Uzbekistan's Cotton Value Chain¹

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1. Introduction

Cotton has a long history in Uzbekistan. Its role expanded greatly in the Soviet Union era and remained so after national independence in 1991. Soviet planners directed that Uzbekistan specialize in cotton, which was bartered for food and other products produced in other parts of the former Soviet Union and the rest of Comecon. When the Soviet Union collapsed, Uzbekistan retained many features of the Soviet state-directed system although some elements of private enterprise were introduced. The strong role of the state provides structure to the cotton value chain and stabilizes producer prices. There are also significant downsides, however. Producer prices are low and the highly centralized control of the system reduces incentives for productivity improvement. Moreover, the disregard for environmental costs characteristic of the Soviet period has continued and even worsened since independence. As the capital equipment used for harvesting has deteriorated, the Uzbek government has resorted to an elaborate system of forced labor at harvest time that has attracted international opprobrium and boycotts of products using Uzbek cotton, imperiling Uzbekistan's increasingly successful efforts to process more of its cotton locally into textiles and clothing.

Although its economic role has declined in recent years, cotton and cotton products still account for 20 percent of GDP and 11 percent of exports (Responsible Sourcing Network 2012). Recently Uzbekistan has made progress in addressing productivity, environmental and labor challenges as well as boosting textile and clothing production. This document reviews the current situation of the Uzbek cotton sector and proposes reforms to strengthen it further. Section 2 sets the context with an overview of the world cotton market and Uzbekistan's place therein. Section 3 describes the structure and operation of the cotton sector in Uzbekistan. Section 4 reviews labor and environmental issues. Section 5 describes the pricing mechanism. Section 6 analyzes the evolution of Uzbek cotton production. Section 7 compares productivity in Uzbekistan to that of other developing country cotton producers. Section 8 describes exports of Uzbek cotton. Section 9 analyzes domestic processing of Uzbek cotton into textiles and clothing. Section 10 concludes and provides a detailed set of recommendations.

2. Uzbekistan in the world cotton market

The World Cotton Market

Although cotton has lost some market share to artificial fibers since the 1990s, it still accounts for one third of world fiber use (USDA 2012). It is actively traded in world markets, with global exports about one third of global production. As are other commodities, cotton is subject to considerable price volatility in response to supply and demand shifts in the world market. Cotton prices trended downwards from 1960 to the early 1980s, and since then have oscillated between about \$1.50 and \$2.50 in 2010 US dollars, except in 2010-11 when the price spiked sharply and then came back down (Figure 1).



Figure 1: World Price of Cotton, Adjusted for Inflation (2010 US\$ per kg), 1960-2014

Source: World Bank Pink Sheet.

Cotton requires a warm dry climate and is relatively tolerant to drought and saline soils. Cotton cultivation and harvesting can be very labor-intensive. Forced labor has played a big part in the history of cotton, particularly in the United States prior to the civil war. Now cotton production in the United States is highly mechanized. However, it remains labor-intensive in many developing countries. After harvest, ginneries must separate cotton lint from seed. Lint is the raw material for textile industries. Cottonseed can be used to make cottonseed oil. Large farms in the United States do their own ginning whereas in developing countries farmers sell their cotton to private or state-owned ginneries.

Developing countries have become increasingly dominant in world production and use of cotton due to favorable climatic and soil conditions, as well as labor abundance. Developing countries now account for 81 percent of global production and 52 percent of exports (ICTSD 2013). In addition, most textile and clothing production takes place in developing countries such as China and Bangladesh, some of whom produce little cotton themselves, so developing countries are even more dominant in cotton mill use (96 percent) and imports (97 percent).

In addition to comparative advantage, the world market is affected by national policies. Major producing countries, including the United States, China, India and Brazil engage in a variety of domestic programs to support domestic cotton producers. Cotton subsidies have been a major flashpoint in the Doha Round of trade negotiations with West African producers and Brazil leading efforts to reduce developed country cotton subsidies. While agreement was reached in principle at the WTO in 2005 to eliminate developed country cotton export subsidies and reduce other market-distorting measures, it has not been implemented given the failure to date to complete the Doha Round. United States subsidies have been particularly contentious and the WTO ruled in favor of Brazil's case that these subsidies were illegal. A number of studies have found that US subsidies depress world prices, but the effects on world prices are small, of the order of 5 percent or less of world price (ICTSD 2010). Recently world prices have been supported by the Chinese policy of building up a large stock of cotton (ICTSD 2013).

Overall, domestic market and government failures in developing countries are more important than developed country subsidies in determining the success of domestic cotton sectors.² Indeed managing cotton value chains poses significant challenges for developing countries. Countries face difficult tradeoffs between coordination and competition (Poulton et al 2004; Tchirley, Poulton and Labaste 2009; Golub 2009).

² This paragraph draws on Golub (2009).

Concentrated systems tend to perform relatively well in coordinating input supply, credit, and public good provision, but competitive systems are more effective in stimulating technical efficiency and higher producer prices. Cotton production requires timely and high-quality provision of seeds, fertilizer, and pesticides. Until the 1980s, in most developing countries government marketing boards organized provision of inputs, deducting input credits from the producer price paid when the cotton crop is delivered. Costs were high and producer prices were typically low, however. Liberalization of prices and entry in agriculture in general and cotton in particular has had mixed success across the developing world (Swinnen, Vandeplas and Maertens 2010; Tchirley, Poulton and Labaste 2009). A general conclusion is that liberalization is often beneficial but requires careful attention to retaining existing or developing alternative institutions that coordinate provision of inputs, research and extension, and other public goods. Comparative studies of the organization of cotton farming in developing countries, particularly in Africa, suggest that appropriate reforms are context-specific and no one system dominates. In particular, the extent and speed of privatization and liberalization depend on the efficiency of state-operated systems and their effects on government finances (Delpeutch, Vandeplas and Swinnen 2011).

Institutional and Historical Background on Uzbekistan

Uzbekistan is a land-locked low-income economy in Central Asia with a population of about 30 million in 2013, about half of which resides in rural areas. With strong growth in recent years, poverty has declined from 27.5 percent in 2001 to 15 percent in 2013. Rural poverty, however, is much higher at 30 percent, and above that in some regions such as Karakalpakstan around the Aral Sea. Agriculture still accounts for 19 percent of GDP, down from 34 percent in 2001, and a larger share of employment (25 percent in 2010) (World Bank 2014).

Uzbekistan's climate is well suited for growing cotton, but lack of rainfall creates a near complete dependence on irrigation. Cotton cultivation began around the 5th century. During the 1860s civil war in the United States, Central Asia cotton increasingly replaced the US as the main supplier of cotton to tsarist Russian textile factories (Djanibekov et al 2010). During the communist era, the former Soviet Union sought cotton self-sufficiency and identified Central Asia as the internal supplier of cotton. Cotton production boomed under central direction and with massive investments in irrigation infrastructure (Abdullaev et al 2009). By 1970, Uzbekistan produced 70 percent of the Soviet Union's cotton fiber, most of which was processed in Russia. In return, Uzbekistan received wheat and other goods from other parts of the Soviet Union.

The Soviet system of agricultural production represented an extreme version of prioritizing coordination over competition. Production was managed by large collective farms with little or no scope for private land use and farming (Abdullaev et al 2009). The central government controlled production through directives to the collective farms and provision of inputs. These large farms managed all aspects of production, including irrigation and farm machinery (tractors and combines). Cotton was heavily subsidized, with inputs and credit provided far below cost.

With the advent of independence, Uzbekistan reformed its cotton sector more gradually than most other countries in Central Asia, with the government retaining nearcomplete control of cotton production, as described in more detail below. Nevertheless, the collapse of the Soviet Union led to major disruptions in the cotton value chain, with the disappearance of large collective farms and the allocation of land rights (but not ownership) to smaller collective farms ("shirkats") and individual farmers ("dekhans"). Input provision was still controlled by the government. "The result was that the land management units no longer matched the input units, resulting in poorer performance of, for example, irrigation and drainage networks" (Abdullaev et al 2009, p. 53). Similarly, water distribution to farms was devolved to local Water Management Units (WMOs), but the WMOs suffered from inadequate financing and authority, further contributing to the deterioration of irrigation and drainage. Also, given the economic difficulties of the other former Soviet Union and other transition countries, Uzbekistan had to reorient its trading relationships. It increasingly turned to countries outside the former Comecon to market its cotton, and reduced cotton cultivation in favor of wheat to compensate for falling food imports from other parts of the Soviet Union.

Uzbekistan's share of world production and exports has dropped steadily since the late 1980s (Figure 2) when Uzbekistan was the world's largest exporter (McDonald 2012). There are several reasons for Uzbekistan's reduced shares of production and exports. In recent years, the Uzbek government has sought to diversify agriculture away from cotton into wheat and other food crops. Stagnating or declining yields in Uzbekistan and rising yields in some other major producing countries have also contributed to Uzbekistan's declining share of world production. The causes of the poor performance of Uzbekistan's cotton yields are discussed below. In addition, exports have dropped more than production because of a rising share of cotton lint used for domestic consumption, i.e., production of textiles.



Figure 2: Uzbekistan's share of world production and exports (Percent)

Source: Authors' calculations based on USDA, Foreign Agricultural Service, Production, Supply and Distribution Online data, 2015.

Despite its declining share of world output and trade, cotton remains very important for Uzbekistan. About 37 percent of arable land is devoted to cotton. Uzbekistan is divided into 13 regions, all of which grow cotton. Most of the cotton is grown in the Bukhara, Kashkadarya and Surkhandarya regions, along the border with Turkmenistan and Tajikistan. This region is irrigated by the Aydar-kul Lake and the Amu Darya and Syr Darya rivers, which feed the Aral Sea. In Market Year (MY) 2014/15,

these three regions is expected to account for 1.1 million tons of seed cotton, approximately 32 percent of total production.

3. The Organization of the Uzbek Cotton Industry

Cotton is one of Uzbekistan's "centralized crops", along with wheat, meaning that the government exercises extensive control over all aspects of production. This control is tighter for cotton than wheat and includes mandating the use of land exclusively for cotton cultivation, production quotas at the farm level, monopoly provision of inputs, and price setting for inputs and cotton lint. Government agencies also have the monopoly over transportation, exports and domestic trade (MacDonald 2012). The Uzbek State owns all land, and leases it to private farmers. Leasing contracts can last up to 50 years, but can be terminated if farmers fail to meet their cotton production quotas (Muradov and Ilkhamov 2014). In addition to required cotton monoculture, farmers are severely constrained in their choice of technology (Responsible Sourcing Network 2012).

Figure 3 shows the structure of Uzbekistan's cotton global value chain (GVC). In this and the next few sections we focus on raw cotton production and distribution. Section 9 discusses the textile and clothing sectors. The state plays a major role in organizing the sector, such that the governance of the value chain can be described as a mix of "captive" and "hierarchical" as opposed to more decentralized "market", "modular" and "relational" systems (Gereffi, Humphrey and Sturgeon 2005; Gereffi and Fernandez-Stark 2011).³ The state role is particularly dominant in the upstream parts of the value chain, i.e., production of raw cotton and ginning.

Cotton production oversight starts at the highest levels of government, with instructions transmitted hierarchically down to the farmers. Early in the year, the president of Uzbekistan issues a decree setting out the varieties of cotton to be planted

³Gereffi, Humphrey and Sturgeon 2005 identified five categories of GVCs by their degree of centralization: 1. "Markets" where multiple firm interactions are arms-length; 2. "Modular", where firms tend to customize their products based on the demands of their customers but where long-term firm relationships are not fixed; 3. "Relational" where groups of firms have long-term relationships based on family, religious, or ethnic ties; 4. "Captive" where one or several large producer or buyer firms exercise a dominant role in the GVC; and 5. "Hierarchical" where the dominant firm(s) are vertically integrated, directly controlling most of the GVC.

and targets for cotton production. During January and early February, the Ministry of Finance, through Selkhozfond (Fund for Payments for Agricultural Production Purchased for Public Use), allocates quotas to districts. These quotas are based on past production levels and on a land registry created during Soviet times. The President of Uzbekistan appoints 13 hokhims (governors) who set quotas for each district. Hokhims in turn appoint local hokhimiyats who then contract with individual farmers and assign their quotas (Responsible Sourcing Network 2012). The Prime Minister conducts regular meetings or conference calls with the regional hokhim governors to review the progress of cotton planting and harvesting. Hokhim governors closely monitor district level hokhimiyat, who hold regular meetings with farmers attended by police and prosecutors among others, underlining the coercive nature of the process.

Procurement prices are not part of the contracting, and so farmers do not know how much they will receive for their cotton until they sell it to local gins. Pricing is discussed in section 5. Local hokhimiyats visit farms during the growing season to adjust planning targets and production quotas for coming years. Based on this information, Selkhozfond determines which fields will grow cotton, which will grow wheat, and which will grow non-centralized crops. In districts that fail to meet their quotas, hokhimiyats risk losing their jobs. Farmers that do not meet their quotas are sanctioned economically and administratively, with some even facing criminal prosecution (Muradov and Ilkhamov 2014). Some farmers go as far as buying cotton on the black markets at elevated prices and sell to the government at a loss in order to preserve their land (Uzbek-German Forum for Human Rights 2014).



Figure 3: Structure of Uzbekistan's Cotton Chain

Once quotas have been allocated, farmers must secure their inputs. Access to credit is constrained, and most farmers use their future crops as collateral when taking out loans to purchase seeds, fuel, fertilizers, pesticides and machinery. Since hard currency is largely unavailable in Uzbekistan, bankers pay input suppliers on the farmer's behalf, in effect lending to farmers, with the credits reimbursed when farmers deliver their cotton. Inputs are produced and distributed by monopolies and oligopolies largely connected to the government: *Uzkhimprom*, a state joint-stock company, produces mineral fertilizers and crop protection chemicals; fuel is supplied by the national oil and gas holding company *Uzbekneftegaz*; and agro-universities and research institutes work on biological pesticides and genetically modified seeds. Seed, agricultural equipment, mechanization service providers, and soil amelioration services are not State-owned, but are monopolies overseen by governmental officials (Muradov and Ilkhamov 2014). Many farms rely on Machine Tractor Parks (MTP), a state company, for machinery. Water for irrigation is

subsidized for all farmers, and the government is responsible for maintenance and operation of infrastructure.

Farmers producing cotton on low-yield land, which represents 45 percent of all land used in cotton production, are eligible for subsidized inputs. When local hokhimiyats assess the yield potential for land in their districts, farmers have an incentive to report lower levels of fertility so as to get more funding for subsidized inputs. This presents opportunities for embezzlement and corruption (Muradov and Ilkhamov 2014). The central government also periodically writes off farmers' debts, and state funded credits to agriculture are at concessional rates, providing implicit subsidies (Guadagni et al. 2005). Finally, imported agricultural machinery and inputs are exempted from value added tax (VAT), as an incentive to mechanization, but this has been insufficient to prevent the deterioration and disuse of farm equipment given the low returns to cotton farming.

Once the harvesting season begins, raw cotton is delivered to the 127 gins spread across the country. The state-controlled association Khlopkoprom is responsible for procuring raw cotton, transporting it from the farm to the gin, and ginning (Responsible Sourcing Network 2012). Logistical costs are deducted from the procurement price paid to farmers, as discussed below. In fact all of these transactions are on paper and no cash payments occur until the harvest is complete. Farmers do not receive full payment for their cotton until well after they have delivered it to Khlopkoprom.

Farmers cannot legally to store their raw cotton and must sell all of their output to the State. Thus, even in the case of a harvest with above-average yield, farmers are required to sell their extra cotton at the official price. Khlopkoprom ensures that all output is immediately transported to ginning facilities, thus inhibiting farmers from selling excess raw cotton in the black market at higher prices.

The central government charges Khlopkoprom VAT of 20 percent on cotton fiber. Exports are in principle exempt from VAT, so Khlopkoprom and farmers should receive a VAT rebate. However, the taxes collected by the central government are not reimbursed when cotton is exported, so VAT on cotton fiber acts as both a sales and export tax. Along with seed crushing excise and implicit taxes due to low procurement prices, VAT depends on quantity produced. VAT thus reduces the incentive for farmers and gins to boost productivity to the extent that the tax incidence falls on both of them. Meanwhile, input subsidies are independent from how much cotton is produced, being determined solely by planted area and expected yield (MacDonald 2012). Farmers face a perverse incentive to only produce up to their quota, so that they pay as little taxes as possible. VAT also incentivizes gins to lessen productivity: the less fiber produced, the less tax will be charged on value addition.

Once raw cotton has been acquired from farmers and processed at Khlopkoprom's gins, it is ready for sale and redistribution. Lint is either exported or sold to domestic textile manufacturers as described in section 8. The central government collects revenues from exports and domestic sales and pays Khlopkoprom, who in turn pays farmers.

4. Labor and Environmental Issues

The cotton sector in Uzbekistan has elicited substantial global concerns about its labor and environmental practices. These issues are of importance for two reasons, in addition to protecting the human rights of the Uzbek people: 1) unsustainable practices are inimical to long-run productivity and quality upgrading of the cotton sector, and 2) perceptions of abusive practices have led to increasingly vocal and organized efforts to boycott Uzbek cotton and cotton products.

Uzbekistan's labor and environmental problems arise in part out of the historical legacy of the Soviet Union when cotton cultivation was subject to near total government control, with no regard to environmental sustainability or autonomy of farm workers. The situation deteriorated after the Soviet Union collapsed as the economic difficulties of independent Uzbekistan and lack of democracy led to continued environmental neglect and inadequate investment and maintenance of infrastructure and capital equipment, the latter giving rise to forced labor to replace mechanical harvesting.

Forced and Child Labor during the Cotton Harvest

As described earlier, the Uzbek government exerts a near complete of control over the cotton value chain, starting with mandated production quotas at national, regional and local levels. Officials and farmers are under intense pressure to satisfy these quotas regardless of availability of labor and machinery. Given the lack of mechanized equipment, harvesting is very labor-intensive. In addition, the harvest must be completed expeditiously or the crop will deteriorate. Thus there is a very large spike in labor demand at harvest time, which far exceeds the normal availability of rural workers. Local officials (hokhimiyats) are responsible for finding the workers to conduct the harvest and have in the past resorted to conscription of children and adults. Numerous media and NGO reports have documented in detail how officials draft large numbers of people into coerced cotton harvesting (e.g., Environmental Justice Foundation 2005, Uzbek-German Forum for Human Rights 2014). Law enforcement officers (police and prosecutors) assist the hokhimiyats, often using threats and intimidation such that it is impossible to refuse to participate in the harvests. In some cases, however, it is possible to pay off officials in lieu of working, or to pay for a substitute worker.

Until recently, children as young as 7 represented a large component of the harvest labor force. Schools would be emptied during the harvest season, with teachers overseeing their students' work in the cotton fields. In 2013, under intense pressure from the international community, and in conjunction with an International Labor Organization (ILO) monitoring of the harvest, the use of younger children largely stopped but increasing numbers of older adolescents (16-17 years old) replaced them, along with adults who are required to abandon their usual jobs for a month or more. This results in interrupted studies for students and reduced public services due to the diversion of staff to the cotton harvest.

Payment of conscripted adults and children is very low and working conditions are often harsh. Children and adults are assigned a daily quota of cotton to harvest, usually about 60 kgs. Failure to reach the daily quota can result in verbal humiliation or even physical abuse. While some workers commute to the fields from their homes, others are housed in local communities in often uncomfortable and unhygienic conditions.

Numerous press and NGO reports have decried mass mobilizations of children and adults to harvest cotton, leading to increasing public scrutiny and strong pressure on retailers to stop carrying apparel made with Uzbek cotton. The Responsible Sourcing Network (RSN) cotton pledge, in which companies agree not to market products made with forced labor in Uzbekistan, has been signed by many major retailers including Target, Walmart, C&A, Marks and Spencer, IKEA, H&M and Tesco.⁴ Daewoo, one of the largest foreign investors and buyers in the cotton value chain in Uzbekistan, has been subject to protests in South Korea and as of July 2014, there were 230,000 signatories to a petition urging Daewoo to stop buying Uzbek cotton. As a result of this publicity, a number of important retailers including Nike, H&M, Ikea, C&A, Jones Group and Michael Kors are no longer sourcing from Daewoo.⁵

International organizations and national governments in developed countries have recently become involved in monitoring Uzbekistan's labor practices in the cotton harvest and provided somewhat conflicting assessments of the severity of human rights abuses and the extent to which the situation is improving. In 2013 the United States Department of Labor's annual report on the "Worst Forms of Child Labor" characterized Uzbekistan as "No Advancement", based on "the Government's continued complicity in the use of forced child labor".⁶ The US State Department's annual report on human trafficking lowered Uzbekistan to Tier 3 status, the lowest level.⁷ However, the 2013 ILO mission, conducted jointly with the Uzbek government, concluded "it would appear that forced child labor was not used on a systematic basis in Uzbekistan to harvest cotton in 2013.³⁸ Similarly, while recognizing the severity of the problem, the World Bank views the Uzbek government as making substantial efforts to eradicate child and forced labor. Together with other donors the World Bank is engaged in a multi-pronged "dialogue and collaboration," including covenants in loans requiring compliance with national laws on labor rights, training and awareness raising, third-party monitoring, and assisting "the government to formulate a strategy to mechanize agriculture, with a particular focus on cotton production." The Uzbek government aims to fully mechanize cotton production by the end of 2016. In a pilot project in the Karakalpakstan region, the World Bank will help finance 230 mechanical cotton harvesters. Diversification into crops that require a more

⁴http://www.sustainablebrands.com/news_and_views/supply_chain/sustainable_brands/worlds_la rgest_retailers_take_stand_against_forced_la

 $^{^{5}\} http://www.cottoncampaign.org/2014/07/09/protest-at-daewoo-in-seoul-against-forced-labor-profiteering/.$

⁶ http://www.dol.gov/ilab/reports/child-labor/uzbekistan.htm.

 ⁷ http://www.mintpressnews.com/uzbekistan-still-using-child-slaves-to-pick-cotton/197884/
 ⁸ http://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:13100:0::NO::P13100_COMMENT_I
 D:3149080

even level of labor throughout the year, such as horticulture, can also reduce the incentives to use forced labor (World Bank 2014).

Environmental Issues

Although cotton is a drought-tolerant crop in that it can withstand periods without rainfall, it is quite water-intensive over the growing season as a whole and Uzbekistan is an arid country. Thus cotton cultivation relies heavily on irrigation from its rivers, particularly the Amu Darya and Syr Daria that feed the Aral Sea. According to World Bank estimates, nearly 20,000 liters of water are used for each kg of cotton produced in Uzbekistan.⁹ Intensive irrigation, largely for cotton, is the primary cause of the well-known shrinkage of the Aral Sea to about 10 percent of its size before the Soviet era. The decline of the Aral Sea has devastated the Karakalpakstan region, destroying its once thriving fishing industry and creating a desert seabed from which a toxic mix of dust, salt and chemical residues is carried by the wind, resulting in a very high incidence of health problems in the local population. Infant mortality and child malnutrition are elevated and the region has the highest female anemia and esophageal cancer rates in the world (World Bank 2014).

Heavy reliance on irrigation and drainage has negatively affected the quality of Uzbek soils. Around 66 percent of Uzbekistan's land has high levels of salinity due to deficient irrigation and drainage and lack of crop rotation, resulting in reduced fertility (Responsible Sourcing Network 2012). To remove the salt, several rounds of flushing of the land are required, raising the amount of water used. A vicious circle of waterlogging and salinization, deteriorating soils, falling cotton yields and rising water usage has resulted.

The system of pump irrigation installed in the Soviet era is highly energy- and water-intensive, accounting for 30 percent of diesel and 80 percent of the country's water use (Abdullaev, Giordano and Rasulov 2009). Worse, the irrigation infrastructure has not been adequately maintained since the end of the Soviet era, with spending falling to \$12

⁹ Reported in Environmental Justice Foundation (2005).

per hectare from \$120 during the Soviet Union era,¹⁰ and as much as 60-80 percent of the water withdrawn from the rivers leaks out the aging pipes and unlined canals before it reaches its destination.¹¹ The World Bank is proposing that Uzbekistan switch from pump-based lift delivery of water to reliance on gravity methods. This will require building new canals (World Bank 2014).

A World Bank project in South Karakalpakstan has substantially improved drainage. Cotton yields rose by 22 percent and salinity in the Amu Darya River substantially lessened. Further improvements in water use depend on raising efficiency of irrigation and instituting incentives to conserve water and raise productivity (World Bank 2014).

A positive legacy of the Soviet Union is that Uzbekistan has strong biotechnology capabilities and has now almost completely substituted organic methods for chemical pesticides (Responsible Sourcing Network 2012). However, intensive use of chemical fertilizer combined with waterlogging of fields and runoff leads to pollution of aquifers (Environmental Justice Foundation 2005).

Weather patterns have been pressuring water availability in Uzbekistan. Precipitation levels are lower, thus causing summer streams to have less water. Climate change is expected to exacerbate water shortages in the region.

A further important consideration is that water is a shared resource between Uzbekistan and its upstream neighbors Kyrgyzstan and Tajikistan. These countries are planning to dam the river for hydroelectric energy generation, which could significantly lower the supply of water to Uzbekistan. Transboundary water issues have thus become a source of considerable tension within the region. Already, these upstream countries have increased their reliance on water sources normally used to irrigate Uzbek farms (MacDonald 2012).

Thus, water availability is decreasing while demand has been increasing, given population growth, farming and rising temperatures. Meanwhile, inefficient water management costs Uzbekistan an estimated \$1.7 billion, a staggering 8 percent of GDP

 ¹⁰ "Old Farming Habits Leave Uzbekistan a Legacy of Salt" by Sabrina Tavernise, June 15, 2008.
 ¹¹ "The Aral Sea Crisis" http://www.columbia.edu/~tmt2120/environmental%20impacts.htm, 2008.

(World Bank 2014). For all these reasons, improved water use in the Uzbek cotton industry is of great importance.

5. Cotton Pricing

Cotton growers in Uzbekistan are paid a procurement price set 10 days before the beginning of each harvesting season. The Ministry of Finance, Selkhozfond and Khlopkoprom, the State ginning association that supervises procurement and processing of cotton, together establish the State Procurement Price (SPP). The SPP is in principle based on global market prices net of costs incurred by the government including ginning, transportation, marketing, and electricity (Bendini 2013).

Assessment of the SPP is complicated by Uzbekistan's exchange rate policy. The Central Bank of Uzbekistan imposes exchange controls and sets the official exchange rate for the soum against foreign currencies. The official rate has often been overvalued relative to the black market exchange rate by a margin that has fluctuated considerably over time (Rosenberg and Zeeuw 2000). The monetary regime with an overvalued exchange rate and a lack of hard currency has prompted the development of a "black market" or "curb market". Curb market rates are undervalued with respect to the official rate, and may fluctuate from one day to the next. These rates are determined by the excess demand left unsatisfied in the official market.

The overvalued official exchange rate imposes a quasi-fiscal tax on cotton exports insofar as farmers would receive a higher soum price for exports if the currency were to depreciate to its equilibrium level. The gap between the official and black market exchange rate generates a profit for the government since it gains possession of foreign exchange earnings from cotton sales, although the ultimate beneficiaries depend on the disposal of the foreign currency.

Figure 4 shows the world price of cotton in US dollars and the SPP converted to dollars alternatively at the official and black market ("curb") exchange rates, over 1994-2014. SPPs are much less volatile than world prices, cushioning farmers from the volatility of world market prices noted in section 2. However, procurement prices are set well below global prices lowering farmer incomes. For the reasons indicated above, the

gap between the SPP and the world price is generally greater when the black market exchange rate is used. Figure 5 shows SPPs as a ratio to world prices and also compares to the producer price in the United States, following McDonald (2012). While the US producer price averaged about 83 percent of the world price over 1994-2014, the Uzbek prices were much lower, averaging about 51 percent evaluated at the official rate and 36 percent at the black market rate, with considerable variations over time due to the previously noted fact that SPPs are much less variable than world prices. In 2014/15, US producers will be paid 83 percent of the world price. Uzbek farmers will be paid 89 percent of the world price at the official exchange rate, but only 62 percent at the curb rate.



Figure 4: State Procurement Prices and World Prices 1994/95 to 2014/15, in \$/kg

Source: SP prices compiled from USDA GAIN Tashkent Attache reports; Exchange rates from CBU (official) and Uztronom.com (curb); World Prices from Cotlook Ltd. A index via Index Mundi



Figure 5: Uzbek and U.S. cotton producer prices as a ratio of world prices, 1994/95 - 2014/15

Direct and indirect government subsidies are a further important dimension of net pricing and the distribution of revenues. The government provides direct subsidies to farmers and also covers a wide range of ancillary costs that can be considered implicit subsidies. The costs of the services provided by the government may be inflated by inefficiency and monopoly pricing, however, and thus overestimate implicit subsidies. Thus subsidies are difficult to identify conceptually let alone measure precisely. World Bank 2014 estimates total direct subsidies at about \$400 million. Muradov and Ilkhamov (2014) attempt a detailed decomposition of costs and revenues to cotton producers in 2012, summarized in Table 1. These revenues and expenditures are evaluated alternatively at the official and black market exchange rates. According to Muradov and Ilkhamov (2014), subsidies to farmers cultivating low-yield land, and government expenditures on maintenance and operation of the irrigation system, land amelioration, services provided by ginners and trading companies together cost the government a total of \$855 million at the official exchange rate and \$694 million at the black market

Sources: SP prices from USDA GAIN Tashkent Attache reports; Exchange rates from CBU (official) and Uztronom.com (curb); World Prices from Cotlook Ltd. A index via Index Mundi; U.S. Farm prices from USDA NAAS US FARM DATA.

exchange rate. On the other hand the government also obtains tax revenues from direct taxes on farmers and VAT. Table 1 also shows the estimated total payments to farmers based on the SPP and what these payments would have been at world prices. Payments to farmers, subsidies and tax receipts are all transacted in soums. When converted to US dollars, the soum values are all higher at the black market exchange rate than the official exchange rate. Taking all these together, Muradov and Ilkhamov (2014) estimate that the government made a profit of \$264 million at the official exchange rate, which more than doubles to \$641 million at the black market exchange rate, implying total implicit net taxation rates of between 15 and 40 percent.

The policies also lack transparency. Selkhozfond oversees the collection and use of revenues from cotton sales. Profits from implicit taxation and revenues from differences in exchange rates are not incorporated in the state budget and very little information about financial flows in the cotton sector is made public (Rosenberg and Zeeuw 2000).

Evaluated at Official and Black Market Exchange Rates in 2012 (US\$ million)			
	Evaluated at Official Exchange Rate	Evaluated at Black Market Exchange Rate	
Value of Cotton at World Prices	1,818	1,818	
Gross Payments to Farmers at State Procurement Price	1,144	818	
Government Costs and Subsidies	855	694	
Taxes Collected by Government	446	335	
Net Government Profit	264	641	

 Table 1

 Effects of Cotton Pricing, Taxes and Subsidies on Net Incomes,

Source: Adapted from Muradov and Ilkhamov (2014)

Figure 6 provides an analytical framework for understanding the effects of pricing, subsidy and exchange rate policies on quantity supplied and farmer surplus¹². Let E^* denote the official exchange rate and E be the black market exchange rate, assumed to be the free market rate. P_W denotes the world price for cotton at a given point in time, and P_{SPP} denotes the State Procurement Price for the same time period. If Uzbek farmers faced a free market for selling cotton, one where they face the world price and the black market exchange rate and receive no subsidies, they would sell quantity Q1. However, when farmers are paid P_{SPP}, they only produce Q2. The government incentivizes greater production by giving per unit subsidies s, so that farmers produce Q3.

The welfare effects are:

ACDE: Farmers' loss from selling below world price ABFG: profit of the Government due to currency overvaluation CDFG: profit of the Government due to SPP below world price BDE: Deadweight Loss





¹² For simplicity Figure 6 ignores domestic consumption of cotton. This makes no difference if there are no price differentials between export and domestic sales prices. If domestic consumption is subsidized there is an additional distortion due to overuse of cotton for domestic processing.

Figure 6 depicts a large disparity between world cotton prices and procurement prices that yields large revenues for the Uzbek government and generates a deadweight loss given that farmers are producing less than the free market level.

6. Production Trends

Uzbekistan is the sixth largest producer of cotton in the world, after India, China, the United States, Brazil and Pakistan. Uzbek farmers are projected to produce 3.4 million tons of seed cotton, 3.3 percent of global production.

Cotton production in Uzbekistan has been declining since the country's independence from the Soviet Union in absolute terms as well as a share of world output; in 1991/92, Uzbekistan produced over 7 percent of total world cotton supply (Figure 7).



Figure 7: Uzbekistan cotton production in volume and share of world production, 1991/92-2014/15

Source: Authors' calculations based on USDA, Foreign Agricultural Service, Production, Supply and Distribution Online data, 2015.

Various factors have contributed to the decline in cotton output. First, cotton

production in Uzbekistan has decreased due to substitution of acreage from cotton to wheat and fruits and vegetables. The country devoted 1,285,000 hectares of land to cotton in MY 2014/15, a 23 percent decrease in area harvested since 1991/92 (Figure 8). In many cases wheat and cotton can be grown on the same land so area devoted to wheat has increased more than land for cotton has declined. Uzbekistan is pursuing food self-sufficiency and diversification of its crops, and so the government has been allocating land historically used for cotton growth to wheat and other food crops. Food crops are also generally less energy and water intensive than cotton, measured as liters per kg produced¹³. Second, land use, pricing, taxation and other policies undermine incentives to farmers, as described previously, resulting in lower productivity. Third, declining soil fertility, as discussed in section 4, also lowers yields. Yields are discussed in more detail in the next section. In addition, Uzbekistan's share of world cotton production has declined as some other countries, particularly Brazil, India and China have increased their cotton production sharply (Figure 9).



Figure 8: Area Harvested for Cotton and Wheat, MY1991/92-2014/15

Source: USDA, Foreign Agricultural Service, Production, Supply and Distribution Online data, 2015.

¹³ http://www.waterfootprint.org/Reports/Zygmunt_2007.pdf.



Figure 9: Cotton production, selected major producing countries, 1991/92-2014/15

Source: USDA, Foreign Agricultural Service, Production, Supply and Distribution Online data, 2015.

7. Comparative Productivity Performance

Uzbekistan's yield in 2014/15 is estimated at 678kg/ha. This compares unfavorably both to yields in Uzbekistan twenty years ago and those in some other major producers now. Average yield for the largest producers is projected at 1081kg/ha in 2014/15 and yield in Uzbekistan was 841kg/ha in 1991/92. Figure 10 compares the evolution of cotton yields in Uzbekistan to those of other major producing countries and regions. At the beginning of the period, Uzbekistan's yields were equal to the best in the world but are now far below those of China and Brazil. While Uzbek yields are still above those in Africa and India, the gap has narrowed considerably. Other Central Asian countries' yields have also declined since independence and remain below Uzbekistan's but they have recovered slightly since the mid-1990s whereas Uzbek yields have continued to trend down.



Figure 10: Uzbekistan's cotton yield in comparison to other major producers, 1989/90-2014/15

Source: USDA, Foreign Agricultural Service, Production, Supply and Distribution Online data, 2015.

Some of the forces lowering yields were discussed in previous sections. The rigid quota system and State procurement pricing policy do not incentivize increases in productivity. Due to the deterioration of farm machinery and lack of new investment, farms have low rates of mechanization, so seeding and harvesting are done manually. Additionally, credit is dependent on the government and farmers are often indebted, inhibiting investment in machinery and new technologies. The government undertook a modernization program for the ginneries in 2007, resulting in upgrading of 45 gins and closure of 25 antiquated gins as of end 2012 (USDA GAIN report 1/4/2013) but Uzbekistan still has a low ginning outturn. The ginning outturn ratio¹⁴ is 32 percent in Uzbekistan, below the global norm of 39 percent in other cotton producing countries (USDA 2014). In MY 2014/15, the ginning outturn lag will yield a loss of about 240,000 tons, or US\$ 370 million at world prices.

¹⁴ The ginning outturn ratio is the proportion of lint in cottonseed.

Wheat is also a centralized crop, but the quota system for wheat is more flexible than for cotton. Farmers are only obligated to sell 50 percent of their wheat harvest to the central government at procurement prices – the rest can be consumed or sold in the free market. Farmers then have an incentive to pursue higher yields, so as to increase the amount of wheat they can sell at world prices (Abdullaev et al 2009). Cotton farmers do not have this privilege, and must go through the black market in order to sell cotton at world prices. As Figure 11 shows, wheat yields have risen while cotton yields have declined, strongly suggesting that the rigid system of cotton quotas and lack of incentives are a critical factor holding back cotton yields since wheat and cotton otherwise face similar constraints.



Figure 11: Yield for Cotton and Wheat, and % Changes in Yield, MY 1991/92-2014/15

Source: Authors' calculations based on USDA, Foreign Agricultural Service, Production, Supply and Distribution Online data, 2015.

The excellent performance of cotton yields in India, Brazil and China also reinforces the importance of liberalization and market incentives to foster innovation and efficiency. China's experience is particularly noteworthy insofar as it is a former centrally planned economy with climatic and soil conditions quite similar to Uzbekistan. China has experienced large productivity increases in cotton growing, due to dissemination of new technologies. A productivity-increasing practice is plastic mulching, which counteracts low temperatures and high soil salinity in some parts of the country. Rows are covered with polyethylene film, which increases soil temperature and hampers the evaporation of water, thus controlling the levels of salt in the soil (Dai and Dong 2013). China has also used double cropping cotton with wheat more effectively than Uzbekistan, most likely largely because Chinese farmers have greater flexibility in implementing it.

Rising productivity of cotton production in China has occurred in a context of farreaching liberalization of agriculture, higher prices to producers, and investments in infrastructure in the post-Maoist period (Guadagni et al 2005). China adopted the following measures:

- Allowing farmers freedom to determine land use and which crops to grow;
- Liberalized entry into ginning, while maintaining some state-owned ginneries;
- Low and transparent taxation;
- Water fees that are high enough to encourage efficient use;
- Payment to farmers in cash and when crops are delivered;
- Increase in the provision of training and extension services to assist farmers with technological upgrading;
- Increase investment in infrastructure;
- Investments in ginning plants which have raised outturn to 39 percent, comparable to the highest levels anywhere and well above Uzbekistan's.

India and Brazil have also made substantial progress through a combination of liberalization, assistance to farmers, and investment in infrastructure. In 2002, India introduced Bt cottonseeds.¹⁵ This genetically modified variety produces much higher yields than organic varieties, and reduced the need for insecticides. Higher yields meant increased production, and therefore higher revenues. An increase in revenues has enabled

¹⁵ Bt cotton is a genetically modified variety produced by Monsanto. It produces an insecticide.

Indian farmers to invest in farm equipment, further increasing their productivity.¹⁶ From MY 1991/92 to 2014/15, average yield in India almost doubled, going from 264kg/ha to 523kg/ha. Brazil has a similar story: farmers have invested in new technologies, new crop varieties, mechanization, soil improvements and biotechnology to increase yields and enhance productivity. The Brazilian government provides subsidized credit and price support to farmers while otherwise largely refraining from intervention (Kiawu et al. 2011). These investments more than tripled average yield in Brazil from 339kg/ha to 1524kg/ha, passing China and reaching Israeli levels.

There are some recent areas of progress in boosting cotton yields in Uzbekistan. Improved drainage funded by the World Bank has led to rising yields in South Karakalpakstan, as discussed in section 4. Uzbek cotton breeders have been developing new varieties of cottonseeds, with potentially higher yields than organic varieties. Recently, breeders have focused on varieties that can withstand stress factors and survive harsher conditions (USDA 2014). Also, Khlopkoprom has been upgrading ginning plants and plans to purchase 200 new linters to replace some of the old ones, which should improve ginning efficiency. Without improving incentives, however, these initiatives are unlikely to suffice to reverse the long-term decline in yields.

8. Exports of Cotton Lint

Uzprommashimpeks, Uzmarkazimpeks and Uzinterimpeks are the three state trading companies in control of all exports. The Ministry of Foreign Economic Relations' Department on Investments and Trade allocates market shares to each company. Uzbek cotton is sold at the world price in foreign currency (Guadagni et al. 2005, Responsible Sourcing Network 2012, USDA 2015).

The three trading companies negotiate with foreign buyers the amount and type of lint, shipping and delivery terms. Foreign buyers pay in US dollars or euros, and convert the payments into soums at the Central Bank. It is unclear which exchange rate is used in the conversions. It seems likely that State-owned companies abide by the official exchange rates. Transaction costs are based on the amount of cotton sold, the SPP and the

¹⁶ http://articles.economictimes.indiatimes.com/2013-01-30/news/36636091_1_bt-cotton-btvariety-cotton-yields, accessed 03/10/2015.

international world price. Once the payment is completed, hard currency is transferred to *Selkhozfond*. Sales of cotton lint in the international market bring hard currency to the government, which then is able to pay farmers and service providers in hard currency as well. The State first pays suppliers and creditors, and fulfills tax payments. Finally, farmers are paid (Muradov and Ilkhamov 2014).

What is not exported is allocated to the Uzbek Commodity Exchange, the body in charge of domestic sales of lint. The Ministry of Foreign Economic Relations also manages allocations to the Commodity Exchange. Textile production is discussed in section 9. At times, Uzbekistan trading companies have held out for higher world prices and been unable to sell all their cotton, leading to accumulation of large inventories.

Uzbekistan is the fifth largest exporter of cotton fiber in MY 2014/15, after the United States, India, Australia and Brazil. Uzbekistan exports are estimated at about 10.6 million tons of cotton, approximately 56.2 percent of total production and 42.9 percent of distribution (production plus initial stocks). Uzbekistan mainly exports non-carded and non-combed cotton fiber of higher grades, strict and good middling. Higher-grade fibers sell for a higher price in the global market.¹⁷ Uzbek cotton has low trash levels, and is of natural white color and high strength. Importers of Uzbek cotton use it in the production of knits, twills, toweling, denim, corduroy and other fabrics (Responsible Sourcing Network 2012).

Most of the Uzbek cotton fiber is exported to Asian countries, with Bangladesh, China, Iran, Turkey and Russia being some of the major importers. Major European buyers are Italy and Germany (Figure 12). Uzbekistan faces logistical challenges when exporting because it is a double landlocked country, raising transport costs. Uzbek cotton fiber must be transported overland until the ports. Cotton reaches Latvia and Ukraine from Kazakhstan, Russia and Ukraine; Georgian Black Sea ports and Turkish ports via the Western Trans-Caucasian Corridor, which runs through Turkmenistan; Iran by the Tejen-Serahs-Meshkhed railway line through Turkmenistan; and China and other Asian markets from Port Druzhba in Kazakhstan, the Dubai Cotton Center, and Bandar Abbas in Iran.

¹⁷ Cotton code 5201. Grade is based on color of the fiber, appearance and trash content (Responsible Sourcing Network 2012).

Bangladesh is Uzbekistan's main buyer. One of the world's main exporters of textiles, the country almost entirely depends on imports of cotton lint. In 2014, Bangladesh purchased 175,000 metric tons of fiber from Uzbekistan, 16 percent of its imports and almost 40 percent of Uzbekistan's cotton exports. Imports in MY 2014/15 were expected to increase 7.6 percent (USDA Gain Report 2014). Uzbekistan's share of the Bangladesh market has been decreasing over the years, mainly reflecting its lower production. 2014 was atypical in that Uzbekistan's share of Bangladesh' imports rose by 7 percentage points. Bangladeshi mills purchase Uzbek cotton because of the higher quality of the fiber, short delivery period and availability due to trade agreements (Responsible Sourcing Network 2012).

China is a major producer of cotton but an even bigger producer of textiles, and imports fiber to complement its domestic production. About 5 percent of its cotton imports came from Uzbekistan in MY 2013/14, which constituted approximately 27 percent of total Uzbek exports for this period (USDA Gain Report 2014). Recently, the Chinese government reassessed its cotton pricing policy in order to reduce costs. Farmers in China are therefore expected to decrease production and substitute cotton for other more profitable crops. Meanwhile, the government plans to release its large existing stocks into the market. USDA estimated demand for imported cotton to fall by 1.8 million tons in MY 2014/15 from the previous year. However, import demand for cotton yarn has increased. Imports of cotton yarn cause demand for raw cotton to fall, a scenario that could benefit Uzbek mills and hurt farmers.

Iran is Uzbekistan's third largest importer. Iran exports capital goods and petrochemical and electrical goods to Uzbekistan. The latter then exports grains and cotton to the former. Trade between the two countries added up to US\$ 250 million in 2014¹⁸. In MY 2014/15, Iran is expected to purchase approximately 5 percent of Uzbekistan's total cotton exports.

The fourth largest importer of Uzbek cotton is Turkey. In 2014, the country imported 8,135 tons of fiber, approximately 2 percent of Uzbekistan's total exports, but less than 1 percent of Turkey's imports. Domestic production had been in decline until

¹⁸ http://www.tehrantimes.com/economy-and-business/121856-iran-uzbekistan-trade-hits-250m-in-2014

2014, when Turkey saw an increase in cotton production. Imports grew because of the domestic textile industry's growing demand for fiber. However, Uzbek supply to the Turkish market has decreased. Many Turkish companies are investors in textile joint-ventures with Uzbek companies and the Uzbek government.

Finally, Russia has imported Uzbek cotton since the latter's independence from the Soviet Union. Russia also imports cotton from other Central Asian countries. Russian demand for Uzbek cotton has decreased in the past three years, and Uzbekistan's share of the Russian market has decreased by 40 percent since CY 2012.



Figure 12: Major importers of Uzbek cotton fiber, CY 2014

Source: USDA GAIN Report, 11/28/2014.

9. Uzbekistan's Textile and Clothing Sectors

In recent years, the Uzbek government has sought to promote the domestic textile industry. The share of cotton production and stocks destined to internal processing has been increasing since 2005, reaching a projected 37.5 percent of production in MY 2014/15 (Figure 13). Manufacturers are mostly joint-ventures between the State and foreign investors, with the Uzbek government as the main shareholder (Bendini 2013). Domestic mills purchase lower quality fibers and manufacture cotton yarn, "greige" fabrics and children's clothing (Responsible Sourcing Network 2012).



Figure 13: Uzbek total exports, domestic consumption and production of cotton, 1991-2014

Source: USDA, Foreign Agricultural Service, Production, Supply and Distribution Online data, 2015.

The Global Textile and Clothing Value Chain

The textile and clothing industries have become increasingly globalized in recent decades with developing countries playing ever-greater roles (Morris and Barnes 2008, Gereffi and Frederick 2010).

The main steps in the cotton textile value chain are

1) Cultivation of seed cotton

- 2) Ginning--the separation of cotton lint from cotton seed
- 3) Processing of cotton seed into oil, soap, animal feed and other products
- 4) Spinning-production of yarn from cotton lint
- 5) Weaving and knitting—production of fabric from yarn

6) Cutting and assembly—production of clothing from fabric.

Due to advances in transport and communication costs, these steps in the value chain are increasingly fragmented with various stages of the production process located

in different countries and evolving in response to the changing patterns of labor costs and technological development in participating countries. The location of cotton cultivation is based on climatic and soil condition. Ginning, which separates cotton lint and seeds, is a low value added activity that almost always occurs within the growing country. Cottonseed oil production also tends to remain in cotton-producing countries. Uzbek oil producers processed 230,000 metric tons of oil in 2014, exceeding domestic demand of approximately 210,000 metric tons¹⁹. In the Khorezm region cottonseed oil production accounted for about 10 percent of the value added of the cotton sector but only about 1 percent of exports in 2005. Cottonseed oil is the main vegetable oil consumed by the Uzbek population (Rudenko 2008).

The other steps in the value chain, however, are often dispersed, as many of the countries producing textiles and clothing do not have climates suitable for cotton cultivation and import most or all the raw material. The most sophisticated activities, involving design and marketing, mostly take place in developed countries and the most unskilled processes, particularly clothing cutting and assembly, are overwhelmingly outsourced to very poor countries with low labor costs. Clothing assembly is much more labor-intensive than yarn and cloth production, such that very poor countries often import textiles and export clothing. It may make sense for some low-income countries to produce and export cotton, import textiles and export clothing.

East Asian and to a lesser extent other developing countries sequentially jumpstarted their industrial development with low-tech industries such as clothing, and then graduated to higher technology sectors as their labor costs and technological sophistication grew. Export oriented clothing industries developed in Japan in the 1950s, moved to Korea and Taiwan in the 1960s and 1970s, South East Asia in the 1980s, China in the 1990s, and most recently have gravitated towards other low-income Asian countries such as Vietnam, Bangladesh and Cambodia.²⁰ For the most part, these

¹⁹ http://www.indexmundi.com/agriculture/?country=uz&commodity=cottonseed-oil&graph=total-distribution.

²⁰ Between 1974 and 2005 the global system of import quotas under the Multi-Fiber Agreement (MFA) played an important part in diversifying sourcing patterns as some Asian countries, notably China, faced binding quotas. The end of the MFA in 2005 allowed China to expand its

countries have developed textile and clothing industries largely or entirely using imported fibers, including cotton.

The textile and especially clothing industries are highly differentiated with varying degrees of quality and sophistication in design and marketing and in the resulting quality and price of garments (Gereffi and Frederick 2010). As countries develop greater know-how and skills they can evolve from CMT (cut, make trim), i.e., simple assembly based on buyer specifications to OEM (original equipment manufacturing) involving a greater role of local manufacturers in organizing production to ODM (original design manufacturing) where the local firms are responsible for product design as well as production, and finally OBM (original brand manufacturing) where the producing country develops its own brand.

Global buyers, including large retailers such as Wal-Mart and branded marketers such as Nike do not invest directly but rather contract with major clothing distributors who in turn subcontract with producers around the world in an ongoing effort to lower costs, reduce shipment time, and upgrade quality. Countries gain from participating in these global value chains through employment creation and technological upgrading. To participate, however, countries must be competitive in terms of labor costs and trade logistics—transportation infrastructure and customs services.

Given that Uzbekistan is land-locked, the costs of fragmentation of production are greater. Nevertheless, Uzbekistan must be attentive to its competitiveness in different parts of the value chain and not necessarily pursue all of them simultaneously.

Organization of Uzbekistan's Textile and Clothing Industries

See Figure 3 above for an overview of the Uzbekistan's cotton value chain. As described in preceding sections, the State exerts near complete control over the production of raw cotton and ginning. The government plays a less dominant but still important role in the textile and clothing components of the value chain. Uzbekistan's value chain is increasingly global with foreign investment from quite diversified sources.

market share further. Nevertheless, the end of the MFA has not precluded new entrants to the global apparel trade spurred by China's rising labor costs.

Exports of textiles are predominantly regional, however, with Russia the largest destination and Turkey also an important market.

The Uzbek state agency O'zbekengilsanoat oversees the textile and clothing industries and engages in joint ventures with foreign and domestic private investors. In 2014 there were 280 textile manufacturers in Uzbekistan, up from 240 in 2011 (email from USDA specialist 2/23/2015, USDA GAIN Report 3/29/2011). About half of these are fully owned by foreign investors or joint ventures (Responsible Sourcing Network 2012).

Foreign investment has increased considerably. Korea is by far the largest foreign investor, accounting for 38 percent of FDI in the textile industry, followed by Turkey at 10 percent, and the United States, Switzerland, Germany, the United Kingdom, India and Russia at around 6 percent each (Revetria et al 2012). Total foreign investment is estimated at \$1.2 billion as of 2014, up about 20 percent since 2010. (USDA GAIN report 8/27/2014). Major international companies such as Korea's conglomerate Daewoo have substantial and growing investments in Uzbekistan's textile sector. Recently, Indorama Industries from Singapore has invested both in the textile industry and in a factory producing textile machinery.²¹

Table 2 shows the input structure of the textile sector in the Khorezm region, separating into yarn, cloth and thread. In all cases, cotton or cotton products are by far the largest component of the gross price at each stage of textile production. Not surprisingly, labor costs are most important in the clothing subsector.

Table 3 presents a summary SWOT (Strengths, Weaknesses, Opportunities, Threats) of the textile-clothing industries in Uzbekistan. As a location for textile production, Uzbekistan has a mix of strengths and weaknesses relative to other countries (Eurasia 2011, UNDP 2010). Of course, having a domestic supply of high-quality cotton is an important potential advantage, but availability of raw material does not guarantee

²¹ Embassy of Uzbekistan in Austria, June 16, 2014.

http://www.usbekistan.at/index.php?option=com_content&view=article&id=468:prospects-of-attracting-foreign-investments-to-the-textile-industry-of-uzbekistan&catid=33:all-categories&Itemid=81

competitiveness in processing. In addition, the government has tended to prioritize exports of raw cotton until recently.

	Yarn	Cloth	Clothing
Cotton or cotton product	61.3	55.4	48.7
Other materials	0.9	0.1	1.8
Energy	2.7	2.9	3.8
Labor	4.6	5.2	7.2
Overhead and administration	8.4	3.0	4.5
Depreciation	1.5	3.9	10.4
Taxes	14.0	20.2	16.7
Profit margin	6.5	9.4	7.0
Total producer price	100.0	100.0	100.0

Table 2: Input Structure of the Textile Industry in Khorezm Region, UzbekistanShare of Item in Producer Price (%), 2005

Source: Adapted from Rudenko (2008).

Table 3.	SWOT	Representation	of Uzbekistan's	Textile Sector
Table 5.	SWUI	Representation	OI UZUEKIStall S	I EXILLE SECIOI

Strengths	Weaknesses
Availability of high quality cotton	Double land-locked location
Low labor cost	Poor trade facilitation
Low energy costs	High Cost of doing business
Good transport infrastructure	Lack of transparency in provision of incentives
Proximity to Russian and Asian Markets	High import taxes on components and accessories
Assistance from donors in boosting mechanization	Limited access to long term financing
Opportunities	Threats
Rising labor costs in China and other producing nations	Declining cotton yields
Scope for employment creation	Environmental sustainability
Scope for technological upgrading	Boycotts due to concerns about labor rights
Incentive to improve the business climate	Asian competitors with low costs, e.g, Bangladesh, Vietnam

Labor and energy costs are very low. Transportation and electric power infrastructure is generally very good. There are several specialized vocational education

institutions, notably the Tashkent Institute of Textile and Light Industry. Retraining programs are well developed with some workers going to Korea, Germany, Italy, Turkey and Japan to upgrade their skills (Embassy of Uzbekistan 2013). Corporate income taxes have been drastically reduced from 45 percent to 9 percent since the early 2000s (Responsible Sourcing 2012). Although landlocked, the country is well situated to supply Russia and other Central Asian markets, and to a lesser extent South and East Asia, enabling participation in Regional Value Chains (RVC).

On the other hand, Uzbekistan's clothing industry is handicapped by a lack of local production of accessories, lubricants and spare parts. These inputs and accessories have at times been subject to high import duties, reducing competitiveness of clothing. At present, inputs that are not produced locally are exempt from import duties, but only through 2015 (USDA GAIN report 3/27/2014). Interest rates are subsidized but long-term credit is difficult to obtain. Trade procedures can be very cumbersome for both imports of inputs and exports of final products. Uzbekistan ranks in last place out of 189 countries in the World Bank *Doing Business* (DB) indicator in the category of ease of "Trading Across Borders" and 146th in the overall DB indicator, worse even than its poorly performing neighbors in Central Asia (Pomfret 2014).

Textile production is subject to a variety of measures, some of which promote domestic processing of cotton while others are inhibiting. Textile producers obtain cotton at close to world prices and must pay in hard currency. They can in principle purchase cotton from state trading companies at a 15 percent discount relative to the world price but in practice this is not very advantageous, given that the world price is quoted in CIF (cost, insurance, freight) terms in destination markets. Moreover, state trading companies have prioritized exports of raw cotton, and often provide lower quality cotton to domestic processors. Domestic processors complain that they have difficulty obtaining appropriate varieties of cotton. A detailed study of the Khorezm region found that textile firms were operating at low capacity in 2005 due primarily to the unavailability of raw cotton (Rudenko 2008).

Foreign investors benefit from a variety of tax exemptions but are subject to the value added tax. The nature of the tax breaks and other investment incentives is highly discretionary and non-transparent, creating uncertainty and distortions (Eurasia 2011).

Exporters of textile products can claim VAT refunds on cotton purchases (UNDP 2010). Also companies exporting more than 80 percent of their production are exempt from property taxes. Imports of capital equipment are not subject to import duties but accessories are.

Even when selling in the domestic market, Uzbekistan textile firms often invoice in foreign currency at world prices. In addition, local processors are subject to a variety of other fees amounting to a few percent of the cotton price. According to Eurasia (2011), the overall tax rates are much higher in Uzbekistan than in other Central Asian countries. Uzbekistan is considering further incentives to boost foreign investment (Revetria et al 2014).

The global textile market is highly competitive with Asian countries, notably China and Bangladesh having huge competitive advantages due to low-cost labor and experience in the sector. Much of the clothing sold in Uzbekistan is imported from China and Turkey (Rudenko 2008). In China, however, labor costs have risen sharply in recent years, opening the door to other countries, including Uzbekistan.

Textile and Clothing Production and Exports

Data on production and trade of textile products in Uzbekistan is very difficult to obtain and the available sources provide conflicting figures.²² Available national data indicate, however, that textile and clothing manufacturing has trended upwards over the last 25 years. As noted above, the share of cotton used for domestic consumption rather than exports has increased considerably, from about 10 percent in the early 1990s to close to 40 percent in 2014. Given the decline in total cotton harvested, the increase in the absolute volume of domestic processing of cotton has not increased as much as the ratio to total production, but has still doubled since the early 1990s.

Uzbekistan's textile industry consists mostly of spinning of yarn, the lowest value-added item in the cotton textile value chain aside from ginning. Uzbekistan also produces some cloth and clothing. In 2014, Uzbekistan produced 450,000 tons of yarn,

²² According to UNDP (2010), data from the State Statistics Committee differs markedly from those of O'zbekengilsanoat.

up from 373,000 in 2010, and O'zbekengilsanoat projects a further increase to 560,000 by 2020 (USDA GAIN reports). Half of this yarn is exported (UNDP 2010). Uzbekistan also produces cloth, both woven and knitted, primarily the latter as it requires a lower level of capital investment. Over 2004-2009, production of woven fabrics declined sharply in favor of knitted linen production.

From 2004 to 2009, clothing production doubled and textile production rose 50 percent (UNDP 2010). Production has continued to rise, with output in 2014 increasing by 23 percent (email from USDA specialist 2/23/2015). In 2013, textile production rose to 2.7 percent of GDP and 26 percent of industrial output (USDA GAIN Report 11/28/2014).

Exports of textiles and clothing have also increased sharply in recent years. Figure 14 shows the increasing share of textiles in Uzbekistan's exports of cotton and cotton products. Yarn is still the largest textile export item, averaging about \$400 million in recent years, but clothing exports have grown sharply since 2010, reaching over \$200 million in 2013. In 2013, revenues from exports of textile products (yarn, fabric, and apparel combined) for the first time nearly equaled income from raw cotton exports, according to data from Comtrade. Textile exports, particularly clothing, increased further in 2014 according to USDA Gain Reports. Exports of textiles and clothing mostly go to Russia and other members of the former Soviet Union (Figure 15). Russia is a particularly dominant destination for Uzbekistan's clothing exports.



Figure 14, Uzbekistan Exports of Cotton and Cotton Textile Products (USD Million)

Source: Authors' calculations based on UN Comtrade data



Figure 15: Destinations of Uzbekistan's Textile Exports, 2014

Source: USDA GAIN Report, 11/28/2014.

10. Conclusions and Recommendations

Uzbekistan has a long history and demonstrated comparative advantage in cotton production. Two decades ago, Uzbekistan was the world's largest exporter of cotton. Since then, the country's production and exports have steadily declined but cotton remains a major source of income, tax revenue, foreign exchange earnings and employment. Some of the decline in cotton production is beneficial, as Uzbekistan diversifies its agriculture, produces more of its own food and discovers new areas of comparative advantage such as horticulture. There is much that can be done, however, to boost domestic cotton productivity.

The cotton sector in Uzbekistan maintains many features of the state-dominated structure under Communism. Cotton, along with wheat, is designated as one of the two "centralized" agricultural products in which the state retains overwhelming control. Government intervention in cotton is very intrusive, with the state not only setting prices and production quotas at the individual farm level, but even designating a large portion of lands as exclusively restricted to cotton production. Failure of farmers to attain designated government quotas or growing of other crops can lead to termination of land rights or even criminal prosecution. In addition, the government owns or manages all ancillary upstream and downstream activities including input supply, credit, transport, storage and marketing. State procurement prices are more stable than world prices but generally are very low. Assessment of pricing and the profitability of cotton farming is complicated by widespread state direct provision of inputs and services as well as subsidies and sporadic debt relief.

At the same time, some of the institutions that supported this highly concentrated system during the Soviet Union era have been dismantled. In particular, large collective farms have given way to smaller group and family farms and the economic crisis led to reduced state support for irrigation infrastructure and mechanized equipment.

The system has some strengths in terms of coordination of input supply and stabilizing producer prices. Overall, however, in many respects Uzbekistan has the worst of both worlds: lack of freedom and incentives for individual farmers to improve productivity accompanied by declining provision of public goods by the government. Both of these factors contribute to declining yields.

While cotton yields have deteriorated in Uzbekistan, they have risen in other developing country producers, including China, Brazil and India. The experiences of these countries have important lessons for Uzbekistan. China in particular has climatic and soil conditions similar to Uzbekistan and also emerged from Communism. The Chinese government has substantially liberalized agriculture since the early 1980s while supporting infrastructure and assisting farmers. As a result of this more favorable environment and farmers' incentives to boost productivity, Chinese farms have invested in technologies and adopted practices that have fostered sharply rising yields. Likewise, Brazil's cotton producers have benefited from liberalization and boosted both land area devoted to cotton and productivity. The heavy-handed control of the Uzbekistan government over its cotton industry and the reliance on coercion rather than incentives are the main reasons for the unfavorable performance of Uzbekistan. This is also illustrated by the divergent performance of wheat and cotton yields in Uzbekistan. Although wheat is also subject to extensive government control, wheat farmers have substantially more flexibility than cotton farmers, and wheat yields have consequently trended upwards while cotton yields have fallen.

Environmental and labor rights abuses are further threatening the viability of the Uzbekistan cotton chain. The subordination of environmental sustainability to increasing cotton supply in the Soviet Union has continued since Uzbekistan's independence in 1991. The deterioration of irrigation infrastructure, soil degradation, and depletion and pollution of water supplies further undermine productivity, threatening the cotton sector with a downward spiral of declining productivity and natural devastation. In addition, lack of maintenance and investment in mechanized farm equipment has led to the use of forced labor in cotton production, particularly during the harvest.

Uzbekistan has had considerable success in attracting foreign investment in textile factories and increasing domestic processing of cotton. However, the textile industry is mostly limited to spinning yarn, the lowest rung of the textile value chain, one of the least labor intensive and with the lowest scope for technological upgrading. As for production of cotton lint, creating a globally competitive textile and clothing industry requires a transparent and conducive enabling environment and good reputation as a supplier. Increased international awareness of labor abuses is leading to boycotts of Uzbek cotton and could undermine efforts to expand textile and clothing production for export to Western Europe.

With assistance and financing from the World Bank and other donors, Uzbekistan recently has improved its drainage network and registered significant progress in improving productivity and environmental sustainability. Many additional steps are possible, involving gradual liberalization of the cotton sector accompanied by increased investment in infrastructure and farm equipment.

Specific recommendations

Production and Distribution of Cotton Lint

- **Gradual liberalization.** Almost nowhere else in the world today does the government exercise such total control over production. There is a tradeoff between competition and coordination in organizing cotton value chains so complete liberalization is not necessarily advisable. However, the government could gradually liberalize aspects of the value chain, while retaining oversight and provision of public goods, to introduce competition and scope for private sector initiatives. Over time, based on trial and error, the role of market mechanisms can be expanded.
- Overall policies and strategies: in view of the increasing importance of the cotton sector, Uzbekistan should strive to define long-term visions that link the sector to national development strategies. By ensuring that the role of cotton is incorporated into national development strategies, the country can increase the likelihood of maximizing the potential of the sector in economic transformation of Uzbekistan.
- **Production quotas**. Designation of specific lands for exclusive cotton cultivation and assigning specific production quotas to farmers should be phased out. Farmers should be able to choose which crops they wish to grow and how to grow them. Uzbekistan is well suited for cotton growing, and farmers will continue to grow it if the environment is favorable. As a first step, the government could retain production targets but allow farmers more freedom in their production

techniques. Also, as for wheat, farmers should be allowed to sell any excess over their production quotas to the market.

- Input provision and ginning. Allow private entry into provision of inputs and ginning. This could occur gradually, with government licensing a few private sector providers to compete with the state companies. The private firms could include foreign companies with experience in other developing countries. This requires regulations and enforcement to ensure that contracts are respected. Privatization of input provision and ginning will contribute to modernization and lower costs.
- Market pricing for water and other inputs. To promote efficient usage and conservation, farmers should have to pay for water. Likewise prices of other inputs such as fertilizer should be at market prices to prevent overuse.
- **Boost productivity**. The government should continue to work with donors to assist farmers in adopting new technologies and equipment. This can include adoption of new cotton varieties suited to Uzbekistan's soil and climate, improving irrigation methods, greater mechanization, crop rotations and double cropping. The government's plan to mechanize cotton production by 2016, with donor assistance, should continue. Uzbekistan should also continue to work with the World Bank and other donors to modernize irrigation and drainage infrastructure, moving from lift to gravity irrigation.
- Linked to the above point, Uzbekistan should use enterprise development to transform productive structures into higher value-added activities that involve more skilled and technology-intensive production, which in turn results in higher incomes that can fuel demand and stimulate new investment. Such capital accumulation in turn enables the development of new activities, employment and further diversification of the economy away from traditional sectors, thereby intensifying the process of structural change.
- Producer prices for cotton and pay farmers in a timely manner. State procurement prices have generally been very low in Uzbekistan. Moreover, cash payments to farmers are delayed until well after they have delivered their crops.

Raising remuneration of farmers and providing more rapid access to cash is the best way to promote cultivation of cotton.

- Eliminate Forced Labor. Increasingly vocal and organized boycotts of Uzbek cotton in reaction to documented child and forced labor abuses could severely damage Uzbekistan's cotton exports and particularly exports of clothing. Consequently the government should redouble its efforts to eradicate longstanding use of child and forced labor for cotton harvesting for the sake of its own citizens' human rights as well as improving the country's reputation as a supplier.
- Update land cadaster. The land cadaster dates from the Soviet period.
- **Improve Transparency**. Expenditures and revenues in the cotton sector are opaque.

Textiles

- An even playing field between exports and domestic processing. Domestic processing should only occur if it is economically viable. UNDP (2010) recommends raising the discount at which cotton is provided to domestic processors. This is questionable. If Uzbekistan can earn higher returns from selling raw cotton there is no reason to subsidize textile production, particularly the more capital-intensive spinning and weaving sectors. It is even possible for Uzbekistan to export raw cotton, import cloth, and export clothing. There should be no special obligations or advantages provided to any particular segments of the market. This should be part of a gradual evolution from a government allocating market shares and quotas to a system based on competition.
- Liberalize imports of components. Imports of accessories and inputs should remain duty free. Trade facilitation procedures should be reviewed so as to lower cost of importing components and accelerating deliveries.
- Access to credit. Banking regulations limiting the supply of long-term credit to domestic firms should be reviewed.
- Export and investment promotion. As the government's agent, O'zbekengilsanoat acts as an investment and export promotion agency. It should

study best practices for export and promotion agencies in other countries in promoting Uzbekistan as an investment destination. The government could maintain some limited tax breaks for foreign investment and exports but the best way to encourage foreign participation is to improve trade facilitation and improve transparency. Eradication of child and forced labor are important to improve the country's reputation.

• **Data**. There is little publicly available data on production and export of textile products. Some standard international databases such as Comtrade have no information on Uzbekistan's trade flows. The government should improve statistical reporting and disseminate accurate and up-to-date data on production and trade.

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