. Forest enterprises, institutions and organizations that have been granted permanent ownership of forest lands are considered permanent users of the forest. Types of forest use include – among other things – cutting of trees and shrubs, hunting, research, or harvesting of non-timber forest products.

Additionally, the lands of the State Forest Fund and unused land may be leased to legal entities and individuals based on investment agreements and public–private partnerships. The right of lease is exercised at the stock exchange. The auction portal for the lease of forest lands can be accessed at www.ijara-urmon.uz.

Land leases are sold based on auctions and may be used for reforestation, research, cultural, educational, health recreational, tourism development, hunting, fishing, establishment of medical plants, cultivation of seedlings. Lease agreements include information such as the area of the land, lease period, amount of rent and, rules stipulating the obligations of the lessee on the rational use of the forest lands.

Penalties for late payment of rent and penalties for breach of contractual obligations are distributed equally between the Forestry Development Fund and the permanent user of the forest.

❖ **Leasing procedures**

Irrespective of whether forest or pastures are concerned, land users primarily interact with state administrators through the procedural process of applying for a land use lease. The procedure for leasing land is similar for both forest and other state land. To provide an overview of the general process through which leases are distributed, an example of the leasing procedure on State Forestry Fund lands is presented in Appendix 1.

In general, the procedure described reveals a high complexity involved in implementing land use policy in Uzbekistan. On one hand, through accepting, rejecting, or transferring leases the state administration can effectively implement national policy in local circumstances. On the other hand, the various steps require much effort from both state officials and local land users, adding to a general sense of lacking transparency and mistrust. In addition, it is important to note that, despite the prominence of the state in managing land use, it is by no means the only relevant institutional actor. To understand the whole picture on the institutions governing land use in Uzbekistan, it is necessary to consider informal structures, rules, and norms.

5.7 Informal structures, rules, and norms

In this section, we try to collect evidence from the available literature about the role of informal institutions and networks in influencing land use governance in Uzbekistan.

Informal institutions play a significant role in countries where formal institutions are often poorly established (Manning and Westreicher, 2007). Many scholars argue that informal institutions are quite pervasive and can interfere with the functioning of formal institutions (Collins, 2002; Helmke and Levitsky, 2004; Theesfeld, 2004; Sehring, 2009). Failure to understand the importance of these informal rules may only create an incomplete picture of incentives and constraints that underlie political behaviour (Helmke and Levitsky, 2004). In Uzbekistan, like all Central Asia, key political processes are informal and may evolve around relations between clans and regime (Collins, 2004), although not all the informal networks in Uzbekistan are purely regional and purely clan-based (Tunçer-Kılavuz, 2009).

Significant literature on the land tenure reforms suggests that one of the outcomes of the agrarian reforms is class stratification in rural post-socialist Uzbekistan (see Ilkhamov, 2007; Kandiyoti, 2002, 2003, 2004; Trevisani, 2007, 2008; Veldwisch and Bock, 2011; Veldwisch and Spoor, 2008). Literature further highlights that such gaps created a way for clientelism and informal coping strategies (Kandiyoti, 1998, 2007). The agro-political literature stresses that the modified institutionalism and path dependence on Soviet legacy shaped both formal and informal relations of production, affecting unequal relations between private farmers and dehkans (Kandiyoti, 2003; Trevisani, 2007, 2008, 2009; Lombardozzi, 2020). Hornidge *et al.*, (2015), while discussing agriculture governance in Uzbekistan, states that “while formal practices follow formal rules and means of governance, strategic practices often follow informal rules, as they offer better rewards in situations where formality is known to be selectively used and enforced (pp. 88). Uriboyev (2013b), emphasizes on the connection between informal transactions of everyday life and the corruption of the state. However, the author also duly highlights that informal transactions are deeply embedded in cultural practices of Uzbekistan and not all informal transactions are corrupt, thus social norms, moral codes and local perceptions should be considered in the academic research and discussion on corruption per se. Delving deep into the topic of corruption is beyond the scope of this review. Hence, we now focus on the role of informal institutions in water management in Uzbekistan.

Schlüter *et al* (2010, pp 623), in their study on water management systems in Uzbekistan, use a broad notion of clans as interest groups that are based on (1) cultural norms that maintain a shared identity in a family, clan or solidarity group (see e.g.... Collins, 2004; Starr, 2006); (2) closed regional networks formed by strong economic and political ties with well-established access rules (“regional elites”, see e.g.... Ilkhamov, 2007) and (3) control over resources (Trevisani, 2007). They identify the latter two as relevant actors in Uzbekistan. The authors further state that these traditional structures and the informal rules governing their interactions have survived through the history of the Soviet Union. They further assume that informal institutions governing interactions among the different groups such as patronage, clientelism or corruption and informal networks such as ties among former members of collective farm brigades or members of an extended family clan (Abdullaev *et al.*, 2010; Zavgorodnyaya, 2006) act as barriers to changing water management practices because they facilitate the consolidation of the status quo or substitute real reforms/ changes. If duly considered, these social linkages can provide the opportunity for vertical integration of policy interventions (Schlüter *et al.*, 2010), meaning a successful policy coordination in the land use sector among governmental organizations across administrative levels.

Women in rural areas have continued to actively use and operate informal networks for money saving purposes along with socialising in contemporary Uzbekistan (Tursunova, 2013). These socio-economic informal networks may also be called “gaps” (Azizova *et al.*, 2017). In Soviet times such informal savings groups (or gaps) were called “chernaya kassa” (black cash registers). Even today, these groups continue to function as a livelihood resilience mechanism (Tursunova, 2013, 2014). Prior research suggests that resource-poor women living in economically insecure households use such savings groups to gain some level of livelihood security (Kabeer, 1994; CARE, 2006). Women’s participation in such social and economic networks often makes the basis for enhancing leadership skills, equality, justice, and environmental sustainability in improving the lives of rural people (Azizova *et al.*, 2017) further increase financial inclusion and overall women empowerment. Tursunova (2014) in their study found that Uzbek women in rural areas of Tashkent created informal social networks with relatives, friends, and neighbours because the majority of women could not borrow credit from the banks due to lack of assets (Tursunova, 2014). Furthermore, these kinship groups provide a safe space for women to address social problems such as domestic abuse and migration etc., share knowledge on seeds, prices in the market, planting, and harvesting etc. This helps them to formulate actions to solve livelihood dilemmas (Tursunova, 2014). These informal networks can be used to create a strong political and leadership domain for mainstreaming the livelihood issues faced by marginalized rural women and communities. The pervasive nature of informal institutions and networks within the field of resource governance often explains the discrepancies between the written rules and the ground reality. This innate nature of the informal institutions can thus be used as a bridge between various levels of governance, further allowing smooth vertical interaction in both directions (Schlüter *et al.*, 2010). Collins (2002) in her study of clans and regional elites in Central Asia concludes that clans provide links horizontally but also vertically by including both elite and non-elite members; the elite members provide political, social, and economic opportunities in exchange for loyalty and respect to maintain their status.

5.8 Conclusion and key recommendations

Land use governance in Uzbekistan revolves around two main themes: agricultural resource governance and water resource governance. Several theories and frameworks have been employed by various scholars to understand the institutional structures of post-socialist Uzbekistan. Some focusing on Stichweh's *Eigenstructures* and society's structural patterns (see Hornidge *et al.*, 2015a, 2015 b; Stichweh 2007), others on institutional economics and policy integration (see van Assche and Djanibekov, 2012) and management and transition framework (see Schlüter *et al.*, 2010). Nevertheless, the literature broadly concludes that the current institutional set-up of Uzbekistan is a mishmash of modified Soviet era organizations and inadequate new abatement institutions (Kandiyoti, 2004).

The transformation of organizations with the goal of bridging the gaps in a new market economy has created an institutional vacuum, an important level of complexity and inefficiencies. Examples are that the Women's Committee is transformed from a welfare organization to a governmental NGO or that various agrarian reforms have unfortunately not worked in favour of the marginalized farmers as intended. Same is the case with the Dekhan and Farmers' Association that was created to assist the newly formed independent and private farmers, or *mahalla* committees that were revamped to distribute welfare entitlements at the local level. Such well-intentioned interventions by the Uzbek Government have not reaped the desired benefits and in fact have suffered a 'blow.' Although these newly modified institutions retained the organizational layout from the Soviet times, the mismatch of devolving responsibilities to the local government (level), but not backing them up with sufficient finance and other resources has led to a broadly ineffective governance system (ibid).

Although working in a democratic setting the policy environment is authoritarian in practice, which hampers institutional innovation. Opening to the international donor agencies may be considered an important and right step towards creating a proxy version of civil society. But it has its own limitations, too (Roy 2002). There is an inherent need to increase the capacities of local NGOs, given that their existence is rooted in Uzbekistan. Thus, they may have a better understanding of the social norms, and parallel systems existing in the society. They would bridge the gap in knowledge when collaborating with the international donor agencies. This will in turn help to draw reasonable expectations from the international project interventions that usually span for a brief period.

Governance in Uzbekistan cannot escape from the evolutionary rigidity introduced by interdependence and path-dependence on the Soviet system (van Assche and Djanibekov 2012). But to carve a new governance pathway, where the broad interests and perspectives of all the resource users are aligned, there is a need for the government to work with various state and non-state actors at all levels.

Farm restructuring is only a part of the puzzle to be brought together into one coherent piece, not a silver bullet as often perceived (Kandiyoti, 2004). The discussion on agriculture in Uzbekistan has been revolving mostly around the farm size thus far. There

is a crucial need for the discussion to focus instead on providing farmers the independence and provisions, through funds and security, which motivate them for adopting new and innovative agricultural practices, investing in agroforestry systems, and having the freedom to make profit, a surplus of which can be shared back with the state. There is a need to strengthen and give decisive agency to farmers associations so that the interests of all kinds of farmers are looked after.

The creation of Water Users Associations in Uzbekistan is a good initiative however, such devolved institutions must not become proxies for the government to implement central government policies, but also be working from the bottom-up. The devolved or co-management institutions must be strengthened to work for the resource users, which in turn work in collaboration with the central government. A two-way interaction is the bare minimum for any co-management system.

Furthermore, Uzbekistan's agriculture policies must be gendering sensitive (FAO, 2019) and international agencies, particularly FAO, have been very vocal in emphasising the role of women in agriculture resource governance. The country is transitioning to a market economy; however, the literature suggests that there is a need for Uzbekistan to incorporate the lessons from Soviet history during this transition. For example, enabling the women's committee to provide support to rural women with different livelihood options based on their working or home-based status. The workings of the women's committee can be linked to providing technical and vocational training that help the rural women to work in agricultural and related cottage industries such as beekeeping. Some aspects of former *zhensoyuz* activities can be recalled modifying the women's committee (Kandiyoti, 2004). The adoption of the country's first ever gender equality law, "Guarantees of Equal Rights and Opportunities for Women and Men" in 2019, highlights the strong will of the Government of Uzbekistan to promote gender equality. This mandate must be accompanied by the efforts to strengthen institutions dealing with the women workforce both, in the farm and at home.

In conclusion, there is a need for the Uzbek Government to foster collaborative relationships at all levels of land use governance (from international to local). This can be done through adopting co-management practices, whereby more agency is given to the organizations based at the community level. Additionally, there is a need for the government to facilitate the opportunities for capacity building, knowledge sharing etc through pilot projects that can later be scaled up based on the local and international experts' recommendations. Facilitating the formation of formal and/informal resource user groups will help mobilise the resource users to voice their opinion on their needs and interests while drafting/revamping policies that affect the resource users is a key to successful management of land, agricultural and water resources.

6. Case studies

The case studies presented in this chapter enrich our analysis in that they provide a view into the perspectives and needs of the stakeholders in the region as well as relevant formal and informal institutions that are relevant as opening new options. Barriers for the implementation of different land use are also considered. While key recommendations have been elaborated in detail in earlier chapters for the land use governance at national scale, our conclusions to this chapter will add to those considerations of governance recommendations a set of guidelines suitable for the two pilots, accordingly.

The chapter starts with a technical subchapter for each region covering key background data and information related to geography, climate, economic activities (especially in the fields of agriculture) and population. This introductory information is followed by a narrative description of the forestry and land use approaches executed in the pilot areas, focused on livestock and agricultural farming by either commercial or dehkan farmers. Our elaboration pays special attention to the way land use is organized in each region and governed. Where visible major conflict lines were elaborated on as well as key challenges, e.g. related to the lease or water management systems.

6.1 Bukhara region: background

The purpose of this report is to develop detailed land use governance guidelines for two specific case study regions within Uzbekistan: Bukhara and Navoi. To that end, the following sections introduce each case study region, providing information on economic, social, and ecological factors relevant to land use. Based on this information, and the national and international research presented above, the final section outlines specific governance recommendations tailored for each area.

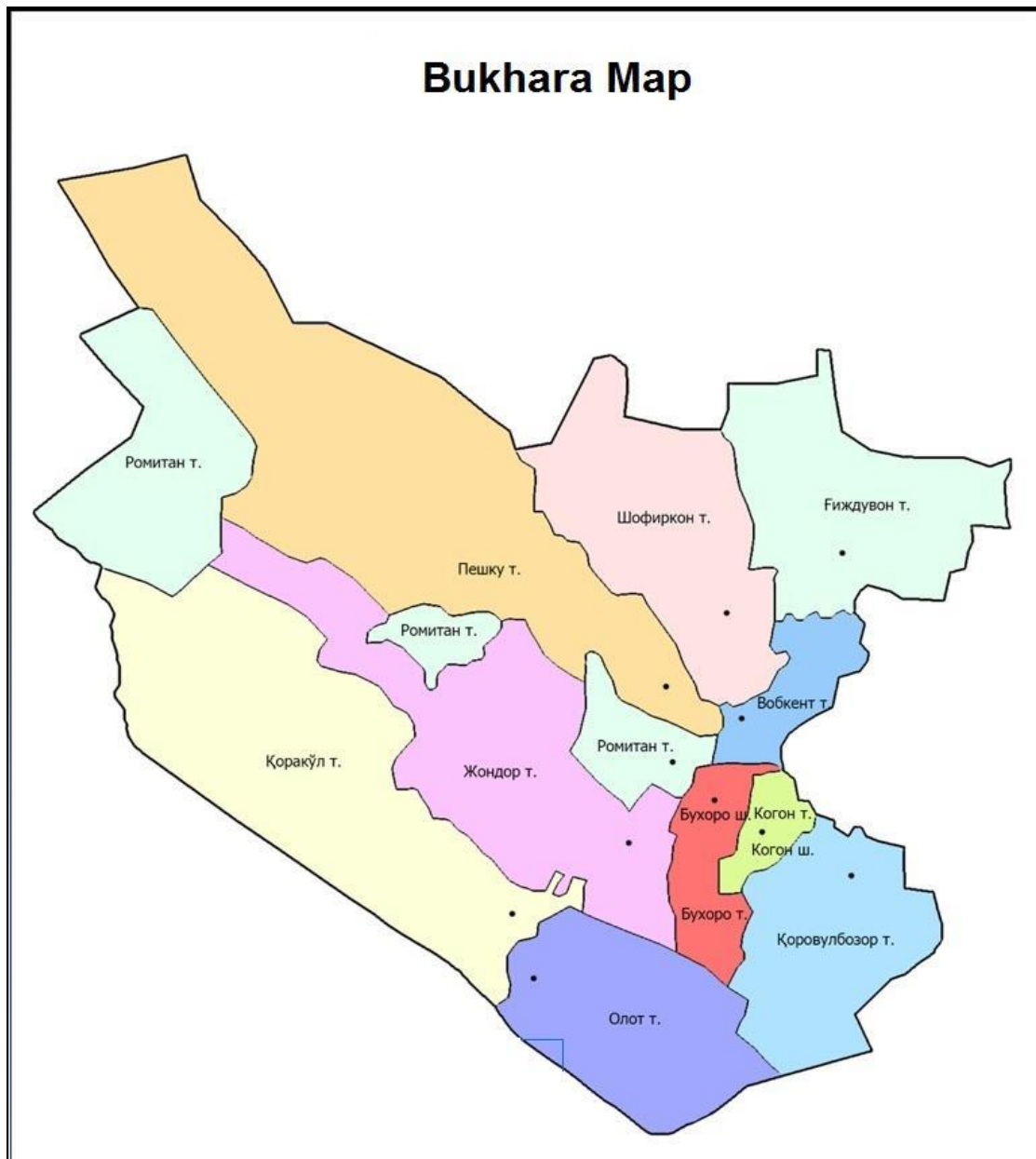
❖ Geography

The first case study region considered in this report is Bukhara.

Bukhara is the second largest region of the Republic of Uzbekistan following Navoi (Figure 1). It was founded on January 15, 1938. The territory of Bukhara is in the Kyzylkum desert, with the south-eastern area occupied by the Zarafshan valley. The region is bordered by the Khorezm region and the Republic of Karakalpakstan in the northwest, Navoi region in the north and east, Kashkadarya region in the southeast, and Turkmenistan in the southwest. The area of Bukhara is 39.4 thousand km².

Bukhara region includes 11 rural districts: Bukhara, Vobkent, Jondor, Kagan, Alat, Peshku, Romitan, Shafirkan, Karavulbozor, Karakol, Gijduvan, 11 cities, and 540 mahallas.

Figure 1: Districts of the Bukhara region



Map 1. Source: Adopted by authors based on *Khokimiyat of Bukhara region web page info*. 2021

❖ Climatic and ecological features

The territory of Bukhara consists primarily of plains. The climate in the region is sharply continental: summers are hot, long, and dry, with an average July temperature of 28–32° C. In sandy desert areas the maximum July temperature may rise to 60–70 °C. Winters are cold, with an average January temperature ranging from 0 °C to -2 ° C. Annual rainfall in Bukhara averages 90–150 mm, with most precipitation falling in spring and winter. The vegetation period is 220 days. In recent years climatic stress has increased in the region with longer and colder winters and hotter summers combined with decreased rainfall. One highly relevant ecological factor is the occasional

occurrence of sand and dust storms. Primarily originating in the flat landscape of Turkmenistan, these storms can be quite powerful, sometimes destroying the roofs of houses or removing trees. Windborn salt from the Aral Sea also impacts the top layers of soils (Fayzullaeva, 2020).

In terms of hydrology, the main water source in the Bukhara region is the Amu-Bukhara canal. Reservoirs are also of great importance as a source for irrigation and drinking water in the region. Kuyimozor, Todakul and Shurkul are the most significant of these. There are also lakes around the oases, such as Dengizkol, Karakir, Katta Tuzkan and Devkhona, where ditches and sewage are discharged. In addition to surface water deposits, Bukhara region also has a lot of mineral water reserves.

In terms of soil resources available for agricultural activities, the Bukhara region is infertile, with 94.4 percent of arable land considered as saline to varying degrees. In general, soil in the desert zone can be described as low-humus brown soil.

Finally, the Bukhara region also contains some significant mineral deposits available for exploitation. These include Setalantepa, Jargok, Gazli, Uchkir gas, Kemachi, Zikri, Ortabulak oil, gas and graphite deposits, limestone, bentonite (gilmoya), and granite deposits.

❖ Population and employment

By the end of 2020, the population of Bukhara region amounted to 1 923 900 people. Of these, 709 500 live in urban areas and 1 214.400 in rural areas. The population of Karakul district, which is a partner of the project, is 163 700, of which 62 400 live in urban areas and 101 300 in rural areas.

Around 1 million people (1 065 800, 54.7 percent of the total population) in the whole Bukhara region are in working age. With 881 400 people a higher number of people was economically active than are employed (796 800, 74.6 percent of the able-bodied population). For the study area - the Karakul district - the numbers show a similar pattern: 87 900 in working age (53.2 percent of total at district level), 70 900 being economically active, 7 200 unemployed (10.2 percent).

With 113 200 people registered as active job seekers, the unemployment rate of the Bukhara region is about 13 percent. The unemployment rate among young people is higher, whereas particularly young people are in urgent need of employment, given the unemployment rate among them is 15.2 percent (Uzbek News Agency, 2021).

Ensuring the employment of the population is a priority for the state. While agriculture plays a key role in the gross regional product of the Bukhara region, its share in the labour market is diminishing, mainly because working in the sector does not offer attractive salaries and development opportunities. Profitability in agriculture is exceptionally low with further limiting factors being few storage and processing opportunities and low levels of agricultural produce suited for external markets. This situation is further worsened by the challenging working conditions in a harsh

environment characterized by poor soil quality, desertification, water salinization, and persisting water (scarcity and waste) problems.

The movement of the (young) labour force to the Russian Federation, the Republic of Kazakhstan, South Korea, and other countries in the region, as observed at increasing rates in recent years, poses a major challenge to the economic development of the sector.

❖ **Economic development**

As shown in the following table, the Bukhara region has exhibited steady economic growth in all sectors over the past 10 years. Agriculture remains the dominant economic activity in the region, contributing to about 50 percent of total economic production.

Table 7: Economic indicators of Bukhara Region

	<i>Unit of measurement</i>	2010	2015	2019	2020
Gross regional product	<i>bln UZS</i>	4 651.6	12 368.6	28 143.3	31 525.1
	<i>growth rate, in percent</i>	110.0	108.5	106.3	101.9
Industrial products	<i>bln UZS</i>	1 674.8	5 143.9	14 798.2	17 567.1
	<i>growth rate, in percent</i>	110.2	111.3	110.5	100.6
Consumer goods	<i>bln UZS</i>	764.1	2292	5311.1	6 634.5
	<i>growth rate, in percent</i>	109.4	113.4	105.9	113.5
Agriculture, forestry, and fisheries	<i>bln UZS</i>	2 518.7	8 441.7	19 436.2	23 974.3
	<i>growth rate, in percent</i>	107.4	107.1	103.4	101.6
Services, total	<i>bln UZS</i>	1 072.6	3 751.2	8 413.2	9 874.1
	<i>growth rate, in percent</i>	117.0	116.4	113.3	106.1
Export	<i>mln. USD</i>	348.8	321.5	265.8	231.1
	<i>growth rate, in percent</i>	172.2	102.7	142.0	86.9

	<i>Unit of measurement</i>	2010	2015	2019	2020
Import	<i>mln. USD</i>	413.7	601.3	993.6	600.1
	<i>growth rate, in percent</i>	312.9	87.2	137.2	60.4

Source: *Khokimiyat of Bukhara region. 2021. Retrieved on 03.12.2021 from https://www.buxoro.uz/full_content.php?dt=pagesandid=119.*

❖ **Agriculture**

Despite the importance of agriculture in the region, only around 273 700 hectares in the region are irrigated (a number that includes all arable lands used for crop production). This accounts for only 7.4 percent of total land. Most other land (74.2 percent) can be described as non-irrigated desert pasture. This land use totals 2 764 600 hectares. Another 14 200 hectares is considered wasteland with no agricultural value. (Source: Khokimiyat of Bukhara region)

Key crops produced in Bukhara include cotton, grain, fruit, melons, vegetables, horticulture, and livestock products. In 2020, the volume of gross agricultural output amounted to UZS 23876.0 billion. Of this, dehqan farms produced 11646.6 billion, while production farms accounted for UZS 12229.4 billion. 9.8 percent of the total value of agricultural production was produced in Karakul district in this year (Source: Bukhara regional statistical department).

Cotton (ca. 129 000 hectares) is by far the most common agricultural produce in the region by area of land under cultivation, followed at a distance by field crops (particularly for fodder: 15 900 ha), orchards (18 200 ha) and vegetables (a total of 9 300 ha). Commonly grown crops include potatoes (2 967 ha), tomatoes (2 741 ha), corn (857 ha), cereals (81 ha), rice (200 ha), beets (116 ha), alfalfa (7 100) and mulberry trees used to feed silkworms (5 900 ha).

Livestock is a well-developed agricultural sector and forms the backbone of agricultural production in the Bukhara region. Livestock produced in the region includes cattle, sheep, goats, horses, camels, and poultry. In 2020, the region produced 262 000 tonnes, making up 10.4 percent of the total meat (live weight) grown in Uzbekistan. Milk and dairy are also important livestock products with 1 008 700 tonnes produced (9.2 percent of the national total), The farms of the region held 1.2 million heads of cattle (9.5 percent of the total), 2.2 million heads of sheep and goats (9.9 percent), and 5.9 thousand heads of horses (2.3 percent). Moreover, there are 4 000 heads (6.4 percent) of poultry (as of January 1, 2021). Finally, the region also produces 7 206 tonnes of fish annually (5.0 percent of the national total).

In addition to agriculture, forestry is also practiced in Bukhara. In 10 major forestry plantations, saxaul, cherkes, and sugarcane are cultivated in moderate quantities. The forestry unit in Karakul also grows medicinal plants.

❖ **Industry**

While agriculture remains the primary economic activity in Bukhara, industry also plays a role. In January-December 2020, UZS 17 574 436.1 mln. of industrial products were produced. The mining industry accounts for UZS 238 936.2 million, and the refining industry accounts UZS 16 781 746.2 million. The case study region of Karakul represents only a small part of this total at 3.3 percent (Source: Bukhara Regional Statistical Department)

6.2 Navoi region – background

The other region that was selected as a case study area within the framework of the CADI project is Navoi. The sub-district of Nurota is the specific district targeted by the second project case study.

❖ **Geography**

Navoi region is one of the most recently established in Uzbekistan. Its administrative centre, the city of Navoi, was established in 1958. Its total area is 110.99 thousand square kilometres, the second largest to Karakalpakstan (source: Khokimiyat of Navoi region) (Figure 2). It is in the central part of Uzbekistan. It can be considered a true desert with almost no rainfall because it is situated in-between two mountain areas. The north-western part of the region is bordered by the Kyzylkum Plateau, and the eastern part is surrounded by the Nurata Mountains. The southern part of the region covers the catchment area of the Zarafshan River. The region borders the territory of the Republic of Kazakhstan in the north and northeast, the regions of Jizzakh and Samarkand in the south-east, Kashkadarya in the south, and Bukhara in the south-west. The main water source of the region is the Zarafshan river. Farms in the region are supplied with water through the Navoi, Ortachul, Amu, Sumbul, Mayna branches of the Amu-Bukhara canal, as well as Konimex, Tos, Shavat, Chovli, right and left banks, Navkar canals, which receive water from Zarafshan. In addition, water reserves are created in the autumn-winter period in the reservoirs Kuyimozor and Tudakul. There are 32 large electric pumping stations in the region.

Figure 2: Districts of the Navoi region



Map 2. Source: Adopted by authors based on web page info of Supreme Court of the Republic of Uzbekistan .2021

Nurata district is one of the regions in the middle of the Republic of Uzbekistan. It is surrounded by Jizzakh in the north-east, Samarkand region in the south-east and east. Nurata has a dry, continental climate. It is – 39 degrees below zero in winter and +46 degrees above zero in summer. The average annual rainfall is 200-250 millimetres.

The district is one of the largest in Uzbekistan. It stretches for about 68 km from north to south and 95 km from west to east. The land area is 6 549 square kilometres, and the total length of its borders exceeds 500 kilometres (Source: Official website of Nurata district Khokimiyat).

The district is bordered by prosperous valleys on the one hand, and vast deserts on the other, and is a meeting place for farmers and cattle breeders.

❖ **Population and employment**

Although the Navoi region is the largest in Uzbekistan in terms of area, it is one of the least populated. Total number of populations is 1.01 million people as of January 1, 2021 (Navoi regional statistical department) with 49 percent urban and 51 percent rural area residents.

In the Navoi region, as in other areas of Uzbekistan, unemployment is a major problem. In 2020, the total number of economically active population was 440 900 people. Of these, 90.6 percent are employed, and 9.4 percent are unemployed. In 2019, the unemployment rate was 8.5 percent (Source: Navoi regional statistical department).

In general, work in the region is divided along the gender lines. Women work in public institutions, particularly in the areas of education, health, and services. Many men, on the other hand, are partly employed in industry (mining and construction) or government. For example, many males dominated jobs can be found in the region's largest mining plants and in government agencies. In addition, men and especially young men from the region work as migrant labourers, in the Russian Federation, the Republic of Kazakhstan and South Korea.

This outmigration is a major issue in the Navoi region. As a result, many families are geographically divided, with women taking work as day labourers in nearby fruit orchards, while their husbands work outside the country.

❖ **Economic development**

As shown in the following table, the Navoi region has exhibited steady economic growth in all sectors over the past 10 years. However, Agriculture remains the dominant economic activity in the region, contributing to about 50 percent of the total economic production.

Table 8: **Economic Indicators of Navoi Region**

	Unit of measurement	2010	2015	2019	2020
Gross regional product	<i>bln UZS</i>	4 325.6	10545.2	36661.9	49742.2
	<i>growth rate, in percent</i>	103.9	103.8	105.2	107.1
Industrial products	<i>bln UZS</i>	4038.5	9 286.9	44 438.1	65 084.9
	<i>growth rate, in percent</i>	99.6	103.4	104.3	109.1
Consumer goods	<i>bln UZS</i>	455.8	1 768.6	3 243.4	3 896.5
	<i>growth rate, in percent</i>	112.1	113.7	101.1	102.3
Agriculture, forestry, and fisheries	<i>bln UZS</i>	1450.8	4 420.6	9 934.2	11 900.4
	<i>growth rate, in percent</i>	105.8	106.7	101.4	103.2
Services, total	<i>bln UZS</i>	640.7	2 067.5	5 056.1	5 840.5
	<i>growth rate, in percent</i>	127.9	117.4	115.2	105.8
Export	<i>mln. USD</i>	553.4	441.4	362.9	462.5
	<i>growth rate, in percent</i>	112.1	100.2	103.6	117.5

	Unit of measurement	2010	2015	2019	2020
Import	<i>mln. USD</i>	372.6	361.0	1 472.5	885.8
	<i>growth rate, in percent</i>	104.5	65.7	114.5	60.2

Source: Bukhara regional Statistical Department, 2021. *Khokimiyat of Navoi region 2021*. Retrieved on 10.12.2021 from <https://navoi.uz/uz/menu/geografijasi-va-ilimi>.

❖ **Agriculture**

Despite the important role of industry, agriculture continues to play a major role in the Navoi region, particularly in remote rural areas. The main branches of agriculture in the region are grain, cotton, and sheep (esp. karakul). Specifically, the region is the leader in desert livestock in the country. In the Kyzylkum desert area numerous large farms have developed a specialization in karakul production (an important export good). Tomdi district is a particularly important region for this type of agriculture.

Table 9 illustrates the steady growth and dynamics which the sector has experienced in the region over the last decade. It also highlights the contribution to the regional economic development in the sector for different practices (e.g. livestock vs. crop production). The Nurota region has played a key role in this development in absolute and relative terms (+1000 percent; 25 percent growth of regional share).

Table 9: The main indicators of agriculture in Navoi region

Items	2010	2015	2020
Arable land for agricultural crops, thousand hectares	105.9	10.8	92.4
Volume of agricultural, forestry and fishery products (billion UZS) – total region	1 450.8	4 420.6	11 908.1
Volume of agricultural, forestry and fishery products (billion UZS) – Nurota district	108.9	345.1	1244,0
Share of the Nurota district in region's total agriculture, forestry, and fishery products	7.5percent	7.8percent	10.4percent
Agricultural production, bln. UZS	1349,7	4206,1	11309,7
Including:			
Crop farming, bln UZS	610,1	1711,7	3989,1
Livestock, bln UZS	739,6	2494,4	7320,6

Source: *Khokimiyat of Navoi region 2021. Retrieved on 10.12.2021 from <https://navoi.uz/uz/menu/geografijasi-va-ilimi>.*

❖ Industry

While pastures are of great importance for karakul farming, the Navoi region also boasts a booming mining and metallurgical industry. As mentioned above, Navoi can be distinguished from the Bukhara region in that it is home to a rapidly developing industrial sector. For example, the regional chemical industry is currently in a period of rapid growth fuelled by the local availability of natural gas and other mineral raw materials.

The centre of the chemical industry is the chemical plant in Navoi. Cement is another important industry. Most of the cement produced in the country is produced at the Navoi Cement Plant. The region is also one of the largest producers of electricity in the country.

Other industrial development projects continue to diversify the sector in Navoi. Since the establishment of the Navoi Free Industrial and Economic Zone, 19 new investment projects have been launched in its territory. These innovative industries include the production of high-tech equipment for televisions, electronic electricity metres, high-

voltage cables, heating boilers for thermal power plants, mobile and landline telephones, finished drugs and other consumer and industrial products.

6.3 Land use management in the study areas

This section builds on the field study – plus literature review - and is a narrative elaboration of land use management in the forest fund area in the pilot study sites and beyond paying heed to the contextual, ecological as well as socio-economic, conditions and the respective challenges and problems that interviewees shared with us during interviews and discussions, or as observed in the transect walks. These observations and perspectives provide the contrasting folia to reflect upon the performance of the new approach to co-management in the region.

In general decisions on the use of different categories of land are made by three entities. They are: 1) District khokimiyat (granting the right to use irrigated, non-irrigated lands), 2) Karakul clusters (lease of pasture lands to farmers, dehkan farms, cooperatives for livestock development), 3) State Forestry Organization (lease of forest lands). From January 1, 2021 (according to Decree No. 6243 of June 8, 2020) will be leased based on an open tender. Dehkan farms can lease up to 0.35-1 hectares, and legal entities more than 30 hectares through these new tenders.

❖ Forestry practice and organization

Desert pastures are the dominant landscape element in both study areas, complemented by irrigated agricultural land that is primarily lent to commercial farmers for a certain period (via lease contracts) for cotton and wheat production. In addition, we find extensive 'forestry' land for which the Forest Committee holds responsible. In desert areas, 'forests' present themselves not as dense forests but as mosaics of grassland / desert pastures with scattered tree plantations and shrubby perennial vegetation along riverbanks or on the shores of lakes.

The regional Forest Committee and its district forestry departments are engaging in numerous economic and agricultural activities in the forest land itself because the public core funding only covers parts of the whole running costs and expenditures. One key source of income is the lease of land to dehkan and other farmers for grazing, but also for afforestation, with lease periods ranging from 3 to 49 years (further details see below). Irrigated plots close to water canals may be used for crop, fruit, or vegetable farming (e.g. under the clusters, see *below*).

The forest departments also maintain their own tree nurseries, agricultural fields with decorative flowers or herbal plants, as well as greenhouses for vegetables such as tomatoes. These activities are an important basis to cover the operating costs for human resources, asset maintenance or patrolling.

In addition, the Forest Committees (especially those in Bukhara/Karakul) serve as active promoters of field trials with new land use approaches to afforestation, (agro)forestry, orchards, crop or vegetable planting, and combinations thereof, e.g.

intercropping, wind shielded plots or silvopastoral systems. The district forestry department, especially in Bukhara, takes on an important role for capacity building of farmers and farm development in the region.

In case of Navoi region, Nurata District Department of Mahalla and Family Support, Nurata District Department of Internal Affairs, Nurata District Department of Ecology and Environmental Protection, Nurata District State Tax Inspectorate, Nurata State Forestry cooperate with each other's to protect the flora and fauna of the district, fight and control poachers, illegal fishing.

❖ **Cluster and independent commercial farming**

Commercial farming takes place in (but not limited to) irrigated land and it is typically organized either based on membership in the so called 'clusters or as independent farmers. Formally, clusters offer an attractive means for farmers to 'join forces' and allow them to benefit from various services such as access to fertilisers, pesticides, or machinery for harvesting, ploughing, transportation, cooling or even processing. Also, in terms of finance and marketing the clusters principally ease the farmers' lives, because they offer centralized purchase agreements where the income comes 'automatically' via bank transfer and farmers do not have to worry about selling their products on local or regional markets.

However, in practice numerous farmers struggle with the cluster system, perceiving the fixed prices in the state procurement scheme as way too low as to cover all expenditures for and efforts of growing cotton or wheat in the harsh desert environments, like Bukhara and especially Navoi. This unfavourable calculation rests in parts on the high prices that cluster members must pay for the services. In the absence of real market competition, the prices for these services are well above hypothetical market prices, according to the farmers. Adding to the frustration, the low income gained from selling cotton and wheat to the state is spurred by cotton and wheat being no longer competitive in quality or price compared to products imported from other countries, like China.

The preferred and scarce irrigated land plots are mostly reserved for cluster farming and hence to a broad extent for the classical cotton and wheat production. More freedom exists in non-irrigated areas where fruits like grapes or pomegranate offer (additional) opportunities for farmers to explore niche markets and to gain higher income from agriculture. Also, livestock herding remains a key approach for gaining higher revenues, however the restrictive state procurement system reduces the available land for growing fodder. Numerous farmers express interest in diversification of the agricultural production beyond cotton and wheat but feel restricted in their free choices and possibilities to explore new markets (in dairy, vegetables, fruits, or herbs).

In fact, the options for diversification for independent farmers are much broader. However, this choice is hardly practicable because independent farmers are outside the cluster service scheme and must take care of all steps from farm establishment to operation, yield, transport, and marketing by themselves, including the typically high

upfront costs for assets, machinery, stocks or seedlings and inputs (like fertiliser) etc. – an option that is typically unaffordable for (small) local farmers.

❖ **Dehkan /subsistence farming and livelihoods**

Subsistence farming by dehkan farmers is the key livelihood strategy in the pilot communities. Fruits and vegetables, but also poultry and livestock (cow, sheep) are grown for household use and only a fraction is sold on the local markets /in the community. Cattle breeding may significantly contribute to household income (~10 percent, cf. Fayzullaeva, 2020)

The life of dehkan farmers in the pilot regions can be burdensome. Apart from the detrimental employment situation described earlier dehkan households are suffering from the limited access to water, electricity, or fuel; and are employing diversified agricultural practices and strategies in their small home gardens or leased plots to compensate for the systematic lack of public services.

In the absence of access to gas and often also affordable coal, dehkan farmers are highly dependent on access to natural resources for heating and cooking. Access to firewood in a desert area is problematic and numerous other materials are used: such as twigs from the garden, cotton stems or biofuel (animal manure). In this respect, the high diversification and integration in a typical dehkan farm combining woody perennials with livestock serve multiple purposes for rural livelihood maintenance (Fayzullaeva, 2020).

Livestock is the backbone not only of the Uzbek agronomy, but also of smallholder /dehkan households in the pilot regions. Typically, households have “at least one big horned and several small horned ruminants” (Fayzullaeva, 2020).

On top of their essential multi-functional role for food security, soil fertilisation, heating and clothing and of course indirectly also the desert pastureland – livestock serve as a reliable and comparably ‘safe’ bank account for smallholder households, which may be ‘cashed out’ by selling individual or more animals to the butcher whenever cash is needed – an essential, but also fragile strategy (*vis-à-vis* the environmental challenges to grazing in the regions). Financial alternatives seem rare seeing the limited possibilities of (esp. female) dehkan farmers to get (long term) credits or finance.

With dehkan gardens being typically very small, sometimes as little as 0.05 ha, the grazing in state forest land and desert pastures is an important basis for the survival of the animals and thus the whole household, and eventually communities. The major system of granting dehkan farmers access to grassland is on a contractual basis through the forest committee ticketing system as part of the lease-based co-management system elaborated on in more depth in this report.

While leased tickets rest based on individual contracts several dehkan farmers herd their livestock jointly making use of ‘economies of scale,’ i.e. sharing costs for employing seasonal herders/shepherds and benefitting from the experience of those contracted herders to take care of the animals. But the quality and quantity of the land available for grazing has dramatically shrunk over the last years, according to the farmers, with dramatic effects on the possibilities for dehkan farmers to sustain their fragile, but highly essential integrated farming strategies. In parts, this is owed to the climatic changes especially prevalent in these desert regions, including the drop in rainfalls or the sandy

storms, adding to the degradation of the land. In addition, there are accusations that the forest department is only reserving grazing plots of poor quality for the dehkan farmers, keeping the 'good plots' for the cluster members or often even unused. Adding to the 'miserable' situation is the water scarcity and mismanagement, which we will elaborate on subsequently.

From our field trip as from the literature, we gained the impression that from the perspective of dehkan and smallholder farmers 'hope seems broadly lost' in the two regions, particularly so in the Navoi /Nurota region, where divorce rates have also gone up recently. In search of labour, many young men have migrated, e.g. to Russia, sometimes being trafficked and trapped in detrimental informal employment arrangements that do not bring the financial relief hoped for. The only way forward for dehkan farmers is a transformation of the ways how land use is organized in the regions allowing them to sustain their traditional farming and livestock herding practices in sustainable ways as a basis for household income and rural development without competing with cluster farmers in ways that are often perceived as unfair and disrespectful of their (families') land use traditions. We will later elaborate in more depth how the co-management system in place in the pilot regions may contribute to this.

In the following, we elaborate on land use management and governance in the two distinct pilot regions.

❖ **Land use in pilot site of Karakul district (Bukhara)**

Forest fund land

In terms of 'raw' numbers the total area of irrigated land in the Karakul district with 19 000 hectares, is just a fraction compared with 350 000 hectares of desert areas used for grazing. The number of farms in the district is 225, with a total land area of 4 000 hectares. As in all areas in Uzbekistan, agricultural land in the district is owned by the state and leased to farmers and other land users. This is also the case for the designated forest land: The regional forest committee with its 78 employed workers controls 68 000 hectares of forest land in the district of Karakul, with saxoul being the dominant woody and perennial species.

For the coming decade, the district forestry department has plans to further develop the forestry sector. Until 2030 600 more hectares are planned to be explored for various agricultural crops and medicinal plants for which 16.4 mi seedlings or saplings will be grown. The plan is also to stock up forest land – of which only around 734 ha exist in the district – up to 1200 hectares by 2030.

As of our field observations and interviews, the major challenge to forestry – apart from climatic stress to the plants and thus afforestation efforts – is the widespread illegal logging (of saxoul) even in presence of fines and sanctions (cf also Fayzullaeva, 2020).

Agriculture and livestock

Overall, the soils around the district of Karakul especially along the previous riverbanks make it still an attractive area for agricultural production. However, the scarcity of water for irrigation – which was exaggerated by the severe overuse of water bodies for cotton planting and led to several rivers being completely dried out in the area - limit the

available options. The plots are often covered with sand. With proper rehabilitation and some decent watering, the soils (rich in minerals) offer a sufficiently good quality for agriculture. Being closely linked to problems of water scarcity and limited possibilities to grow fodder at scale (with plots being given to clusters growing cotton to satisfy state demand), the desert pastures in the Bukhara Forest lands – and the Karakul district specifically – appear broadly overused and exhausted.

During our field visit we heard from smaller field trials, e.g. by Chinese projects/investors, growing medicinal herbal plants as one opportunity to access profitable markets for natural resources abroad. However, the project stopped during the pandemic impacting on international trade and cooperation.

❖ **Land use in pilot site of Nurota (Navoi)**

Forest Fund land

The total area of Forest Fund land in the Nurota district is 20 160 hectares. While a small amount of around 8.5 percent (or 1765.8 hectares) are principally arable, only 156.1 can be irrigated (due to water scarcity). By contrast, most of the land is desert pastures (17 806.5 ha) and drylands (1609.5 ha). The district forestry department is supported by 63 employees and workers in charge of administration, maintenance, and operations.

Most of the land of the Nurata State Forestry is located in the desert, 200-250 km from the centre of Nurata and the forest fund lands face several difficulties, such as the lack of services for vehicles or planting equipment (incl. greenhouses, water installations, nurseries), impairing possibilities to prevent resource overuse (esp. illegal logging) or the development of afforestation or agroforestry in the sites.

Agriculture and livestock

Considering the severe depletion of (underground) water resources (see next section on water management), the state has abolished the requirement to plant cotton and wheat in the Nurota district. In the district, the cluster is divided between forestry, agriculture, and animal husbandry. All agricultural operations, thus the plan, should rely on natural precipitation, but the lack of precipitation due to climate change caused subtle economic damage. Where underground water access still permits agriculture, small agricultural plantations are still ongoing to grow corn or sunflowers or other fodder plants for livestock farmers. In addition, a few orchards (e.g. apple) exist, partly attached to the gold mining or chemical industry operations, and most of which are far from profitable. In the surroundings of the Chuya village a well-developed peach plantation has evolved. The cluster farmer succeeded in developing a flourishing export-based business including some processing arrangements in Samarkand.

Because of the lack of irrigation water, the dominant agricultural practice was and remains livestock grazing especially for dehqan farmers, which are severely poor and have much more limited possibilities for integrated and diversified approaches in their home gardens (due to lacking access to water). But overall cattle breeding opportunities

in the Chuya village area are highly limited for smallholders because available pastures are very rare and the grazing periods available through grazing tickets too short, while prices for forage are high (Fayzullaeva, 2020). In fact, conflicts arose between the hokimiyats and local people, because vast areas of desert pastures were given to the cluster farmers for grazing, leaving only few and poor sites for the livestock of the local smallholder farmers. According to reports from the village, some cluster farmers have failed using livestock species that were not adapted to the harsh environment and died. Although the land is now mostly abandoned, local smallholder farmers are reluctant to sub-lease this land back from the clusters in a feeling that these lands have been their 'traditional' grazing areas. In their mistrust against government and commercial farmers, they perceive it as another rent-seeking way of 'pressing money' out of them and have also reported that money has disappeared from NGO projects meant to support them. In terms of handling complaints an important reform is that hokimiyats are no longer in charge of managing the land lease affairs and that these need to directly be addressed to the ministry now.

Livestock cooperatives

There are eight livestock pasture cooperatives in the Nurota district established in 2017. After the liquidation of prior state /commercial farms, the cooperatives were established for livestock feeding and a fair number of pastures were allocated to them. The cooperatives take responsibility for controlling the condition of the pastures and allocate 1-year lease agreements to the population for using the cooperative's pastures. The annual payment per 1 animal is UZS 3 600 and the cooperatives take over the payment of taxes to the state. The cooperative's organizational structure is slim, consisting of one manager, one accountant and one employee. Under the cooperative, the farmers jointly hire one shepherd in charge of herding all cattle on the cooperative's pastures for nine months (much longer than reported for individual leases, cf. Fayzullaeva, 2020). Livestock is kept in the population's homes during the remaining three winter months. The Shepherd's salary is covered with the UZS 5 000 to 7 000 per head of livestock that the farmers pay.

Farmers council centralized accounting

Another interesting system for establishing collaborative action or economies of scale is the so-called farmers council centralized accounting system that was established in 2018 based on the Decree⁸ of the President of the Republic of Uzbekistan. Activities started in the Nurota district in September 2018 serving 170 horticultural farms (previously specialised in wheat cultivation). The land area per farm ranges from 15 to 100 hectares. The farmers council centralized accounting system provides free services to its members in preparation of reports, calculation, and payment of taxes to the state, including banking operations, submission to the tax office, statistics department, or other government agencies. This way the council also monitors the use of land by its members in conjunction with agro-inspection organizations. The council is 100 percent state funded with annual salaries adding up to 320 million soums. One accountant is supporting 20 horticultural farms. The use of electronic signatures in the service to its

⁸ Presidential Decree No.3680 on date April 26, 2020 "On additional measures to improve the activities of farmers, farmers and landowners".

members allows making payments on behalf of its members while away working in the field. The system has proven highly attractive for local farmers: After a few years in existence, 100 additional horticultural farmers and dehkan farmers have applied to the district governor to become members of the Farmers Council Centralized Accounting system. The council plans to extend its operations with 5 additional accounting positions already applied for at the district finance department.

The possibility of shifting to horticulture from unprofitable and highly water consuming cotton and wheat production in the region has generated considerable flexibility and growth, and through the new accounting services the state budget benefits: Before joining the council, the 170 farms in total paid ca. UZS 480 million in taxes. With the centralized accounting in place, tax accounting and reporting problems have decreased, and tax revenues have risen to UZS 4.82 bln, accordingly, well beyond the costs. Where previously 1 worker was documented per farm, on average 4-5 new jobs were created on each farm based on recommendations by the council addressing the problems of informal labour and unemployment. The council currently only serves horticultural farms, whereas the 108 livestock farms in the district were transferred to livestock clusters instead and cannot be members 5-6.

6.4 Water management and supply

As described in earlier chapters and other studies conducted in the pilot areas (e.g. Fayzullaeva 2020), access to water, its supply and management, is one of the key issues for agriculture and land use more generally as well as for livelihoods in the pilot regions. The described challenges such as salinization or water scarcity are of relevance to both project regions – where desert is the dominant landscape with very limited rainfall and only a few natural water bodies above or below ground. The issue is further accelerated by water leakage occurring because of inefficient water pumping and distribution systems in place. Where canals are employed these often lack concrete trays and are prone to increased evaporation fuelling salinization. The water use culture – peaking in the summer months from June to August – may be best described as lacking a sense of saving water, including that modern technology such as dripping irrigation is still broadly missing or that crops, vegetables and fruits prevail, especially such as cotton and wheat that are particularly ‘thirsty.’

As valid for all regions in Uzbekistan water use is currently nationally codified on the basis of the Resolution of the Cabinet of Ministers of the Republic of Uzbekistan dated March 19, 2013, No 82 "On approval of the regulation on the order of water use and water consumption in the Republic of Uzbekistan" and the Resolution of the Cabinet of Ministers of December 11, 2019, No 982 "On measures to improve the activities of water consumer associations". Still, we see that differences among regions may be tremendous not only because of climatic or ecological conditions but also in the way water use is organized and governed.

Water management and use in Bukhara - Karakul district

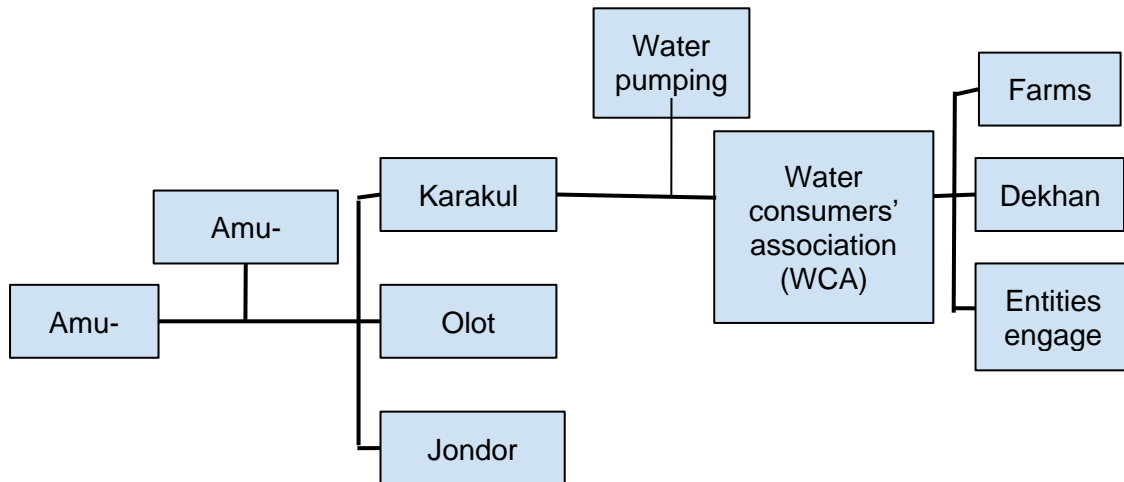
In the Karakul district, the District Irrigation Department oversees water supply and distribution. The department was reorganized in 2017 as a separate structure from the

Agriculture Department, which was in charge up to then. Its main function is to supply irrigation to the designated agricultural fields to three mahallas (Sayyod, Durmon and Sovur), with major users being commercial farmers and entities engaged in agriculture, water consumer association, as well as livestock /dehkan farmers.

Water scarcity in the Karakul district is dramatic, partly owed to the fact that above ground water resources, like the close by river, were heavily overused especially for the cotton and wheat production. Several rivers have dried out or are severely salinized. Therefore, water needs to be pumped through 2 stations up to the plains from far away in the region. There are several players in the irrigation water supply chain in Bukhara. The main water supplier of the region is Amu-Bukhara Irrigation System. In terms of agreement the district Department of Irrigation in Karakul signs a contract with the Amu-Karakul water system based on types of crops and the size of irrigated crop land (hectares) for 6 months. No provision exists for the termination of the Agreement.

The water user associations in the region oversee the contractual arrangements with its members/the customers i.e. making plans of how water is distributed among the farmers. They do not have responsibilities whatsoever beyond that, such as maintenance or efficiency of the irrigation facilities. While maintenance would be in the hands of the irrigation department or pumping station, the available budget is way too low to allow for substantive and urgently needed transformations of the water infrastructure.

Figure 3: **Organization of the water supply and use in Karakul district**



The concrete trays (where existent) have multiple cracks that lead to water leakage, sediments undermine an even water flow (see picture). Moreover, the outdated pumps (from Soviet times) in the pumping stations increase costs for users by raising the energy bill, while the pumping volume is comparably low and leads to a situation where users especially at the edges of the system are often complaining of insufficient water flow and supply.

Just recently first installations for drip irrigation technology went into operation and further installations are planned in the future for saving water and for addressing at least some of the pertaining issues related to water loss and overuse mitigating the cultural and technical aspects of water consumption on the fields. But much more needs to be done to deal with the pertaining issues, e.g. related to poor maintenance and low budget.



Picture: Canal in Bukhara, Sayot water station: Broad and long cracks (visible with the plants) in the concrete leading to leakage to the underground and sediments that undermine the water flow.2021

Except for the mechanics at the pumping stations, the system is locally funded by the different users based on water contracts (e.g. For 6 months of irrigation) where farmers pay for the water delivery depending on how many times in the year they irrigate or the

size of their plots. The average price in the district was 70 UZS/per cubic m (with reduced fees during the pandemic, 40 UZS/m³) or UZS 500 000 per hectare (around EUR 40).

Due to the pertaining problems of water supply but also because of the severe poverty among farmers, several instances were reported of bills not being settled or water being stolen from the channel, esp. overnight as a way of avoiding having to pay for the water coming from the pumping station.

Where farmers are unable to settle bills, the water department sees itself forced to bring cases to court and therefore charge may apply of about 1-2 percent of the annual profits of the respective farmers. According to local employees, fines for water stealing have hardly any regulating effect, because they are so low that people are not refraining from stealing water from the channel. In addition, we took note of unproven information about unofficial deals being made on water usage as well as to avoid inspections. There is also a certain sense in the communities to also protect the family and clan from fines or prosecution. Motivation on the side of the responsible authorities to chase after wrongdoers may be seen as low – unsurprising considering that farmers are stealing out of a situation of severe poverty and desperation.

Water supply and management are in an urgent need of management reform and budget for catching up on urgently needed technical innovation. Switching to water saving installations based on pipes rather than open and broken channels employing dripping irrigation will need substantive investments – by national institutions or foreign support, since the local population is very unlikely to be able to cover the costs. Recent pilot attempts, such as under the ICARDA project, providing water for 35 households using underground water from 35 meters depth, are important but also limited steps toward addressing the massive water loss implied by long distance transportation – seeing the problems in Navoi regarding underground wells.

Water management and use in Navoi - Nurota district

In the region of Navoi and the district of Nurota desert is the predominant landscape with only little land being irrigated or used for water intensive agricultural practices because of the pertaining water scarcity and lacking rain falls. There are very few above ground water sources. The major Lake in the Nurota district is prone to high salinization and is therefore not used for irrigation. The only agricultural use is fishing.

Water for any agricultural, household or industry use needs to be either pumped up from underground or is transported to the villages through long pipelines from the mountain areas.

There are a few natural water wells providing the water from the mountains to the village(s) and its households as drinking water, accordingly. Water is also stored in a few water towers outside the villages. Based on gravity alone (height difference mountain-plane) the water pressure on the pipelines is low and prohibits a more diversified use, e.g. for irrigation. The water installations are outdated and often hand-made and self-maintained. With lacking technological support, e.g. allowing compression, the water use situation, especially for agricultural purposes, remains way

below its potential. It also leads to the situation that households in the upper areas are not supplied in sufficient volumes (Fayzullaeva, 2020)



Picture: Chuya village (Navoi /Nurota) Handmade leaky vessel-based construction of drinking water pipes used for main street tree irrigation and households supply (November 2021)

While the water quality of the wells from the mountains is very high, the situation may be described as highly dramatic for the water supply from underground wells in the region, which is the main and only remaining source for irrigation of the few small corn or tree plantations. Water tables have dropped down over the years from around 50m to as low as 80-100m. It is highly expensive and technically challenging to pump water up from such depths and the poor water quality makes it hardly usable

for irrigation purposes, because of high degrees of salinization.

This exaggerated depletion of underground wells in the district and region is directly attributable to the overuse in prior decades for water intensive crops - like cotton and wheat - in fulfilment of the national demand. In addition, lacking rainfall and severe droughts have led to a situation where underground water is not restored.

While the Agricultural Department under hokim supervision oversees water supply, including the water basins or water towers, water users or consumers are not really organized in the Nurota district and no water consumer association is present, accordingly, helping with water supply and distribution among users.

The spring water for drinking is provided to the local community for 2 hours/day (at costs of UZS 6 500 /person/ month, or UZS 40 000 sums /month per household (Fayzullaeva, 2020). Regarding water for farming: Because of the higher prices for electricity for the pumping of water from deeper water tables, higher water fees are in place now for farmers that wish to use underground water for irrigation or livestock drinking purposes. These higher water taxes drive people out of farming at dramatic rates. This trend is further fuelled by the fact that the water is of very poor-quality implying further costly purification efforts to ensure safe use for animals and plants.

According to our information from the field trip, only one highly profitable peach plantation can afford the water bill and purification in the district area while still running a profitable business. This creates a competitive situation for livestock production: With the vanishing possibilities and affordability of irrigation for fodder crop fields, livestock farming – the backbone of the agricultural production in the region and the basis for smallholder livelihoods – has become even more difficult (on top of the situation related to the limited availability of high-quality grazing land, as described).

There seems to be an urgent need for re-organizing water supply and use in more efficient, effective, and fairer ways among the farmers still irrigating bigger plots for various purposes. Moreover, new investments are needed for modern installations allowing pumping and water purification, but also a more effective use of the mountain spring water including for small scale irrigation purposes. Considering the severe poverty of the population alternative sources for covering these investments must be sought for, including development cooperation.

6.5 Piloting co-management lease arrangements

In the context of pertaining problems such as overuse and degradation of the desert grassland and depletion of forest resources (esp. saxoul) in the forestry areas due to firewood collection, earlier studies have discussed the implementation of ecosystem-based management approaches and participatory co-management agreements in the region (Fayzullaeva, 2020).

The common co-management practice existing in Bukhara and Navoi region is the leasing of forest land by the district forest department to the local farmers for grazing purposes. Through this arrangement, the forestry department earns additional income by selling the grazing tickets or leasing the forest land to farmers for up to 6 months strictly for grazing purposes. At the same time, farmers benefit from this co-management practice as they get access to pastures thus reducing their need to buy the expensive fodder from the market.

Based on the field work undertaken in November 2021, the following section presents some key insights on the leasing system implemented in the forestry area as supported by the CADI project. With a particular view on the needs of dehkan farmers, we try to explore how the system is operating at a district level and how it contributes to meeting the objectives of sustainable and integrated land use or may do so in the future. These elaborations seek to consider the outlined specificities of the two regions as well as the changes that have occurred in recent years, with the land use system in Uzbekistan having undergone a series of major reforms.

❖ Land leasing system

Overall, the typical lease in the two regions is for livestock farming, i.e. for pasture use, which may be handed over for up to 5 years. This lease approach is however suspended until Jan 2022, until the transition phase to a new state, which then will implement a presidential decree that intends to improve the lease systems.

According to the new procedure, it will be now possible to obtain agricultural land by (online) auction for conducting business activities (afforestation, grazing, and other purposes, incl. tourism) whereas the fee will be based on their own 'offer' rather than fixed ticket prices. Typically lease fees are head-based, which means taking into consideration the number of livestock brought to the grazing areas. The new approach to fees also seeks to give due consideration to the quality of the leased-out land, for

instance offering discounts for desert areas (half price) or hilly or mountainous areas (25 percent). In addition, farmers can sublease their vacated lands to other farmers or dehkans on a seasonal basis by mutual agreement, e.g. to grow vegetables and other products as a second crop. Leases are also available for low-income families at a discount (10-20 percent). Eligibility is determined and certified by the local mahalla. In addition, these families may be eligible for exceptional and cost-free firewood extraction from the forest area.

The income generated from these leases will be distributed among the forest committee (10 percent), the forest committee fund (50 percent, supporting the forest development activities) and the district forestry departments (40 percent).

In earlier days, decisions about the leasing of forest lands (for agricultural purposes) were made and implemented by the regional hokim. However, according to the new procedure, all the power of the district hokim in connection with the lease of land or termination of the contract transitioned to the forest authority.

❖ **Review and disciplinary action**

In general, the state and regional governments maintain the final control over leased lands, in line with the principle of state ownership. In this system land access can be revoked in response to a variety of conditions. In cases where a farmer does not fulfil the terms of the leasing contract, violates the requirements of the charter, or misuses the land, they may be required to forfeit their lease. For example, if pastureland is found to be used for growing crops or is changed to other uses, contracts may be cancelled. According to the old procedure, decisions on these matters were made by the commission on land issues operating under the supervision of district hokim (Governor). This commission worked on land allocation, optimization, and potential termination of lease contracts. It included the cadastral organization, the agricultural department, and the farmers' council, who used to put the proposal to the governor for leasing the land to the farmers. If a farmer were suspected of not meeting the requirements, the commission would inform the district council of people's deputies. On the recommendation of the Council of Deputies, the district governor could decide to terminate the contract.

Additionally, several other reasons for involuntary revocation of land use leases currently exist. Contracts may get cancelled due to the state policy of land optimization, which has historically sought to increase average farm size (and efficiency). For example, the state requires a minimum land area 5-10 hectares for horticulture or 50 hectares for cotton. Contracts can also be revoked for reasons such as non-payment of taxes by farmers, non-compliance with the terms of the contract for public procurement, violation of specialization in land use, low profitability, deterioration of land quality. In these cases, the commission submits documents to the authorities, who may in turn file a lawsuit in the economic court to return the land to the district reserve. Following the decision of the Economic Court, the district governor makes the final decision.

In case the land is damaged by forces beyond the control of the lease he or she may be eligible for reimbursement of the damage. Likewise, the lessee holds accountable for damages caused by him/her and the livestock, respectively. Fines depend upon the damage (e.g. quantities and diameter of trees and plants hit) but also on the income of the responsible person.

❖ **Challenges in forestry co-management practice**

Although a straightforward and simple co-management arrangement, the leasing of forest lands for different purposes faces several challenges not necessarily uniquely tied only to the leasing instalment but to land use in Uzbekistan more generally. Since we elaborated at length on the national policy level, the following section highlights aspects of co-management arrangements as discovered during the fieldwork in Bukhara and Navoi regions.

1. Illegal activities, corruption and 'deals' in forestry

In the fieldwork (in Nov 2021), it was reported that there are many repetitive instances of saxaul wood theft and that the forestry department struggles to monitor and protect the saxaul plantations. In interviews, it became evident that the lack of punishment and very low penalty fees in case of illegal logging proves to be a contributing factor for the increasing cases of theft and deterioration of the forest resources. During the fieldwork, it was also reported that in recent years, a black market has been established, which allows the illegal loggers to sell the wood to farmers, who in cold winters are in dire need of fuelwood. For instance, in Bukhara region, there are six main entrance points (bridges) that lead to the Saxaul plantation in the forest. But the forestry officials mentioned that the forestry department is not able to monitor illegal tree logging in those places.

In some cases (Navoi region), the forest personnel were said to have been caught selling agricultural products, decorative flowers or decoration trees, honey, tomatoes, cucumbers for personal gain. It was hinted that there are gaps in activities undertaken by the forestry personnel, and they are misusing the authority to earn extra income.

There are also instances, however, which highlight that despite the efforts of the state or nongovernmental organizations to change the way of life of the people, some of the allocated funds are disappearing without achieving the intended purpose. There is a need to overcome the corruption and informal practices that undermine innovation in the forest department and beyond. One interviewee shared that there are also other kinds of corruption taking place, such as accountants stealing the corona bonus money from forestry personnel salaries. A legal inquiry is underway, and 2 accountants have been suspended.

The incidence of water theft is becoming a frequent occurrence in the region where people steal water for watering their own fields in the leased plots inside the forest area. The water inspector in Bukhara shared his concern that they cannot do much because the fines for water stealing are very little and thus people are encouraged to steal water

from the channels. There are allegations regarding informal deals between the officials and users concerning informal water usage and avoiding inspections.

In the fieldwork, it was found that in Bukhara region, the forestry committee and the local government were not very transparent on the dehkan co-management agreements.

It is anticipated that without more transparency, mistrust between the state and the people will continue. The problem is in part owed to the predominance of informal arrangements that have been created out of a necessity to accommodate urgent livelihood needs within the rigid institutional set up for land and resource use activities. With such a historical legacy, it became apparent that local inspectors or workers still often adhere to a culture of covering up for their neighbours and fellow farmers (sometimes family members). These informal rules are weaved deeply into the social fabric of Uzbekistan.

2. Budgetary constraints and poor infrastructure

The main reasons behind the widespread illegal logging in the forestry areas was reported to be the lack of monitoring facilities available to the forestry officials. The vehicles were found to be in poor condition, and most were not even in working conditions. There is a lack of personnel that could be deployed for forest patrolling. Likewise, the low paying salaries are also one of the demotivating factors for forestry officials to patrol the extensive forest areas in harsh weather conditions.

While there is genuinely a severe lack of water in the desert pastures, the fact that is wasted and lost is to a certain extent a problem of dysfunctional installations. In the water channels in the Bukhara (Karakul) region, water is, for instance, pumped long distances up to the plains. In the Navoi (Nurota) region, not even a comparable water pumping facility exists; a very limited amount of spring water is coming in from the mountains or needs to be pumped up from ever deeper underground water. In both cases this is a highly energy consuming effort, also because the pumps and infrastructures used are outdated (from the 1960s/1970s). For maintenance technical know-how is also seen to be lacking. On top, the way water use is billed it is unlikely that the installations can be repaired based on this income stream, while low costs and fines also de-incentivise water saving practices.

3. Lease 'fraud' and lack of trust

During the interviews in the field, instances of "lease fraud" came to surface. It was noticed that the farmers were hesitant to speak and said something along the lines – "they do not want (their) families to get in trouble because they really depend on the farming activity." The literature also provides evidence for the argument that it is not uncommon for the local people to be scared of the officials (Urinboraev ,2018). Following are a few cases that were mentioned in the field.

In Bukhara (Karakul), there was an instance where the land was confiscated from one (female) farmer, who had a multi-functional farm on which she was growing high quality grapes and apples and feeding livestock. Although there is a provision in

the agreement that the initial investment costs are reimbursed in case the government confiscates the land, she had to go to the court to get back her rights (including high costs for advocates). After a year, she eventually won in court and got back her lease but was not reimbursed the costs and loss she incurred during the whole legal process. The reimbursement is now under “process” with a specialised agency /organization. In this context there was a mention that the Hokim of Karakul region took a personal initiative to redistribute land to the prisoners, who lacked proper training of land use. This was done without consulting the other local authorities, esp. Mahalla.

The next instance may not be called a lease fraud *per se*, nevertheless, a dehkan farmer lost his land whose family held this land for centuries. He was heartbroken because even after investing his time, money, and effort in learning to grow pomegranates and grapes under water scarcity, his land was taken away only after 3 years and was given to a bigger farmer, despite the original land lease being issued for 49 years. This was done as part of the agrarian reform so that the land is efficiently used by the farmers who are bigger and resourceful. The dehkan farmer is now working on the same land but for the bigger farmer, who has now subleased the land to him. The dehkan farmer feels it was unfair and unjust to be now under the arbitrary control of a big farmer, given that the land used to be in his family for so many years.

4. Information and lessons sharing training and extension support.

There is a high potential for orchards or other tree based integrated systems, which may be well combined with grazing or fodder plantation regimes. Orchards have been on the rise in both regions. During the discussions in the field, however, it was noticed that sometimes, the new farmers/beneficiaries are not capable of taking care of the trees in their initial stage of growth. This is due to the lack of (access to) technical information and resources, including water, why (part of the) harvest is lost.

With water scarcity being a pertaining issue the further cultivation of cotton or wheat in the region seem highly unfavourable for farmers and inappropriate regarding the environmental challenges in the desert regions. With low qualities and quantities and high competition in the international market these two thirsty crops are no longer (or never have been) a viable option for desert ecosystems. While numerous farmers have experience with rain-fed /deep root-based systems with fruit trees (like peach, pistachio, or mulberry) or grapes, further scaling to other farmers in the region is hampered. It is important to install more avenues for farmer-to-farmer exchange on successful field trials including those by the forestry department. However, efforts to scale or diffuse successful and more integrated approaches by and among farmers may exert only little effect if the further application of more integrated systems is factually constrained, because the biggest and best plots remain reserved for the clusters, be it for cotton or wheat monocultures or commercial livestock herding.

In the Navoi region, for example, one of the farmers showed his farm and mentioned that he does not depend on the government and makes his own business instead. He owns a small home garden with apples. He also had a few cattle. He failed to get access to more land for his growing number of cattle. He mentioned that there was some kind

of “informal” agreement between his father and the forest manager for the grazing, which disappeared after the death of his father. Now he is clueless about where to apply for getting access to the pastures in the forest area where his father used to herd. This highlights the lack of information among the farmers of how the lease system works exactly but also the pertinence of informal rules in land use.

These are telling examples of the persisting uncertainty and disinformation related to formal land tenure and rights. Especially the new decree allowing land to be leased as auction has caused additional confusion as to whether water and land near water belongs to the common people or not and how access is granted.

5. Economic and Financial constraints

Especially dehkan farmers face severe financial constraints. People are suffering from the lack of jobs and the payment of low wages. There is a high unemployment rate in the region along with the lack of able-bodied men and young male population in rural and urban areas due to outmigration. The young men are leaving the country to earn better opportunities for their families and themselves. Where these employment opportunities stay behind expectations, e.g. being highly insecure in informal markets, families are faced with a situation of being highly indebted at the end of the season, leading many farmers to accept even more loans at high interest rates – a vicious cycle.

Rather than spending time and finance on developing and increasing their own plots, desperation, and debts force smallholder farmers to pick up dependent labour relations on the (cluster) farms or, as said, abroad. Additionally, and applicable to all farmers, the mechanisation and intensification of the production becomes more and more expensive with every new season, so do services for renting machinery and the like, e.g. from the clusters. Even if they wanted to invest and move to more diversified and multifunctional and agroforestry farm systems that allowed exploring new markets for premium products (grapes, pomegranate, pistachio, silk) while being economically more resilient vis-à-vis price volatility, commercial banks do not support long-term land lease agreements, a key institutional barrier for smallholder farmer development (Fayzullaeva 2020)

6. Limitation in fieldwork

During the fieldwork, we noticed that both in Bukhara and Navoi regions, it was difficult to talk to the users of forestry lands. We could not get access to the agreement papers between the forestry department and the farmers. We believe the lack of transparency in the system creates the bottleneck for the economic development in the regions.

Another limitation was the time constraint. However, we believe the fieldwork did provide substantial anecdotal evidence for the challenges faced by the forest authorities as well as farmers. We believe this is a good start for understanding and looking for opportunities to develop relevant co-management regimes or related interventions within the given constraints and challenges in the regions of Bukhara and Navoi.

6.6 Interventions in co-management – recommendations

In the context of pertaining problems in the regions, such as overuse and degradation of the desert grassland and depletion of forest resources (esp. saxoul) due to firewood collection etc, this report is actually not the first study to discuss and suggest the implementation of ecosystem-based integrated management approaches built in participatory co-management agreements in the region (Fayzullaeva, 2020). Also, in the international literature co-management schemes that built on collective resource use in ILUS, esp. agroforestry, are highlighted as an important approach to rural development vis-à-vis climatic change.

However, we found that the ‘co-management’ practices in Uzbekistan, and the pilot regions, which rest in private lease, are not the same as in other parts of the world. Usually, when collaborating within the co-management systems the communities and the state agencies share responsibilities and benefits of forest management (Cronkelton *et al.*, 2012) in one way or the other and to a much greater extent than observed in Uzbekistan.

To make co-management and integrated use and management systems more attractive to governments it is believed to be important to open avenues for local participation and ownership in resource governance. In chapter (iv) we have elaborated in more depth on the possibilities for governments to foster collaborative relationships at all levels. As most important aspects we would like to highlight to:

- give more agency to government as well as community-based organizations at local levels, such as the mahallas, forest departments or specific associations (land use or water related) and NGOs;
- secure tenure and land or natural resource use rights for longer periods and irrespective of farm size; whereas granted rights need to not only imply responsibilities and certain state control, e.g. not depleting resources, but also;
- offer more freedom and flexibility for resource users when obtaining and exerting lease rights, including liberalisation from cotton and wheat or other cluster approaches that spatially separate uses in the landscape that are better thought and practiced together;
- provide avenues for collaboration between state agencies and farmers, e.g. around monitoring, management, or maintenance sharing costs but also benefits;
- consider collective use right approaches as way for achieving economies of scale, especially for livestock and dehkan farming;
- reconsider the allocation of use rights based on farm size and separated cluster considerations toward an integrated and landscape perspective with bundles of collectively shared rights;’
- strengthen capacity building efforts (including through extension, e.g. forestry department) for farmers and their organizations to enable informed decisions when developing more integrated land use systems;
- increase state budgets for staff, infrastructure, and operations in rural settings, including finding innovative approaches of public–private partnership (PPP) or international support.

These measures will be particularly important to address the persisting lack or gaps in the social and institutional trust. Given the Soviet history of Uzbekistan and its constant effort to transition to a market economy, recent steps by the government to legalise sub-lease arrangements or to suspend certain quotas, as for unprofitable and impractical cotton and wheat production in Nurota, may be seen as highly critical for overcoming this legacy.

The co-management practices in Uzbekistan may differ from that of the rest of the World, so do those found in the two pilot regions. In addition to general recommendations related to the political, tenure and economic framework, following are some more concrete management related recommendations to overcome some of the current challenges faced by the forestry department as well as the forestland users in the pilot areas. They build on the insights from the literature review and analysis of the experiences with co-management in the pilot regions. While a listing of ideas shared by the stakeholders and experts involved, they provide a foundation for bringing investments (back) into rural contexts for transitioning agricultural practices into energy, water, and resource saving pathways but also ways of making different actors and organization working jointly toward the adoption of more collaborative and integrated land use systems.

Local workforce and state supported employment

High unemployment in the region and low salaries urge people to find alternative income sources through illegal selling of Saxaul wood (for example, one truck of saxaul may cost UZS 5–6 mln, USD 500–570). Additionally, the lack of appropriate patrolling facilitates the illegal logging of the trees. To overcome these challenges, it is recommended to involve forestland users in monitoring activities and work in collaboration with the forest officials to patrol the forests. Local farmers are aware of the landscape and can be hired to work as patrollers on the incentive basis for their time and effort. The incentives can be monetary or user rights but must be discussed among the stakeholders and any financial responsibility for such a mechanism must be incurred by the Central government as part of their vision for sustainable development. The case of the Local council of accounting is another a telling example how state seed funding for local employment (of accountants) can unfold further employment and hence economic growth.

Investments in forest land and water infrastructures

The forest department's effectiveness in natural resource conservation and management – including its monitoring and control is shown to be chronically insufficient. Although engaged in some self-sufficiency and income generation activities⁹, salaries need to be further increased for the forest personnel to function as a motivating factor towards performing their duties effectively and having incentive to

⁹ For example, self-financing activities for Karakul Forestry department include growing vegetables (1 ha carrot, onion, chickpeas), fruits (10 ha apricot and apple), wheat (20 ha=3 tonnes), beekeeping (honey selling in the market), land lease, selling seedlings etc.

monitor the illegal activities that are prevailing in the system. The same may hold true for the water theft situation.

It is evident from the field, that the punishment and penalty fees for illegal logging is very minimal and does not create any disincentive for people to indulge in illegal activities. For example, in one of the instances from Bukhara region, illegal saxaul loggers damaged the forestry car and repair cost for the damaged vehicle was calculated as UZS 26.0 mln by the car master. However, the guilty person was charged only UZS 9.0 mln by the court. Likewise, to grow a saxaul tree of 100 cm width, it takes up to 10 years incurring tremendous costs in the form of time, effort, and patrolling costs to the forest department.

When combined with increased fines better patrolling could result in additional revenue needed to maintain and purchase additional patrol vehicles suitable for the desert landscape or for establishing appropriate checkpoints with cameras in the forest area to reduce the illegal logging, as well as six “special-easy-assembled mobile houses” (installed with solar panels and cameras) on the gates. An appropriate number of observation towers (with camera and solar panels) should be built and “video records should be connected to forestry department,” internal affairs (local police station) and national guard (security) offices’ computers or user groups with such monitoring responsibilities (and shared benefits). This will help to take immediate actions against illegal logging.

Likewise, it is highly recommended to modernise the water infrastructure to overcome the loss of water due to cracks, evaporation etc.

Collaborative patrolling and monitoring

A cost saving measure suggested in the field by some farmers was to do patrolling of the forests on horses. In line with the spirit of co-management, we encourage open discussions and collaborative approaches between the forestry department and the local farmers in combating such challenges, including as related to aspects of ecosystem stability or damages. This can offer a suitable opportunity for extensive co-management of forestland and long-term trust building.

Protection through use

While it is highly recommended to develop special measures for safety and resource protection vis-à-vis the pressures from illegal logging or water theft such command-and-control strategy may only be properly working when complemented with efforts to address the pressure on the natural resources that stand behind the illegal activity in the first place. Part of this strategy must be to explore opportunities for further developing saxaul plantations (including on a commercial basis) e.g. dedicated afforestation sites not only for conservation, but explicitly also for addressing the local firewood needs. Explicit management and use rights, as for instance already granted to poor families in the lease arrangements may contribute to creating ownership and a sense of responsibility and belonging to the community could play out positively also on keeping out loggers from outside the community.

Likewise, the water fee structure must be reformed and adapted to the small local budgets considering the environmental conditions. Such restructuring may include the increase of fees and fines if at the same time water management skills are improved and installations provided at no or low costs that help save water at scale (e.g. dripping). At the same time strategies, including thinking of subsidies, need to be developed for dealing with exceptional water use peaks, e.g. during installation phases when tree saplings are still small or when dealing with government quota.

Lessons learning and sharing

There is a need for training the local population to improve not only irrigation but also agronomy practices at large from water saving approaches to rain fed and land use systems that integrate crops or livestock with fruit or nut trees. We have seen impressive field trials employing traditional as well as modern knowledge and practices among dehqan and independent farmers in the pilot regions. Also, the forest department in Bukhara has proven as a real innovating power within its limited budgetary restrictions. There seems to be a critical need and scope to establish more organizational and collaborative ties among farmers as well as between farmers and the forestry department for mutual sharing of their valuable lessons vis-à-vis the pertaining challenges of climate change and water scarcity.

Livestock and farmer associations with collaborative approaches as seen in Navoi for joint herding might serve as primary information sharing nodes or brokers for such structures and easily be integrated with other services and purposes, such as shown with the farmers council centralized accounting or other farmer associations, including under the clusters. Where possible the state needs to foster and support such collaborative efforts, including by financial support to their not-for profit educational activities, but also by granting more freedom and flexibility, including through legal exceptions (from the cluster/separating approach in the lease system) for experimentation in the fields. In this effort, also the consultation of international expertise or international non-governmental organizations may be beneficial also seeing the high upfront costs of integrated systems and the need for foreign investments. The forest department may serve as a key broker bringing insights from the field up to national policy levels to inform policy making processes and respective land right reforms.

Building trust into the leasing system

Eventually, there is an urgent need to address the culture of informal deals and corruption in both pilot sites. Trust and accountability make the very basis of any co-management regime and efforts must be made towards increasing the transparency in the management of forests, including the lease agreements. Numerous of the aspects have a strong collaborative orientation and can support that trust is re-build between state actors and farmers.

Appendix 1: Scheme of state forest fund land lease

Stages	Entities	Activities	Terms
Stage-1	State Committee on Forestry	<p>Decision of the Board of the State Committee for Forestry (hereinafter referred to as the Committee) to organize the lease of forest fund plots for the next year.</p> <p>In the decision of the Board:</p> <p>the composition of the Commission for the organization of lease of forest fund plots for the next year (hereinafter referred to as the Commission).</p> <p>forecast indicators of the areas of the forest fund plots to be put up for auction for lease in the next year.</p> <p>the forecast indicators of the funds allocated from the Committee's Forestry Development Fund for reforestation on undeveloped (non-forested) lands of the forest fund for the next year</p>	Each year December
Stage-2	Regional branches of State Committee on Forestry	Proposals for the lease of forest fund plots shall be submitted by the permanent users of the forest to the Committee in electronic form through its territorial bodies.	Within a month
Stage-3	Commission	<p>The Commission shall review the proposals as necessary, but at least once a quarter, and decide on the results of their consideration.</p> <p>The decision of the commission is made out by the report.</p>	Each quarter
Stage-4	Commission	According to the decision of the Commission, within five days from the date of the decision, the announcement will be posted on the website of the Committee, local media, citizens' self-government bodies, state forestry bodies.	Within 5 days

Stages	Entities	Activities	Terms
Stage-5	Commission	Auctions for the lease of forest fund plots (hereinafter referred to as auctions) shall be held by the Commission at least thirty calendar days from the date of publication of the relevant announcement on the official website of the Committee.	After at least 30 calendar days
Stage-6	Commission	Applications for participation in the auction are registered by the Commission in the order of their receipt. Applications received after the deadline specified in the announcement will not be accepted and will not be considered.	Within at least 30 calendar days
Stage-7	Commission	The protocol on the results of consideration of applications shall be signed by the members of the Commission on the day of the auction and approved by its chairman.	On the day of the auction
Stage-8	Lessor	The leased state forest fund shall submit to the Commission the documents on lease of the land plot.	Within two days
Stage-9	Commission	Considers the documents submitted by the lessor and draws a conclusion on the results. The decision of the commission is formalized in the minutes and copies of all documents are sent to the lessors.	Within five days
Stage-10	State Committee of Forestry of the Rep. Uzbekistan – Committee of Forestry of Republic of Karakalpakstan, regional forestry departments	The lessor draws up a lease agreement with the bidder, which is approved by the Commission. A forest fund plot leased in the amount of up to 5 hectares shall be registered by the State Forestry Committee of the Republic of Uzbekistan – the Committee of Forestry of the Republic of Karakalpakstan, regional forestry departments in cases where applicants are authorized.	Within three days

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Glossary of most relevant uzbek land use terminology

Clan: Informal organizations based on kin and fictive kin ties (Collins, 2011)

Dehkan: Smallholder (household, subsistence) farmers

(K)hokimiyats /Hakimiat: Local government or state administration, e.g. Municipal or city council or governorate

Hokims: Heads of regional, municipal and district administration

Fermer: Registered owner of a private agricultural enterprise

Goscomzem: The State Committee of Land Resources or Goscomzem

Goskomles: State Committee on Forestry (SCF) under the Ministry of Agriculture of the Republic of Uzbekistan

Kolkhozs: Collective farms

Khokims: State official or head of district administration

Mahalla: Citizens' assemblies, the basic unit of self-government

Oblast: Region

Raion: District

Shartnama: Contract

shirkat: Closed or open joint stock company (former collective enterprise)

sovkhos(s) (pl. sovkhos(s)y): State farm

Tamorka: Private subsidiary plot

Uzgeodescadastre: Main Administration of Geodesy, Cartography and State Cadastre at the Cabinet of Ministers

Viloyat: Province

Zhensoyuz: Soviet Women's Committee (now Women's Committee of Uzbekistan)

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FAO Representation in Uzbekistan
FAO. 2. University str., Qibray district
Tashkent region 100140 - Uzbekistan
FAO-UZ@fao.org

Food and Agriculture Organization of the United Nations
Tashkent, Uzbekistan

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