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## **Agriculture in Afghanistan and Neighboring Asian Countries**

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# Agriculture in Afghanistan and Neighboring Asian Countries

## Summary

Agriculture's share of total economic activity – as measured by gross domestic product (GDP) – is significant in seven countries located in Central and South Asia: Afghanistan, Iran, Kyrgyzstan, Pakistan, Tajikistan, Turkmenistan, and Uzbekistan. Its share ranges from about one fifth in Tajikistan to more than one half in Afghanistan. Those employed in the agricultural sector account for a large portion of the entire labor force in all seven countries. Agricultural workers account for almost one-third of all employment in Iran; in Afghanistan, farmers and related workers represent more than two-thirds of the labor force.

Large desert regions and extreme mountainous terrain limit the amount of arable land in most of these countries. Irrigation systems are vital in most countries in directing limited water supplies to agricultural producing areas.

All seven countries are net food importers, meaning they do not produce enough to cover all their food needs. Even with food purchases, the World Bank considers a portion of each country's population to be malnourished due to poverty. Hunger in some areas has been further exacerbated by food shortages. Some countries have in recent years experienced successive years of drought, which has resulted in a decline in agricultural output. Largely for these reasons, the United Nation's (UN) World Food Program reports that Afghanistan and Tajikistan are in need of emergency food assistance over the next year to cover sizable food deficits. Afghanistan's food aid needs have increased since mid-September 2000, reflecting refugee movement toward border regions, and disruptions and logistical problems that UN personnel expect in distributing food aid due to military conflict and the onset soon of harsh winter conditions.

Afghanistan's agricultural sector has deteriorated during more than two decades of conflict, and made a large portion of the country's population reliant on international food aid. By comparison, Pakistan and Iran have introduced some agricultural reforms in recent years, seeking to raise productivity and to bolster their agricultural sectors' contribution to their national economies.

Of the former Soviet Union republics (Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan), Kyrgyzstan appears to have modified its policies the most by transferring formerly state-owned farmland to agricultural producers and by introducing elements of market-oriented agricultural policies. Tajikistan has also introduced some reforms, but its agricultural sector faces serious problems following two years of drought. Cotton production (heavily reliant on irrigation) is a major component of the agricultural sectors in Tajikistan, Turkmenistan, and Uzbekistan. Cotton exports from these three countries are important in generating much needed foreign exchange as well as transferring resources to other economic sectors.

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# Agriculture in Afghanistan and Neighboring Asian Countries

## Overview

Agriculture (as measured by share of gross domestic product and employment) is a significant economic sector in seven Central and South Asian countries: Afghanistan, Iran, Kyrgyzstan, Pakistan, Tajikistan, Turkmenistan, and Uzbekistan.



All of these countries are net food importers. Some have experienced successive years of drought, which has contributed to noticeable declines in agricultural output and the need to increase commodity imports. The United Nations' World Food Program reports that both Afghanistan and Tajikistan are currently in need of emergency food assistance to cover sizable food deficits. The food outlook in Afghanistan is made uncertain by ongoing military conflict.

## Sources and Notes

Key facts on each country precede a description of its agricultural sector. The CIA's *World Factbook 2001* and the World Bank's "2001 World Development Indicators" online database are the sources for the highlighted facts. Data are for 2000 unless otherwise noted. The CIA-published gross domestic product (GDP) data are derived from purchasing power parity calculations. Arable land refers to land cultivated for crops that are replanted after each harvest, such as wheat, corn, and rice. Land associated with permanent crops refers to the area cultivated for crops that are not replanted after each harvest (e.g., citrus and other fruits). Permanent pastures refer to land permanently used for forage crops.

In this report, a profile of each country's agricultural sector and recent developments was prepared using publications and studies issued by the Central Intelligence Agency (CIA), the UN's Food and Agriculture Organization (FAO), the

U.S. Department of Agriculture (USDA), the International Monetary Fund (IMF), the World Bank, and the Economist Intelligence Unit, among others.

## Afghanistan

<i>Population (millions)</i>		<i>Agriculture's Share of GDP (% , 1990)</i>	53
	26.6	<i>Agriculture's Share of Labor Force (% , 1990)</i>	68
<i>Gross Domestic Product (billion \$)</i>	21.0	<i>Arable &amp; Permanent Cropland (% of total)</i>	12
<i>Per Capita Income</i>	\$800	<i>Permanent Pastures (% of total land)</i>	46

The Afghan economy is predominantly agricultural, even though only 12% of its land area is arable and farmers have cultivated much less than that in recent years. Agricultural production is constrained by an almost total dependence on erratic winter snows and spring rains for water; irrigation systems are primitive. Some existing irrigation networks and other agricultural facilities were destroyed in military conflict between the Taliban and opposition forces in 1999. Relatively little use is made of machines, chemical fertilizer, or pesticides. Food shortages caused by successive years of drought have been exacerbated by the country's already limited transportation network, which has deteriorated further due to damage and neglect resulting from war and the absence of an effective central government.

According to what may be dated information, the agricultural sector contributes slightly more than half of GDP and employs almost 70% of the labor force. Grain (primarily wheat) production is the country's traditional agricultural mainstay. Other major farm products are fruit, nuts, karakul (sheep) pelts, wool, and mutton. Afghanistan has the productive capacity to more than meet its food needs, according to some observers. In the mid-1990s, overall agricultural production and livestock numbers were less than one-half of what they were just before the Soviet invasion in 1979. Fighting against Soviet forces followed by another decade of civil war, instability in rural areas, prolonged drought, and a deteriorated infrastructure have all contributed to this reduction. Many years of conflict had also led to migration to the cities and refugee flight to Iran and Pakistan, further disrupting agricultural output. Lately, the economy has consisted of little more than subsistence farming and cross-border trade.

Opium became a source of cash for many Afghans, especially after the breakdown in central authority following the withdrawal of Soviet military forces in early 1989. Opium poppies are easy to cultivate and transport, and offered a quick source of income for returning refugees and impoverished Afghans. In 1999, Afghanistan was the world's largest producer of opium poppies, and heroin trafficking was a major source of revenue. In a reversal, the Taliban in mid-2000 banned opium poppy production, citing religious reasons. This has apparently been adhered to, as wheat almost completely displaced poppy cultivation in 2001. Despite the ban, the Taliban has been flooding the world market with heroin in recent months to draw down its large opium stocks, according to the UN's Office of Drug Control and

Crime Prevention. This Office believes that most of the opium still grown is in those areas controlled by the Northern Alliance (opposition forces).<sup>1</sup>

Agricultural output rebounded in 1997 and 1998 due to sufficient precipitation and territorial consolidation by the Taliban. Livestock herds also were rebuilt somewhat. However, a 70-90% reduction in precipitation during the fall 1999 rainy season led to a total failure of the 2000 rain dependent crops and a major reduction in the output of irrigated areas. As a result, Afghanistan faced a cereal shortfall of almost 60% of its annual requirements. The severity of the situation compelled the UN's World Food Program (WFP) to begin emergency food drops in June 2000 in an effort to prevent imminent loss of life. Subsequent food aid shipments from the United States and other Western countries, most distributed by the WFP, covered much of the need.

A Food and Agriculture Organization (FAO) alert issued in June 2001 stated that three consecutive years of drought and worsening economic problems had jeopardized Afghanistan's food supply, putting millions in danger of starvation. FAO then estimated that 5 million Afghans (almost one-fifth of the population) have little or no access to food, largely because jobs are scarce due to the end of poppy cultivation and the decline of other cash crops, low livestock prices, herd depletion and refugee displacement. The population's movement toward borders and to their rural homes subsequent to the U.S. military response following the September 11 terrorist attacks on the United States, disruptions in WFP food aid deliveries, and continued economic disruption and conflict have worsened the humanitarian crisis within Afghanistan. The WFP in early October 2001 estimated that as many as 7.5 million Afghans (28% of the population) were at risk of hunger and will need food aid through March 2002. The WFP continues with its plan to stock up warehouses with 300,000 metric tons (MT) of grains and other foods before winter snows block roads, and to prepare to airdrop food into the most remote areas if needed during the winter, in order to avert famine. As of mid-November 2001, the WFP reported that despite the hazards of operating in the country, it has met its monthly food aid target of shipping 52,000 metric tons, using five overland supply routes.<sup>2</sup>

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<sup>1</sup>For additional background, see CRS Report RS21041, *Taliban and the Drug Trade*, by Raphael Perl, October 5, 2001.

<sup>2</sup>For information and status reports on WFP food aid efforts in Afghanistan, see [http://www.wfp.org/newsroom/in\\_depth/](http://www.wfp.org/newsroom/in_depth/) and click on "Afghan Crisis," and the country brief at [http://www.wfp.org/country\\_brief/indexcountry.asp?country=33#?country=33](http://www.wfp.org/country_brief/indexcountry.asp?country=33#?country=33). For an overview of U.S. Government's humanitarian efforts, see <http://www.usaid.gov/about/afghanistan/>, [http://www.usaid.gov/hum\\_response/ofda/](http://www.usaid.gov/hum_response/ofda/), and <http://www.fas.usda.gov/excredits/afghan.htm>. For WFP activity to assist Afghan refugees in Pakistan, see [http://www.wfp.org/newsroom/emergency\\_reports/search\\_results.asp?id=30#](http://www.wfp.org/newsroom/emergency_reports/search_results.asp?id=30#). [web sites reflect addresses as accessed on November 16, 2001]

## Iran

<b>Population</b> (millions)	64.0	<b>Agriculture's Share of GDP (%)</b>	20
		<b>Agriculture's Share of Labor Force (%)</b>	33
<b>Gross Domestic Product (billion \$)</b>	413.6	<b>Arable &amp; Permanent Cropland (% of total)</b>	11
<b>Per Capita Income</b>	\$6,300	<b>Permanent Pastures (% of total land)</b>	27

Village agriculture is an important component of Iran's economy. The agricultural sector accounts for one fifth of GDP, and employs one third of the labor force. Food processing (particularly sugar refining and vegetable oil production) also is an important industrial sector. With its large population and limited arable land, Iran is not self-sufficient in food, and is a major food importing country in the region.

Iran enjoys a wide diversity of climate and terrain, enabling its farmers to produce the traditional staple cereals (wheat and barley), rice, sugar beets as well as tobacco and tea. It is the world's largest exporter of high-quality pistachio nuts. Over the last decade, as part of a policy to generate non-oil export earnings, the government has promoted the expansion of export-based specialty products such as pistachios, dates, and flowers by bringing large-scale irrigation projects online. These and other efforts sustained a healthy economic growth in the agricultural sector in the 1985-1998 period, marked by increased yields and additional land put into cultivation. By the mid-1990s, Iran was importing just 5% of its wheat, rice, vegetable oil, sugar, and meat needs. A drought in 1997 arrested the upward trend in Iran's cereal producing regions, and resulted in a leveling off of wheat output and a fall in barley production.

Though agricultural production recovered in 1998, three successive years of a severe drought (1999-2001), combined with government restrictions on the import of fertilizers and pesticides, have thwarted growth in Iran's agricultural sector. Despite government efforts to mitigate the impact of rainfall fluctuations on the sector by building dams and irrigation and drainage networks, agriculture remains sensitive to weather. Also, the country's inadequate packaging, processing, and distribution networks have kept production costs high, making it more cost effective to import grains and rice. Iran is now one of the largest wheat importing countries in the world, covering much of its needs from Australia. In spite of these developments, government policy still aims to develop niche export markets for flowers, fruit concentrates, and fruit juices in Europe, the Gulf States, and neighboring ex-Soviet republics. One analysis suggests that "greater use of irrigation, supported by renewed World Bank loans to Iran, will help boost production of wheat, corn, and vegetables, but that [the country's] demand for cereals, together with the rising cost of imported fertilisers, makes it unlikely that grain imports will fall significantly."

In recent years, Iran's government has continued to reduce its role in agriculture by encouraging private sector activities and the growth of cooperatives. It sees its role as limited to providing infrastructure needs, such as dam construction and irrigations systems. The amount of subsidies for agricultural inputs (pesticides and fertilizers) has been reduced in real terms. Subsidies for some basic commodities (in particular wheat) account for about 80% of total direct subsidies, according to the

IMF. The government sets procurement prices for agricultural products using a cost-based approach that allows for a 20-25% gross profit margin, and that also takes into account world prices.

About one-third of the value added in agriculture occurs in the livestock sector, consisting largely of small farms that produce milk and meat. Other major agricultural products include wool and caviar. In the food processing industry, rice milling is an important subsector. Barley, corn, and other grains are processed primarily for animal feeds and packaged snacks. Fruit and vegetable canning expanded in the 1960s, as increasing populations in the cities accelerated the demand for canned produce.

The Food and Agriculture Organization (FAO) reported in early September 2001 that three years of drought have resulted in an acute scarcity of drinking water in both urban and rural areas, and devastated crops and livestock. Although the 2001 drought affected fewer regions than in previous years, FAO states that its impact on food supplies and people's livelihoods has been much greater for some communities. For example, large numbers of rural residents and their livestock in the most adversely affected provinces have started to migrate to other areas in search of water.

## Kyrgyzstan

<i>Population (millions)</i>	4.9	<i>Agriculture's Share of GDP (%)</i>	39
		<i>Agriculture's Share of Labor Force (%)</i>	52
<i>Gross Domestic Product (billion \$)</i>	12.6	<i>Arable &amp; Permanent Cropland (% of total)</i>	7
<i>Per Capita Income</i>	\$2,700	<i>Permanent Pastures (% of total land)</i>	44

Kyrgyzstan is a small, poor, mountainous country with a predominantly agricultural economy. Experts consider the country to be generally self-sufficient in meeting its food needs. Cotton, wool, and meat are the main agricultural products as well as exports. Tobacco, potatoes, vegetables, grapes, fruits and berries, and wool are also produced. The agricultural sector contributes 39% of total GDP, employs more than half of the labor force, and accounts for one fifth of export earnings. Because of its topography, pastures and meadows cover nearly half of the country's total area. Only 7% is arable land, of which nearly half is used for fodder crops consumed by its sizable livestock sector. Food processing is an important manufacturing sector.

Kyrgyzstan reportedly has been one of the most progressive countries of the former Soviet Union in carrying out market reforms. Following a successful economic stabilization program, which dramatically lowered inflation during the mid-1990s, attention turned toward stimulating growth. In 1995, land use rights were extended from 49 to 99 years, and the government implemented a unified land registration system. As a result of a 1998 referendum, land can now be privately owned. In 1999, the government and legislature are reported to have modernized the laws related to the creation of a land market, relations between landlords and renters, and the use of the land reserve fund, which had been the property of the state.



Favorable weather and economic reform measures adopted in the agricultural sector have served to make agriculture “a source of underlying strength for the Kyrgyz economy,” according to the IMF. Reflecting these developments, agriculture’s share of economic activity increased from 34% in the late Soviet period to over 40% now. Reforms freed controls on commodity prices and sales, broke up most state and collective farms, introduced new mechanisms and means for agricultural financing, and extended land use rights.

The IMF notes, though, that the increase in agricultural output “has been achieved against a background of a serious decline in both the level and growth of productivity.” Except for sugar beets, potatoes, and vegetables, yields have not increased since the mid-1990s, suggesting to IMF observers that output growth primarily reflects the expansion of arable land and an increase in livestock numbers. Despite recovery and growth in the sector over the last decade, the World Bank reports that rural incomes (on a per capita basis) fell substantially, due to a 40% increase in agricultural employment and a decline in non-farm rural income.

Factors viewed as hindering growth in the agricultural sector, according to the IMF, include the lack of modern equipment, poor quality or lack of inputs (i.e., low-yielding seeds, fertilizers, and irrigation systems), financial constraints caused by poor access to credit, and the need for better land management. Some of these problems were to be addressed in an agricultural reform program adopted by the Kirghiz government in 1999, but it apparently has not been fully implemented. Major components of the program announced were to: (1) increase the cultivation and processing of sugar beets and corn; (2) increase production of cotton, tobacco, fruits and vegetables by supplying farmers with high quality seeds, fertilizers and pesticides, fuel and lubricating materials, and by providing agricultural machinery servicing; (3) to increase meat production by helping farmers improve cattle and poultry selection, and build efficient marketing and auction systems; (4) to open rural credit associations; and (5) to work out a legal basis for corporate management for agriculture and introduce corporate management practices to agricultural enterprises.

The Food and Agriculture Organization (FAO) reported in early September 2001 that drought and water shortages have had less impact in Kyrgyzstan than in the neighboring countries. This is primarily due to sufficient water being available from the rivers that originate in the country but supply the region with irrigation water. FAO noted that the overall food supply situation remains satisfactory, but that access to food among the poorest groups is expected to be tight due to the lack of purchasing power and unemployment.

## Pakistan

<i>Population (millions)</i>	138.1	<i>Agriculture's Share of GDP (%)</i>	26
		<i>Agriculture's Share of Labor Force (%)</i>	44
<i>Gross Domestic Product (billion \$)</i>	282.0	<i>Arable &amp; Permanent Cropland (% of total)</i>	28
<i>Per Capita Income</i>	\$2,000	<i>Permanent Pastures (% of total land)</i>	6

Pakistan's principal natural resources are arable land and water. More than one quarter of its total land area is under cultivation, and is watered by one of the largest irrigation systems in the world. Agriculture accounts for just over one quarter of GDP, as well as for a large share of export earnings. The sector employs 44% of the labor force, and supports about 75% of the population. The most important crops are wheat, sugarcane, cotton, and rice, which together account for more than 75% of the value of total crop output. Other major agricultural products include fruits, vegetables, milk, beef, mutton, and eggs. Despite intensive farming practices, the country remains a net food importer. Pakistan exports rice, cotton, fish, fruits, and vegetables. To cover the needs of its large population, imports include vegetable oil, wheat, cotton, lentils, and consumer food products. This year, to draw down large stocks from last year's bumper crop, Pakistani traders plan to export wheat to nearby countries.

Some agricultural commodities provide raw materials for key industries, including textiles and sugar. In particular, cotton is important to Pakistan's economy, by providing the primary input for its fabric and garment industries. In turn, cotton-derived products dominate the country's exports. The economic importance of agriculture has declined since independence in 1947, when its share of GDP was around 53%. Over the last decade, according to the Food and Agriculture Organization (FAO), agriculture grew at an average annual rate of 4.5% with some fluctuations due to weather conditions.

Pakistan's agricultural sector, though, suffered a severe setback during 2000/01 due to an unprecedented drought situation and a shortage of irrigation water. This resulted in a 2.5% decline in agricultural output, compared to an "impressive" growth of 6.1% the previous year. Both factors contributed to lower production of cotton, rice, sugarcane, and wheat. Irrigation water shortages were due to two consecutive weak monsoons, and inadequate glacier and snow melt due to below normal snowfall and cooler than normal temperatures. Since the 2001 monsoon rains started well, expectations are that water reserves will be fully recharged, and that irrigation water levels will return to normal. Others observe that the longer-term cause for the irrigation shortage is poor resource management and planning. As a result, chronic irrigation shortfalls are expected to become an increasingly important factor in Pakistan's agricultural outlook.

In July 2001, FAO reported that the prolonged drought in parts of Pakistan had decimated livestock, and severely affected fruit and rain-fed cereal production. While large cereal stocks from last year's bumper crop are anticipated to cover this year's shortfalls in production, it noted that wheat imports may be necessary to replenish stocks. FAO's assessment is that government interventions to mitigate the effects of

the drought so far have been effective in averting large-scale human suffering, but that those farmers who lost the bulk of their fruit trees, pastoralists and landless rural households, are of particular concern and will require emergency assistance.<sup>3</sup>

According to the U.S. Department of State, agricultural reforms, including efforts to increase wheat and oilseed production, play a central role in the new government's economic reform package. To address the fall in agricultural output in 2000, USDA's agricultural attache reports that the government announced various initiatives to increase productivity, including improved availability of agricultural credit, better management of irrigation and drainage facilities, and stricter measures to check the adulteration of fertilizers and pesticides.

## Tajikistan

<i>Population</i>	6.3	<i>Agriculture's Share of GDP (%)</i>	19
<i>(millions)</i>		<i>Agriculture's Share of Labor Force (%)</i>	44
<i>Gross Domestic Product (billion \$)</i>	7.3	<i>Arable &amp; Permanent Cropland (% of total)</i>	6
<i>Per Capita Income</i>	\$1,140	<i>Permanent Pastures (% of total land)</i>	25

Tajikistan is reportedly the poorest and least economically developed of the former Soviet republics, in part due to the economic specialization that central planners in Moscow imposed on the country through the early 1990s. This policy fostered excessive dependence on the production and export of cotton, still its most important crop, and hindered economic diversification. The country is mostly mountains and deserts; arable land comprises only 6% of its land area. Tajikistan, though, is well endowed with water resources, unlike its neighbors. This has enabled irrigation of 80% of the arable land, and contributed to its specialization in cotton production. Cotton alone accounts for about half of the country's agricultural output. Following the former Soviet Union's dissolution, agricultural output declined considerably as civil war, floods, and economic dislocation dramatically reduced cotton yields and output.

The agricultural sector accounted for 19% of Tajikistan's GDP in 2000, down from 38% in 1995. About 44% of the labor force is employed in this sector. The country is climatically well suited for raising fruit and vegetables, producing much more than is domestically consumed. Livestock (primarily sheep) is also an important part of Tajik agriculture. Besides cotton, various fruits and vegetable oils are also exported. Grain and flour, together with other food products, are imported.

In early 2000, analysts expected that agriculture and agro-processing would play a major role in Tajikistan's economic recovery, pointing to its comparative advantages and the potential for productivity improvements. An International Monetary Fund (IMF) report noted the combination of land reform, and price and trade liberalization, had already had a "positive supply response in the agricultural sector and related

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<sup>3</sup>For more recent information and reports on WFP activities in Pakistan, see [http://www.wfp.org/country\\_brief/indexcountry.asp?country=30](http://www.wfp.org/country_brief/indexcountry.asp?country=30). [as accessed on November 16, 2001]

activities.” The report mentioned that there has been little change in the pre-reform “market infrastructure.” This gives established production and commercial entities “unusual market power,” which has “contributed to a relatively slow pace of change in the restructuring of incentives and production decisions in the agricultural sector.” The land reform process received a boost in 1998, when President Rakhmanov issued several decrees confirming the right of farmers to have inheritable and transferable land share and use rights for up to 99 years. The government also began dismantling the large state agricultural enterprises into privately-owned peasant farms. As a result, by 2000, these farms held over 40% of the arable land, compared to 30% in 1997. These developments have contributed to improved productivity on private farms, and attracted foreigners to invest and participate in the cotton sector.

Despite these positive prospects, a crop failure in late 2000 due to drought significantly changed the outlook. The UN’s World Food Program (WFP) reported in August 2001 that Tajikistan faced a serious food deficit for the second year in a row, leaving one million vulnerable people (16% of the population) in remote areas in need of food assistance. This drought further exacerbated structural problems and the deteriorating conditions of the agricultural sector. The report stated that a “shortage of financial and technical resources has also resulted in a near collapse of the country’s irrigation systems, agro-processing industries, agricultural input production and supply units, as well as the severe deterioration of farm machinery and equipment.” The WFP laid out its estimate of estimated food aid needs for the vulnerable population, particularly those living in the remote border areas and the mountainous regions. It called for urgent assistance to rehabilitate the country’s collapsing irrigation infrastructure, repair farm equipment, procure quality cereal seeds, and establish an adequate rural finance system. “Without such measures,” the report said, “it is likely that agricultural production will continue to decline regardless of the climatic conditions.”<sup>4</sup> SovEcon reports that because the 2001 grain harvest was poor for the second year in a row, Tajikistan will need to import significant quantities of wheat to cover its needs. As of mid-November, SovEcon reported that the country could only pay for about half of its needs, and was seeking to cover the balance in the form of food aid commitments from international organizations.

## Turkmenistan

<b>Population</b>	4.8	<b>Agriculture’s Share of GDP (%)</b>	27
<b>(millions)</b>		<b>Agriculture’s Share of Labor Force (%)</b>	44
<b>Gross Domestic</b>			
<b>Product (billion \$)</b>	19.6	<b>Arable &amp; Permanent Cropland (% of total)</b>	3
<b>Per Capita Income</b>	\$4,300	<b>Permanent Pastures (% of total land)</b>	63

Much of Turkmenistan is desert; only 3% of the country’s area is arable. Even so, the country’s agricultural sector accounts for 27% of GDP, and employs more than 40% of the labor force. Its agricultural sector is also centered around cotton, to which almost half of the arable land is allotted. It is among the world’s top 10 cotton

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<sup>4</sup>For more recent information and reports on WFP activities in Tajikistan, see [http://www.wfp.org/country\\_brief/indexcountry.asp?country=32](http://www.wfp.org/country_brief/indexcountry.asp?country=32) (as accessed on November 16, 2001).

producers, and a leading exporter. In the late 1990s, cotton sales contributed about one quarter of the country's export earnings. Turkmenistan also produces a variety of fruits and vegetables, as well as grain and sugar beets. Even so, food production in the Soviet era suffered due to cotton specialization, the result of central planning that provided extensive free irrigated water to cotton producers. Turkmenistan (unlike its neighbors) is well endowed with natural mineral resources, primarily natural gas and oil that are exported to Western Europe. Earnings from these exports enable Turkmenistan to import the balance of its food needs, primarily grain and grain products, meat, dairy products, sugar, and beverages.

Following the dissolution of the Soviet Union, the major objectives of Turkmenistan's agricultural policy have been to achieve self-sufficiency in grains, earn foreign exchange through continued exports of cotton, and redistribute the earnings from agriculture to other sectors for investment in public buildings, infrastructure, and industry. With a large portion of the economy still reflecting Soviet-style principles, economic reforms have been introduced very slowly. The government continues to exercise extensive control over the agricultural sector, primarily through the system of "state orders" for cotton and wheat – the country's two main crops. This system makes input subsidies and below-market credit available (as well as the promise of land ownership) in return for farmers' growing these two crops, meeting output targets, and selling both commodities at government-set procurement prices.

The Turkmen government has taken an approach to land reform and farm restructuring that differs from that adopted by the other former Soviet republics. The collective land holdings are divided into lots that are leased to families, while retaining the overall collective structure and state ownership of all farmland. Leases of land are made to farmers, who have the possibility of transferring ownership to other family members once the farmer has established a good track record in farming. Land is given under 10 to 15 year leases to families, and tied to meeting conditions for producing cotton and wheat under the "state order" system. The government, though, has been reluctant to confirm rights of ownership following the two-year probationary period; accordingly, few ownership certificates have been issued. Reasons offered are that farmers have not met their production targets, or that they would not be able to effectively operate the farm on a private basis. Though other crops and livestock are not marketed through a state order, the government reportedly influences farmers' decisions through land allocations, implicit price controls administered by the state commodity exchange, and the availability of agricultural inputs.

During the 1990s, the government pursued a program to achieve self-sufficiency in grain. As production targets for wheat have been met, imports of wheat and flour have fallen. A portion of the wheat and flour produced each year is stored in a state reserve. In early September 2001, the Food and Agriculture Organization reported that drought and shortages of irrigation water for the second year in a row were expected to significantly lower crop production. To cover immediate needs, experts expect that Turkmenistan will import wheat and other food products from Russia, paying for these purchases with natural gas sales.

## Uzbekistan

<i>Population</i>	24.7	<i>Agriculture's Share of GDP (%)</i>	35
<i>(millions)</i>		<i>Agriculture's Share of Labor Force (%)</i>	40
<i>Gross Domestic</i>			
<i>Product (billion \$)</i>	60.0	<i>Arable &amp; Permanent Cropland (% of total)</i>	10
<i>Per Capita Income</i>	\$2,400	<i>Permanent Pastures (% of total land)</i>	46

Uzbekistan is a dry, landlocked country of which one-tenth consists of intensely cultivated, irrigated river valleys. It was one of the poorest areas of the former Soviet Union. Agriculture's importance to Uzbekistan is illustrated by the links between the cotton sector and the rest of the country's economy. Cotton is also its dominant crop, accounting for about 40% of total agricultural output. Uzbekistan ranked among the world's top five producers of cotton during much of the 1990s, and is a leading cotton exporter. As its largest source of foreign currency (40-45% of total export earnings, followed by gold), cotton is likely to continue to be the country's most important commodity, even though the quality of Uzbek cotton is reportedly below that of most other cotton-producing countries. In recent years, the government has switched acreage from cotton to wheat and feed grains in an effort to achieve self-sufficiency in grain production. USDA reports that Uzbekistan had, by 2000, nearly reached this objective, and that the government planned to initiate a major program to reform the cotton sector in order to boost foreign exchange from increased exports (see below).

The country's agricultural sector accounts for 35% of GDP, and employs about 40% of the labor force. This reflects the fact that more than 60% of its population lives in densely-settled rural areas and is largely dependent on farming for its livelihood. About 30% of the country's labor force is engaged in cotton farming in small rural communities. In addition, the food industry sector contributes an estimated 13% to Uzbekistan's economy. Other major agricultural products produced are silk, fruits, and vegetables. Virtually all agriculture involves significant irrigation.

During the Soviet era, intensive production of "white gold" (cotton) and grain led to overuse of agrochemicals and the depletion of water supplies. The World Bank notes that the Aral Sea is Uzbekistan's most pressing environmental problem, as poor water management over a long period of time resulted in its partial drying up and contamination by agricultural chemicals. This crisis, it adds, now has a strong negative impact on economic activity and on the general health of the population.

Since the dissolution of the Soviet Union in 1991, Uzbekistan has followed a gradual approach to introducing macroeconomic and market-oriented structural reforms. However, according to the World Bank, reforms in the agricultural sector have not occurred. It points out that the government has not introduced measures to reduce the market clout of the monopolies that sell inputs to farmers, to improve producer prices and reduce mandatory procurement of cotton and wheat, and to liberalize export marketing. The Bank notes that prospects for growth and improvement in rural living standards are being undermined by these government policies that continue to extract resources from the agricultural sector (primarily cotton) to meet other economic priorities. Similarly, the IMF reports that changes made to the structure and organization of the former state farms have not resulted in

much change from how they operated prior to the early 1990s. Collective enterprises still account for almost all cotton production, and 90% of wheat output, and their importance to meeting national economic objectives has limited change. However, rural families have expanded their traditional household plots, which now dominate meat and milk production. These plots also account for about half of fruit and vegetable output. Though a new Land Code that passed in 1998 clarified some issues, the IMF notes that these do not support changes in farm structure and land tenure that would lead toward more productive units.

The Food and Agriculture Organization (FAO) reported in late summer 2001 that severe water shortages and a second year of drought have significantly affected production of wheat, rice, and cotton. The worst affected areas are in the northwestern part of the country. The Uzbek government has appealed for international assistance to rehabilitate the irrigation systems, install desalinization equipment, and provide targeted food aid in some areas.