Agriculture

A Sector in Transformation

Agriculture plays a pivotal role in the social and economic life of the people of Central Asia. It accounts for much of the employment and gross domestic product (GDP) in all countries in the region. It drives most of the region's industrial production and domestic trade and demand, and provides jobs for most of the region's poor. Nonetheless, agriculture in these fragile and arid lands does not come easy. Extreme temperatures and low and variable rainfall have long presented challenges.

Like people in similar environments, Central Asia's earliest inhabitants learned to adapt thousands of years ago. Taking advantage of the region's vast rangelands they turned to nomadic pastoralism, moving livestock seasonally between winter and summer pasture. Livestock still plays an important part in the cultural fabric of Central Asia. However, for more than half a century, the region's crop farming area has increased at the expense of grazing land.

Crop production in the region dates back millennia to farming settlements around oases, which developed remarkably efficient irrigation systems. They were concentrated near natural water bodies and rivers, especially the Amu Darya and Syr Darya, and were relatively small in comparison with today's widespread irrigated agricultural systems that drain these rivers.

Over the past 100 years, there has been a huge increase in irrigated crop agriculture, beginning in Tsarist times and spreading dramatically in the Soviet era, when massive irrigation projects—most beginning in the 1950s—became the norm. Quickly, the land and the people's relationship to it were transformed. During Soviet central management, the region's republics were required to specialize in the production of farm products that met the perceived needs of a command economy. Production and distribution followed prescribed trade and economic relationships. In 1991, these arrangements ended almost overnight, resulting in an immediate downturn as the region's newly independent states faced uncertain futures.

Countries in the region made food security a top priority. They have also, except Uzbekistan which still practices much state control, moved toward more market-driven economies. This has resulted in major changes in farm production environments and technologies: giant state-run farms have given way to smaller, private farms. Emphasis is away from the high-input and highly mechanized production methods of the past and toward development of systems most appropriate for smallholdings and family-operated production units. These processes are ongoing and experiencing varying levels of success.

Overall, the agriculture sector needs to overcome the environmental damage from improper irrigation and poor grazing management, grow a wider range of crops, create new markets for high-value crops, increase productivity, improve regional cooperation, and help farmers become more business oriented. Should these challenges be met, Central Asia would not only be able to meet its national needs but would also become an even more important player in world agricultural markets. Already the region's chief commodities—cotton, wheat, livestock, and fruits and vegetables—are making an impact; and as greater commodity diversification is introduced the potential should grow even more.

Men collecting hay for the winter. Issyk-Kul, Kyrgyz Republic. Inset: A woman weeding out her vegetable garden, which provides additional income to her family.

Land Cover

Original dataset: Central Asia Land Cover (CALCOVER - Version 1)
Data source: ADB CALCILM Programme
Satellite data: MODIS NDVI Time Series Dataset (MOD13Q1, 250m)
Acquisition date: January 2008–December 2008
Projection: Transverse Mercator

Central Asia Land Cover (CALCOVER Version 1) is produced by ADB CACLIM Programme using MODIS monthly NDVI time series data acquired in 2008. The original land cover product includes some 20 land cover classes compatible with the UN Land Cover Classification System (LCCS). The map presented here is highly generalized and only includes major land cover classes.

Prepared by C. Y. Ji, 2010

Land Cover Classes

- Alpine/Subalpine grassland
- Irrigated cropland
- Regularly flooded grassland/woody vegetation
- Sparse grassland/shrubland
- Rainfed cropland
- Water body
- Forested land
- Close to open grassland
- Bare area
- Permanent snow/ice

Basic Agricultural Indicators for Central Asia

Country	% Share of Agriculture in GDP, 2007	% of Labor Force Employed in Agriculture, 2006
Kazakhstan	5.8	29
Kyrgyz Republic	32.0	33
Tajikistan	22.4	66
Turkmenistan	20.3	43
Uzbekistan	24.0	29

Note: GDP data for the Kyrgyz Republic and Turkmenistan are from 2006. Labor force data for Turkmenistan are from 2004 and Uzbekistan from 2005.

Source: ADB. 2008. *Key Indicators 2008*. www.adb.org/statistics.

Agricultural Lands

More than 70% of the region is classified as agricultural. This includes rainfed and irrigated cropland as well as permanent pastureland. Agricultural land makes up 33%–77% of the total area of the countries, the highest being in Kazakhstan (77%), with about 208 million hectares. Tajikistan has both the lowest total (4.6 million hectares) and proportion (33%) of agricultural land.

The map opposite shows how these lands are distributed: a concentration of irrigated areas along the course of the two major rivers—the Amu Darya with its Karakum Canal, and the Syr Darya—and

Agricultural Land in Central Asia, 2007 ('000 hectares)

	Land Area	Arable Land Total	Permanent Crops	Permanent Meadows and Pastures	Total	Share of Land Area (%)
Kazakhstan	269,970[a]	22,700[a]	100[a]	185,098[a]	207,898[a]	77
Kyrgyz Republic	19,180[a]	1,280[c]	73[c]	9,375[c]	10,729[c]	56
Tajikistan	13,996[a]	710[a]	101[c]	3,770[a]	4,581[a]	33
Turkmenistan	46,993[a]	1,850[a]	63[a]	30,700[a]	32,613[a]	69
Uzbekistan	42,540[b]	4,300[a]	340[a]	22,000[a]	26,640[a]	63
Region	392,679	30,840	677	250,943	282,461	72

[a]Manual estimation, [b]Data reported on country official publications, websites, or trade country files, [c]Official data reported on FAO questionnaires from countries.
Source: FAOSTAT, 2009. Available: http://faostat.fao.org (updated April 2009).

Upper: Farming on the Pamir mountains in Roshorv, Gorno Badakhshan Autonomous Province, Tajikistan. **Lower:** Tobacco growing near Osh, Kyrgyz Republic.

in the water-rich southeastern parts of the region; rainfed agricultural lands, primarily in northern Kazakhstan; vast pasturelands of the Kazakhstan steppes; and the dominance of deserts with their sparse pasturelands reaching out across the region.

From 1995 to 2005, the total area of agricultural land in the region changed only slightly, down from about 289 million hectares to 284 million hectares. However, this tells only part of the story; much of the land is in a degraded state. Principle causes include overgrazing; declining soil fertility and loss of soil structure; salinization; elevated water tables in irrigated areas; inefficient water use; and expansion of plowed land into marshes, forests, and steppe unsuitable for sustainable agriculture. All have led to less than optimum agricultural productivity and profitability. Discounting degraded land, a regional environmental assessment put the remaining agricultural land area in 2004 as only 150 million hectares.

The map on the next page gives a broad-brush view of how Central Asia's agricultural lands are used: cereal and cotton farming in irrigated areas; cereal farming with livestock raising in many rainfed areas; relatively small vegetable- and fruit-growing areas; and almost everywhere else, even in the deserts, some form of livestock raising or pastureland for livestock. Details follow.

Irrigated Farmland

In the early 20th century, Shar'ia law formed the basis for water distribution. Water was considered a common good and was shared according to need. Subsequently, in the Soviet period, massive systems for irrigation and drainage were installed, chiefly to increase cotton and later wheat production. These systems were built to accommodate the requirements of large-scale, state-run farms for which water usage was centrally

Agricultural Lands of Central Asia

1:10 000 000

200 100 0 200

Kilometers

RUSSIAN FEDERATION

KAZAKHSTAN

ASTANA

UZBEKISTAN

TURKMENISTAN

ASHGABAT

KYRGYZ REPUBLIC

BISHKEK

TASHKENT

TAJIKISTAN

DUSHANBE

PEOPLE'S REPUBLIC OF CHINA

AZERBAIJAN

IRAN

AFGHANISTAN

Caspian Sea

Aral Sea

Lake Balkhash

Lake Zaisan

Lake Issyk-Kul

Ishim

Nura

Irtysh

Emba

Ural

Syrdarya

Chui

Ili

Naryn

Amu Darya

Karakum Canal

Atrek

Tejendzh

55°0'E

75°0'E

50°0'N

40°0'N

National capital

International boundary

Rivers and canals

Boundaries are not necessarily authoritative.

Projection: Lambert Conformal Conic
Datum: WGS 1984

Data source:
Digital Geographical Maps of the World, 2008, Russia

GIS/Cartography:
V. Sibagatulin, GIS-Service Ltd.
Kyrgyz Republic, 2009

Agricultural Lands

- Alpine pasture livestock farming (horse, yak, etc.) in combination with other land use in mountain valleys
- Cereal farms (rice and corn) in combination with cotton on irrigated lands and meat and dairy farming
- Cereal farms (wheat, corn), meat, and dairy farming
- Cereal farms (wheat, millet, rice, and corn) in combination with cotton and livestock
- Cereal rice farms on irrigated lands
- Cereals, bean, oil, and other crops in combination with vegetable, watermelon, melon, and pasture livestock
- Forests with occasional land use and livestock
- Land use in oases (wheat, corn, palm trees, vegetables, and fruits)
- Less cultivated and not populated areas with occasional land use; livestock farming and others
- Livestock farming (cattle, sheep, and goats) with occasional land use
- Meat and dairy farming, and sheep breeding in mountains and other land use in mountain valleys
- Meat-wool farming and sheep breeding
- Nomadic and semi-nomadic livestock (cattle, sheep, goats, and camels)

controlled. Now that state farms have been divided into smaller units, individual countries have been left to develop their own water-sharing schemes, with varying levels of success. Irrigation is now used on large areas of arable land in the region. Three sources of water prevail in the region: river diversion, pumping of rivers, and reservoir storage. The Amu Darya and Syr Darya rivers are the major primary sources, with almost all of their water exploited. Large irrigation reservoirs include the Tengiz Reservoir in Kazakhstan, Toktogul Reservoir in the Kyrgyz Republic, and Kayrakkum Reservoir in Tajikistan.

Upper: Field. **Lower:** A view of the Karakum Canal in Turkmenistan near the village of Nichka.

The Osh Bazaar, Kyrgyz Republic, one of the busiest and most colorful markets in Central Asia, with a wide variety of produce.

Irrigated Crops

Major irrigated crops across the region are cotton and cereals, primarily wheat. Kazakhstan's leading irrigated crops are fodder (mainly alfalfa), cereals, cotton, fruits, potatoes, rice, and sugar beets. Fodder crops are often grown in areas where salinity and poor drainage conditions prohibit the growth of other crops. Kyrgyz Republic's major irrigated crops are cereals, mainly wheat, and fodder, which account for 37% of the irrigated crop area; major irrigated export crops include cotton, fruits, and vegetables. The major irrigated crops in Tajikistan are cotton—grown on about 50% of irrigated farmland—and fodder, fruits, cereals, and vegetables. Fruits are gradually replacing cotton as the number one crop. Cotton and fruits, especially grapes, are the most important export crops. In Turkmenistan, the major irrigated crops are cereals, mainly wheat, and cotton and fodder, with the most important export crops being cotton and vegetables. In Uzbekistan, cotton is by far the major irrigated crop, with the country consistently ranking among the world's leading cotton exporters. Other important crops include fodder, wheat, and fruits.

Proportion of Arable Land Equipped for Irrigation, 2007 (%)

Country	Land Equipped for Irrigation ('000 hectares)	Arable Land ('000 hectares)	Share in Arable Land (%)
Kazakhstan	3,556[a]	22,700[a]	15.7
Kyrgyz Republic	1,021[b]	1,280[b]	79.8
Tajikistan	722[c]	710[a]	101.7
Turkmenistan	1,800[a]	1,850[a]	97.3
Uzbekistan	4,281[a]	4,300[a]	99.6
Total	**11,380**	**30,840**	**36.9**

[a] Manual estimation, [b] Official data reported on FAO questionnaires from countries, [c] Expert sources from FAO (including other divisions).
Source: FAOSTAT. 2009. http://faostat.fao.org (updated April 2009).

Upper: A woman selling melons and gourds at the Osh Bazaar. **Lower:** Pomegranate farmer in Tajikistan with a prize specimen.

Top left: A wheat field in Kerbulak oblast in Kazakhstan. **Top center:** Grain elevators on the steppes of Kazakhstan. **Upper right:** Wheat in transit in Aktau, Kazakhstan's only seaport, on the Caspian Sea. **Middle left:** Wheat products in a local Kazakhstan market. **Middle right:** Naan sellers at the market in Khojand, Tajikistan Bottom: Grain storage in Kerbulak oblast in Kazakhstan.

Agricultural Standouts

WHEAT

Wheat production is a large-scale enterprise that began in the 1950s in an effort to showcase Soviet agricultural prowess. More than 300,000 square kilometers were planted to wheat in the first few years and hundreds of thousands of Russians immigrated to work in the fields. The first harvests exceeded expectations but by the end of a decade the soil had become barren; poor fertilizer use and lack of erosion control led to loss of most of the topsoil. In the 1990s, many state and collective farms were replaced by inefficiently run small farms and cooperatives. Wheat harvests fell nearly as spectacularly as they rose. Yields picked up in 2000 when grain-trading companies took over the management and consolidated these struggling farms and cooperatives, providing much-needed capital and inputs, expertise, and market outlets.

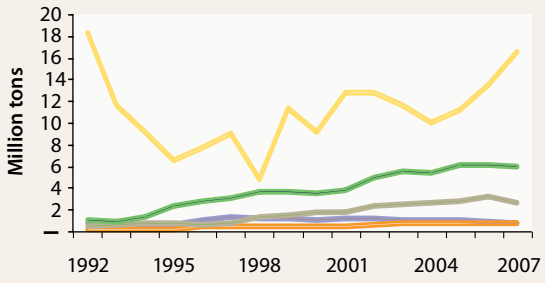
Wheat, primarily grown as winter wheat, is Central Asia's chief grain and now occupies more than 15.8 million hectares in the region. During most of the 20th century, wheat cultivation was concentrated in rainfed areas. However, as grain self-sufficiency became a priority, there have been dramatic increases in the amount of irrigated land sown to grain. The Kyrgyz Republic, Tajikistan, Turkmenistan, and Uzbekistan have all increased irrigation areas planted with wheat. Between 1992 and 2005, their wheat production increased by about 40%, 270%, 650%, and 500%, respectively, with both Tajikistan and Turkmenistan more than doubling wheat yields per hectare. Massive increases in the area under wheat in Turkmenistan and Uzbekistan account for much of their spectacular growth in wheat production.

While the goal of its neighbors has been self-sufficiency, Kazakhstan has continued in its role as Central Asia's breadbasket. Spring wheat and winter wheat are grown in Kazakhstan's warm, irrigated southern regions, accounting for a third of the annual wheat crop. The other two-thirds are produced in the country's three rainfed northern oblasts, Akmola, Kostanai, and North Kazakhstan (see image next page). This rich wheat country dates from the Soviet Virgin Land's Campaign, which plowed up and seeded more than 20 million hectares of fragile grassland for wheat production between 1950 and 1960. Wheat production soared, but enormous areas of steppe lands subsequently deteriorated, later requiring millions of hectares of land to be abandoned. Declines in wheat land continued after independence. However, state investment in inputs brought a rebound in 2000, and the wheat production area climbed some 3 million hectares in 5 years.

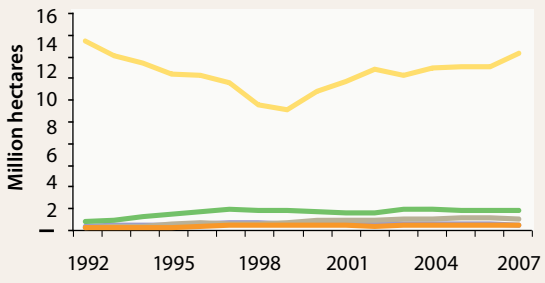
Generally speaking, northern Kazakhstan is considered a risky agricultural zone, receiving very little rainfall and drought in 2 of every 5 years.

Nonetheless, its chernozem and *kashtan* soils are extremely fertile and capable of excellent harvests in years of adequate rain. Moreover, because a hot finish contributes to improved quality, Kazakh wheat tends to be relatively high in protein and quality, and is even better during drought years. Kazakhstan counts wheat among its major exports and, given increasing global demand for the grain, prospects look promising. Moreover, if world grain prices continue to increase, more and more wheat is expected to be planted across the region.

Wheat Production in Central Asia, 1992–2007, million tons



Area Harvested of Wheat in Central Asia, 1992–2007, million hectares



Kazakhstan
Kyrgyz Republic
Tajikistan
Turkmenistan
Uzbekistan

Source: FAOSTAT. 2008. http://faostat.fao.org

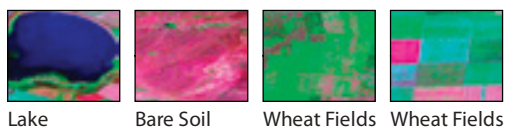
Northern Kazakhstan Wheat Fields

10 5 0 10 Kilometers

1:1,000,000

City

Town



Satellite image: Landsat ETM+ (15m)
Image Acquisition Date: circa 2000 (+/- 3 years)
Projection: Geographic, WGS84
MODIS image: MOD13Q1, Day 257, 2008

Prepared by C. Y JI, 2009.

Upper: Cotton harvest. Cotton plays a major role in the economies of Uzbekistan and Turkmenistan. **Lower:** Tajik villagers collect cotton in Yangiabad, about 140 km from Dushanbe, Tajikistan.

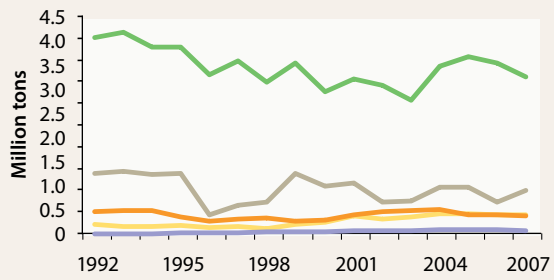
COTTON

Central Asia has the perfect climate for cotton: warm to hot temperatures, low humidity, more sunshine hours, and low risk of rainfall at harvest. Excellent conditions like these helped make Bukhara and Samarkand cotton products popular as far back as the 10th century, fostered the establishment of trade in cotton fiber and cloth to Russia in the 16th century, and encouraged Tsarist expansion to the region to feed Russia's textile mills in the 19th century.

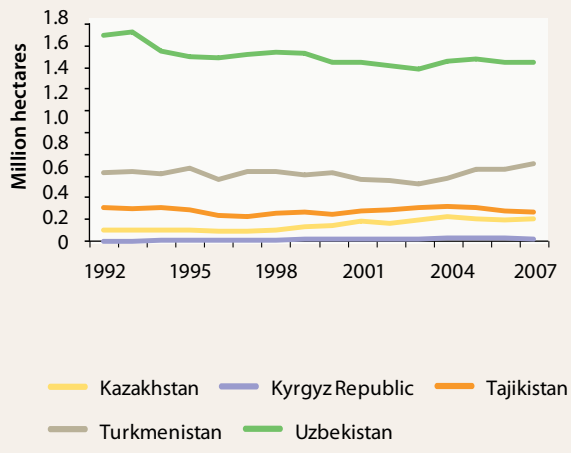
But cotton has proved a double-edged sword. While it has reaped considerable wealth for the region, recent dependence on it—in what many have labeled a virtual monoculture—has had serious consequences. Primary is the environmental degradation caused by the massive irrigation required for growing vast amounts of cotton in Central Asia's parched lands.

Under the Soviets, cotton production expanded geometrically. Production is down somewhat from pre-independence levels. However, it remains a paramount crop that still dominates Tajikistan, Turkmenistan, and Uzbekistan economies. Between 1992 and 2004, cotton lint has been the number one export in each of these countries, and cotton seed, cotton linter, oil of cotton seed, and cotton waste have all ranked among the top exports. The cotton subsector accounted for roughly a fifth of Tajikistan's and Uzbekistan's exports in 2004 and 2005. Production mandates from government are mostly responsible for these high numbers.

Cotton Production in Central Asia, 1992–2007, million tons

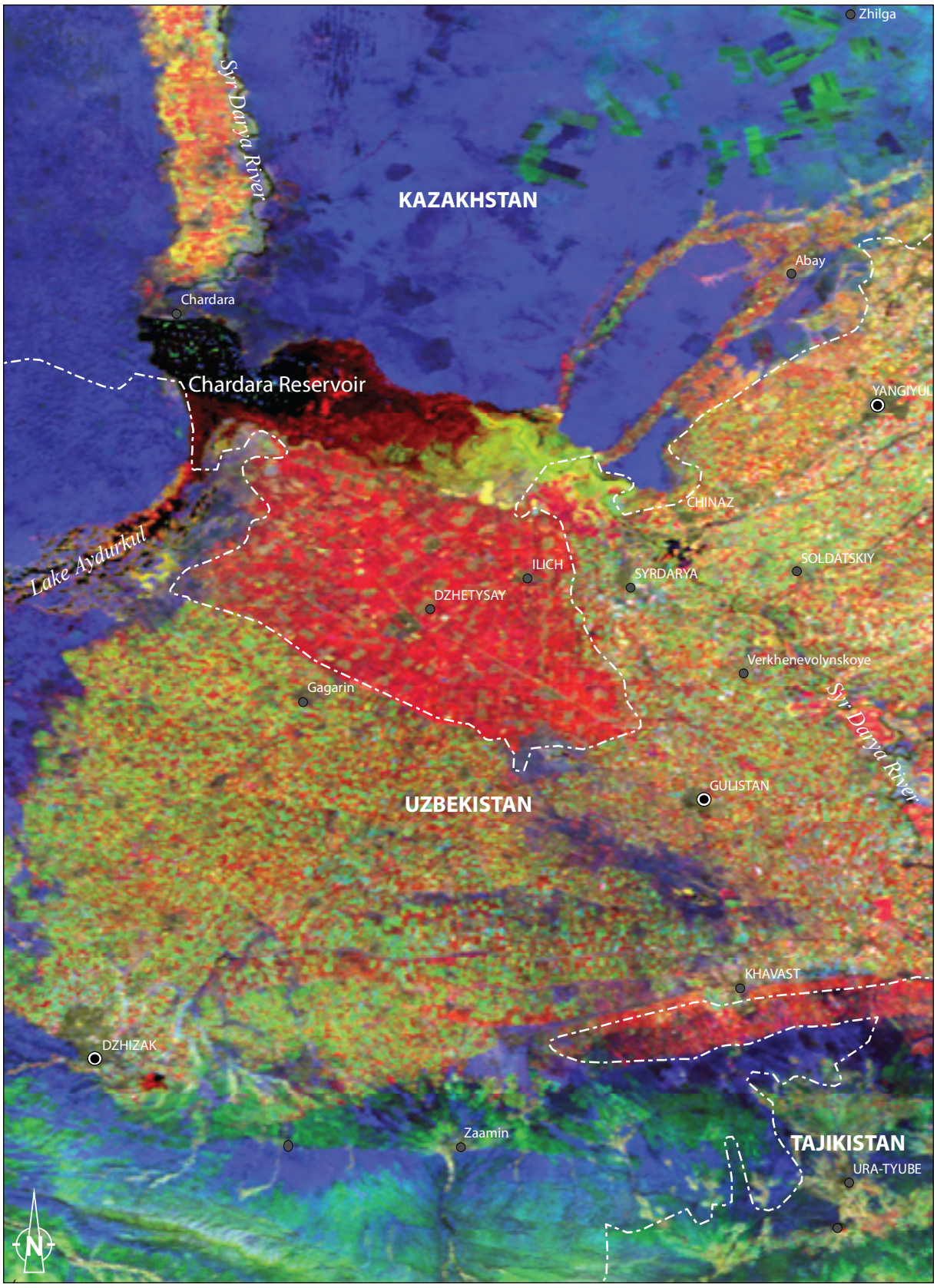


Area Harvested of Cotton in Central Asia, 1992–2007, million hectares



Source: FAO. http://faostat.fao.org (accessed 29 April 2009).

Golodnaya Steppe



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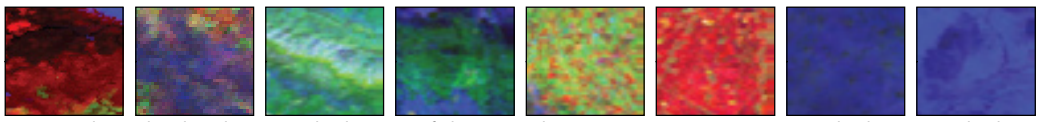
Kilometers

1:1,000,000



Provincial capital
City
International boundary

Satellite Image: MODIS NDVI Composite (250m)
Image Acquisition Dates: April, May, October, 2008
Projection: Geographic, WGS84

Prepared by C. Y. Ji, 2010

Upper: Cotton ready to be harvested. **Lower**: Cotton loading in Uzbekistan. Image at left shows a cotton-growing area, the Golodnaya Steppe, in Kazakhstan and Uzbekistan, with significant areas of land in Uzbekistan abandoned due to poor drainage causing high salinity.

Upper: Across Central Asia, the cotton industry includes carpet making—here in a carpet factory in Uzbekistan. **Lower:** Cotton factory in the Kyrgyz Republic.

Cotton lint was also the top export for the Kyrgyz Republic, and has stood second only to wheat in Kazakhstan for many years. Both these countries have been diversifying their agriculture in recent years in light of the importance of food security and to some extent have been moving from cotton to grain.

Cotton will continue to play an important role in the region. However, the region has to confront its cotton legacy. Studies have linked cotton monoculture with poverty and, in some cases, repression. However, cotton's role in water and land degradation has caused the most alarm—witness the damage to the Aral Sea and its surroundings.

Golodnaya Steppe, shown in the image on the previous page, is one of the major cotton production bases in Uzbekistan. Much of the area is affected by soil salinity due to disrepair of drainage systems.

The business of cotton, its method of production, and its relative importance to the region's future call for reassessment of the subsector. This will take time. One thing is certain, however: less reliance on cotton and greater agricultural diversification hold strategic, environmental, and socioeconomic benefits for the region.

Fergana Valley

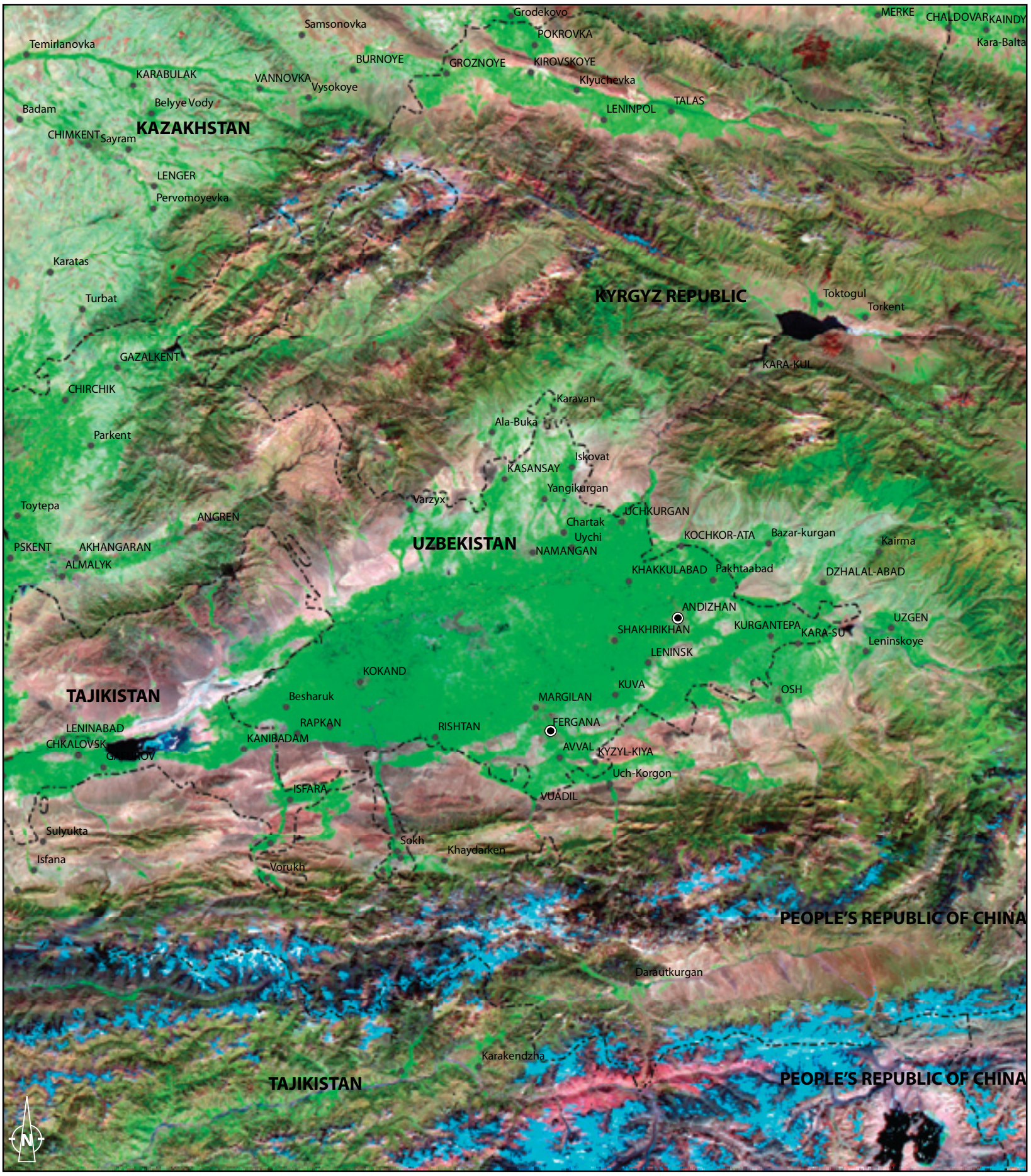
Fergana Valley's rich land and central location (see image, opposite page) have attracted people for millennia. It is as much a center for the region's agriculture as it is for its industry and cultural history. Topographically, it is an enormous depression spanning 22,000 square kilometers between the mountain ranges of the Tien Shan in the north and the Gissar-Alai in the south. Approximately 300 kilometers (km) long and up to 70 km wide, it lies mainly in eastern Uzbekistan and partly in Tajikistan and the Kyrgyz Republic. Comprising only about 1% of Central Asia's land area, it is home to about 18% of the population or about 11 million people, making it one of the region's most densely populated areas. More than a quarter of the populations of Uzbekistan and Tajikistan, and more than half of Kyrgyz Republic's population live in the valley.

Made fertile by the Naryn and Kara Darya rivers, which join in the Fergana to form the Syr Darya, the valley is the backbone of Central Asia's agriculture. It is a major producer of cotton, wheat, fruits, and raw silk. Because of their local demand, many other crops are grown on a smaller scale as well. In the Uzbekistan part, these include carrots, maize, melons, mungbean, and rice, as well as groundnut and vegetables. Rice is double-cropped using drainage water if salinity is not too high. In southern areas, maize and mungbean are also double-cropped. In the Tajik portion of the valley, small-scale farmers also double-crop. Maize and mungbean are grown widely, followed by buckwheat, common bean, groundnut, millet, sesame, soybean, tobacco, and vegetables. When water availability is good, rice is also grown. In addition to annual crops, the area is covered with orchards, vineyards, walnut groves, and mulberry tree plantations (for silk production).

Fergana was exploited by the former Soviet Union for its metal and uranium ores. There are also deposits of oil and natural gas. Other minerals include iron, gold, uranium, mercury, antimony, and ozocerite. These immense natural resources have led to considerable industrialization, mainly through mining and processing industries (oil and gas, chemicals, and textiles).

Unfortunately, increasing population, poor land management, and industrialization have taken a toll on this verdant region. Deforestation and overgrazing, salinization of agricultural soils, pressure on mountain slopes from recent human occupation and agricultural development, as well as land disputes—many of them transboundary—are of increasing concern. Pollution and hazards associated with industry and mining, from both active and past operations, also constitute a threat to both the environment and security. Fifty years of Soviet uranium mining in the adjacent mountains led to accumulation of 174 million tons of toxic and radioactive piles and tailings, deposited in river catchments, river beds, and floodplains. These threaten the valley's future through pollution, especially of water sources, by radioactive and toxic chemicals and the prospect of their movement down the valley in the event of earthquakes, landslides, or erosion.

Fergana Valley



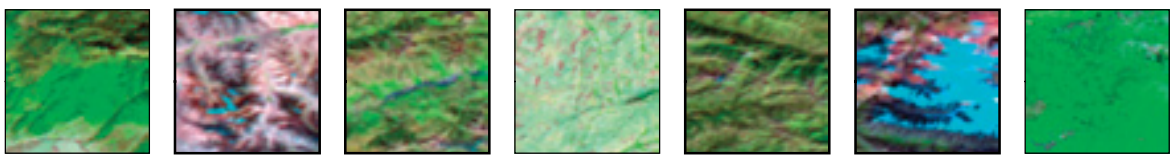
25 12.5 0 25 Kilometers

1:1,800,000

Provincial capital

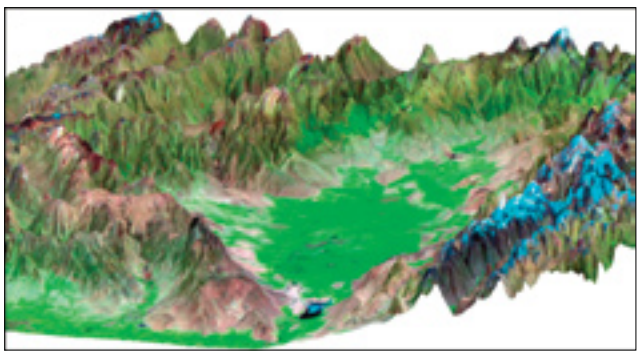
City

International boundary



Satellite image: MODIS (MOD13Q1, 250m)
Image Acquisition Date: Days 257, 2008
Projection: Transverse Mercator

Prepared by C. Y. Ji, 2009.



Right: Three-dimensional image of the Fergana Valley

Upper: A shepherd and his flock in the steppe below the Alatau range, Kazakhstan. **Lower:** Horses graze in the foothills of the Alatau range.

RANGELAND

Central Asia's rangelands are confined to no single topography. They extend over more than 60% of the region, and are abundant everywhere from the deserts of Uzbekistan and Turkmenistan to the mountains and foothills of the Kyrgyz Republic and Tajikistan, and the Kazakhstan great steppe. Specifically, rangeland refers to open, mostly unimproved, land composed of native plant communities that include grasses and shrubs, and may also include seeded managed areas. Generally, it is any land associated with grazing and fodder. However, rangelands are also a source of food, fuel, medicinal plants, and recreation, and provide a significant carbon sink, vital in preventing escape of greenhouse gases.

With more than 185 million hectares of rangeland, Kazakhstan ranks fifth in the world in pasture resources, and first in rangeland per livestock head. Rangeland covers nearly 70% of the country and is found in Kazakhstan's flat steppe zone in the north, the semidesert of the central region, the desert zone of the south and west, and in the southern pasture and desert areas, which can be used year-round. Rangeland also covers roughly 50% or more of the Kyrgyz Republic, Turkmenistan, and Uzbekistan.

The majority of the Kyrgyz Republic's rangeland is found at altitudes of 1,000–3,500 meters, with 25% above 3,500 meters. Land cover varies from

Rangelands of Central Asia, 2007

	Land Area ('000 hectares)	Rangeland (Permanent Meadows and Pastures) ('000 hectares)	Rangeland as % of Land Area
Kazakhstan	269,970	185,098	69
Kyrgyz Republic	19,180	9,375	49
Tajikistan	13,996	3,770	27
Turkmenistan	46,993	30,700	65
Uzbekistan	42,540	22,000	52
Region	**392,679**	**250,943**	**64**

Source: FAOSTAT. 2009. http://faostat.fao.org (updated April 2009).

Upper: Shepherds set up camp in the pastures of the Kazakhstan steppe. **Lower:** Herding sheep across rugged terrain in Jalalabad, Kyrgyz Republic.

semidesert at lower elevations to steppe, mountain steppe, and alpine meadow. Seasonal use patterns generally depend on elevation, with summer pastures found at elevations above 2,500 meters, spring and fall pastures at 1,500–2,500 meters, and winter pastures often below 1,500 meters. Tajikistan's rangeland, like that of the Kyrgyz Republic, is mountainous, with seasonal and year-round pastures.

In Uzbekistan, 80% of rangeland is in the deserts of the Kyzylkum, Ustyurt Plateau, Karshi Steppe and Fergana Valley; rangeland is also found in piedmont areas in the east and in semidesert areas spread sporadically around the country. Most of Uzbekistan's rangeland can be used year-round.

But overgrazing has reduced the productivity of the region's pastures dramatically and is leading to their desertification. In Tajikistan, for example, 90% or more of pasture land is degraded; and in Uzbekistan, 70%.

Top: A breeder from the state stud farm, Uzbekistan, shows the farm's pride—home-bred White Karakul sheep. **Middle:** Horses are also a source of milk for rural families; farmer milks a horse in Sary near Pavlodar, Kazakhstan. **Bottom:** Goats are a source of both meat and milk in many areas of the region.

LIVESTOCK

Livestock remain one of Central Asia's most important agricultural commodities. They represent a principal export of Kazakhstan, the Kyrgyz Republic, and Turkmenistan, and a key source for rural employment, food, and income generation across the region. Long a staple of Central Asian agriculture, traditional forms of nomadic pastoralism were practiced in some parts of the region until the 1930s, when Soviet mass collectivization abruptly forced the last pastoralists to move to big agricultural cooperatives and state-run farms.

Central Asia's livestock sector flourished under collectivization. Soviet infrastructure not only offered animal health services and a ready supply of mechanically harvested fodder but also provided sufficient shepherds and transport to ensure that grazing animals could follow traditional seasonal patterns of migration. Herds and flocks grew enormously, and markets were made available for meat, pelts, and wool within the former Soviet Union, and for pelts to luxury markets abroad.

Regional independence brought an end to this supply and market infrastructure, and the sector quickly declined as state support all but disappeared and large enterprises gave way to smaller units—cooperatives and individual and household farms. Herd and flock sizes began to plunge. Small livestock counts eroded genetic pools and breeding practices. Lack of state support led to declines in animal health and ended the transport of animals to fertile, remote rangelands, causing farmers to overgraze close to home, resulting in land degradation near villages and underutilization of land elsewhere. Together, this has reduced farm quality and income, and led to increasing levels of poverty in rural areas, with livestock, in many cases, being sold off and land being sowed with subsistence crops instead of fodder.

Still, the livestock sector is anything but fading. This is important because it is not only vital to the rural economy but it also significantly contributes to the region by providing employment, a source of nutrition, and much-needed foreign exchange. Primary livestock include sheep, cattle, goats, pigs, and horses. Top 10 livestock export products since 2000 have variously included cattle hides, pig meat, wool, and skim cow milk in Kazakhstan; cattle hides, fine animal hair, wool, cow milk, cheese, and ice cream in the Kyrgyz Republic; and wool and cattle hides in Turkmenistan. Uzbekistan and Turkmenistan are important breeders of Karakul sheep, famous for the production of Astrakhan pelts. Along with Tajikistan, these countries also produce significant quantities of cattle meat and fresh milk from sheep and goats.

Today, the sector is dominated by private ownership, although the institutions created to replace the pastoral collectives remain weak. Progress varied in the countries. In the Kyrgyz Republic, agrarian reform has progressed quite rapidly, with most collective farms restructured as cooperatives or peasant enterprise associations. In Kazakhstan where agriculture is less significant in

the overall economy, reform in the livestock sector has been slower.

For the sector to grow, these fledgling private institutions—as well as the traditional herding groups and herders' organizations that are taking on greater roles—need continued support; for example, through technologies to increase fodder production and preservation in the lowlands, improve grazing management, and use feed resources more efficiently. Reintroduction of high-yielding forage crops offers some promising solutions.

Central Asia's Major Livestock Products, 2007, kilograms
Top 5 Products in Each Country are Shown in Bold Type

	Kazakhstan	Kyrgyz Republic	Tajikistan	Turkmenistan	Uzbekistan
Camel milk	—	26	—	—	260
Camel meat	—	—	—	—	610
Cattle meat	**383,800**	**92,000**	**26,900**	**102,000**	**586,300**
Chicken meat	52,000	5,500	700	12,600	24,900
Cow milk, whole, fresh	**5,006,700**	**1,192,000**	**529,000**	**1,332,800**	**5,121,000**
Goat meat	10,500	7,300	—	6,400	—
Goat milk, whole, fresh	15,500	8,500	**54,600**	—	36,300
Hen eggs, in shell	**147,700**	**20,830**	**6,180**	**33,900**	**37,500**
Horse meat	58,000	20,500	—	—	2,000
Natural honey	—	1,400	200	—	2,200
Other bird eggs, in shell	1,700	110	—	255	3,200
Pig meat	**218,000**	18,900	—	210	19,200
Rabbit meat	2,000	200	—	—	200
Sheep meat	**114,000**	**39,500**	**29,400** [a]	**90,200**	**88,900**
Sheep milk, whole, fresh	51,000	**40,000**	—	—	**500,000**
Silk-worm cocoons, reelable	—	150	—	—	18,000
Wool, greasy	34,172	10,600	3,700	**20,200**	22,600

— = data not available.
[a] Sheep and goat meat.
Source: FAOSTAT, 2009. http://faostat.fao.org

Top: Herd of goats in Tes Tur, Kyrgyz Republic. **Middle:** Sheep in the green valley near Karakol, Altyn Arashan, Kyrgyz Republic. **Bottom:** Kyrgyz traveler with his donkey and cart near the shore of Lake Issyk-Kul.