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המרכז למחקר בכלכלה חקלאית

THE CENTER FOR AGRICULTURAL ECONOMIC RESEARCH

Working Paper No. 9608

LAND AND WATER POLICIES IN UZBEKISTAN

by
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**THE CENTER FOR AGRICULTURAL ECONOMIC RESEARCH
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LAND AND WATER POLICIES IN UZBEKISTAN¹

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Uzbekistan, with land area of 447.4 thousand sq. km and population of 20.7 million, is the third most populous among the former Soviet republics (after Russia and Ukraine) and the fifth largest (after Russia, Kazakhstan, Ukraine, and Turkmenistan). This is a desert country, however, in which only 10% of the territory is habitable land. During the Soviet era, Uzbekistan was designated as the main supplier of raw cotton and karakul skins to the USSR, and its agriculture accordingly specialized in these two products. Cotton remains the most attractive agricultural export commodity in independent Uzbekistan.

Recognizing the serious economic inefficiency and environmental abuse problems inherited from its Soviet past, Uzbekistan has embarked since the declaration of independence in September 1991 on a program of reforms intended to achieve a transition from a command economy to a market-oriented economy. The reforms in the agricultural sector are aimed to improve the efficiency of production, thus increasing the output and eliminating the traditionally wasteful use of resources. This goal is to be accomplished through the process of land reform and farm restructuring, implemented simultaneously with price and trade policy reforms. The complex reform process is basically expected to change the producer incentives, strengthening profit orientation and thus increasing personal involvement and motivation.

The present article reviews the current land and water policies in Uzbekistan and examines their adequacy in the light of these objectives. The analysis is largely based on the data collected by the authors in extensive field trips through the fertile parts of Uzbekistan in 1994-1995.²

Inherited Structure³

Despite its rich mineral resources and the fairly diversified industry created during the Soviet regime, Uzbekistan is still basically an agricultural country. Rural population is 60% of the total. Agriculture employs 40% of the labor force and accounts for 35% of net material product and of productive assets. Yet Uzbekistan is mostly desert, and its agriculture is concentrated in relatively small areas of irrigated arable land in oases and along the rivers. Desert and mountain pastures account for more than 80% of agricultural land in this country, and the entire rural population is concentrated on 4.5 million ha that is both arable and irrigated (16% of agricultural land). The effective density of rural population in Uzbekistan is 2.7 people per hectare of arable land, compared to only 0.5 in the European republics of the former Soviet Union (1990 data). Ignoring the expansive desert pastures, which are not of much use to individual farmers, there is only 0.37 ha of arable land per rural resident in Uzbekistan, compared to 2 ha per person in Ukraine and 0.75 ha per person in the densely populated Moldova.

The high population density is actually increasing over time due to two factors. First, the cultural tradition in Uzbekistan encourages young people to stay close to their parents' homestead, so that there is very little migration of rural population to urban areas, despite employment opportunities. Second, the population growth rate in Uzbekistan, at 27.6 per 1000, is among the highest in the former Soviet Union, compared to 2.2 per 1000 in Russia and 6.5 per 1000 average for the FSU. Uzbekistan ranks third by family

size among the former Soviet republics: 5.5 people in an average family, compared to 3.2 in the Slavic republics and 3.5 the USSR average. During the last decade, the combination of these two factors produced a steady increase in the proportion of rural population in Uzbekistan, which grew from 57.7% in January 1984 to 61.0% in January 1994, while the arable and cultivated area remained practically unchanged. This trend is in contrast to the developments in most other former Soviet republics, where the proportion of rural population decreased between 1980 and 1990.

High population pressure on the intrinsically limited resources of land usable for farming is one of the two main features of Uzbek agriculture. The other feature is the need for irrigation of arable land. Crop production and most of livestock production (with the exception of the karakul sheep) is confined mainly to irrigated areas. All cotton (Uzbekistan's main export product) is grown under irrigation, and grain production largely shifted to irrigated lands in the 1970s. The share of dry farming declined over the years, as irrigated areas increased from 78% of total cultivated land in 1965 to 98% in 1990.

Production Overview

Appropriately for a country specializing in cotton, agricultural production in Uzbekistan during the 1980s averaged two-thirds crop products and one-third livestock. The cultivated land was mostly sown to field crops, with orchards and vineyards taking up not more than one-tenth of the area. Among field crops, cotton accounted for 50% of the cropped area, with the rest under grain (25%), animal feed crops (20%), and vegetables (5%).

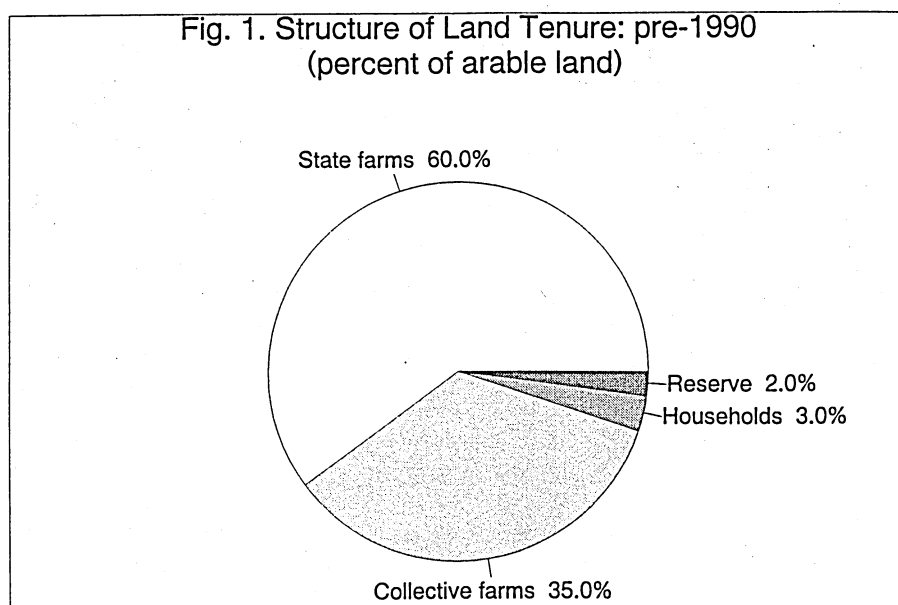
Gross agricultural product increased at a rate of 1.6% per year between 1976 and 1990, rising from 8 billion rubles to 11 billion rubles (in constant 1983 prices). The growth was entirely due to the increase in the volume of livestock products, which doubled between 1976-1990, while the volume of crop production stagnated. Agricultural production in Uzbekistan did not collapse since independence. Gross agricultural product in 1994 and 1995 was about 15% lower than in 1990 (in constant prices), in contrast to other former Soviet republics and countries in East Central Europe, where agricultural output dropped by 30%-40% after 1990. To a large extent, this was achieved because Uzbekistan was growing cotton, an internationally marketable export commodity, for which ready markets could be found in Western Europe and Turkey after the disappearance of the traditional FSU demand. However, agricultural production shows a definite downward trend since 1990, which so far has not been reversed.

Farm Organization

The agriculture in Uzbekistan, as in all other Soviet republics, was traditionally organized in a dual system, in which large-scale collective and state farms coexisted in a symbiotic relationship with quasi-private individual farming on subsidiary household plots.⁴ The large-scale farms were the backbone of commercial agriculture, feeding agricultural products into the state-controlled distribution system. Yet the subsidiary household plots produced much in excess of their subsistence needs, and typically sold their surplus products to the local large-scale farm, to the state-controlled consumer coop network, and partly also in nearby towns, where the bazaar was a well-established traditional institution.

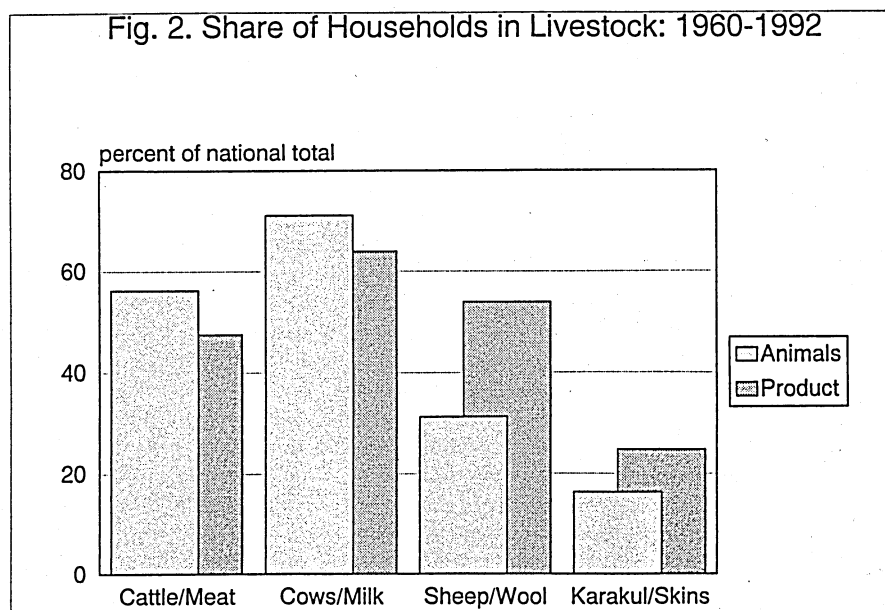
An average collective or state farm in Uzbekistan had 2000-3000 ha of arable land and employed around 1000 farm workers. Some 2000 collective and state farms jointly managed 95% of arable land in the country. An average household plot in Uzbekistan in the 1980s was 0.12 ha, and 2 million household plots cultivated 3% of arable land (Fig. 1). In terms of production, however, the household plots consistently accounted for 20%-25% of gross agricultural product over the recent decades, a much higher proportion than their share of land. This was accomplished mainly by concentration in livestock production. Collective and state farms provided young stock as well as feed and common pasture for household animals. In return, the

Fig. 1. Structure of Land Tenure: pre-1990
(percent of arable land)



households delivered their surplus livestock output to the local large-scale farm, which then proceeded to sell it to the state as part of its obligations to the administrative command system. Collective and state farms thus sold commercially their own products as well as products originating in subsidiary household plots. In fact, between 1980-1990, sales of meat by collective and state farms to the state were 35% higher on average than the reported meat production of these farms. Commercial sales of milk and eggs were close to 90% of reported production, more than what is left after allowing for internal consumption in the village. In contrast, the share of household plots in direct sales of livestock products to the state was less than 5%, despite their high share in production.

Fig. 2. Share of Households in Livestock: 1960-1992

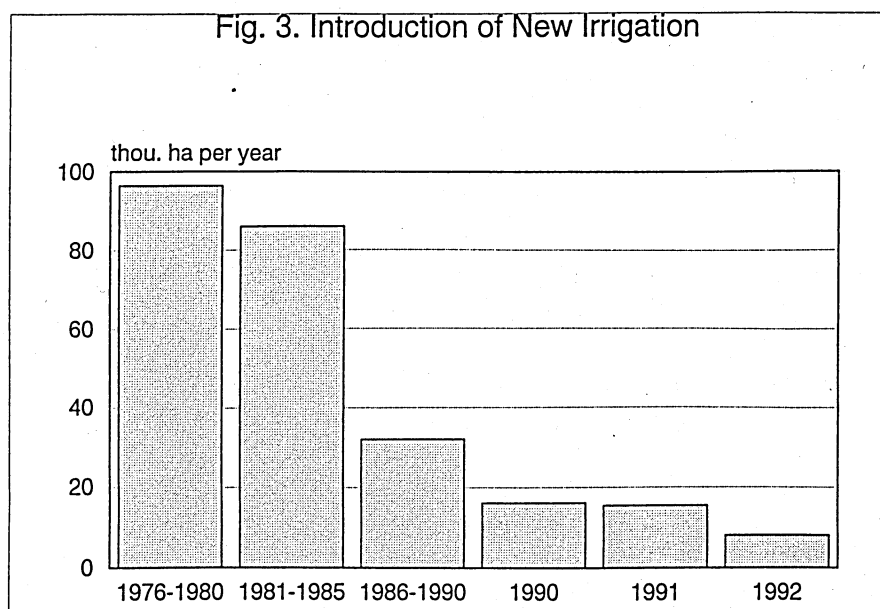


Since 1970, the households had more cattle in absolute numbers than the collective and state farms combined (nearly 60% of all cattle and over 70% of all cows between 1970-1992; Fig. 2). Sheep, on the other hand, and especially karakul sheep, were bred predominantly in state farms, which managed most of the extensive desert pastures ideally suited for sheep grazing. Pigs were also mainly handled by state farms (over 85% of all pigs in Uzbekistan), possibly because of the predominantly muslim persuasion of the population.

Over the years, the household plots produced half the total meat output in Uzbekistan and around 60% of milk and wool (Fig. 2). In addition to livestock production, the small household plots specialized in labor intensive crops, producing 30% of the total output of potatoes, 45% of vegetables, and 60% of fruits and berries during the decade 1980-1989. Scale crops requiring advanced mechanization and purchased inputs, such as cotton and grain, were grown mainly by collective and state farms. Thus, up to 1990, household plots produced about 5% of grain (mainly as feed for their animals) and no cotton.

Irrigation System

All agriculture in Uzbekistan, even the karakul sheep grazing in the desert, is dependent on irrigation. The rapid population growth necessitated continuous expansion of irrigated areas over the years. During the decade 1976-1985, irrigated area was growing at an average rate of 90 thousand ha per year (Fig. 3). The total irrigated area increased from 3 million ha in 1976 to nearly 4 million ha in 1985. After 1985, the introduction of new irrigated lands slowed down considerably, and in recent years the total irrigated area has remained static at the level of 4.1 million ha.



The main source of irrigation water in Uzbekistan is the surface flow from melting snows and mountain streams: this provides more than 95% of the water used for irrigation. The groundwater resources do not contribute significantly to the total supply of irrigation water, and groundwater is mostly used to water desert pastures from wells. Water is pumped from reservoirs, and also directly from the two major rivers of Amu Darya and Syr Darya, in quantities fixed by multilateral agreements with Uzbekistan's neighbors.

Total water deliveries to agriculture in Uzbekistan increased significantly over the 1970s, when the irrigated area was expanding rapidly. Water deliveries declined by about 10% over the 1980s (from 62

billion cu.m in 1980-1981 to 55 billion cu.m in 1989-1993), as the expansion of irrigated areas slowed down. Since the cropped area on irrigated lands kept increasing all through the 1970s and 1980s, the rate of water delivery per hectare of irrigated land peaked in 1980 and then declined much more sharply than total water deliveries, dropping from about 18,000 cu.m/ha in 1979-1981 to around 13,000 cu.m/ha in 1989-1993 (Table 1). Yields of all crops grown on irrigated land appear to have declined in the 1980s with the decline of the rate of water deliveries per hectare (Table 1). Although the decline of crop yields may have been caused by a combination of many technological and natural factors, the association with the decline of water deliveries is striking.

Table 1. Water Deliveries and Crop Yields: 1980-1993

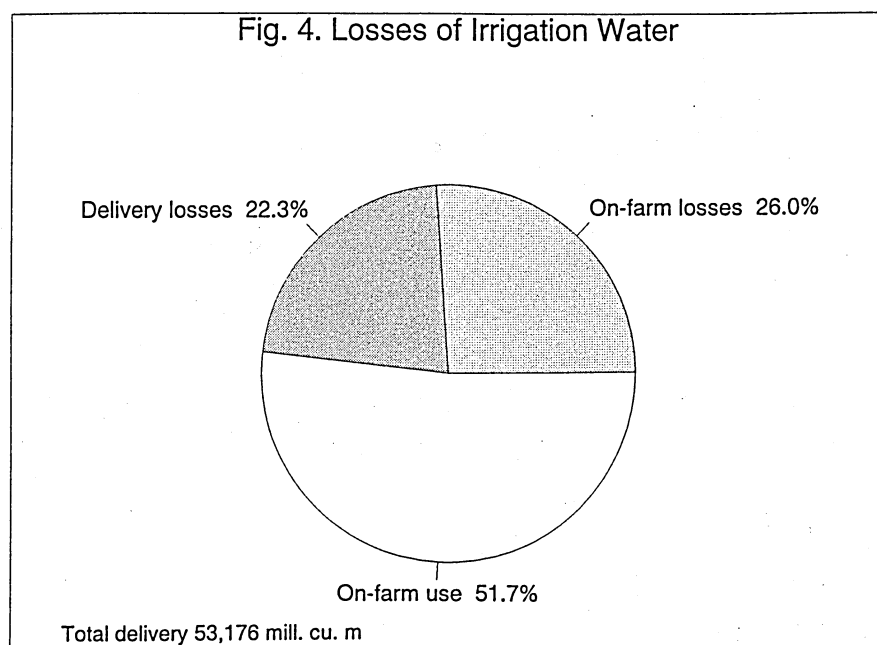
Year	Water, '000 cu.m/ha	Crop yields, centner per ha					
		Cotton	Grain	Corn	Rice	Vegetables	Wheat
1980	17.9	29.7	4.7	6.7	36.8	14.9	2.2
1981	17.5	32.2	4.8	6.5	39.9	15.8	2.3
1982	15.7	31.7	5.1	6.8	36.9	14.6	2.3
1983	15.2	31.4	5.0	6.5	33.0	15.2	2.5
1984	15.6	26.2	3.1	3.8	30.0	13.3	2.0
1985	14.7	27.0	2.8	3.4	31.0	13.1	1.9
1986	11.8	24.3	2.7	3.0	30.1	12.5	1.9
1987	13.7	23.1	2.9	3.5	28.2	13.2	2.0
1988	14.0	26.6	3.4	4.4	27.7	13.8	2.4
1989	12.8	26.9	3.2	4.0	28.0	13.2	2.3
1990	13.3	26.2	3.2	3.8	29.2	12.6	2.5
1991	13.2	27.3	NA	3.8	24.3	NA	1.7
1992	13.1	25.0	NA	3.4	21.8	NA	3.0
1993	13.7	25.5	NA	3.5	21.0	NA	2.0

Source: SANIIRI, Tashkent.

Water is regarded as a nationally owned resource, and the irrigation system is built, run, and operated by the state. The irrigation water supply passes through a network of main canals, interfarm canals, and collective farm ditches, as it moves from the principal reservoirs to the fields. Some of the canals are lined with concrete or a composite material, but many are unlined. The farm-level ditches are also unlined, and the seepage and evaporation losses in the system consume nearly 50% the water in transit (Fig. 4). Central water management authorities measure water deliveries from main canals to local interfarm water associations, and the local agencies in turn measure water delivery to collective farms with reasonable accuracy. Deliveries to individual fields within collective farms are usually not measured.

The main features of the irrigation system in Uzbekistan are allocation of water according to irrigation norms and free delivery of water. The irrigation norms determine the volume of water delivered to each region, district, and collective farm. The volume of water needed to irrigate crops is set by scientists working in research institutes, and not by farmers who produce the crops. The scientific irrigation norms include (i) the biologically optimal norms or the net crop water requirement (evapotranspiration, plus leaching requirement, minus effective rainfall), (ii) losses in main canals and interfarm canals, and (iii)

correction for the efficiency of farm-level irrigation practices. Irrigation norms also allow for regional soil characteristics and growing conditions. Based on the irrigation norms and the detailed cropping plans prepared by all farms, the state water authority estimates the volume of water required to irrigate the crops on each farm and thus allocates irrigation water among state farms, collective farms, and other agricultural producers. The norms, specified for each 10-day interval during the vegetative season, result in a detailed procedure for scheduling and measuring water deliveries to each farm. Norms also determine water deliveries during the non-vegetative season, for leaching cotton fields and for late-season or post-harvest



irrigation of orchards and other perennial crops.

Farms pay nothing for water, and the government absorbs the full cost of delivery to all regions, districts, and farms, including the investment and maintenance cost of physical plant. The costs of delivery vary significantly among regions, and all farms have an incentive to take delivery of their full allocation, but do not have economic incentive to use their allocation efficiently. The free delivery of water through the national irrigation system is also responsible for the underdeveloped use of groundwater: pumping water from the aquifer involves energy costs and is thus more expensive to the farms.

A Record of Inefficiency

Since the declaration of independence in September 1991, Uzbekistan has been forced to face the serious economic and environmental problems of its inherited agriculture. As a Soviet republic, Uzbekistan specialized in cotton, supplying over 60% of the USSR output between 1980-1990, and was virtually monocultural. Undiversified agriculture fitted well in the framework of centrally planned inter-republic relations within the Soviet Union, where Uzbekistan's cotton was simply moved out by rail and in return the country received all the food products it needed. During the Soviet regime, Uzbekistan was a net food importer, with the value of food imports from other republics at 2.25 times the value of food exports (1989 data). Lack of diversification, however, is becoming quite painful and damaging in the new political environment, when the breakdown of economic relations within the FSU has adversely affected the inter-republic trade and when

this remote southern country suddenly finds itself without reliable transportation links to maintain its trade with the main FSU markets. As a natural response to the shrinking trading relations with former FSU partners, Uzbekistan is shifting its cotton to Western Europe and Turkey, which are beginning to provide the foreign exchange needed for imports from new sources.

In addition to the problems associated with concentration in a single dominant crop, the Uzbek agriculture suffered from the perennial Soviet problem of inefficient use of resources. This was inherently an outcome of the administrative command system that imposed physical production targets and thereby relieved the individual farmer and farm manager of any profit responsibility and any motivation for efficiency improvement. Inefficient use of resources had at least two manifestations. First, the output produced per unit of input application was lower than the technological optimum, which resulted in under-production. Second, in an attempt to compensate for under-production, farms increased the application of inputs to levels above those necessary to produce one unit of output. There was no direct penalty for wasteful use of resources, because during the Soviet regime farms were not accountable for the inputs that they received through central allocation in order to meet their physical production targets.

The economic and social effects of under-production on consumer welfare are obvious, but wasteful use of inputs also has had far reaching and lasting environmental impacts. Excessive use of mineral fertilizers, insecticides, herbicides, and cotton defoliants has led to contamination of groundwater, and eventually rivers and lakes, with dangerous chemicals. Excessive use of irrigation water, which has always been abundantly and freely available from melting snows and rainfall in the eastern mountains, raises the water table, causes deaeration and water logging, increases surface runoff and soil erosion, produces high salt loading, and accelerates the loss of nutrients that are rapidly leached below the root zone. Wasteful use of water on Uzbekistan's very large irrigated area, especially with such a water-intensive crop as cotton, has contributed to a dramatic decline of the water flow (from 250 km³ annually in the 1960s to only 10 km³ by 1985) in the two major rivers, Amu Darya and Syr Darya, that feed the Aral Sea, and thus acted as a major factor in the Aral Sea catastrophe (Precoda, 1991). Also, more water is not necessarily better for crops: by the nature of the production function, overwatering may actually reduce crop yields.

Table 2. Comparison of cotton growing efficiency in Uzbekistan and other countries

	Uzbekistan	Greece	Turkey	Syria	Egypt	Pakistan	Calif.	Australia
Lint yield (kg/ha)*	824	915	988	1,129	1,057	503	1,480	1,406
Fertilizer use (kg/ha) **	285	169	61	47	360	85	138	27
Water use ('000 m ³ /ha)#	12.8	2.7	NA	7.4	8.5	19.0	9.2	7.0
<i>Lint produced per unit of input</i>								
kg per kg of fertilizer	2.9	5.4	16.2	24.0	2.9	5.9	10.7	51.8
kg per 1000 m ³ water	64.4	342.1	NA	152.6	124.4	26.5	160.1	200.8

* Yields are averages for 1992-94; California 1991-93. Data calculated from FAO (1994); for California from USDA (1994).

** Fertilizer use data are averages for 1985-91; Uzbekistan 1985-90. Country data from USDA (1992); for Uzbekistan from USDA (1995); for California from USDA(????).

The information on water use in Uzbekistan has been provided by Central Asian Scientific-Research Institute of Land Reclamation and Irrigation (SANIIRI) in Tashkent, based on direct water delivery data in 1989; data for California provided by D. Munk, Cooperative Extension, University of California (private communication); Australia from Hodgson et al. (1990); other countries from Gillham et al. (1995).

Inefficiencies in the use of resources perhaps can be best demonstrated by considering the example of cotton, which is the main crop produced in Uzbekistan. Table 2 presents comparative data on cotton yields and use of main inputs (fertilizer and water) for cotton growing in a number of countries.

The cotton yields in Uzbekistan (in kg per ha) are not much lower than in the Mediterranean countries, and Uzbekistan actually outperforms Pakistan by gross yields. Although the yields in Uzbekistan are about 45% lower than in California and Australia, this is mainly because of the relatively cold weather in Uzbekistan, which is responsible for the late start and early conclusion of the cotton season. Despite respectable yields, however, farms in Uzbekistan use the highest amount of fertilizer per hectare (after Egypt), and the efficiency of cotton production per kg of fertilizer used is the lowest among other cotton growers. Uzbek farms also use the highest amount of water per hectare (after Pakistan). Uzbekistan thus produces significantly less cotton per unit of irrigation water than Syria and Egypt, and about one third the quantity of cotton produced in California and Australia per 1000 cu.m of water. Thus, both nitrogen and water are used inefficiently relative to the achieved yields in Uzbekistan.

Table 3. Productivity Indicators of Agriculture in Uzbekistan and Other Soviet Republics (1965-1990 data)

	Agricultural output per worker, thou. rubles	Average growth rate of agricultural output per worker, %/year	Deviation of productivity level in agriculture from Russia's average level, % ⁵
Uzbekistan	5.4	0.75	-27.5
<i>Central Asia</i>			
Turkmenistan	5.4	1.4	-29.2
Kyrgyzstan	6.1	1.5	-20.5
Tadjikistan	5.6	0.8	-25.8
<i>Trans-Caucasus</i>			
Azerdaidjan	6.0	1.9	-20.5
Georgia	4.9	2.0	-16.8
Armenia	5.4	1.0	-18.7
<i>Slavic Republics and Kazakhstan</i>			
Kazakhstan	8.4	1.7	+9.6
Russia	7.7	2.3	0
Ukraine	7.1	2.8	+2.3
Belarus	7.4	3.2	+2.2
Moldova	5.5	2.4	+3.2
<i>Baltic Republics</i>			
Lithuania	9.7	2.2	+11.4
Latvia	9.6	1.3	-2.2
Estonia	12.8	1.4	+18.8

Source: Kriss (1994); based on official published data of the USSR State Committee on Statistics.

The rate of use of purchased inputs in Uzbekistan (as demonstrated by fertilizer application in the case of cotton and other crops) was similar to that in all former Soviet republics, so that excessive nitrogen

use may have been a systemic problem. Yet Uzbek agriculture compared unfavorably even to the rest of the USSR by productivity of rural labor. The ratio of gross agricultural product to labor in Uzbekistan was among the lowest in the former Soviet Union: 5.4 thou. rubles per worker per year (in constant prices over the period 1965-1990) compared to 8.4 in Kazakhstan, 7.5 in the Slavic republics, and around 10 in the Baltics (Table 3). This productivity ratio in Uzbekistan increased between 1965-1990 at a very slow rate of 0.75% annually, compared to over 2% annually in the Slavic republics and around 1.5% annually in Uzbekistan's Central Asian neighbors (Kazakhstan, Kyrgyzstan, and Turkmenistan). The increases of gross agricultural product in Uzbekistan thus hardly caught up over the long term with the growth of agricultural labor, which in turn was driven by rapid population growth.

Econometric analysis of gross agricultural product as a function of various factors of production (such as land, livestock, capital, labor, and fertilizer use) for the period 1965-1990 has shown that the average level of productivity in Uzbekistan was among the lowest in the former Soviet Union. The productivity level (as measured by gross product per agricultural worker) in Uzbekistan in that period was almost 30% below the productivity level in Russia and other Slavic republics, although it was comparable to the productivity level in other Central Asian republics (see last column in Table 3).⁵

The observed inefficiency is largely a legacy of the Soviet economic system. However, regional and cultural factors place Uzbekistan's performance in an unfavorable comparison to the Western republics in the FSU. Even if this comparison is fundamentally unfair, as any comparison between Asia and Europe is likely to be, it certainly serves to highlight the broad scope for improvement and the untapped efficiency reserves of Uzbek agriculture. The inherited difficulties in agriculture, and throughout the economy, cannot be remedied by tinkering with the existing system, as was the standard practice of "reforms" during the Soviet regime. Their solution requires a radical transformation of the existing system, and the current thinking in Uzbekistan is focusing on a program of transition to individual initiative based on private ownership of productive assets and establishment of functioning market institutions.

The Process of Land Reform⁶

Uzbek agriculture, although relatively backward compared to Western Europe and North America, relies heavily on machinery and purchased inputs for production. In this respect, it is substantially different from the agricultural sector in China and Vietnam, where prior to decollectivization land was the main resource while the use of capital and purchased inputs was minimal. Therefore, agricultural transformation in Uzbekistan, as in all other FSU countries, must simultaneously combine land reform with restructuring of farms, so that changes in land tenure will be accompanied by appropriate changes in ownership and management of farm assets and in farm operation.

Agricultural reform in Uzbekistan began in 1989, more than two years before independence, as a natural extension and adaptation of Gorbachev's centrally initiated attempt to increase food production and improve farm efficiency.⁷ The 1989 legislation proceeded in the dual track of giving more land to households and encouraging restructuring of farms for better efficiency. In addition to increasing the total area in the household sector by 60%, this initial phase of the reform process spelled out the first principles of farm restructuring through creation of autonomous subdivisions in large-scale collective and state farms, which have largely guided the implementation of reforms since then.

The land reform legislation that has emerged in Uzbekistan since 1989 provides an adequate basic framework at least for the first stages of transformation of agriculture toward market-oriented operation. The general principles incorporated in Uzbek reform legislation are quite similar to those adopted by other former Soviet republics, which is perhaps not surprising in view of the pervasiveness of common heritage in all these countries and the common roots of reform in Gorbachev's *perestroika* strategy.

While already the pre-independence legislation encouraged changes in land tenure and farm organization, all land remained property of the state. The principle of state ownership of land, which prevailed in the Soviet Union since October 1917, was incorporated in the new Uzbek Constitution of December 1992 and subsequently reiterated in other laws. The official rationale against private ownership of land is two-fold: first, it includes the universal argument of the need to avoid speculation in land and accumulation of large tracts in the hands of absentee owners; second, it relies on the specific Uzbek reality, where land is useless without water, and water is a national resource delivered by a state-run irrigation system.

In Uzbekistan, land is allocated to the users by the state. Collective users are granted land in permanent use, and individual users receive state-owned land in inheritable lifetime possession (*pozhitzennoye nasleduyemoye vladeniye*). In both these traditional Soviet forms of land tenure, land is granted to the user for an unlimited term, but without any rights of transfer. Only leasing out of part of the land for a specified term is allowed. Transactions in land are thus limited to short-term leasing of relatively small parcels of state-owned land among users. Users pay for the use of state-owned land, although no "downpayment" is required when land is allocated. In retaining state ownership of land, Uzbekistan followed the accepted practice among its Central Asian neighbors, and consciously departed from the policy of other large republics of the FSU, such as Russia and Ukraine, which legalized private (individual and collective) ownership of land alongside state ownership. Even Belarus and more recently Kazakhstan, which retain state ownership of agricultural land intended for commercial farming, recognize at least private ownership of subsidiary household plots.⁸

Land, however, remained the only productive asset in Uzbekistan that could not be owned privately (by individuals or collectives). The new constitution declared that "the economy of Uzbekistan, evolving towards market relations, is based on various forms of ownership." It explicitly allowed "private property, along with other types of property." The Law of Property, as amended in May 1994, recognizes three main forms of ownership. These are private property, collective (*shirkat*) property, and state property (including municipal). Property of foreign investors and international organizations is introduced as a distinct, fourth category. Private property in Uzbek law is the property of individuals. The definition of collective property is broader than usual: it includes partnerships, cooperatives, joint-stock companies, and all shareholder structures in general.

Strengthening the Individual Farming Sector

Individual farming never ceased during the Soviet regime, as subsidiary household plots in Uzbekistan consistently contributed around 25% of gross agricultural product, and well over 50% of livestock and crop production excluding cotton and grain. The household plots, however, can be characterized merely as quasi-private agriculture because of their close and almost symbiotic relationship with the large-scale host farms (Waedekin, 1973; Lerman et al., 1994). Their normal operation and success depended more on the good will of the local farm manager than on the diligence and efforts of the household members. A phenomenon closer to private farming began to emerge in 1991-1992 with the establishment of first peasant farms in Uzbekistan. The peasant farms are expected to be operationally more independent of the local farm enterprise, although physically they are located on its territory and share its irrigation system.

Land in subsidiary household plots steadily increased between 1960 and 1988, rising at an annual rate of 2% from 130 thou. ha to 250 thou. ha. This permanent growth was driven by the natural increase of rural population, but did not catch up with it. The rural population increased faster at an annual rate of 2.7% during this period, and at the end of 1988 the number of households with land was only 1.9 million out of total of 2.5 million households in rural areas (Table 4).

After 1988, land distribution to subsidiary household plots came in two waves, primarily as a social measure intended to reduce the pressure of multiple families in a single household plot. The first wave began in August 1989, more than two years before independence. The land allocated to household plots nearly doubled by November 1990, and the number of households with land increased from 1.9 million to 2.3 million (Table 4). The second wave came in January 1991, when an additional 100 thou. ha was allocated by presidential decree for augmentation of subsidiary household plots. The actual distribution fell short of the target from practical considerations of availability of suitable land, but by January 1993 the total land in subsidiary household plots reached 491 thou. ha and the number of households with land exceeded 2.5 million. Compared to the status on November 1988, over 650,000 new households received land for the first time and 1.6 million households received additional land to augment their plots. The average plot size increased from 0.12 ha in 1988 to 0.19 ha in 1992-1993 (Table 4). As a result of these changes, the subsidiary household plots in 1993 held 1.7% of agricultural land and 8.6% of arable land in Uzbekistan (up from 0.7% and 3.2% respectively in the 1980s).

Table 4. Land in Household Plots: 1988-1993

	<i>Total land, thou. ha</i>	<i>Number of families, thousands</i>	<i>Per family, ha</i>
Status Nov. 1988	249.9	1871.6	0.12
Distributed in 1989-1990	148.3		
Status Nov. 1990	398.2	2340.0	0.17
Distributed in 1991	79.6		
Status Jan. 1992	477.8	2536.2	0.19
Distributed in 1992	13.2		
Status Jan. 1993	491.0		

Emergence of Peasant Farming

A fundamentally new option for the restructuring of Uzbek agriculture was provided by the Law of Peasant Farms adopted in July 1992. A peasant farm is a legal entity based on the family unit, with one of the members designated as the "head of farm". The peasant farm is allowed to keep a business bank account and must have an official stamp and a letterhead. A peasant farm is created for the purpose of agricultural production using primarily family labor, although additional use of hired labor is allowed. A peasant farm is essentially different from a subsidiary household plot in that its members are self-employed and do not work for a large-scale farm enterprise.

A peasant farm is established on a plot of land that its head receives from the state in lifetime inheritable use. Additional land may be leased from the state as needed for a period of not less than 10 years. The land for a peasant farm is allocated in a single tract, including all irrigation and drainage facilities and access roads. The size of the tract depends on local conditions, such as availability of irrigated land, the needs of employee households in collective farms, the size of the applicant's family, etc. The farmer receives the land with the irrigation facilities free, without any payment. The law, however, requires to pay for use of land, in the form of a land tax or lease payments.

The land is given to peasant farms under highly restrictive conditions: first, the land must be used for farming, with due regard to conservation practices and environmental concerns; second, the land cannot be privatized, sold, mortgaged, given away as a gift, or exchanged. There is, however, no explicit prohibition

on leasing some of the farm land to or from other producers. The land of a peasant farm is not subject to division among members or heirs: a single heir is chosen by "family council" among the members when the head of farm dies; a member who decides to leave the farm is not entitled to a share of the land.

The land tenure provisions for peasant farms in Uzbekistan are in line with the general practice among Central Asian republics: in these countries land remains state owned and at best can be given in *lifetime inheritable use*. This of course is different from the practice in Russia, Ukraine, Moldova, the Baltics, and the Trans-Caucasus states, where peasant farms receive land in private ownership (possibly up to a certain limit). Despite the difference in land ownership, the stipulation that land must be used for farming is universal in the FSU, and the restrictions on transactions in land are only now beginning to be relaxed in other countries of the FSU. Thus, Russia allowed buying and selling of privately owned land in October 1993 and further liberalized transactions in land in March 1996. Kazakhstan and Kyrgyzstan legalized buying and selling of land-use rights in the spring of 1994. In all these countries, however, the basis for buy-and-sell transactions in land and land rights is provided by presidential decrees, and is not yet embedded in constitution or other permanent legislation, so that the situation can be reversed at any time. Paradoxically, Turkmenistan, the only country where constitution formally recognizes private ownership of land, still does not allow any transactions in land.

An unusual provision in the Uzbek Law of Peasant Farms states that "new peasant farms may be initially created on a contract basis within the structure of collective and state farms." This is, of course, completely at variance with the practice in other countries of the FSU and throughout East Central Europe, where the very act of creation of a peasant farm implies secession from the collective enterprise. The rationale for this provision may be connected with the special importance of irrigation in this desert country. Peasant farms must be established on irrigated land. Since virtually all irrigated land is in collective (and former state) farms, land for new peasant farms must be carved from existing farm enterprises. Peasant farms are thus automatically created within the existing perimeter of a collective farm, and there is no special reason to insist on formal separation. Furthermore, in countries with rainfed agriculture the failure of an individual farm is limited to a personal tragedy plus the usual social costs of family bankruptcy. In Uzbekistan, if a new peasant farm is not successful, its failure may additionally involve degradation or even destruction of the existing irrigation network. The state obviously wishes to minimize the potential loss of capital investment in a critical asset and is thus reluctant to allow full independence of a new small farm until it has proven its ability to survive and perform up to expectations.

These considerations may also explain the much stricter control that Uzbek administration attempts to exercise on the operation of peasant farms. These are required by law to submit detailed business plans to the district governor in justification of their application for a plot of land. The scarce irrigated land is allocated to peasant farms on a "competitive" basis: the applicants "bid" for land by submitting their business plans and stating their qualifications, and the local authorities allocate land on the basis of some ranking of the applications. Once established, the peasant farm must submit actual performance reports and periodic financial statements so that the district officials can judge its progress and accomplishments. If unsuccessful, the farm may be stripped of its land. Even if justified by the attempt to preserve the integrity of the irrigation network, this unusual administrative evaluation process is an obvious remnant of the central planning and administrative command system, and as such it is of course easier to implement under conditions of maximum control of the peasant farms. The provision that peasant farms may be created within collective farms and that peasant farms may be given land in less than lifetime tenure are obviously in line with this philosophy, as they enable the state to maintain its control of the emerging private sector.

As in other parts of the former Soviet Union, the reality in the field preceded formal reform legislation. Thus, peasant farms in Uzbekistan began to be created long before the adoption of the Law of Peasant Farms in July 1992. The number of registered peasant farms increased rapidly from less than 2,000 in 1990-1991 to nearly 18,000 in 1994 (Table 5). The average farm size has increased steadily over the years,

rising from 6.7 ha in 1990 to 14.5 ha in 1995 (compared to farms of around 40 ha in Russia and 20 ha in Ukraine). The total land allocated to registered peasant farms, however, is still less than 1% of agricultural land in Uzbekistan.

In addition to registered peasant farms, which are the only ones reflected in official statistics, thousands of families have submitted an application to establish a peasant farm and have been actually allocated land by their collective farm in excess of a standard household plot. There were nearly 7,000 such "unregistered" peasant farms in collective enterprises in the fall of 1994, compared to 13,000 registered peasant farms at that time. The total land allocated to both registered and unregistered peasant farms was 340 thou. ha in the fall of 1994, compared to 185 thou. ha in registered farms only. The "unregistered" peasant farms are established on a temporary basis in accordance with the law inside large-scale farm enterprises until they prove their ability to operate and justify a permanent grant of land in lifetime inheritable use. "Probation" farmers that do not fulfill the business plan submitted to the local authorities may lose their land and revert to the former status of farm-enterprise employees.

Table 5. Growth of Peasant Farming in Uzbekistan

	Jan. 1991	Jan. 1992	Jan. 1993	Oct. 1993	Oct. 1994	Oct. 1995
Number of registered farms	1358	1868	5942	6469	13768	17700
Land allocated to registered farms, thou. ha	9.1	13.7	45.1	65.3	184.9	257.3
Average size of registered farm, ha	6.7	7.3	7.6	10.1	13.4	14.5

Not all the land in peasant farms is arable: more than one-third is pasture and only half is irrigated (Table 6). The cultivated land in peasant farms (which includes arable land and land under perennials) is 160 thou. ha, which is around 3% of total cultivated land in Uzbekistan. Although peasant farms are rapidly closing the gap with subsidiary household plots as measured by total land area (340 thou. ha in peasant farms compared to 490 thou. ha in subsidiary household plots in the second half of 1994), subsidiary household plots have a much higher share of arable land in Uzbekistan.

Table 6. Land in Peasant Farms: Structure and Use (Sept. 1994)

<i>Structure of Land Holdings</i>		<i>Structure of Land Use</i>	
Total land, ha*	339,700	Cultivated land, ha	159,680
Irrigated	48%	Grain	27%
Dry arable	7%	Feed crops	31%
Pasture	34%	Vegetables	5%
Other	11%	Fruit&grapes	10%
		Cotton	14%
		Other	13%

* Includes 154,800 ha in 6820 unregistered peasant farms created on a probation basis in collectives.

Of the nearly 20,000 peasant farms in 1994, two-thirds specialize in livestock and only one-third (6,500 farms) specialize in crop production. Government policy encourages livestock specialization among

peasant farms. According to recent decrees and resolutions, only operations with at least 30 head of cattle will be eligible to peasant farm status. These livestock farms automatically receive 0.3 ha of land per head of cattle for feed production. They are also entitled to assistance from district authorities and farm-enterprise managers in provision of concentrated feed and other farm inputs, an important consideration in the absence of market sources for inputs in Uzbekistan. This policy is part of the general drive in Uzbekistan to emphasize livestock production as a source of domestically produced food and to reduce the dependence on food imports. The policy has definitely produced significant results, as the number of cattle in peasant farms increased from 90,000 head in September 1993 to 225,000 head in September 1994, and the average number of animals per livestock farm rose from 9 to 17. Yet in relative terms the weight of peasant farms in the livestock sector is still small: 4% of the total number of cattle and 2% of the total number of sheep in 1994. For comparison, household plots account for 70% of cattle and 50% of sheep in 1994 (Table 7). The share of the livestock sector represented by peasant farms is thus not higher than their share of the crop sector as represented by cultivated land (3% of the total).

Table 7. Structure of Livestock Sector: September 1994

	<i>Cattle</i>	<i>Cows</i>	<i>Sheep</i>	<i>Pigs</i>
Total animals (thou.)	5376.5	2299.3	10288.3	307.7
Collectives	26%	18%	48%	90%
Household plots	70%	79%	50%	7%
Peasant farms	4%	3%	2%	3%

Peasant farmers are treated as a preferential sector by the state and enjoy a wide range of incentives. The Law of Peasant Farms provides a 2-year exemption from the land tax and stipulates that peasant farms "will have access to subsidized loans from a special credit fund to be created for their use by banking institutions." This provision was operationalized in February 1994 when the Cabinet of Ministers instructed Uztadirkorbank (the major investment bank in Uzbekistan) to provide unlimited credit to peasant farms for a term of not less than 10 years to purchase equipment, livestock, construction materials, fuel, fertilizer, seeds, and other inputs. Peasant farms are entitled to participate in state budgets for land reclamation, construction of roads and bridges, gas, electricity, heat, and water supply systems, and other communal services. The Tax Code identifies peasant farms, together with the rest of the farming sector, as a specific category of tax payers who have to pay income tax only on earnings derived from non-agricultural activities. The February 1994 cabinet resolution slashed by 50% the tax rate on non-agricultural earnings of small rural enterprises.

Performance of the Individual Sector

The augmentation of household plots and the emergence of peasant farms substantially increased the role of the individual sector in agricultural production in Uzbekistan. The share of the individual sector (including both household plots and peasant farms) in total agricultural production increased from 28% in 1990 to 41% in 1994. Since 1990, the individual sector is responsible for a significantly higher proportion of the output of vegetables and livestock products than during the 1980s (Table 8). Household plots and peasant farms combined now produce over 60% of Uzbekistan's output of meat, milk, and wool, half its output of potatoes and vegetables, and probably also half the output of fruits and berries, although no definitive figures are available in this category since 1990. Even grain production in the individual sector

has increased to respectable levels of around 10% of the total. Some peasant farms are beginning to grow cotton, although no output results are still available for this commodity.

Despite the impressive increase in total output and in the share of agricultural product, the productivity of the individual farming sector presents a mixed picture (Table 9). Households plots, for which fairly reliable statistics are available over time, never really outperformed the collective sector by physical yields. Households achieve significantly higher yields than the Uzbek average only for melons, grain, and grapes. Unfortunately, the total production of grain and grapes by household plots is very small. In livestock, where households are a major player, their contribution to meat and milk production was consistently less than their share in the number of cattle and cows, respectively (see Fig. 2). The milk yields in households over the years were significantly lower than in the collective and state sector: 1600 kg per cow per year in household plots compared to around 2500 kg in collective and state farms. The lower milk yields of Uzbekistan household plots are in a striking contrast to the situation in Russia, Ukraine, and other European republics, where household plots in fact achieve higher milk yields than collective and state farms. This phenomenon in Uzbekistan is usually explained by inadequate feed and poor genetic quality of the cattle in households. Household cattle is left to graze on the roadside or on harvested fields, without any attempt to ensure a scientifically balanced ration. Moreover, for cultural reasons local households do not readily accept the practice of artificial insemination and have no means for introducing productive breeds. On the other hand, the households were more efficient in the production of wool and karakul skins: their share in the output of these products was always higher than their share in the number of sheep (see Fig. 2).

Table 8. Average Share of Subsidiary Household Plots and Peasant Farms for Selected Commodities: 1980-1989 vs. 1990-1993
(in percent of total output for each commodity)*

	1980-1989	1990-1993
Grain	NA	9.7
Potatoes	31.3	45.5
Vegetables	45.3	55.5
Fruits&berries	60.0	NA
Meat	47.7	61.3
Milk	62.7	72.3
Eggs	34.0	40.3
Wool	62.2	68.8
Karakul	30.5	29.3

*All differences between the two periods are statistically significant, except for eggs and karakul.

The yields achieved by peasant farms are astonishingly lower than the national average for all products (Table 9). The reported crop yields may be low because many farms were established only in 1994 and have not yet produced any output, while their land allocation has been included in the denominator for yield calculation. The abysmally low milk yields are surprising, however, especially because special arrangements have been made by livestock breeders associations at the district level to provide peasant farmers with superior stock (often imported from Estonia) and because peasant farmers enjoy special

subsidized credits for purchase of high-productivity breeds. The official yields thus may reflect significant under-reporting by private producers.

The main difference between the two components of the individual farming sector -- the subsidiary household plots and the peasant farms -- is mainly that of size: while household plots have 0.2 ha of land, an average peasant farm has around 15 ha. Another formal difference is that household plots are run by families of employees in the local farm enterprises, while members of peasant farms are self-employed. These two factors are probably sufficient to account for deep behavioral and psychological differences between the two types of farming, and yet we cannot ignore the fact that in Uzbekistan both the household plots and the peasant farms are physically located within the same large-scale farm enterprise, coordinating their activities in various ways with the farm manager. The very creation of a peasant farm depends on the good will and cooperation of the farm manager: the village council and the district authorities will not move on a new application for land without the consent of the farm manager, who is expected to allocate a physical tract of irrigated land to the new peasant farm out of the lands that his farm manages.

Table 9. Yields in the Individual Farming Sector (1993-1994)*

	<i>Household plots</i>	<i>Peasant Farms</i>	<i>Uzbek average</i>
Fruits&berries	50	20	49
Grapes	81	--	46
Grain	30	23	20
Potatoes	85	69	83
Vegetables	190	48	181
Melons	167	58	113
Milk	1600	1031	1800

* Centners per ha for crop products; kg per year per cow for milk.

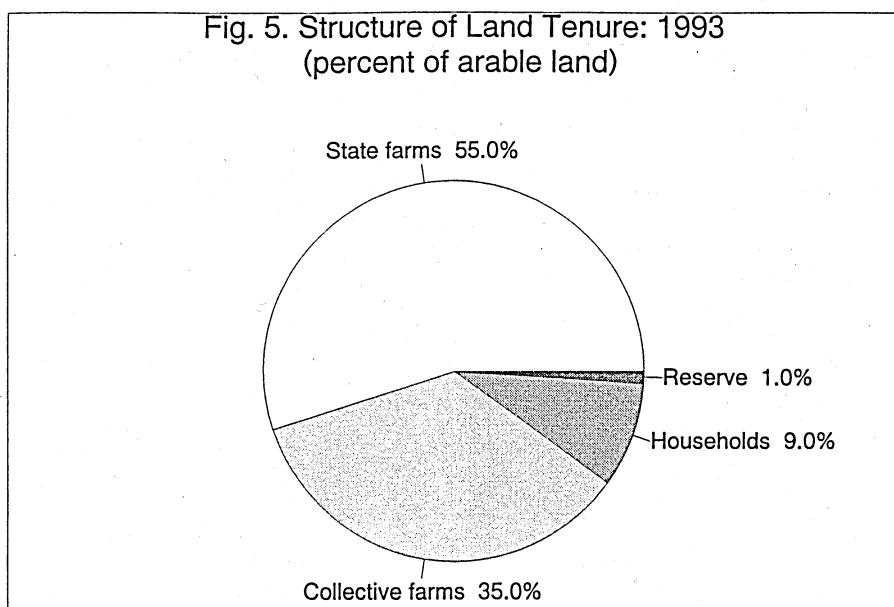
The Uzbek procedure is different from the practice in Russia, Ukraine, and other European republics, where peasant farms receive land from a state reserve created in advance by extracting a specified percentage of land from collective and state farms and where peasant farms are physically separated from the large-scale enterprises. While in other republics the relations between peasant farmers and farm managers, although usually not hostile, can be described as "at an arm's length," the relations in Uzbekistan appear to be extremely friendly to the extent that the peasant farmers continue to depend on the farm manager for much of input supplies, product marketing, and even lobbying at the district government level. This may be a natural state of things in an environment without functioning market services and infrastructure, and it may be quite helpful to the new peasant farmers in the initial stages of development. There is nothing that legally prevents the farmers from independent management of their relations with the external environment, and many farmers are already beginning to move in this direction, but so far private farms appear to operate simply as oversized subsidiary household plots, and not independent economic agents. Some officials in Uzbekistan are actually of the opinion that peasant farms should simply evolve through further augmentation of subsidiary household plots, and not through a special land-allocation procedure.

Restructuring of Farm Enterprises

Although the individual sector, including the household plots and the peasant farms, almost trebled its land holdings since 1990, it accounts for only 9% of arable land in Uzbekistan. Fully 90% of irrigated and

arable land in the country is still managed by large-scale collective and state farms. The pattern of land tenure after four years of reform (Fig. 5) is thus not significantly different from that in the pre-reform period (see Fig. 1). Deeper changes in land tenure will come only as a result of deep restructuring of large-scale farm enterprises, intended to make them more suitable for operation in a market environment and to help them adapt to a new system of relations with the individual sector.

The intention of the Uzbek government to reduce state ownership of business enterprises was formulated in the Law of Destatization and Privatization adopted in November 1991, just two months after the declaration of independence. Destatization involves transformation of state-owned enterprises into collective enterprises, lease enterprises, joint-stock societies, limited liability partnerships or corporations,



and other non-state organizations. Privatization is clearly intended as the next stage of the destatization process, with property rights in the collective and shareholding structures passing to individuals or private legal entities. Privatization is applicable to all assets, but not land. Ownership of the new enterprises created in the process of destatization and privatization is not restricted to Uzbek nationals: foreign residents and foreign corporations are allowed to acquire former state property through bids or at an auction. It is, however, the workers' collective at each enterprise who decide on the new form of organization and determine through their choice if any of the assets are to be auctioned to outsiders.

In application to agriculture, the general strategy for reducing the direct involvement of the state in business enterprises primarily involved transformation of state farms into collective farms and other shareholder forms, as well as reorganization of large-scale state-owned livestock and poultry complexes into joint-stock companies. Although the legal framework provides for a mixed form of transfer of ownership of state property, combining free transfer with redemption of assets at their current value, the government decided to transfer all the assets of state farms without any payment to the workers' collective.

The destatization of state farms in Uzbekistan is virtually complete (Table 10). The status of privatization of other state-owned structures in the agro-industrial complex is less clear. Although many of the support structures dealing with input supply, machinery maintenance, and product marketing have been formally reorganized as associations or closed joint-stock companies, no competitive structures have emerged and the entire system is still monopolized by former bodies with a different name. Recent

presidential decrees and government resolutions instruct these bodies to make one further step toward true privatization by reorganizing as open joint-stock companies, i.e., companies that have to sell their shares to outside investors. Poultry complexes and meat processors have already registered as open joint stock companies, but so far no stock has been issued to outsiders. One of the options is to try and attract foreign investors as shareholders in these corporations.

Another useful step toward improved access and increased competitiveness in services is the establishment of networks of small service outlets by the large centralized organizations. Thus, the Uzsel'khozsnabremont supply and maintenance system reorganized as a cooperative and opened 258 service outlets in rural areas, which provide maintenance services to farmers and act as sources of spare parts for agricultural machinery.

Table 10. Transformation of State Farms in Uzbekistan

	<i>Number of farms</i>
State farms on Jan. 1, 1992	1137
Transformed into other forms by Oct. 1, 1994	1066
Collective farms	530
Cooperatives	374
Lease enterprises	129
Other forms	33
To be transformed till the end of 1994	22
Designated to remain state farms	49

While detailed statistics are available on the transformation of state farms into collective structures, there is virtually no systematic information on the reorganization of collectives into alternative forms. In general, the internal restructuring of collective farms in Uzbekistan appears to have followed the widely accepted model that emerged under Gorbachev and continued to evolve in all former Soviet republics after the dissolution of the USSR. According to this model, the large-scale collective structure is gradually dividing into smaller units, mostly based on functional subdivisions. These units gain increasing operational autonomy and develop first into cost centers and eventually into profit centers. The subdivisions maintain current accounts, initially on a clearing basis in the accounting department of their collective farm and later in the local bank in the nearest town. Their buying and selling activities are usually handled by the central structures of the collective farm, although some enterprising units choose to manage input purchases and product marketing on their own. A characteristic feature of these units in the initial stages of development is that they operate assets leased from the collective farm: they own the output and the profits, but not the productive assets or the land.

Typically, each of these units is a small production cooperative managed by the workers' team. In this sense, it is a smaller replica of the large collective farm. Yet already the change in scale may be sufficient to induce a better sense of responsibility and motivation among the member-workers, improving the performance compared to the anonymous and faceless large-scale farm. As long as the individuals in these units do not own the productive assets, however, they will continue to suffer from all the inherent weaknesses of production cooperatives and labor-managed firms that led to the failure of this organizational form in Eastern and Central Europe. Moreover, Gorbachev's experiment with "contracting out" the farm operations to autonomous groups was unsuccessful mainly because the "lease units" were subject to the then prevailing system of state orders and centrally planned allocation of inputs, which continued to be handled

through collective and state farms, and in this sense were never fully independent business entities. The success of the restructuring of collective farms in Uzbekistan thus largely depends on relaxation of government intervention in the management of agriculture and development of functioning support services for the sector.

An interesting variation on the theme of "lease groups" adopted in some cases in Uzbekistan involves the leasing of productive assets to individuals, and not to whole workers' teams. One individual leases from the collective farm a functionally complete subdivision and hires the workers needed to run the unit. The lessee is fully responsible for the operation of the leased enterprise, and his or her managerial skills will determine its success or failure and with it the welfare of the workers' team. This structure based on an individual lessee appears to be unique to Uzbekistan, and it is probably as close as one gets to a privately held corporation without actually allowing private ownership of the assets. It is a very interesting experiment, but unfortunately no information is available on its frequency and breadth of adoption in the country.

The next stage in internal restructuring of collectives will come with the eventual implementation of the temporary regulations adopted in June 1994. These regulations provide guidelines for the division of collective assets into individual shares and regrouping of shareholders into voluntary functional units, not necessarily based on existing subdivisions in the collective farm. Collectives will issue certificates of share ownerships to their workers, pensioners, and optionally employees of the social sphere in the village (teachers, medical personnel, support service staff, etc.). Once asset shares are assigned to individuals and the individuals regroup according to internal agreements, the collective farm will in effect divide into an association or a union of producers with private ownership of their assets. Unfortunately, there is still no mechanism for division of land into individual shares, and land will have to be leased collectively by the entire group of individuals forming the new unit, or by the unit as a corporation. Division of enterprise assets into shares does not necessarily imply the creation of a shareholding corporation or joint-stock company. The "shareholders" may decide to keep their shares in a collective farm, a cooperative, a lease enterprise, an association, or any other organizational form recognized by law.

The small producer groups created by individuals pooling their asset shares and leasing land collectively may continue to function in the framework of the former collective farm, utilizing the accumulated expertise of its specialists and administrators as a service cooperative. The service cooperative will specialize in input purchasing, product marketing, mechanical maintenance, and various professional and managerial services -- i.e., activities with pronounced economies of size and manifested benefits of specialization. Already today some collective farm managers, when asked about their future role in the restructured farms, indicate that they intend to focus on finding markets for their member producers and making use of their ability to find and procure inputs and machinery.

Distribution of asset shares to individuals is a necessary step in fundamental restructuring of collective farms beyond a mere name change, and once completed it will eventually have to be followed by a similar procedure for distribution of land shares. It is only in this way that farm restructuring will advance toward production based on individual ownership, which is a prerequisite for increased efficiency. The structure based on groups of producers with private ownership of assets and individual allotments of land can be made to work in all lines of agricultural production. The voluntary regrouping of individual shares of land and assets provides a mechanism which is sufficiently flexible for the production of vegetables, grain, cotton, livestock, and even for desert-pasture grazing of karakul sheep.

As part of its attempts to speed up farm restructuring, the government has embarked on an experimental program in Karakapakalstan, which is a relatively backward area in the western part of the country suffering from severe environmental problems associated with the Aral Sea catastrophe. The program, still on the drawing board, will be designed to convert the large collective farms in Karakapakalstan, which suffer from chronic inefficiency, into associations of private farmers with private ownership of assets and individual land leases.

Another fairly radical restructuring program implemented in Uzbekistan involved the separation of entire livestock units from collective and state farms and their reorganization as shareholder companies or joint-stock societies. Over 1500 livestock units (out of a total of some 2000 farms) have been separated and privatized in this way following a March 1993 government resolution. The livestock units were sold to the workers' teams, who are required to repay the value of the assets in 10 nominal annual payments, without interest. Although some of the 1500 privatized livestock units have been operating for more than a year, the accumulated experience is still very limited and no data are available to judge the changes in performance. Field visits indicate that some units shed as much as 15%-20% of the original labor force in the process of privatization in an attempt to reduce costs. At the present stage, these privatized units are closed joint-stock societies, but in future they may be allowed to sell shares to outside investors. The livestock privatization program is another example of a unique Uzbek approach to farm restructuring: it is without precedent among the former Soviet republics. Unfortunately, it is also an example of the enormous power that central authorities continue to wield in the management of agriculture.

The diversity of organizational forms emerging in the process of farm restructuring necessitates development of appropriate standard statutes and articles of incorporation that can be used as a specimen by new structures. The cabinet has adopted a resolution instructing the relevant ministries to develop the required specimen charters, and the process appears to have begun. A new standard statute for collective farms has been published by the Ministry of Agriculture of Uzbekistan, and it is largely based on generally accepted principles of cooperative organization. Unfortunately, it perpetuates certain features inherited from the administrative command system, which have no place in a market-oriented economy. Thus, the new standard statute gives the district governor the power to nominate the candidate for the position of the farm manager and to fire the manager in case of unsatisfactory performance. Although formally it is the general assembly that elects the manager, the statute in fact reduces its function to that of mere rubber-stamping. This approach to the appointment of managers contradicts the spirit of voluntary cooperation on which new collective farms should be based and must be eliminated if these structures are to develop grow as true cooperatives based on market principles.

Water Management Reforms

Viewed against the dynamic changes in land relations and farm organization, Uzbekistan's water economy remains largely static. There are no ongoing plans to adjust the traditional water delivery system to the new reality, specifically to the emergence of peasant farms, which cannot become truly independent as long as they continue to receive their irrigation water through the collective farm. Reform proposals in water management are mainly limited to academic circles, where researchers conduct valuable field studies, analyses, and simulations of water use and alternative water pricing scenarios. In this section, we review some of the current thinking at SANIIRI, the Central Asian Scientific-Research Institute of Soil Reclamation and Irrigation, which goes beyond the traditional technical issues of efficient water scheduling, biologically optimal water norms, and reduction of delivery losses in the irrigation system. Given SANIIRI's stature in Uzbekistan and throughout the rest of Central Asia, this thinking may develop into future policy guidelines for the local water economy.

Pricing of Irrigation Water

The issue of water pricing has been in the forefront of attention of local scientists for a number of years now. Traditionally the Government absorbs all the costs of construction, expansion, maintenance, and operation of the irrigation system, and does not charge any price for the irrigation water it delivers to collective farms and other agricultural enterprises. Any input that is provided free of charge is likely to be

used in excess of the amount that generates the greatest net economic value, when direct and indirect costs and returns are considered. The combination of water quotas and free delivery is a guaranteed recipe for excessive use of water. There is no incentive for the farms to utilize only the necessary quantity of water, which may be less than the full allocated quota. There is actually a real disincentive to save water, because reduced use in the current period will be translated by the planning authorities into a reduced water quota for the next period.

Researchers at SANIIRI have developed several pricing schemes for irrigation water, which are designed to recover delivery costs, to provide funds for renovating and expanding the water delivery system, and to motivate improvements in farm-level water management practices. The pricing programs vary according to the proportion of costs that are recovered through a combination of charges per unit of irrigation water and per hectare of irrigated land. All pricing schemes include charges for land reclamation, insurance, and profit, which on average add 50% to the actual full cost of water delivery. The inclusion of profit (which makes 20% of the final price) may be justified by possible inadequacy of the depreciation component in the delivery cost and by the need to generate revenues for future expansion to serve a growing number of users.

The average price for irrigation water in Uzbekistan is estimated by SANIIRI at \$6.33 per 1000 cu.m, with natural variability across the provinces mainly reflecting differences in actual pumping costs to farm turnoffs. This price is relatively low in comparison with prices in other parts of the world. For example, current prices of irrigation water in California's San Joaquin Valley range from \$25.00 to \$75.00 per 1,000 cu.m. However, the imposition of any positive price for irrigation water in Uzbekistan will have a significant impact on farm-level perspectives regarding water management practices, because farms will be required to pay, per unit, for an essential input that was previously provided free of charge.

It is often argued that the economic situation of farms in Uzbekistan is so weak that they cannot afford to pay an additional cost for a basic input. At the present time, the system of state orders for cotton and grain presents the farms with fixed government prices that are far below the market price for these products. This procedure limits the potential farm revenues, and makes it difficult for farms to pay market prices for inputs. The introduction of a system of water prices in this situation will reduce farm revenues even further, without permitting the farms to enjoy the economic benefits of yield improvements that will result from better water management practices. Hence, the system of water prices can be implemented only in conjunction with other market reforms in agriculture, specifically when production quotas and marketing restrictions are eliminated and farmers begin to receive true market prices for their products. If marketing reforms are delayed, then perhaps a lower-cost version of a water pricing program may be implemented, to provide economic incentives for improvements in water management without causing unnecessary financial stress at the farm level.

There is considerable support among water resource professionals and government officials for implementing a system of water prices in Uzbekistan. The primary concern among those interviewed on this subject is that, if farms are required to pay for water use, they must also be allowed to determine which crops to produce, to select their best marketing alternatives, and to retain the profits that are generated through the sale of their production. Farmers facing market prices for both their outputs and inputs will adjust cropping patterns and adopt irrigation practices, as needed, to maximize the net economic values that result from the use of irrigation water.

Tradable Water Rights

No thought has been given in Uzbekistan to changing the property rights for water. While there is some ongoing discussion of the question of land privatization, it seems to be taken for granted that water will remain a state-owned resource, and will continue to be delivered through a state-owned system. Yet even before a water pricing program is implemented, the current system of allocating water to agricultural

producers can be modified to ensure a more efficient use of water resources. The volume of water allocated annually to each farm could be determined using the existing system of irrigation norms, or by assigning a uniform average volume of water to all farms. In either case, farms would be permitted to trade portions of their annual water allotments with other farms in the same district, or with farms in other districts, to the extent that existing water delivery facilities can support such trades. Farms may trade water use rights intertemporally, i.e., among seasons of the year, or they may trade water for units of agricultural commodities, or portions of their state-order production quotas. A tradable water allotment program would generate an opportunity cost to water that will motivate farms to use their allotments efficiently, through an optimal combination of irrigation deliveries and trades with other farms.

A tradable water allotment program could evolve over time into a formal water market as experience is gained with market prices and transactions costs. In addition, the implementation of a formal system of water rights would enable farms to trade water among years, as they would be given use rights to a specific volume of water each year. The current system of irrigation norms actually imparts a form of perceived water rights among all farms in Uzbekistan, because farms expect to receive the volume of water required to produce their crops each year. Hence, the concept of formal use rights may be viewed as a natural extension of the existing water allocation program.

The assignment of water rights is an appropriate answer to the needs of peasant farms. At the present time, peasant farms have a secondary status regarding water deliveries within collective farms. This procedure should be replaced with the assignment of a specific volume of water for each hectare of land that is irrigated on the peasant farms. The primary purpose for establishing peasant farms is to increase the output from each hectare of land. The same result can be achieved with regard to water resources if the peasant farms are given property rights to the use of their irrigation supply. If such a program is implemented, experience with water rights will grow as the number of peasant farms increases.

Market Infrastructure and Government Intervention

Land reform and farm restructuring are essential components of a transition to a market-oriented economy. Yet to succeed the new farm structures require a whole range of support services, including supply of farm inputs and machinery, product marketing, and financing channels. The inadequacy of market infrastructure inherited from the former administrative command system can be best demonstrated by the long list of actions that the government proposed in February 1994 in order to support and strengthen the emerging private sector (Table 11).

In addition to demonstrating the problems that private producers face in the new environment, these government resolutions highlight the extent to which the economy of Uzbekistan remains centrally controlled. True, the government resolution of February 1994 instructs the ministries and the central procurement organizations "to bring to the attention of all farms that the cropping structure and the production mix are to be determined by the farms independently, based on contracts concluded with procurement organizations and with processors and also on market demand." Yet despite these free-market sentiments, the overall spirit of the resolutions remains that of pervasive government intervention in the functioning of markets, all the way down to setting specified quantities of feed and fuel to be allocated to farmers, as in the former command system.

International experience shows that farmers can overcome difficulties due to market imperfection through the creation of service cooperatives. An interesting attempt to help small producers overcome the difficulties due to inadequate market infrastructure is the establishment of the Association of Subsidiary Household Plots in Uzbekistan. This appears to be a unique Uzbek phenomenon, as no such associations exist in the other former Soviet republics, at least not in the European part of the FSU. The Association was created in 1991 by Presidential decree, but it is nevertheless viewed as a voluntary organization supported

by membership fees. Of 2.5 million household plots in Uzbekistan, 1.7 million are today members of the Association. Upon its creation, the Association received an interest-free loan from the state budget, 25% of which were used to provide unindexed operating advances to households and the remaining 75% went to establish various small service enterprises throughout the country. The objective of these service enterprises is to facilitate independent access of households to the market and thus reduce their dependence on farm managers. The Association's enterprises today include processing, veterinary services, sale of consumer goods, and various manufacturing activities (e.g., production of construction materials). Future plans include establishment of enterprises to provide mechanical services in the fields, including application of fertilizers and chemicals. The Association's processing enterprises sign contracts with the households for their surplus production. Payment for farm products is not in cash, but rather in inputs, food, consumer products, or equipment that the Association procures through its other enterprises.

Table 11. Government of Uzbekistan Instructs State Organs to Provide "Market Services" (February 1994)

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- State investment bank: provide unlimited credit to peasant farms for a term of not less than 10 years to purchase equipment, livestock, construction materials, and fuel; MinFin: ensure enabling transfer of funds to the bank.
 - Central procurement organizations: ensure unobstructed receiving of products from peasant farms at freely negotiated prices.
 - Agricultural and construction banks: allocate sufficient and timely credits to procurement organizations and trade enterprises in order to pay the producers.
 - MinAg, the Fruit and Vegetable Association, and the Uzbek Academy of Agricultural Sciences: provide peasant farms with seeds, fertilizers, veterinary medicines, and artificial insemination and veterinary services.
 - Central supply and maintenance organization: allocate trucks, tractors, and other equipment to peasant farmers according to their requests and requirements; strengthen the mechanical service depots in rural areas and ensure that they are supplied with small-scale machinery and other equipment.
 - Feed supply organizations: allocate specified quantities of concentrated feed to peasant farms.
 - Petroleum supply organization: allocate specified quantities of fuel to peasant farms.
 - Meat processing association: reorganize the provincial meat processing installations into open joint-stock societies.
 - MinAg and MinFin: reorganize the poultry complexes into open joint-stock societies.
 - MinAg, the Fruit and Vegetable Association, and the Uzbek Academy of Agricultural Sciences: organize courses to teach farmers and farm managers the principles of farm management in a market economy and their rights and duties in areas of production and marketing.
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Although Uzbekistan has a national Association of Subsidiary Household plots, it does not have a national Association of Peasant Farms, which is a common and fairly powerful lobbying organization in other former Soviet republics. Peasant farmers are beginning to cooperate, however, by establishing local district-level associations at their own initiative. The objectives of these local associations are similar: to help peasant farms operate with better results despite inadequacy of market infrastructure and strong dependence on farm managers.

Conclusion

Uzbekistan maintains a strategy of pervasive government intervention combined with rigid control by local authorities of the allocation of land to peasant farms and continued monitoring of their performance through business plans and financial statements. This creates a picture of transition to the market which is different from the strategy in Russia and Ukraine. In the major European republics, central controls collapsed fairly soon after 1991, and the transformation of agriculture was largely left to the lower levels, with some encouragement by central government (Russia) or even without any government guidance (Ukraine under Kravchuk). In Uzbekistan, the central controls appear to be still in place, and it is the President and the government who are the main planners of reform and the main driving force behind its implementation. It remains to be hoped that the government will be able to phase out its intervention as the system progresses toward more privatization and will not continue to retain such a close grip of the economy, as eventually it may backfire and stifle the transition to the market. After all, a market economy is an inherently chaotic system, and perhaps the transition to the market cannot be fully controlled.

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Notes

1. The article is based on observations and data collected by the authors while on World Bank missions in Uzbekistan. The opinions expressed in this paper are of the authors themselves, and in no way reflect the policy, official or otherwise, of the World Bank.
2. For a review of the early phase of agricultural reforms in Uzbekistan, see Van Atta (1993). For a Russian perspective of the initial economic changes in Uzbekistan, see Plyshevskii (1993). Spoor (1993) analyzes problems of agrarian change in the context of transition to a market economy in cotton-growing water-dependent countries of Central Asia.
3. The data in this section are based on official statistical publications, including Narkhoz SSSR (1990), Narkhoz UzbSSR (various years), SNG (1994), and SNG (1995). For an informative discussion of agricultural and rural issues in Soviet Uzbekistan and a detailed bibliography of Soviet sources on the subject, see Craumer (1992). 1991???? CHK BOOK
4. For a comprehensive description of the phenomenon of subsidiary household plots in the USSR, see Waedekin (1973). For a recent discussion of the symbiotic relationships between subsidiary household plots and their collective host farms, see Lerman et al. (1994).
5. The differences in productivity level across republics are based on a multiple regression model with a dummy variable for the republics. The model assumes homogeneous slopes, and the parametrization has been chosen so that the dummy variable coefficients are estimated relative to Russia.
6. The discussion of the process of land reform in this section is based on the text of the relevant laws and unpublished official data provided by the Ministry of Agriculture, the Ministry of Planning and Forecasting, and the State Committee on Statistics.
7. For a discussion of farm restructuring in the USSR during Gorbachev's period, see Brooks (1990).
8. The May 1992 Constitution of Turkmenistan formally recognizes private ownership of land, but the private land owners have no rights of transfer in any form, so that in practice land tenure in Turkmenistan is identical to Uzbekistan's "lifetime inheritable possession". Kyrgyzstan and Kazakhstan, on the other hand, allow a variety of transactions by individual land holders, although land in these countries remains state owned.

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