



Assessing the Social Impact of Cotton Harvest Mechanization in Uzbekistan

FINAL REPORT

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Abbreviations

CGP	Cotton Ginnery Plant
FGD	Focus Group Discussion
GDP	Gross Domestic Product
GNI	Gross National Income
GOU	Government Of Uzbekistan
ICAC	International Cotton Advisory Committee
MTP	Machine And Tractor Park
VAC	Village Assembly Of Citizens
WCA	Water Consumer Association

Glossary

<i>ball bonitet</i>	score that reflects biophysical production conditions for cotton
<i>dehkan</i>	small-scale household farm, usually up to 1 ha. The farm may or may not be registered as a legal entity (Uzbek)
<i>hashar</i>	work parties (Uzbek); community work activities done on a voluntary basis
<i>hasharchi</i>	name given to cotton pickers from outside the local area
<i>hokimiyat</i>	territorial public and administrative authority (Uzbek)
<i>hokim</i>	head of <i>hokimiyat</i> (Uzbek)
<i>kolkhoz</i>	collective farm enterprise (Russian composite word)
<i>mahalla</i>	informal self-governance body, neighborhood community (Uzbek)
<i>main crops</i>	state-mandated crops subject to state procurement quota, usually wheat and cotton
<i>mirob</i>	person responsible for distributing irrigation water (Uzbek)
<i>pahta shtab</i>	district cotton-picking committee
<i>private farm</i>	large commercial entities that lease land of 50 ha or more from the state
<i>secondary crops</i>	crops that farmers grow on land that is free from main crops, or the land where they grow wheat (second harvest); not subject to state procurement quotas
<i>shirkat</i>	collective/cooperative farm in post-Soviet Uzbekistan (Uzbek)
<i>tomorka</i>	household plots (Uzbek); also referred to in literature as “kitchen gardens”
<i>vodhoz (rdawr)</i>	Regional Department of Agriculture and Water Resources (Vodhoz—used informally; Russian composite word—Water Management)
<i>Uzbekistani Soum</i>	Currency of Uzbekistan—US\$1 varied between about Soum 2,500 to 3,000 during the 2014 cotton harvest. The approximate average state exchange rate for September–November 2014 was Soum 2,500, while the average market exchange rate for this period was about Soum 3,000.

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Executive Summary

- i. **The Government of Uzbekistan (GoU) has recently adopted a policy to mechanize the cotton harvest as part of its drive to modernize the agricultural sector.** Under Uzbekistan's state-order system it is compulsory for many farmers to grow cotton. They are contractually obligated to produce stipulated quantities that are annually set by the government, and must sell these to the GoU at a price fixed by the government. Almost all cotton in Uzbekistan is harvested by hand, even though mechanization existed during the Soviet period. An estimated 2.2–3 million people were involved in at least some aspect of the cotton harvest during 2014. While cotton harvest mechanization might reduce the need for state-mobilized labor for manual cotton picking, it is unclear what impact it may have on those for whom the cash earned from picking cotton is an important part of their livelihood.
- ii. **This report presents the findings of a social impact assessment on cotton harvest mechanization.** The study aimed to (i) to assess the *ex ante* social impact of the policy to mechanize cotton harvesting on cotton pickers and vulnerable private farmers; and (ii) to identify ways to mitigate the policy's potential negative impacts on these groups and to make these reforms more acceptable to them. The assessment is based on the collection and analysis of qualitative data and two background studies. Data were gathered in four regions that vary in terms of labor scarcity, area of land under cotton, cotton production conditions, and experience with mechanization.
- iii. **Findings suggest that daily earnings from cotton picking are above rural daily wage rates for women only when they pick cotton on high-yielding farms (with more than 2.5 tons of raw cotton per ha), and in particular during the first and second passes.** On these farms and during these early passes, picking productivity is high, as many cotton bolls are open within a given area. Pickers are able to pick 100 kg of raw cotton per day and earn about US\$10 per day.
- iv. **On the lower yielding farms—which are often more remote—it takes more time to pick a particular amount of cotton, and local pickers are less keen to work there.** Farmers in charge of these lands have trouble finding local pickers. In an attempt to attract local pickers, farmers pay 35 to 65 percent more per kg of picked cotton than better-off farmers, but this is not enough to attract harvesting labor. They depend on people brought in by the state from outside the area to harvest their fields. These laborers tend to be civil servants or factory workers; they are reportedly unmotivated and not very productive. The third and fourth passes can be important for farmers to meet the state-mandated cotton production quota, also on the less remote and higher yielding farms.
- v. **Given that harvesting labor is scarcest on the more remote and low-yielding cotton farms, farmers who manage these plots would in principle be in most need of harvest mechanization.** In addition, mechanization on these farms would reduce the need for state-mobilized harvesting labor. However, cotton cultivation on these plots tends to have low or even negative returns, and cotton would not necessarily become an attractive and profitable crop for them even if mechanization reduced their harvesting costs.
- vi. **Cotton picking has several advantages compared to other daily agricultural wage labor.** Pickers are paid in cash and almost immediately after work is completed, usually every two to five days during the season. Farm labor, on the other hand, is typically paid in kind. According to women who participated in the study, the money earned from picking cotton is spent on livestock, school uniforms, books, other school equipment for children, weddings, winter preparations, and dowries.
- vii. **Cotton pickers across all sites believed that cotton harvest mechanization will negatively impact their livelihood.** Respondents were worried that mechanization will negatively affect daily wages for other agricultural work. Female cotton pickers were particularly concerned. Alternative cash-earning opportunities outside the agricultural sector are very limited, especially for women. Young male study respondents (aged 20–25 years old) were more hopeful that mechanization might open up new job opportunities for them.

- viii. **Farmers in all four regions claimed that mechanization will offer important advantages in terms of managing the harvesting process and completing the harvest on time.** They claimed it is easier to manage one machine and one driver than 100 cotton pickers. In areas where labor is scarcest, farmers viewed mechanization most positively. Even if machine harvesting reduces the quantity and quality of cotton harvested, the advantages would still outweigh the costs, farmers in these areas claimed.
- ix. **However, farmers expressed concern over both the quality of harvesting machines on the market and the current lack of knowledge about the new initiatives for cotton harvest mechanization.** Farmers also claimed that not all their plots would be suitable for mechanized cotton harvesting. Farmers in Syrdaryo and Karakalpakstan suggested that cotton ginnery plants (CGPs) be in charge of managing the machines. Respondents suggested that training and seminars about mechanized farming be organized for farmers as well as *hokimiyat* officials, machine and tractor parks (MTPs), and CGPs.
- x. **Cotton pickers in all sites suggested that mechanization will allow schools and local hospitals to remain open during the cotton season.** Government employees (teachers, doctors) and students will no longer need to pick cotton.
- xi. **In Fergana region, participants suggested that the government and banks offer special loans to local entrepreneurs who want to train people in certain skills and then employ them.** Microloans for women to purchase livestock were also seen as an attractive way to cushion the negative social impact of mechanization. Cotton pickers and *mahalla* leaders suggested that existing social assistance programs would not be suitable to compensate vulnerable and other low-income households for the income lost from cotton picking.
- xii. **The study recommendations include a number of short-term measures to mitigate the negative social impacts of cotton harvest mechanization.** We also propose a set of reform measures that would have an impact in the medium term.
- xiii. **Short-term measures include:** (i) establishing a public works program that can provide alternative income-earning opportunities for rural women; and (ii) improving the accessibility of labor market management information systems—which provide information on labor demand, shortages, surpluses, fees, and wage rates across regions—and strengthening public employment centers.
- xiv. **Medium-term reform measures include:** (i) liberalizing crop choice and allowing farmers who currently grow cotton in less suitable areas to switch to more remunerative farm activities¹; (ii) adopting measures to further support farmers engaged in high value activities (such as horticultural or livestock production) that can create alternative income-earning opportunities for rural women; (iii) supporting smallholders (*dehkans*) to raise the productivity of their plots and enhance the quality and value of their harvests; and (iv) developing a support program that enables rural women to start and develop small businesses through access to microfinance, technical training, and child care.
- xv. **To ensure a smooth rollout of the mechanization process, different business models for cotton mechanization should be piloted** to test the efficacy, impact, and alternative arrangements for ownership, leasing, and contract service provision. In addition, training courses should be organized to facilitate the emergence of contract service businesses and alert the banking community to the potential of this as a recurring business model.

1. To some extent this is already happening in the country, and this is further promoted through policies issued in 2015.

Overview

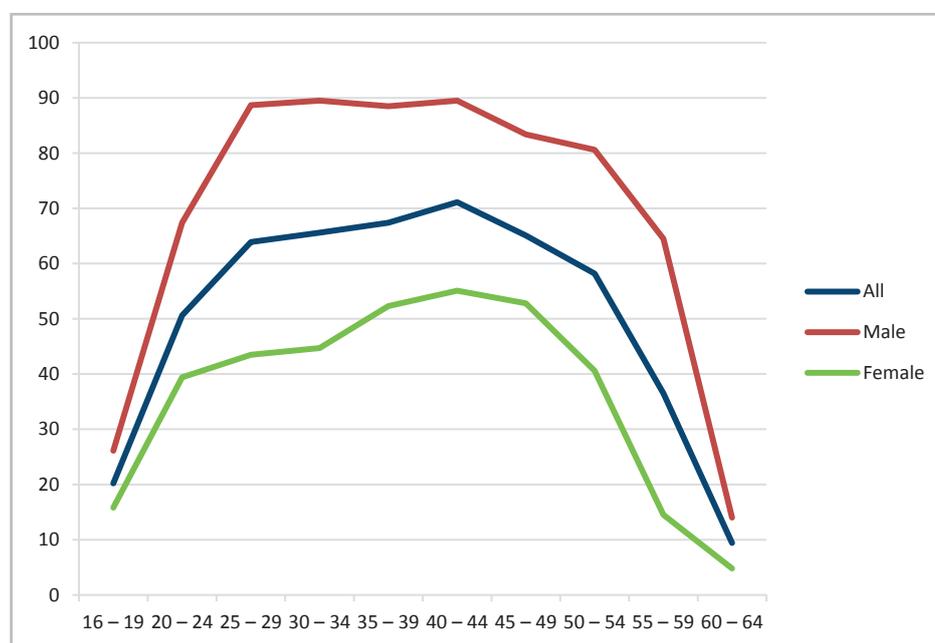
Introduction

- xvi. **The Government of Uzbekistan (GoU) has recently adopted a policy to mechanize the cotton harvest.** This policy is part of a broader government strategy to modernize the agricultural sector and reduce production costs. Mechanization also helps address the large seasonal peak in labor demand for manual cotton picking and reduce the need for state-mobilized labor. In the past, the latter has led to an outcry from nongovernmental organizations and calls to boycott cotton produced in Uzbekistan.
- xvii. **Mechanization of the cotton harvest might accelerate a further reduction in the demand for labor in rural areas,** and it is unclear what impact it may have on the livelihoods of those who pick cotton. While mechanization may have positive economic and social effects, especially if combined with additional sector reform measures, it is possible that some households may suffer, as the cash earned from picking cotton is an important source of their seasonal and even annual cash income. In Uzbekistan, the majority of cotton pickers are women, and they may be the group that is most impacted by mechanization. Also, the extent of support for mechanization among farmers remains unclear. Despite the government decision to mechanize the cotton harvest, it cannot be assumed that this is an optimal solution for all farmers.
- xviii. **This report presents the findings of a social impact assessment on cotton harvest mechanization. The study has the following objectives:** (i) to assess the ex ante and social impact of the policy to mechanize cotton harvesting in Uzbekistan on cotton pickers and vulnerable private farmers; and (ii) to identify ways to mitigate the policy's potential negative impacts on these groups and to make these reforms more acceptable for them. More specifically, the assessment aims to:
- prepare a socioeconomic profile of local rural population groups that currently pick cotton, and of farmers engaged in cotton cultivation;
 - assess livelihood alternatives for female and male cotton pickers; and
 - gather cotton farmers' views and concerns regarding the mechanization of cotton harvesting, as well as their suggestions for how these concerns can be addressed.
- The report aims to provide recommendations that can help ensure that cotton harvest mechanization is undertaken in a socially responsible manner.
- xix. **The assessment is based on the collection and analysis of qualitative data and two background studies.** Qualitative data were collected via 20 focus group discussions (FGDs), 20 in-depth interviews, and eight case studies. Eight focus groups were held with people who pick cotton and twelve were conducted with cotton farmers. The 20 in-depth interviews were carried out with local village leaders, local government representatives, and organizations involved in cotton harvesting, processing, and mechanization.
- xx. **Data were collected in four regions that varied in terms of labor scarcity, area of land under cotton, cotton production conditions, and experience with mechanization.** The selected regions were Karakalpakstan, Jizzakh, Syrdaryo, and Fergana region. Separate focus groups were held with farmers that lived far from and close to population centers. Focus groups were also divided up between large and small farms and those with good and poor cotton production conditions. While the research approach enabled us to obtain useful and rich insights into the experiences and perspectives of cotton pickers and farmers on the topic at hand, the sampling of the research sites and respondent groups was done in a purposive manner and does not allow us to present findings that are statistically representative of all cotton pickers and farmers in the country. Two background studies were conducted. These included a review of international experiences with cotton harvest mechanization and an analysis of the rural labor market in Uzbekistan.

Background

- xxi. **Almost all cotton in Uzbekistan is harvested by hand, even though mechanization existed during the Soviet period. An estimated 2.2–3 million² people were involved in at least some aspect of the cotton harvest during 2014.** This represents about 7 percent to 10 percent of the country's total population and about 14 percent to 20 percent of the work force. Total gross earnings by workers harvesting cotton were estimated to be between US\$250–\$300 million in 2014, depending on the exchange rate.³
- xxii. **Under the state-order system farmers often have no choice but to grow cotton. They are contractually obligated to produce stipulated quantities that are set annually by the government, and must sell these to the GoU at a price fixed by the government.** The quota are based on *ball bonitet*, a score that reflects biophysical production conditions for cotton. Farmers who fail to meet the assigned quota may be unable to pay back their loans and could lose their land.
- xxiii. **The employment rate⁴ of those between 16 and 64 years old is relatively low compared to other transition countries.** According to Ajwad et al. (2014), only 55 percent of that group was employed, meaning they had a job defined as having conducted paid work (in the formal or informal sector) in the two weeks prior to the survey, compared to 60 percent to 68 percent of other Eastern Europe and Central Asian economies. According to the same survey, 34 percent of those employed are self-employed. Entrepreneurship in Uzbekistan is dominated by microenterprises that operate in the services sector. About 70 percent of all self-employed individuals do not employ any additional workers. Economic policies in recent years have supported the growth of capital-intensive industries that have a positive impact on GDP and productivity of the national economy, but that generate relatively few new jobs. The female employment rate is particularly low (see Figure O.1).

Figure O.1. Employment rate* of the population in 2013, by age group (%)



Source: Ajwad et al., 2014 using data from the 2013 Uzbekistan Jobs, Skills, and Migration Survey⁵,

*The employment rate is defined as the number of people older than 16 years who worked for at least one hour during the two weeks prior to the survey on their own land (excluding kitchen gardens), or for someone who is not a household member, or on an own business activity, as a proportion of all people older than 16 who are available for paid work.

2. Presented in Appendix 4.

3. Townsend, 2015.

4. Defined as the number of people older than 16 who conducted paid work during the two weeks prior to the survey, as a proportion of all people older than 16 who are available for paid work.

5. Data from this survey are the only household survey micro-data on welfare, income and employment for Uzbekistan that were available to the team for the analysis of welfare and labor market trends for men and women.

Review of international experience

- xxiv. The percentage of world cotton production harvested by machines was about 29 percent in 2013–2014 and has not changed over the past 15 years.** All or nearly all of production was machine harvested in Australia, Brazil, Greece, Israel, South Africa, Spain, and the United States. In Argentina, Bulgaria, Colombia, Kazakhstan, Mexico, and Turkey, between 60 and 90 percent of production was harvested by machines. In China, 9 percent of total production in 2013–2014 was harvested by machine (up from 5 percent in 1998–1999).
- xxv. There are many advantages to handpicking cotton—higher quality, higher yields, and less trash enters the harvested cotton.** Handpicked fields can be harvested repeatedly when additional bolls mature, but only once or twice by machine when most of the bolls have matured. For a second or third picking, the cost of fuel and operator time tends to be greater than the value of cotton harvested.
- xxvi. A review of international experiences⁶ suggests that every country that has adopted mechanical harvesting techniques did so primarily because of labor scarcity. When labor costs rise, mechanized harvesting becomes more economical.** In Greece and Turkey, mechanization reduced the costs associated with harvesting as a share of total cotton production costs by about half. Additional reasons for mechanizing cotton harvesting have been to (i) reduce contamination⁷, particularly in Turkey; and (ii) shorten harvesting time.
- xxvii. Introducing mechanical harvesting has always been a decades-long process.** In Greece, this process took place very gradually over a 15-year period. In Turkey, it took 20 years.⁸ New varieties must be developed that have (i) a more limited plant width; (ii) bolls that form at least 15 centimeters above the ground to enable machinery access; (iii) reduced hairiness; and (iv) exhibit uniform plant maturity so that at least 80 percent of potential bolls are open and ready to be picked at the same time. Plant breeders indicate that at least eight years are needed to optimize local varieties for machine harvesting.
- xxviii. The operating rate of harvesting machines is initially much lower.** It is estimated that the operating rate for the first few years is only about 60 percent, because of the time spent maintaining and adjusting the machinery and moving between fields. As farmers and machine operators gain experience, the operating rate of the machines rise.⁹
- xxix. Machine harvesting tends to reduce the labor associated with harvest operations by 80 to 90 percent.** Approximately 1.2 hours of labor per hectare are required with mechanical harvesting. Demand tends to increase for experienced machinery drivers and mechanics, and labor is still required to transport seed cotton to gins. Women tend to be disproportionately negatively affected by mechanization of harvest activities. Governments tend to encourage mechanization. As a result, little thought has been given to the impact of harvest mechanization on rural laborers. In Greece, Turkey, and Argentina, most rural workers displaced by the introduction of mechanical harvesting either found jobs in cities or returned to other available agricultural jobs. Men tried to find alternative seasonal agricultural employment, while women often returned to traditional household responsibilities. In Turkey, displaced workers shifted to other agricultural sectors and continued to migrate seasonally in search of employment

6. A review of international experiences with cotton harvest mechanization (Townsend, 2015).

7. Contamination is when nonplant material (jute, polypropylene from fertilizer bags, rocks, dirt, and headscarves and other clothing) inevitably gets caught up in huge heaps of seed cotton as a result of millions of pairs of hands being involved.

8. A very strong recommendation derived from the experience in Turkey is that delegations of Uzbek farmers and ginners should be organized to visit Turkey and Greece to observe mechanical harvesting and related operations.

9. Greek researchers and government officials with experience dating back to the 1980s emphasize the importance of training farmers and ginners on how to adapt to machine picking. Experts in Greece interviewed for this study suggested that Uzbekistan embark on a robust program of seminars, farm meetings, and ginner training sessions with experts from countries that already machine pick.

Findings

Cotton-harvesting practices in Uzbekistan

- xxx. **Study respondents report that cotton is normally picked in three passes.** This is to make sure that only open bolls are picked and not left in the sun for too long. Also, harvesting should be completed before the first autumn rains, as wet cotton bolls quickly degrade in quality. The first pass starts when around 75 percent of cotton bolls are open. After around 10 days or so, more bolls are open and the second round of picking starts. The third round starts after another 10 days or more. Participants in our study stated that if bolls stay open in the field too long, their color might change and their fibers shrink. Usually, when a cotton-picking “brigade” has completed one pass for a farmer, it moves to another farm and returns later for the second pass on the first farmer’s fields.
- xxxi. **In each district, a cotton-picking committee (*pahta shtab*)¹⁰ is established to organize, coordinate, and monitor the process of picking cotton.** Farmers submit requests for cotton pickers to the *shtab*. *Mahalla* offices start recruiting cotton pickers by taking down names and ID numbers of people in each village who want to participate. Contracts are signed. The *mahalla* offices submit these lists to the cotton *shtab* and then form brigades of pickers. Each brigade consists of 100–150 people and is appointed a leader (usually a representative of the *mahalla*), a weigh man (someone who weighs how much cotton each person picks), a nurse, and an accountant. The *shtab* drafts a schedule of when and for which farmers the brigade will pick cotton. The *shtab* is responsible for documenting the amount harvested and for solving conflicts between farmers and pickers.
- xxxii. **Local pickers said they are keen to harvest cotton during the first two passes, when open cotton bolls are plentiful and picking productivity is high. Toward the end of the season, however, when sometimes a third or even a fourth pass is conducted, their interest drops significantly.** There is not much cotton left in the field at this point; instead of up to 100 kg a day, a worker can now pick only 10–20 kg per day. Because the fee per kilogram is set by the government and remains the same throughout the harvest, the amount a picker can earn in a day on average drops by more than five times, and the effort per kilogram of picked cotton increases. By this time, a significant number of local pickers leave their brigades and farmers and, according to study respondents, *pahta shtabs* have to rely on people that are brought in from urban population centers to pick the cotton.

“During the first picking mothers-in-law with daughters-in-law and toddlers come. Everybody comes with the families. And during the second and the third picking nobody comes.”

—farmer, Bagdad District, Fergana region

“For the first pass, people pick up to 100 kg of cotton per day, but for the second picking less than 50 kg per day, and for the third pass they pick 30 kg of cotton in a day. They pick less and they earn much less money—about 5–6 thousand per day, people don’t want to come for this money. ... Therefore it is necessary to make the higher fees for the second and third passes. For example, 200 Soum, 300 or 400 Soum per kg, then more people will come for the third picking.”

—farmer, Bagdad District, Fergana region

- xxxiii. **Farmers with cotton fields that are far from population points (50–120 km) claimed to have difficulty attracting villagers to pick cotton, also because their yields tend to be low.** Instead they rely on poorly motivated pickers from outside the area, such as those brought in from urban areas by government organizations. Local pickers are the least motivated to pick cotton for this group of farmers (see below). These farmers were said to provide poor working conditions, with water, lunch, and work equipment insufficiently available for pickers. Secondly, the yields and the quality of cotton on these fields tend to be low, making it unattractive to local pickers.

10. According to the Federation of Trade Unions in Uzbekistan the authority of the *pahta shtab* is limited; a legal framework is in place to regulate labor relations, protect workers, and solve labor conflicts.

“There is a significant amount of land with low water availability. Because of that many farmers were not able to meet the cotton production quota, had no profit, and were unable to pay off their state loan.”

—farmer, Pakhtakor District, Jizzakh

xxxiv. Pickers from outside the area are referred to as hasharchi. These are arranged by the *shtab*, which approaches different organizations in the district, other districts, or even other regions to ask them to bring cotton pickers to their area. These pickers were said to include government employees, factory workers, and students (older than 18). The *shtab* organizes these pickers into brigades, includes them in cotton-picking schedules, and helps arrange their accommodation and transportation.

xxxv. Farmers claimed that pickers who are brought from outside the area were less qualified, less experienced, and less keen to pick cotton than pickers from the local area.

“150 students picked only 900 kg per day in my field. That is 6 kg per person. And I was able to get only Soum 400 per kg for it since it was fourth grade cotton.”

—farmer with fields far from population centers, Bagdad District, Fergana region

“Some hasharchi (government workers and students) have never seen cotton before and are not keen to work hard. Local pickers are motivated to pick cotton because they are interesting in getting income.”

—farmer with poor soil conditions, Pakhtakor District, Jizzakh, FGD with farmers with poor soil quality

xxxvi. In many cases, those brought from outside to pick cotton were said to pay locals to conduct the task on their behalf.

“Conflicts happens only when hasharchi (people brought in from other areas) start enticing local pickers that already work for certain farmers to pick cotton on their behalf. They pay local pickers up to Soum 500 per kg of cotton. As a result local pickers leave farmers for which they were picking cotton who then lose their brigades.”

—farmer, Pakhtakor District, Jizzakh

xxxvii. Local government officials and leaders interviewed for our study estimated that between 14 and 20 percent of the district population was involved in picking cotton in 2014. Of these, 70 percent to 85 percent were said to be from rural areas, and about one-third (Bayaut District, Syrdaryo) to four-fifths (Beruniy District, Karakalpakstan) of all pickers were from local communities. Local pickers are mostly female and typically between 20 and 40 years old.

Cotton-picking benefits and available alternatives

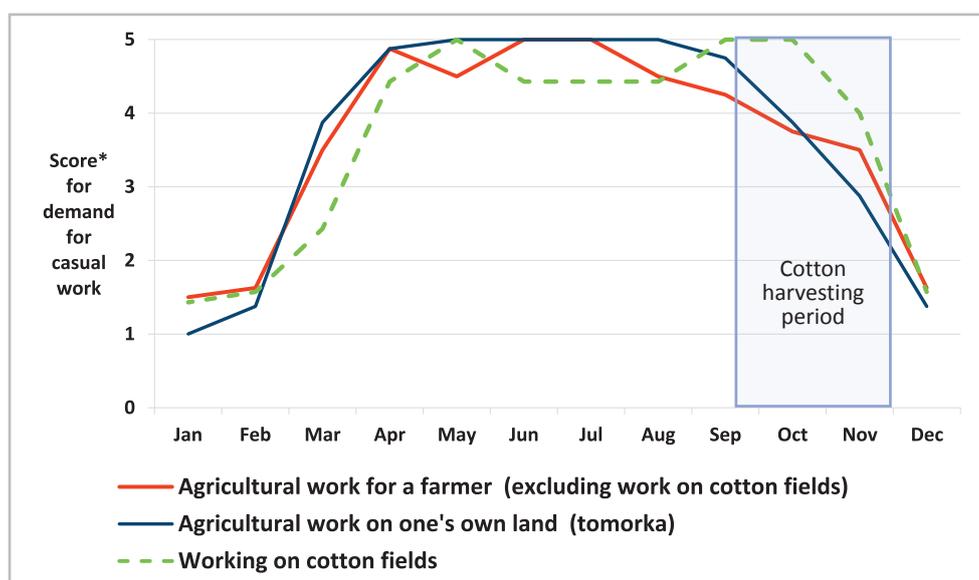
xxxviii. Participants in focus groups with local rural cotton pickers were asked what different wealth groups exist in their community and roughly what proportion of each group is involved in picking cotton. In all four regions, respondents claimed that three groups could be found in their area:

- **Wealthy households, comprising between 10 and 15 percent of the local population.** Typically, 20 percent to 50 percent of members from this group pick cotton, mostly to help their relatives who are cotton farmers meet the state quota.
- **Middle-income households, about 70 percent to 80 percent of the rural population.** This includes government workers, teachers, doctors, *dehkans* who sometimes rent land from farmers, and daily wage laborers in the agricultural and industrial sector. Most of these households have members who pick cotton.
- **Vulnerable households (5 percent to 15 percent of the population).** Many of these

have lost a breadwinner or have a household member with a disability. Fifty to eighty percent have members who pick cotton. However, the total number of hours worked in cotton fields tends to be lower for this group than for middle-income households. Some households in this group have no members who can pick cotton due to old age or poor health.

- xxxix. **During the beginning of the cotton harvest in September, agricultural day workers face competing demand for work on their own kitchen gardens, and cotton picking likely takes place at the expense of work on cotton pickers' own fields (see Figure O.2).** In particular, in Fergana region, labor demand for harvesting farmers' horticultural crops is also high from July to September, which exacerbates labor shortages during that period. In Jizzakh, where farmers mostly grow wheat and cotton, the overall demand for agricultural laborers seems to drop in August; this makes local laborers available for part-time work picking cotton.
- xi. **Work opportunities outside the agricultural sector are very limited, especially for women.** According to Ajwad et al. (2014), in 2012–2013 average wages in Uzbekistan (excluding Tashkent region) were around Soum 300,000–320,000 per month for women and Soum 500,000–600,000 for men, demonstrating substantial gender wage gaps.
- xli. **On average, one local picker was said to work on the cotton fields between 42 and 60 days per season.** Most of these days (20–30) are typically spent picking cotton in September during the first pass, when cotton is easiest to pick and more can be picked in a day (and thus yield higher earnings). In October, during the second pass, there is less cotton in the field, and even less during the third (and sometimes fourth) pass. Local pickers report it is difficult to earn enough during these last picking rounds (see Table O.1). The last column of Table O.1 shows the average wage rate for rural Uzbekistan for work outside the cotton sector. As shown, only earnings during the first and second pass can compete with the rural wage rate.

Figure O.2. Distribution of demand for casual labor throughout the year by (i) cotton farmers; (ii) non-cotton farmers; and (iii) kitchen gardens owned by laborers



* Scale is 1–5, with 1 being the least busy month and 5 being the busiest month for laborers. The presented scores are the average of four sites.

Source: Focus groups with cotton pickers.

Table O.1. Number of working days and average income of a cotton picker

Pass	Number of days rural households typically pick cotton	Amount of cotton picked per worker (kg/day)	Amount of cooking oil obtained per worker* (liters)	Typical daily income of one picker**, excl. value of cooking oil (Soum/day)	Typical daily income per picker, incl value of cooking oil* (Soum/day)	Average female wage rate (Soum/day)
First pass (September)	20–30	80–130	7–15	17,360–28,210	19,000–30,700	15,000–20,000
Second pass (October)	15–20	40–100	5–10	8,680–21,700	10,340–24,200	15,000–20,000
Third pass (October/November)	7–10	20–40	2–3	4,340–8,680	4,570–10,200	15,000–20,000
Total per season	42–60 days	2,400–6,300 kg	14–28 liters of oil	Soum 521–1,367	Soum 590–1,507	

Note: Cotton stalks are only given to laborers who work permanently on their farm, and their family members.

* The sale price of 1 liter of cotton oil is Soum 5,000.

** Pickers received Soum 217 per 1 kg of cotton in 2014.

Source: Mini case studies with cotton pickers (December 2014 to January 2015).

- xlii. **Only during the first pass is income from cotton picking higher than the annual average daily wage rate for women. During the second pass they are similar (see Table O.1).** Picking productivity after the first pass is lower, but the cotton-picking fee fixed by the state remains the same across all passes and all parts of the country (irrespective of labor scarcity). In 2014 cotton pickers were paid Soum 217 per kg of raw cotton (US\$0.72–0.86). To attract workers, farmers give pickers cooking oil as an additional bonus and motivation, provided pickers meet a daily quota. Pickers who participated in our focus groups claimed they received on average 14 to 28 liters of oil per season. The cooking oil bonus can add 10 percent to 18 percent to a cotton picker’s income. According to those who participated in our study, cotton pickers typically earn between Soum 600 and 1,500 per person per season, which is equivalent to US\$200–600.
- xliii. **Focus groups with pickers suggested that the share of cotton-picking income in their total annual income tends to be higher for rural middle-income households (up to 20 or sometimes even 30 percent) than for the most vulnerable in rural communities (around 10 percent).** Rural middle-income households might have several members who pick cotton and who work the whole day (from 6 am to 4 pm) in the field; they are motivated to earn as much cash as possible. In contrast, vulnerable households often consist of pensioners or women with small children who can only work half a day, and, due to health issues, cannot pick much cotton.
- xliv. **Cotton picking has several advantages compared to other daily agricultural wage labor. Pickers are paid in cash and almost immediately after work is completed, usually every two to five days during the season.** In contrast, permanent farm workers usually are paid in kind in the form of the harvest product (for example, wheat), or they might be given a piece of land on which to grow secondary crops. Even if a farmer pays workers in cash, they might be paid two to three months later, after the farmer has sold the harvest. Picking cotton enables workers, especially women, to significantly contribute to their household budget.

- xlv. **Pickers said they spend the money earned from picking cotton on livestock, school uniforms, books, and other school equipment for children, weddings, winter preparations, and dowries.** Rural middle-income households who participated in focus groups in Tashkent region regarded picking cotton as a good way to earn extra money without making others think they are in need of extra cash.

Types of cotton farmers and their harvesting costs

- xlvi. **Participants suggested that cotton farmers in the area can be divided into three groups: well-off farmers, middle-income farmers, and vulnerable cotton farmers.**

- **Well-off farmers were said to comprise about 10 percent to 20 percent of all cotton farmers in all five sites.** These farmers are also referred to as “golden” farmers. The main characteristic of this group is that the revenue earned from their farms exceeds the expenses, and thus they manage to make a profit from cotton farming. Their farmland is close to population points and has good-quality soil (*ball bonitet* is 60–65 points). Their income is obtained from producing different types of crops; in addition to wheat and cotton, they also grow horticultural crops and keep livestock. Their farm size varies from 80 ha to 100 ha. They tend to have high yields and produce up to 150 percent of their state-mandated cotton production quota. Well-off farmers were said to have access to a reliable source of good-quality irrigation water and the highest yields: 3–3.5 tons of raw cotton per ha. Finally, they incur relatively modest costs and their debt is low.
- **Middle-income cotton farmers represent around 50 percent to 60 percent of all cotton farmers in the five sites. They make little profit from cotton due to variable yields and high production costs.** While these farmers were said to usually meet the state production quota, their yields are lower due to poorer soil quality and the more remote location of some of their plots, as well as more constrained access to irrigation water.
- **Vulnerable farmers, also referred to as “lagging” or “bankrupt” farmers, comprise between 20 and 30 percent of all cotton farmers in the studied districts, according to respondents.** Focus group participants in Syrdaryo and Karakalpakstan claimed that farmers in this group struggle to meet the state production quota for cotton and have no free capital to invest in their farm. The gross value of their harvests tends to be lower than the expenses they incur and they have trouble repaying their debts to suppliers and banks. Respondents claimed that limited access to water is an important factor in this group’s poor yields. Their plots are often located near the end of the canal, so they receive less, poorer-quality water than farmers upstream. Moreover, they rely on pump irrigation (except those in Jizzakh) and thus incur electricity expenses. Poor access to irrigation water is said to result in shorter cotton plants, which reportedly causes problems for the cotton-harvesting machines that are currently on the market. The cotton yields of this group was said to be low: 1.5–2 tons of cotton per ha. Moreover, the quality of the cotton tends to be poorer than that of other farmers. The cotton fields of vulnerable farmers are located far away from population points (50–120 km), which reportedly makes it difficult for them to attract villagers to pick cotton. Vulnerable farmers were said to therefore rely on poorly motivated pickers from outside the areas, such as those brought in from urban areas by government organizations.

- xlvii. **In an attempt to attract local pickers, vulnerable farmers pay up to 35 percent to 65 percent more per kg of picked cotton than better-off farmers, but this is not enough to attract local workers.** The higher labor costs these farmers incur reflect workers’ higher transportation costs, the costs of providing more frequent meals, higher bonuses, workers’ lower productivity, and, in Karakalpakstan, higher fees per kilogram paid to attract workers.

Impact of harvest mechanization on cotton growers

- xlvi. **Overall, farmers in all four regions claimed that mechanization will offer important advantages in terms of managing the harvesting process and completing the harvest on time.** They claimed it is easier to manage one machine and one driver than 100 cotton pickers. They stated that a machine can harvest the same amount of cotton in an hour that 50–100 pickers can collect in one day. If mechanized, the harvest can be completed in one month instead of the current two to three. This implies it can be completed before the onset of the rainy season in October/November, preventing the rain from impairing the cotton's quality and its sale price. Completing the harvest early will also allow farmers to sow wheat earlier, raising its yield.
- xlix. **Farmers in Syrdaryo and Jizzakh, where labor is scarcest, and farmers whose farms are located away from population centers are most positive about mechanization.** Even if machine harvesting reduces the quantity and quality of cotton harvested, the advantages would still outweigh the costs, farmers in these areas claimed. Farmers in Jizzakh and Syrdaryo who have experience with mechanized harvesting claim it can save up to 50 percent of the cotton-harvesting costs.
- i. **However, farmers in Jizzakh and Syrdaryo—where a portion of the cotton harvest is already mechanized—claimed that not all their plots would be suitable for mechanized cotton harvesting.** This includes, for example, those plots that have irregular shapes or are rugged in the corners. Currently, farmers have to follow the state order to grow cotton on these fields. They claimed that because machines will not be able to harvest cotton on such plots, these fields should be used to grow high-profit secondary crops instead.
 - ii. **Discussions with farmers in Jizzakh revealed that plots that have less irrigation water available to them produce cotton plants of insufficient height for machine harvesting.** According to these farmers, such plots could instead be used to grow vegetables, horticultural, or fodder crops, which require less water than cotton.
 - iii. **The quality of harvesting machines on the market led to heated discussions among farmers from Syrdaryo and Jizzakh who had some experience with machines.** Many blamed their poor quality and low-grade cotton on the harvesting machines. Farmers in Syrdaryo, Jizzakh, and Karakalpakstan also had a number of concerns regarding the quality of harvesting machines on the market.
 - iiii. **The current lack of knowledge about the various issues surrounding cotton harvest mechanization is a concern for farmers.** They would like to know more about what machines are on the market, the costs involved, the implementation process of mechanization, and the required adjustments to land preparation and sowing practices.
 - liv. **During focus groups, farmers also raised the importance of adjusting agronomic practices of cotton cultivation for machine harvesting.** They claimed that cotton should be planted in rows 0.9 meters apart to accommodate a harvester's wheels. Most farmers participating in focus groups in Karakalpakstan and Fergana region said they currently plant in rows 0.6 meters apart, which is most suitable for manual cotton picking.
 - lv. **Farmers who want to mechanize their harvest prefer to lease the machines instead of renting them from machine and tractor parks (MTPs).** Farmers were worried that if MTPs are in charge of managing the harvesters, they might charge farmers for the machines without being responsible for the quality of the harvested cotton. They also raised concerns about having to wait a long time to get a machine.
 - lvi. **Farmers with remote, poor-quality land that has limited access to irrigation water—often the most vulnerable farmers—have the most difficulty finding pickers.** Mechanization of these cotton fields would reduce the need to bring in cotton pickers from outside the area. However, study

participants in all districts claimed that vulnerable/lagging/bankrupt farmers, who represent 10 percent to 20 percent of all farmers in selected districts, will have the most difficulty mechanizing their cotton harvest. In particular, these farmers cannot afford to buy or even rent these machines. This group usually does not even have enough resources to take care of all agricultural procedures to grow cotton on time. Cotton production on fields of these farmers tends to have low or even negative returns and cotton production would not necessarily become the most remunerable crop for them even if mechanization would reduce their harvesting costs.

- lvii. **Well-off and middle-income farmers said they would prefer to lease harvesting machines, as buying them would be too expensive. An important issue for them is the availability of spare parts.** Farmers in Jizzakh and Karakalpakstan suggested group loans should be provided to two or three farmers so they could purchase machines. However, that option was said to work only for well-off and middle-income farmers.

The impact of harvest mechanization on cotton pickers

- lviii. **Cotton pickers across all sites believed that cotton harvest mechanization will negatively impact their livelihood. Female cotton pickers were particularly concerned.** Male focus group participants were more positive about the effects of mechanization. They claimed that if there are fewer jobs for cotton pickers, they will work longer hours on their tomorka (kitchen garden) or will do some other daily wage job—for example, work for *dehkans* that grow horticultural crops or vegetables. Moreover, young male participants (aged 20–25 years old) claimed that mechanization would open up new job opportunities for them.
- lix. **In districts where labor is scarce (such as those in Jizzakh), cotton pickers were concerned that mechanization can negatively affect daily wages for other agricultural work.** Right now, due to high labor scarcity and significant demand for cotton pickers, and the fact that other crops (vegetables, horticultural crops) need to be harvested at the same time as cotton, farmers have to pay higher wages to harvest vegetables and other horticultural crops.
- lx. **Cotton pickers in all sites suggested that mechanization will allow schools and local hospitals to remain open during the cotton season.** Government employees (teachers, doctors) and students will no longer need to pick cotton (especially in remote areas where locals do not want to pick cotton).

Solutions suggested by study participants

- lxi. **Farmers in Syrdaryo and Karakalpakstan suggested that the cotton ginnery plants (CGPs) be in charge of managing the machines.** A CGP can hire the machine operators and deduct the cost of the services from the payment the CGP owes farmers. According to farmers, CGPs will take better care of the machines than MTPs. Harvesting arrangements and the payment process will be easier for farmers. Farmers in Syrdaryo suggested that CGPs charge vulnerable farmers a lower tariff. MTPs currently charge farmers the same fee in all study districts: Soum 177,000 per ton of raw cotton.
- lxii. **Respondents also suggested that training and seminars on mechanized farming be organized for farmers as well as *hokimiyat* officials, MTPs, and CGPs.** Experimental farms should be established in each district to showcase the advantages of mechanization and teach farmers how to grow cotton in a way that is conducive to machine harvesting.
- lxiii. **Female pickers suggested and supported the idea of organizing and developing local-level skills trainings for women.** Female pickers said they are aware such courses (in tailoring, baking, or nursing) exist in the district they would like to attend, but that these are only offered in urban areas.
- lxiv. **In Fergana region, participants suggested that the government and banks offer special loans to**

local entrepreneurs who want to train people in certain skills and then employ them. Microloans to purchase livestock and poultry were also seen as an attractive way to cushion the negative social impact of mechanization.

- Ixv. According to cotton pickers and *mahalla* leaders, existing social assistance programs would not be suitable for transferring funds to vulnerable and other low-income households to compensate them for the income lost from cotton picking.** There is a strict quota on the number of households that can be eligible for social assistance, resulting in limited coverage of vulnerable households. In visited areas, the quota was at least 50 percent lower than the number of vulnerable households. In addition, middle-income households lose the most income from harvest mechanization, yet they are not eligible for social assistance. Finally, it would be difficult for local government bodies to identify households that lost the most income due to mechanization.

Recommendations

- Ixvi. This social impact assessment has identified two vulnerable population groups that are involved in the cotton production process.** These are: (i) women who are engaged in cotton picking and have few alternative cash income-earning opportunities; and (ii) farmers who grow cotton under less favorable production conditions. The recommendations presented below follow from the analysis of the collected data and aim to address the needs of both of these groups to make sure the mechanization process is successful and generates benefits for all population groups.¹¹

Short term mitigation measures

- Ixvii. The government could consider instituting a public works program.** Such a program could focus on improving rural infrastructure (roads, canals) to increase farm productivity, while at the same time providing alternative income-earning opportunities for needy households that are no longer able to earn income from picking cotton following mechanization.
- Ixviii. Options should be explored for organizing contract labor teams that consist of skilled and effective workers** who can compete with mechanized harvesting or find niches for cotton-harvesting work, such as premium cotton for cotton seed, small fields, or cotton fields in remote areas. Picking fees should be liberalized so that farmers are free to pay wages needed to attract such laborers.
- Ixix. Labor market management information systems that provide information on labor demand, shortages, surpluses, fees, and wage rates across regions should be made accessible.** Such information, together with more flexible wage rates, will make workers more likely to voluntarily travel from labor surplus to labor deficit areas when wage incentives are present.

Medium term reform measures

- Ixx. There is a need to liberalize farming and allow farmers that currently grow cotton in areas that are less suitable for that crop to switch to more remunerative farm activities that raise land and labor productivity and use less water.** The latter is important in areas where abundant irrigation water is not easily available.¹²
- Ixxi. Measures to further support farmers engaged in high value activities such as horticultural or livestock production that have a higher labor productivity (in Soum per day) than cotton,** and thus enable farmers to pay workers attractive daily fees, would be important. At the same time, support to smallholders (*dehkans*) to raise the productivity of their plots and enhance the quality and value of their harvests would be needed. This would require better integrating smallholder

11. It should be noted that the government is already undertaking various measures to diversify agriculture and generate income-earning opportunities for the rural population outside the cotton sector.

12. To some extent this is already happening in the country and this is further promoted through policies issued in 2015.

in the value chains of their products to enable them to tap into higher value markets and meet product preferences of middle and high income consumers. Training, which can be facilitated by the employment centers, can help facilitate the shift to high value added activities.

- Ixxii. Structural barriers that prevent rural women who currently pick cotton from accessing formal employment or engaging in alternative income-earning activities should be identified and tackled.** Measures could for example include those that enable rural women to start and develop their small businesses through access to micro-finance, technical training, and child care. Livestock production and agro-processing could be relevant activities in this respect.
- Ixxiii. Agronomic research is needed to produce cotton varieties that are not only well suited to the range of Uzbek growing conditions, but that also reduce the number of cotton-picking passes.** This will help ensure that mechanized picking is economic and efficient, and put in place a more efficient hand-picking process that enhances cotton pickers' productivity and income.
- Ixxiv. Mechanizing the cotton harvest requires further on-farm field testing of different harvesting machines and machine design options.** Such field tests should take place under the different cotton-growing conditions that currently exist in Uzbekistan, including the most and least favorable conditions. This will help ensure that the mechanization needs of marginalized farmers that grow cotton under difficult conditions—such as low reliability of irrigation water, low soil fertility or highly salinized soils, and low availability of labor—are also addressed.
- Ixxv. Different business models for mechanizing the cotton harvest should be piloted** to test the effectiveness, impact, and alternative arrangements for ownership, leasing, and contract service provision (such as cotton harvested by a contractor), and to address the needs of smaller-scale farmers and farmers with remote fields. In addition, training courses should be organized to facilitate the emergence of contract service businesses and alert the banking community to the potential of this as a recurring business model.
- Ixxvi. The government and farmer organizations should develop a plan for enabling farmers and pickers to actively engage with the research findings around cotton harvest mechanization and explore new ways forward.** It is important to hear the voices of stakeholders affected by cotton harvest mechanization and involve them in an action plan to address possible negative social impacts; doing so will ensure these are based on realities on the ground.
- Ixxvii. Assisting the most vulnerable households more broadly would require strengthening the mechanism for identifying those household, and expanding the coverage of social assistance programs.** This would include making sure only those households that need it are assisted through the program and ensuring all vulnerable households are covered.

1. Introduction

1. **The GoU has recently adopted a policy to mechanize the cotton harvest.** The goal is to have 70 percent of the cotton grown in Uzbekistan harvested by machines by 2020. This policy is part of a broader government strategy to modernize the agricultural sector and reduce production costs. It is also a response to growing international concerns and calls to boycott cotton produced in Uzbekistan due to continued state-sponsored mobilization of adult labor and the previously common practice of mobilizing children to pick cotton.
2. **Mechanizing the cotton harvest might accelerate a further reduction in the already low demand for labor in rural areas,** and it is unclear what impact it may have on the livelihoods of those who pick cotton. While mechanization may have positive economic and social effects, especially if combined with additional sector reform measures, it is possible that some households may suffer, as the cash earned from picking cotton is an important source of their seasonal and even annual cash income. Losing this income source is likely to hurt their livelihood, especially if alternative income-earning opportunities are limited. This is particularly likely for women, some of whom reportedly rely on cotton picking as an important seasonal livelihood activity. Cotton farmers might also be negatively affected, as mechanization might be unaffordable for the poorest and most indebted among them.
3. **Replacing cotton cultivation with more remunerative alternatives that are also labor intensive—such as horticultural crops—will generate new employment opportunities for cotton pickers.** These may offset some of the income-earning opportunities that will be lost due to cotton harvest mechanization. However, it is not immediately clear whether the employment opportunities that crop diversification will generate will be accessible to the vulnerable households that are most affected by mechanization.
4. **The likely impact of cotton mechanization on the livelihoods of cotton-harvesting laborers is poorly understood. Similarly, little is known about the impact of mechanization on different types of cotton farmers.** Such information is important for designing policy and operational measures that will ensure cotton harvest mechanization reforms will not be undertaken at the expense of the most vulnerable sections of the population.
5. **This report presents the findings of an SIA about cotton harvest mechanization. The study has the following objectives:** (i) to assess the ex ante and social impact of the planned cotton mechanization policy in Uzbekistan on farm workers and vulnerable private farmers; and (ii) to identify ways to mitigate the policy's potential negative impacts on these groups and to make these reforms more acceptable for them. The assessment aims to obtain an in-depth understanding of the needs, attitudes, grievances, and perspectives of different stakeholders involved in cotton production on the mechanization process across a range of circumstances. Specifically, the social impact assessment aims to:
 - **Prepare a socioeconomic profile of local rural population groups that currently pick cotton, and of farmers engaged in cotton cultivation.** This involved identifying what local wealth groups exist in selected research sites and obtaining subjective estimates of proportions of the income of each of these groups that is earned from cotton picking. Similarly, local cotton farmers were divided into wealth groups, and for each of these typical characteristics and constraints for mechanization were identified.
 - **Assess the livelihood alternatives for female and male cotton pickers.** The analysis considered the local labor market situation and alternative income-generating opportunities of these population groups during the cotton harvest. Assessing gender differences was an important focus.
 - **Gather views and concerns of cotton farmers regarding mechanization as well as on what can be done to address these concerns.** While the mechanization of cotton harvesting might have considerable benefits for cotton growers, there are risks and

uncertainties that may need to be addressed regarding uptake and sustainability of the mechanization initiative, especially for more vulnerable farmers. Better-off and poorer farmers' perceptions of these issues were gathered across sites with low and high labor/land ratios.

Methodology

- The assessment is based on the collection and analysis of qualitative data from 20 focus group discussions and 20 in-depth interviews.** Eight focus groups were held with people that pick cotton and 12 with cotton farmers. Each focus group included 8–10 participants and typically lasted between two and three hours. Focus groups were conducted separately with female and male participants (see Pictures 1 and 2). In total, 80 cotton pickers and 95 farmers participated in the discussions.

Picture 1. FGD with cotton farmers, Pakhtakor District, Jizzakh



Picture 2. FGD with female pickers, To'rtko'l District, Karakalpakstan



- The 20 in-depth interviews were held with local village leaders, local government representatives, and with organizations involved in cotton harvesting, processing, and mechanization.** This included representatives of *hokimiyat* cotton committees (*pahta shtabs*), community leaders, cotton ginnery officials, local mechanization experts, and representatives from MTPs. The average duration of one interview was 1 hour and 30 minutes. In addition, eight mini case studies were conducted—four with cotton farmers and four with vulnerable cotton pickers. A case study interview lasted two to four hours.
- A local research firm conducted the fieldwork between December 12, 2014, and January 15, 2015.** Group discussions and interviews were conducted in Uzbek and were based on detailed discussion and interview guides that were prepared by the World Bank task team. All field team members went through several days of training provided by an international consultant to become familiar with the interview guide and the focus group discussion guide. This was followed by a pilot test of the methodological tools, which was carried out in Urtachirchik district (Tashkent region) November

18–21, 2014. Following the pilot, methodological tools were finalized and the team underwent additional training. Audio records were used to produce full transcripts in Russian of all discussions and interviews.

9. An international consultant worked closely with the research firm to provide additional quality control. After completing each round of data collection, the field team sat down with the consultant to review key findings and discuss difficulties in data collection. After all data had been collected, a final meeting was held with the field team to summarize key findings and how these varied across research sites. The World Bank task team produced the draft report with inputs from the local research firm.

10. Focus group discussions with cotton pickers covered the following topics, among others:

- socioeconomic characteristics of cotton pickers and the importance of cotton picking to their livelihood
- typical amount earned from cotton picking in a day and factors that cause variation
- incentives for people to pick cotton compared to other income-earning opportunities
- expected impact of cotton harvest mechanization on their livelihoods, what can be done to mitigate the expected impact, and the availability of alternative income-earning opportunities
- skill training or other programs/services in the area that could help cotton pickers transition to alternative income-earning opportunities
- existing social assistance programs and their potential role to transfer funds to cotton pickers who lose their income

A list of the research questions is presented in Appendix 2. The complete field research guide for discussions with cotton pickers is shown in Appendix 3.

11. Focus group discussions with cotton farmers and/or farm managers revolved around issues such as:

- difficulties faced by different types of cotton farmers in obtaining sufficient cotton-picking labor
- advantages and disadvantages of the cotton harvest mechanization
- different types of cotton farmers that can be distinguished and for which of these harvest mechanization will work well or less well
- policy measures and support services needed to make cotton harvest mechanization work for farmers of all income groups, including the most vulnerable

The field research guide for discussions with cotton growers is presented in Appendix 4.

12. Key informant interviews included the following questions, among others:

Interviews with heads of *mahallas* and cotton committees (*pahta shtabs*)

- How does recruitment take place and what is the role of the *mahalla*?
- What types of people are particularly keen to pick cotton? What alternatives do they have?
- What are the advantages and disadvantages of cotton harvest mechanization and who are its likely winners and losers?
- What are possible mitigation measures for those negatively affected?

Interviews with cotton ginnery officials and mechanization experts

- For what types of cotton farmers will harvest mechanization work well and for what types will it work less well?
- What policy measures and support services are needed to make cotton harvest mechanization work for farmers of all income groups, including the most vulnerable?
- What can make it easier for farmers to have their cotton harvested in time?

13. **The eight mini case studies** collected the life stories of cotton growers and pickers; important life events; the importance of cotton picking/growing in their livelihoods; the expected impact and desirability of mechanization; and what they believe should change to make mechanization work for low-income laborers and farmers. Mini case studies with cotton growers also gathered detailed estimations of costs and returns for growing cotton and alternative crops.
14. **Two background studies were commissioned for this assessment.** These included (i) a review of international experiences with cotton harvest mechanization focusing on Argentina, Greece, and Turkey;¹³ and (ii) an analysis of the rural labor market situation in Uzbekistan, using the data from the 2013 Central Asia Labor, Skills, Migration and Consumption Survey.¹⁴

Sampling

15. **Data were collected in four regions that varied in terms of labor scarcity, area of land under cotton, suitability for cotton production, and experience with mechanization.** This was done to enable a comparison of findings across a range of conditions that are typical for Uzbekistan. The selection process was based on official statistics and information gathered from local experts. The following regions were selected, each of which represented different conditions:

- **Jizzakh**—high labor scarcity and high proportion of land under cotton
- **Syrdaryo**—medium labor scarcity and relatively high extent of mechanization
- **Fergana region**—low labor scarcity, high proportion of land under cotton, and limited mechanization
- **Karakalpakstan**—high labor scarcity

The research firm collected data on the different districts in each of these four regions in order to select the ones that would best fit the selection criteria. One district was selected in each region except in Karakalpakstan, where two districts were chosen to ensure sufficient coverage of the mechanization pilot in a World Bank project. The characteristics of the selected districts are presented in Table 1.

Table 1. Characteristics of the five selected districts

Region	Jizzakh	Syrdaryo	Fergana	Karakalpakstan	
District	Pakhtakor	Bayaut	Bagdad	Beruniy	To'rtko'l
Agricultural area used to grow cotton (thousand ha)	12	17	7	12	12
Proportion of the agricultural area under cotton	46%	54%	88%	26%	18%
Number of farmers	392	628	788	310	286
Percentage of farmers that grow cotton	97%	83%	31%	95%	100%
Percentage of the cotton area harvested by machinery (2014)	0.7	12	0	< 1	0
Number of rural people per 1 ha of agricultural land	1.6	2.9	21.6	2.3	1.8
District of the mechanization pilot in World Bank irrigation project	No	No	Yes	Yes	Yes

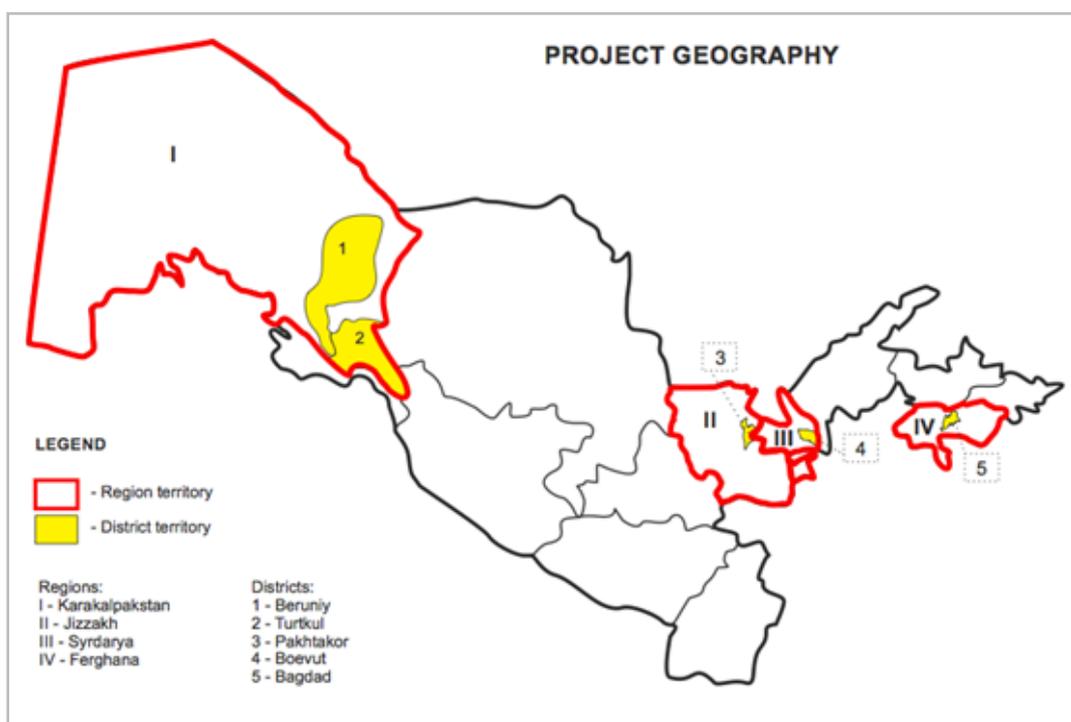
Source: Interviews with representatives of *pahta shtabs* (December 2014 to January 2015).

13. Townsend, 2015.

14. Kudo, 2015.

Map 1 presents the geographic location of the selected districts. In each district, five focus groups were conducted; three with farmers and two with cotton pickers.

Map 1. Location of selected regions and districts



16. **Farmers who were invited to participate in the focus groups were selected so as to ensure a broad range of cotton production conditions were covered in the overall sample** (not necessarily within each district). This implied that focus groups were held with farmers that either grow cotton on low-quality soil (*ball bonitet* below 50) or on high soil quality (*ball bonitet* above 50), and with farmers with either small farms (less than 30 ha) or large farms (more than 60 ha). Also, we chose farmers whose fields were either close to population centers (less than 5 km) or whose farms were more remote (more than 5 km from population centers). See Table 2 for an overview of the characteristics of farmers and cotton pickers who participated in focus groups.

Table 2. Criteria of farmers and cotton pickers invited for FGDs in each of the selected regions

# FGD	Selected region			
	Syrdaryo	Karakalpakstan	Fergana	Jizzakh
Farmers				
1	Good soil	Bad soil	Good soil	Bad soil
2	Small farms	Large farms	Large farms	Small farms
3	Close farms	Remote farms	Remote farms	Close farms
Low-income cotton pickers				
4	Male	Male	Male	Male
5	Female	Female	Female	Female

Note: Sampling aimed to ensure different production conditions were covered across all districts, not necessarily within each district.

Focus groups with cotton pickers were held with working-age adults who, during the 2014 season, harvested cotton for a significant amount of time and for whose household cotton picking is a significant source of income. Separate focus groups with male and female cotton pickers were conducted in each region (see Table 2). Also in each region, two mini case studies were conducted, one with a farmer and one with a cotton picker. This included farmers that used cotton-harvesting machines in 2014.

17. **The study has a number of limitations.** The sampling methodology was “purposive”— the sites that were selected and the growers and pickers who participated in the discussions were chosen to represent a wide range of cotton production conditions in Uzbekistan. This enabled us to gather a rich set of experiences and the views of those who are directly affected by cotton harvest mechanization. Findings are strongly embedded in their local context. However, data were not gathered through a probabilistic random sample survey, and thus the people who participated in the study do not necessarily represent the wider population—or subgroups of the population—in a statistical sense. It is therefore not possible to extrapolate the study’s findings to the country as whole in a statistically robust manner, or assess how common the findings are among all cotton pickers or growers. In addition, the quantitative data collected for the study—such as yields and production costs—are based on what was told to the survey team by study participants and not on direct measurement in the field or verification of administrative records.
18. **The rest of the report is organized as follows.** The remainder of this chapter provides background information about the cotton sector in Uzbekistan and summarizes the labor market situation. Chapter 2 presents an overview of the international experience with cotton harvest mechanization and its social impact. Chapter 3 briefly describes cotton-harvesting practices in the country based on the findings of the field research. Chapter 4 discusses the research findings regarding the benefits of cotton picking as compared to available wage-earning alternatives. This is followed by a presentation of the different types of cotton farmers that can be distinguished and the harvesting costs these groups were said to incur (Chapter 5). Chapter 6 explores the potential effect of mechanization on cotton growers and pickers. Chapter 7 summarizes possible measures that are needed to make the cotton harvest mechanization a success for all stakeholders. Chapter 8 offers conclusions and recommendations.

Background: Cotton production in Uzbekistan

19. **Uzbekistan is one of the largest producers of cotton in the world.** It produces between 800,000 and 1 million tons of lint per year, which represents about 4 percent of the world’s total. Uzbekistan ranked sixth in world output and fifth in terms of global exports of cotton in 2012.¹⁵ Official annual state revenues from cotton exports amount to over US\$1.6 billion. Cotton remains the country’s second-most important crop in terms of area of cultivation and has great (albeit declining) political, economic, and cultural significance. Together with wheat, another state-mandated crop, cotton occupies about 80 percent of the cultivated agricultural area.¹⁶ Per capita gross national income (GNI) in 2014 was US\$2,090.¹⁷ As of 2011, agriculture accounted for 19.1 percent of GDP and 25.9 percent of labor force participation.
20. **Almost all cotton in Uzbekistan is harvested by hand, and an estimated 2.2–3 million people were involved in some aspects of the cotton harvest during 2014** (see Figure 1, and see appendix 1 for an explanation of the calculation method used). This represents about 7 percent to 10 percent of the population of Uzbekistan and about 14 percent to 20 percent of the work force. Total gross earnings by workers harvesting cotton were estimated to be between US\$250–\$300 million in 2014, depending on the exchange rate.¹⁸

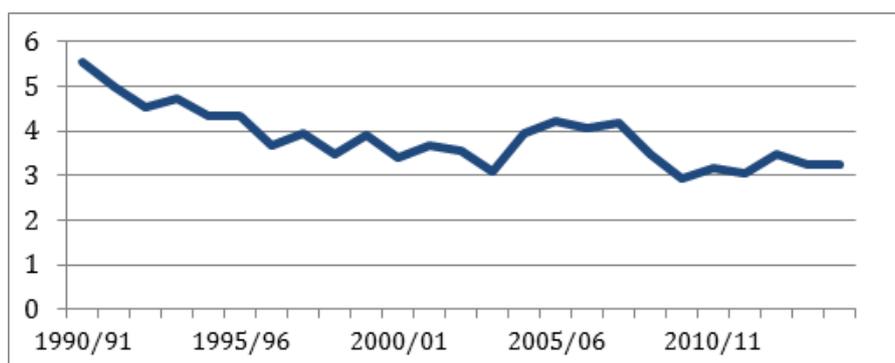
15. According to GoU estimates, the country is ranked third in global export of cotton (World Bank, 2012, 2015).

16. World Bank, 2012.

17. See data.worldbank.org.

18. Townsend, 2015.

Figure 1. Number of cotton harvest workers in Uzbekistan (millions)



Note: See Appendix 1 for an explanation of the method used.

Source: Townsend, 2015.

21. **About 30 percent of all cotton produced globally in 2011 was harvested by machine, while in Western countries the proportion is 90 percent or higher. At present, nearly all cotton produced in Uzbekistan is handpicked, even though mechanization existed during the Soviet period.** The reasons for this are rooted in (i) traditional practices of manual cotton picking that trace back generations; (ii) strong cultural beliefs in the high quality and value of manually picked cotton; and (iii) earlier failed attempts to mechanize after independence. Uzbek farmers take pride in the fact that the cotton produced in their country is highly valued worldwide. Additionally, earlier failed attempts to mechanize cotton harvesting led to high costs yet produced few results due to inappropriate equipment. Poor servicing and repair facilities only further discouraged new attempts to introduce automated harvesting and reinforced belief in the importance of picking cotton manually.
22. **The availability of rural labor diminished when, following the dissolution of the state-controlled collective farms, and in the absence of other industries to absorb rural labor, there was massive labor migration to cities in Uzbekistan and abroad, primarily Russia and Kazakhstan.**¹⁹ The reallocation of agricultural land to large farms with fewer opportunities for permanent employment for many, in turn, resulted in labor shortages on private farms, especially during the growing season.
23. **Cotton growers are said to be unable to mobilize sufficient seasonal workers to meet their peak labor demands during the cotton harvesting season because of low cotton-picking wages set by the government and the low available liquidity (cash) in the economy to pay workers.** Faced with demanding state procurement quotas for cotton, the diminished size of the available labor force, and insufficient incentives for workers to pick cotton, farmers depend on local, regional, and national authorities to mobilize cotton-picking labor for their harvests.
24. **The key reasons for state authorities to mobilize cotton-harvesting labor is ostensibly the “state-order system” within a context of increasing peak labor shortages in rural areas.** Farmers who lease land that has been designated by the state for cotton production are contractually obligated to produce stipulated quantities of cotton. The government sets these production quotas annually, and farmers must sell the cotton to the state at a price fixed by the government. Farmers who fail to meet their assigned quota may incur considerable financial penalties and lose their land. The uncertainty surrounding their land tenure is likely to be reflected in the limited number of farmers who invest in new machinery or land improvement.²⁰ Local government (*hokimiyat*) officials are personally responsible for ensuring that quotas are met, and may face grave consequences if their localities fail to meet the assigned quota. Government pressure to meet production quota cascades down the bureaucracy, from the national level to local *hokimiyats* and *mahallas*.

19. Ilkhamov and Muradov, 2014.

20. Shtaltovna and Hornidge, 2014.

25. **While the practice of using children to pick cotton has declined, there are allegations that individuals over the age of 18 have been mobilized to harvest cotton. University students and civil servants, including teachers, doctors, nurses, and police officers have been taken to the fields in the last several years.** Civil servants and even employees of private firms are often mobilized to pick cotton during the 20–30 days of the peak harvesting season.²¹ Reportedly, during the 2012 cotton harvest, 15 percent to 20 percent of all government employees were working in the cotton fields at any given time.²² People who refuse to participate in the cotton harvest may be subject to sanctions.
26. **Mechanization may have positive economic and social effects, especially if combined with additional sector reform measures.** If successfully implemented and especially in combination with higher cotton-picking fee policies, an accelerated mechanization effort is expected to have an overall positive impact by minimizing the need to mobilize or coerce labor to pick cotton. However, mechanization may also further reduce demand for labor in rural areas and lead to negative impacts.
27. **To date, the importance of cotton picking as a source of seasonal cash income for agricultural laborers in cotton growing areas has been poorly understood.** More broadly, in Uzbekistan there is no information on which population groups in rural and periurban areas are the most vulnerable, or what their characteristics and income sources are. This lack of knowledge hampers the design of measures that can cushion such at-risk groups from the potential negative effects of policies that might be adverse for them, such as the policy to mechanize cotton harvesting. It also inhibits the proposal of alternative livelihood measures. Also, mechanization is unlikely to replace all manual work for cotton picking, but little is known about the cotton-picking wage levels at which the voluntary supply of laborers and their incomes might be maintained or even increased.
28. **In Uzbekistan, the majority of workers tending the fields are women, and they may be the group that is most impacted by mechanization.** There is an increasing feminization of the agricultural sector in Uzbekistan due to the growing outmigration of men to urban centers and abroad in search of employment. Women are the main cotton pickers, and thus mechanization threatens to eliminate jobs that are largely carried out by women. Moreover, new jobs that may be created by mechanization may require skills that women lack.
29. **It is expected that other measures that comprise an integral part of moving away from current cotton production policies—such as crop diversification—will generate new employment opportunities that may offset some of the income-generating opportunities eliminated by mechanization.** The GoU is increasingly pursuing a policy of crop diversification to ensure food security and to increase land and water productivity. The horticultural crops that are replacing cotton offer much higher economic returns. However, the opportunities that this diversification generates for cotton pickers are as of yet unclear. Careful monitoring is needed to ensure that these opportunities are equally accessible to the most vulnerable segments of the population and that there are no adverse direct or indirect effects on these population groups.
30. **Support for mechanization is likely to vary among different types of farmers.** Despite the government decision to mechanize the cotton harvest, it cannot be assumed that this is an optimal solution for all farmers. Under the current cotton sector policies, farmers benefit from a supply of laborers below market cost. For smaller and less well-off farmers, mechanization might be unaffordable and support services inadequate. Given that cotton production is not a profitable undertaking for all farmers, economic incentives for them to mechanize might vary, and mechanization may not necessarily be their preferred option. All this of course depends on the availability of labor and terrain conditions for mechanization.

21. A more detailed discussion on child and forced labor practices in Uzbekistan is provided in the Social Assessment Note and Annex produced for the World Bank–supported South Karakalpakstan Water Resources Management Improvement Project (SKWRMIP).

22. ILRF, 2014.

31. **Attempts to reduce the negative social impacts of mechanizing cotton harvesting will take place in a suboptimal agricultural policy environment, given that the cotton subsector experiences strong government interference.** The current policy environment constrains the development of the agricultural sector and the improvement of the lives of people who depend on it for their livelihood. This study attempts to identify ways to reduce the poverty and social impacts of mechanizing cotton harvesting in a “third-best” agricultural policy environment. The “first-best” situation would be to allow farmers to choose the crops they grow and thus whether they would grow cotton (allowing “freedom to farm”). A “second-best” policy environment would be one that better takes into account the regional differences regarding labor availability and agroclimatic and soil conditions when selecting areas where farmers are mandated to grow cotton.
32. **At any given time, a combination of three modes of cotton harvesting may exist; this depends on circumstances that differ across regions.** The three modes are machine harvesting (currently very low); laborers that are recruited locally to pick cotton; and labor that is mobilized by the state and brought in from outside areas. The share of machine harvesting in the total harvesting effort is likely to be directly related to the level of the cotton picking fee—a higher rate will provide farmers with more incentive to replace expensive labor with machines. The share of machine harvesting is likely to be inversely related to the level of rural labor scarcity—more available local labor would reduce the need for mechanization. The share of voluntary labor is expected to be positively correlated with (i) the level of the cotton-picking fee; (ii) picking productivity, which is linked to the cotton yield; and (iii) local labor availability. Given the pronounced regional differences in labor availability, the situation therefore varies from one region to another.

Background: The rural labor market situation

33. **Aspects of reforms in agriculture and in its cotton subsector should be analyzed in the context of overall trends in population dynamics and in the labor market.** By early 2014, the Republic of Uzbekistan’s total population was estimated to be 30.5 million (compared to 24.5 million in 2000), of which approximately 49 percent was located in rural areas.²³
34. **Agriculture remains the second major branch of the economy, by the number of employed population; 3.1 million, or 27 percent of the total employed.** Approximately 28.5 percent of female labor and 25.5 percent of male labor is engaged in agriculture. Meanwhile, 17 percent of the employed population works in industry and 56 percent in the service sector.²⁴
35. **The 2013 World Bank/GIZ Uzbekistan Jobs, Skills, and Migration survey suggests that 24 percent of the working age population that conducted paid work were engaged in agriculture and fishing.**²⁵ This includes 35 percent of women and 19 percent of men in those age groups. In rural areas, construction remains the second-largest sector of the economy. It provides employment to 20 percent of the rural working-age population (predominantly males), followed by education services at 15 percent of the rural employment (predominantly females).
36. **During the 2000s, Uzbekistan’s economy diversified from agriculture to industry and services, cutting the importance of agriculture in GDP in half, to about 18 percent of GDP.** The share of agricultural exports has fallen from about 45 percent to about 10 percent over the same time period, while exports of fuels and chemicals have largely replaced the agricultural share. Taken as a whole, agriculture constitutes a small and declining share of Uzbekistan’s national income. Even so, it is an important source of income for the 4.7 million households that operate dehqan farms (smallholders in rural and disproportionately poor communities).²⁶

23. The country’s last population census was conducted in 1989, and the population data are calculated based on the number of births and deaths and estimates on migration. According to data from the State Committee on Statistics (2012), the earlier estimate of the rural population at 64.2 percent in 2008 was adjusted to 48.3 percent in 2009 (and 48.8 percent in 2011).

24. State Statistical Committee, 2011.

25. Own data analysis of the 2013 Central Asia Labor, Skills, Migration and Consumption Survey. Sample size for the core questionnaire is 1,500 households with a total of 8,622 individuals. The survey was conducted from July to September 2013.

26. World Bank, 2014.

37. **The employment rate²⁷ of the population between 16 and 64 years old is relatively low compared to other transition countries.** According to the World Bank/GIZ Uzbekistan Jobs, Skills, and Migration Survey 2013, only 55 percent of that age group was employed, meaning they had a job that was defined as having conducted paid work (in the formal or informal sector) in the two weeks prior to the survey, compared to 60 percent to 68 percent of other Eastern Europe and Central Asian economies (see Table 3). In part, this can be explained by the low official retirement age of 60 for males and 55 for females. Mothers with more than three children can retire even earlier. According to the 2013 World Bank/GIZ Uzbekistan Jobs, Skills, and Migration Survey, 34 percent of those who are employed are self-employed. Entrepreneurship in Uzbekistan is dominated by microenterprises that operate in the services sector. About 70 percent of all self-employed individuals do not employ any additional workers. Economic policies in recent years have supported the growth of capital-intensive industries that have a positive impact on GDP and the national economy's productivity, but generate relatively few new jobs.

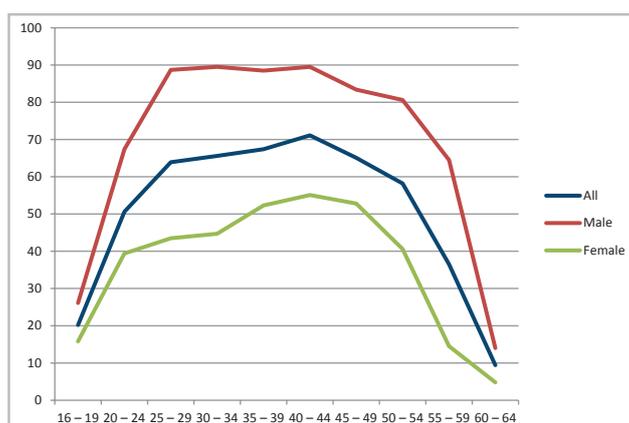
Table 3. Employment rate of the population in selected emerging market economies, %

Country	Age group	Period	Employment rate, %
Uzbekistan	15–64	2013	55.3
Russia	15–72	QIII 2014	65.9
Ukraine	15–70	2013	60.3
Azerbaijan	15–64	2013	63.2
Bulgaria	15–64	2013	59.5
Czech Republic	15–64	2013	67.7
Poland	15–64	2013	60.6
Romania	15–64	2013	59.7
Slovakia	15–64	2013	59.9

Source: Eurostat online; national statistical services.

38. **The female employment rate is particularly low (see Figure 2).** The disparity in employment rates between women in Uzbekistan and women in OECD countries is almost 20 percentage points for 25-to-34-year-olds, and, more significantly, 42 percentage points for 55-to-59-year-olds.²⁸

Figure 2. Employment rate* of population in 2013 by age group (%)



Source: Ajwad et al., 2014 using data from the 2013 Uzbekistan Jobs, Skills, and Migration Survey,²⁹

* The employment rate is defined as the number of people older than 16 years who worked for at least one hour during the two weeks prior to the survey on their own land (excluding kitchen gardens), for someone who is not a household member, or on an own business activity, as a proportion of all people older than 16 who are available for paid work.

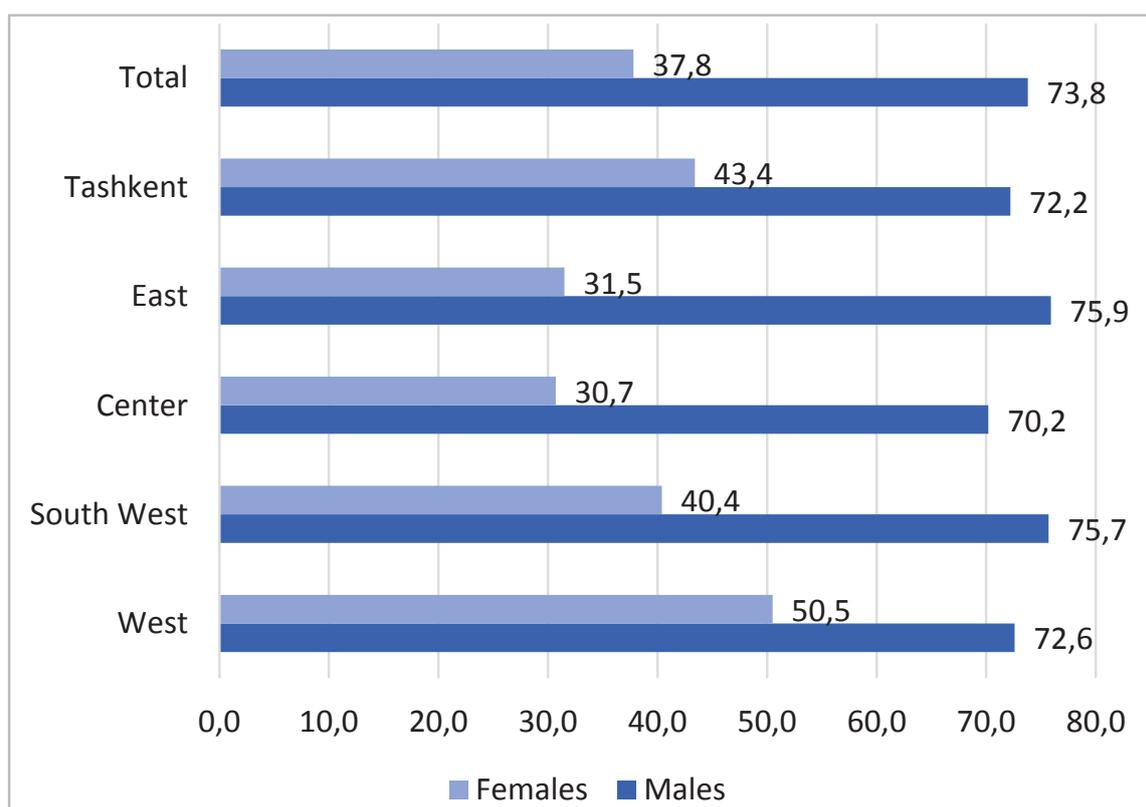
27. Defined as the number of people older than 16 who conducted paid work during the two weeks prior to the survey, as a proportion of all people older than 16 who are available for paid work.

28. Ajwad et al., 2014.

29. Data from this survey are the only household survey micro-data on welfare, income and employment for Uzbekistan that were available to the team for analysis of welfare and labor market trends for men and women.

39. **Especially for women, disparities in employment across different parts of the country are very large (see Figure 3).** The employment rate for women was as low as 31 percent in the center of the country and 32 percent in the eastern part, but 51 percent in regions in the country’s west. Among men, the employment rate equaled between 70 percent in the center and 76 percent in the east and southwest. Low employment rates for women makes the mechanization of cotton harvesting potentially challenging from a social point of view. The gap in average earnings between urban and rural population is relatively modest, especially during the growing season, but females earn significantly less than males (see Chapter 3).

Figure 3. Employment rate of the population in different parts* of the country in 2013, ages 15–64 (%)



* West = Khorezm, Karakalpakstan, and Navoi regions; South West: Khaskhadaryo, Bukhara, and Surkhandarya regions; Center: Samarkand, Jizzakh, and Syrdaryo regions; East: Fergana, Andijan, and Namangan regions.
Source: Ajwad et al., 2014.

40. **Uzbekistan has maintained more than a million migrants in recent decades, fluctuating from 1.6 million in 1990 to over 2 million in 2012–2013.** Among youth, migration rates are particularly high—one in three males between the ages of 20 and 24 is a migrant, according to the World Bank/GIZ Uzbekistan Jobs, Skills, and Migration Survey. These high migration rates stem from deficiencies in the domestic labor market.³⁰ Southern Kazakhstan receives a substantial influx of temporary low-waged migrants—cotton pickers from Uzbekistan.
41. **According to the 2013 World Bank/GIZ Uzbekistan Jobs, Skills, and Migration Survey, 34 percent of those who are employed are self-employed.** Entrepreneurship in Uzbekistan is dominated by microenterprises that operate in the services sector. About 70 percent of all self-employed individuals do not employ any additional workers, and another 21 percent employ fewer than five additional workers. While perhaps the overall job creation rate has kept pace with population growth, it has largely been achieved as a result of the growth in informal activities, including in subsistence agriculture and outmigration of population.

30. World Bank, 2014.

2. International experience with cotton harvest mechanization and its social impact³¹

42. **The percentage of world cotton production harvested by machines was about 29 percent in 2013–2014 and has not changed over the past 15 years.** All or nearly all of production was machine harvested in Australia, Brazil, Greece, Israel, South Africa, Spain, and the United States. In Argentina, Bulgaria, Colombia, Kazakhstan, Mexico, and Turkey, between 60 and 90 percent of production was harvested by machines. In China, 9 percent of total production in 2013–2014 was harvested by machine (up from 5 percent in 1998–1999). Iran and Paraguay also reported small percentages of machine harvesting as of 2013. Machine harvesting is not used in India even though production has expanded there by 4.5 million tons over the past 15 years. While there was no mention of machine harvesting in Uzbekistan in the 2014 report of the International Cotton Advisory Committee (ICAC), it is believed that a few machines were used on 1 percent to 2 percent of the crop.³² This is down from the estimated 5 percent that was harvested mechanically in 1998–1999 using machines that survived from the Soviet era.
43. **This chapter looks at three country case studies—in Greece, Turkey, and Argentina—to review their experience with cotton harvest mechanization.** These countries share certain economic and agroeconomic characteristics with Uzbekistan and mechanized their cotton harvests relatively recently.
44. **There are many advantages to handpicking cotton—higher quality, higher yields, and less trash enters the harvested cotton.** Handpicked cotton tends to be higher quality, as machine spindles tend to break fibers and create little knots, reducing the quality. Yields are about 10 percent higher in handpicked fields because every mature boll is harvested by hand, while many are missed by machines. Handpicked fields can be harvested repeatedly when additional bolls mature, but only once or twice by machine when most of the bolls have matured. For a second or third picking, the cost of fuel and operator time tends to be greater than the value of cotton harvested. Handpicked cotton has less trash, which is plant material inadvertently caught in the harvesting machinery. An additional advantage of handpicked cotton is that cotton plant varieties do not need to be uniform in height; similarly, the maturity of cotton that is handpicked does not need to be uniform. Also, defoliants are not required, and machines do not need to be purchased and maintained.
45. **Every country that has adopted mechanical harvesting techniques did so primarily because of labor scarcity. When labor costs rise, mechanized harvesting becomes more economical.** In Argentina, machine harvesting is about one-fourth less expensive than handpicking. In Greece and Turkey, mechanization reduced the costs associated with harvesting as a share of total cotton production costs by about half. In Greece, the labor associated with cotton picking represented one-fifth to one-fourth of the total cost of cotton production in the 1970s, but harvesting costs currently represent about one-tenth of the cost of production.³³ Mechanization also reduced the time needed for harvesting and transporting seed cotton to gins from 70 person-days per hectare to 20 person-days. Mygdakos reported that as of 1995 producers reported that mechanical harvesting reduced harvest costs in absolute terms by half.
46. **Additional reasons for mechanizing cotton harvesting have been to (i) reduce contamination, particularly in Turkey; and (ii) shorten harvesting time.** Contamination is when nonplant material (jute, polypropylene from fertilizer bags, rocks, dirt, and headscarves and other clothing) inevitably gets caught up in huge heaps of seed cotton as a result of millions of pairs of hands being involved. Mechanized harvest operations are also much faster. A hectare of cotton in Uzbekistan requires between 400 and 500 person-hours of labor to harvest by hand³⁴ but only a couple of hours by machine, which is an important consideration if snow or heavy rain is anticipated.

31. This section is based on Townsend, 2015

32. See the International Cotton Advisory Committee's *Cotton Production Practices*, 2014.

33. Letter from the Greek Ministry of Rural Development and Food, January 7, 2015.

34. According to the International Cotton Advisory Committee's *Cotton Production Practices*, 2013, based on information provided by researchers in Uzbekistan. Estimates of the average amount of seed cotton harvested per day per worker vary substantially and are not measured officially. Official statistics are kept by the Ministry of Agriculture on labor requirements per hectare.

47. **Introducing mechanical harvesting has always been a decades-long process.** In Greece, this process took place very gradually over a 15-year period. In Turkey, it took 20 years.³⁵ Agricultural technology is not modular, meaning one component cannot simply be swapped out of the production system for another, leaving other components unchanged. New varieties must be developed on which fruiting nodes occur on the main stem rather than on branches, thus limiting the width of plants. Varieties must be developed with bolls that form at least 15 centimeters above the ground to enable machinery access. Plants' hairiness (which impedes spindle picking) must be reduced. Varieties must be developed that exhibit uniform plant maturity so that at least 80 percent of potential bolls are open and ready to be picked at the same time. Plant breeders indicate that at least eight years are needed to optimize local varieties for machine harvesting.
48. **Machine harvesting also requires more defoliant and lint cleaners.** Depending on the differences between daytime high and nighttime low temperatures, defoliants might be needed to induce leaf drop. Also, as mentioned, machine picking will result in more trash. Therefore, precleaners (sometimes called lint cleaners) are needed at gins, and the weight of seed cotton per ton of lint will increase, resulting in higher costs for transporting seed cotton to gins. Gins will also have more gin trash to dispose of.
49. **The operating rate of harvesting machines is initially much lower.** It is estimated that operating rate for the first few years is only about 60 percent, because of the time spent maintaining and adjusting the machinery and moving between fields. As farmers and machine operators gain experience, the operating rate of the machines rise.³⁶
50. **Machine harvesting tends to reduce the labor associated with harvest operations by 80 to 90 percent.** Approximately 1.2 hours of labor per hectare are required with mechanical harvesting. Demand tends to increase for experienced machinery drivers and mechanics, and labor is still required to transport seed cotton to gins. With mechanization, job opportunities (as machinery operators) open for all workers, including women. Mechanically harvesting cotton requires operating machinery very precisely to avoid running over rows of plants, moving too fast or too slow, or setting the picker heads too high or too low. There is anecdotal information that women more carefully operate the machinery than men and so are preferred by some farm owners.
51. **Women tend to be disproportionately negatively affected by mechanization of harvest activities.** Many men are able to transition to jobs involving harvesting equipment maintenance or operation; transporting and storing seed cotton; and ginning. Generally speaking, women are not employed in such positions, and cultural practices and gender roles may prevent them from taking such employment.
52. **Governments tend to encourage mechanization. As a result little thought has been given to the impacts of harvest mechanization on rural laborers.** In Greece, Turkey, and Argentina, displaced workers did not receive any compensation or adjustment assistance. Governments introduced little or no support programs targeted toward rural workers displaced by mechanization. There were general social welfare programs targeted toward rural households. In the three countries, most rural workers displaced by the introduction of mechanical harvesting either found jobs in cities or returned to other available agricultural jobs. Men tried to find alternative seasonal agricultural employment, while women often returned to traditional household responsibilities. In Turkey, displaced workers shifted to other agricultural sectors and continued to migrate seasonally in search of employment.

35. A very strong recommendation derived from the experience in Turkey is that delegations of Uzbek farmers and ginners should be organized to visit Turkey and Greece to observe mechanical harvesting and related operations.

36. Greek researchers and government officials with experience dating back to the 1980s emphasize the importance of training farmers and ginners on how to adapt to machine picking. Experts in Greece interviewed for this study suggested that Uzbekistan embark on a robust program of seminars, farm meetings, and ginner training sessions with experts from countries that already machine pick.

3. Cotton-harvesting practices in Uzbekistan

53. **This chapter presents a description of the cotton-harvesting process in Uzbekistan based on the information provided by study respondents in each of the five research sites.** It discusses key actors, interactions among them, and difficulties in hiring labor and organizing the cotton-picking process in the selected regions.
54. **For most tasks, farmers were said to use either permanent farm laborers, temporary workers from local villages, or machines. However, for cotton harvesting there is a need to also mobilize pickers from nearby urban areas and from other districts and regions.** Cotton farmers who participated in the focus groups across the five sites revealed that machines typically plow, sow, and apply fertilizer and pesticides. Farmers either own these machines or rent them from the MTPs. Irrigating the fields was said to be done by full-time farm workers, while for weeding farmers rely on temporary workers from local villages, usually women. The harvest is the most labor-consuming activity of the cotton production process. Focus groups with farmers suggested that between 40 and 150 pickers are needed to pick 1 ha of cotton field in one day. Pickers from local villages or farmers' own workers pick cotton much faster than those brought in from other areas. Every farmer has a cotton cultivation schedule with a timeline for each activity. This schedule is approved and monitored by the *hokimiyat*.
55. **Farmers indicated that they are assigned a cotton production quota by the government. This is based on a composite indicator (the *ball bonitet*) for each of their plots that reflects production conditions.** The indicator is based on the soil's chemical composition, the average precipitation in the area, and the availability of irrigation water. Based on the quota, farmers can receive a low-interest loan from government banks to cover the costs of cotton production, at an annual interest rate of 3 percent. The loan has to be paid off after the cotton harvest is sold to the ginnery. If a farmer fails to meet the quota, his/her income from cotton cultivation might be insufficient to pay back the loan. In such a case, the farmer will need to cover the loan from income earned from sales of other crops, or pay it off the following year. If a farmer fails to meet the quota several years in a row, he or she might become bankrupt and the bank can confiscate his/her property. If farmers do not have a "valid" excuse for not meeting the quota—such as poor weather conditions or irrigation water shortages—the land will be allocated to another farmer.

"There is a significant amount land with low water availability. Because of that many farmers were not able to meet the cotton production quota, had no profit, and were unable to pay off their state loan."

—farmer, Pakhtakor District, Jizzakh

"The many farmers in this area who have been unable to meet the cotton production quota saw their land put up for auction. Household goods, car, agricultural machinery and livestock were also sold to allow the state bank to recover its loan. However, these farmer are allowed to keep their house."

—farmer, Bayaut District, Syrdaryo

56. **Those who participated in the mini case studies claimed that farmers who have met the production quota sometimes give the cotton to their neighbors who have had trouble meeting it.** One farmer in South Karakalpakstan claimed that if a farmer sells more cotton to the ginnery than the production quota, he/she will receive additional benefits in the form of cotton oil and cotton cake (compressed cotton seed used to feed cattle).

"We keep harvesting cotton even if we have already met the quota. The cotton of the first and second grade I sold to the cotton ginnery plant. The cotton of the third and fourth grade I give to other farmers who could not meet the quota."

—farmer, Pakhtakor District, Jizzakh

“If I was supposed to harvest 300 tons of cotton but submitted 312 tons, for the extra cotton the cotton ginnery plant provide me cotton oil and cotton cake. It is done by the decree of our President ... If I submitted an extra 12 tons, then the CGP will provide me 120 kg of cotton oil and 3 tons of cotton cake. Because of that we are interested in exceeding the quota.”

—farmer, Beruniy District, Karakalpakstan

57. **The cotton harvest was said to usually start in the first week of September and end mid-November. The cotton is normally picked in three passes, according to study respondents.** The first pass starts when around 75 percent of cotton bolls are open. After around 10 days or so, more bolls are open and the second round of picking starts. The third round starts after another 10 days or more. Participants in our study stated that if bolls stay open in the field too long, their color might change and their fibers shrink. Usually, when a cotton-picking brigade has completed one pass for a farmer, it moves to another farm and returns later for the second pass on the first farmer’s fields.
58. **There are large price premiums for high-quality cotton.** The cotton that the ginnery (the CGP) receives from the farmers is assessed and then classified into one of five grades. The first grade is the best quality, the fifth grade the worst. The higher the quality of the raw cotton, the higher the prices that farmers receive. Table 4 shows the prices ginneries across the country paid farmers in 2014 for raw cotton.

Table 4. Procurement price of raw cotton and sale price of cotton fiber and cotton seed (in thousand Soum per ton), 2014

Raw cotton grade	Price paid to farmers for raw cotton	Price paid to ginnery for cotton fiber	Price paid to ginnery for cotton seed
First	1,164	4,000	0.32
Second	1,064	3,800	0.21
Third	932		
Fourth	693		
Fifth	288	2,950	

Source: Field work conducted for this study.

59. **According to a representative of a Fergana region cotton ginnery plant, 1 ton of raw cotton (seed cotton), provides 330 kg of cotton fiber, 510 kg of seeds, 60–70 kg of cotton fiber, dust, and dirt.** The quality and sale price of the cotton fiber and cotton depend on the grade of the raw cotton used to produce it. The ginnery was said to be able to sell 1 ton of first-grade cotton fiber for Soum 4 million, while the cotton ginnery plant is paid Soum 3.8 million for the second-grade fiber, and Soum 2.95 million for the fifth grade (see Table 4). Cotton seeds are also graded and the price depends on the quality (see Table 4). The costs involved in processing 1 ton of raw cotton was said to be Soum 0.75 million. This covers salary, gas, electricity, and diesel oil.
60. **Respondents claimed that in order to produce the best quality of cotton fiber and cotton seeds, it is important that the harvesting process meets a number of criteria.** These include: (i) cotton should be picked in passes to make sure only open bolls are picked, while making sure open balls are not left in the sun for too long, (ii) harvesting should be completed before the first autumn rains as wet cotton loses quality fast, and (iii) the cotton should be clean and not contain a high amount of leaves or dirt.

Roles and responsibilities

61. **According to local government representatives and community leaders interviewed for this study, planning for the cotton-picking campaign starts in late July or early August.** The *hokimiyat* of the district establishes a cotton-picking committee (the *pahta shtab*). Usually, the committee includes

representatives of the *hokimiyat*, *mahalla* offices, the Village Assembly of Citizens (VAC), Vodhoz, cotton ginnery plants, police stations, and so on.

62. **The local *pahta shtab* organizes, coordinates, and monitors the process of cotton picking at the district level.** When the *shtab* is established, farmers submit requests for pickers. At the same time, *mahalla* offices start recruiting cotton pickers and make lists of names and ID numbers of people in each village who want to pick cotton. Contracts are signed. The *mahalla* offices submit these lists to the *shtab* and start forming brigades of pickers. Each brigade consists of 100–150 people and is appointed a leader (usually a representative of the *mahalla*), a weigh man (someone who weighs how much cotton each person picks), a nurse, and an accountant. The *shtab* subsequently drafts a schedule of when and for which farmers these people will pick cotton. Usually, people from one village join a single brigade. The brigades then pick cotton on the land of three or four farmers whose fields are nearby. The *shtab* is responsible for documenting the amount of cotton harvested and solving conflicts between farmers and pickers.
63. **Respondents in all five sites claimed that pickers from local areas were only able to meet part of the demand for manual cotton pickers. As a consequence, the *shtab* needs to arrange for pickers from outside the area.** These are referred to as *hasharchi*. The *shtab* approaches different organizations in the district, other districts, or even other regions to ask them to bring cotton pickers to their area. These pickers were said to include government employees, factory workers, and students (older than 18). In Syrdaryo, soldiers were also said to be involved in the cotton harvest. The *shtab* organizes these pickers into brigades, includes them in the cotton-picking schedules, and helps arrange their accommodation and transportation.
64. **Farmers must arrange for the raw cotton to be transported to the CGP. At the end of each day they visit the ginnery to confirm the amount of raw cotton delivered.** *Mahalla* leaders and heads of brigades are responsible for monitoring the quality of the work and the work conditions. *Mahalla* offices also mediate in the signing of contracts between farmers and pickers. *Mahalla* leaders who participated in our study claimed that *mahalla* offices sign contracts with farmers on behalf of pickers. Pickers from Fergana said that the contract states that farmers must provide pickers with lunch and transportation.
65. ***Pahta shtab* members and community leaders stated that each cotton picker is required to meet a quota of 50–60 kg of raw cotton per day. Workers reported being monitored and encouraged to meet the quota, but local pickers generally meet or even exceed the quota.** According to farmers who are located far from population centers and who participated in focus groups in Jizzakh, the *pahta shtab* gives brigades of pickers who are brought from other areas (*hasharchi*) a picking quota. The head of the brigade then divides this amount by the number of pickers and tries to make sure each picker meets the quota. The heads of those brigades were said to sometimes scold those pickers who do not meet their quota.
66. **According to local experts in each research site, local communities provide only 35 percent to 70 percent of all cotton pickers in the district.** The proportion of pickers from outside was highest in Bayaut District (Syrdaryo), where pickers from urban areas and employees from different types of government or private institutions represent 65 percent of all pickers. The proportion of outside pickers was lowest in Beruniy District (Karakalpakstan) and Bagdad District (Fergana), where pickers from local rural communities represent more than 65 percent of all pickers.
67. **As mentioned, farmers claimed they rely on pickers brought in from outside the area for a significant proportion of their labor. This is in part due to competing demands for local workers during the harvest season.** High water availability in Bayaut District (Syrdaryo) has led to high agricultural productivity there and a high demand for agricultural labor during the growing and harvesting season. This district produces a large amount of cotton (17,000 tons per year), while

labor tends to be scarce; there is high demand for agricultural workers to harvest “secondary” crops (rice, corn, vegetables). As a consequence, cotton pickers were needed from outside the area. Even in Bagdad District (Fergana), which has relatively high labor availability, farmers have to rely on pickers from outside the area. This particularly the case for the third or even fourth passes, which were said to draw few local pickers because of the low productivity at that point in the harvest. Pictures 3 and 4 show cotton pickers in Fergana region.

Picture 3. Women picking cotton in Fergana region, Uzbekistan, October 2014



Picture 4. Cotton pickers, Fergana region, Uzbekistan, October 2014



68. **Members of the local community were said to be more motivated to pick cotton since they regard it as an important source of income. In contrast, farmers claimed that pickers brought in from outside the area were less qualified, less experienced, and less keen to pick.** Focus group discussions with pickers from local communities claimed they were able to pick 60–100 kg of raw cotton per day. These pickers were said to be experienced agricultural workers and able to make sure they work mostly on nearby farmers with good production conditions and high yields. However, farmers claimed that pickers brought in from outside the area pick on average only 20–40 kg of raw cotton per day. Farmers from Syrdaryo estimated that a brigade of 100 pickers from the local community could pick 10 tons of raw cotton per day, while pickers who have been mobilized from urban areas manage to pick less than half that amount (only 4–5 tons of raw cotton per day).

“Hasharchi leave too much in the field. As a consequence the government commission does not give us permission to remove the cotton stalks.”

—farmer, Beruniy District, Karakalpakstan

“150 students picked only 900 kg per day in my field. That is 6 kg per person. And I was able to get only Soum 400 per kg for it since it was fourth grade cotton.”

—farmer with fields far from population centers, Bagdad District, Fergana

“Some hasharchi have never seen cotton before and are not keen to work hard. Local pickers are motivated to pick cotton because they are interested in getting income.”

—farmer with poor soil conditions, Pakhtakor District, Jizzakh, FDG with farmers (low soil quality)

69. **Some respondents stated that in many cases those who are brought in from outside the local area to pick cotton may pay locals to conduct the task on their behalf.** Respondents conveyed that these people sometimes hire local community members to pick cotton for them, and pay them substantially more (for example, 50 percent more) than the set price, and then submit the cotton as if they had picked it themselves. Or, local pickers pick cotton under the name of someone who came or was supposed to come from another area (a government employee, factory worker, or student). One of the study respondents in Jizzakh said that a local picker can pick 120 kg in a day, submit 100 kg of it (if a picker submits 100 kg a day, he/she gets a bonus of 1 liter of cotton oil), and sell another 20 kg to a picker from an urban area at a higher price than he/she would normally get.

“Conflicts happen only when hasharchi start enticing local pickers that already work for certain farmers to pick cotton on their behalf. They pay local pickers up to Soum 500 per kg of cotton. As a result local pickers leave farmers for which they were picking cotton who then lose their brigades.”

—farmer, Pakhtakor District, Jizzakh

“People from Tashkent region arrived to help. But some of them are not employees of organizations sent to pick cotton, but are people hired by these employees to replace them. For example, if one kilogram of cotton costs Soum 200, they pay Soum 300 for it.”

—remote farmer, Pakhtakor District, Jizzakh

70. **Local pickers are keen to harvest cotton during the first two passes, when open cotton bolls are plentiful and picking productivity is high, according to pickers who took part in focus groups.** Since workers are paid for the amount they pick, and the fee per kilogram is the same for all passes, local pickers are more motivated to work at the beginning of the season when they can pick more cotton in a given time period, and thus earn more money. In the middle of the season, when all farmers have cotton ready to be harvested and there is mounting pressure to complete the harvest before the oncoming rains, the demand for pickers is the highest; farmers and *pahta shtabs* must mobilize as many people as possible. During this period, farmers have to rely on both local pickers and those brought in from urban areas.

71. **Pickers who participated in our study claimed that toward the end of the season (the third and fourth passes), their interest drops significantly. By this point, there is not much cotton left in the field. Instead of 100 kg a day, a worker can now pick only 10–20 kg per day.** Because the fee per kilogram is set by the government and remains fixed throughout the season, the amount a picker can earn per day average drops by more than five times, and the effort per kilogram of picked cotton increases. By this time, many local pickers leave their brigades. Farmers and *pahta shtabs* have to rely on people brought in from urban population centers to pick the cotton.

“During the first picking, mothers-in-law with daughters-in-law and children come. Everybody comes with the families. And during the second and the third picking nobody comes.”

—farmer, Bagdad District, Fergana

“For the first pass, people pick up to 100 kg of cotton per day, but for the second picking less than 50 kg per day, and for the third pass they pick 30 kg of cotton in a day. They pick less and they earn much less money—about Soum 5,000–6,000 per day, people don’t want to come for this money ... Therefore it is necessary to make the fees higher for the second and third passes. For example, Soum 200, 300, or 400 per kg, then more people will come for the third picking.”

—farmer, Bagdad District, Fergana

72. **During focus groups, farmers revealed that if they have to fully rely on the pickers provided by the cotton *shtab*, they might end up with poor-quality pickers from urban areas, which will delay the harvest until the start of the rainy season and lower the quality of the cotton.** To avoid ending up in such a situation, farmers said they invite the family members of their permanent farm workers to come pick cotton. For example, if a farmer has 20 permanent workers, he/she might be able to form a brigade of 40–50 pickers. If three to four neighboring farmers merge these workers into one brigade, they should be able to organize a brigade of 150–200 motivated pickers.
73. **Farmers from Jizzakh and Syrdaryo mentioned employing another strategy—hiring some good pickers from urban areas or rural areas in other districts, and paying them more than the official rate.** Farmers in Jizzakh claimed that in their district, labor shortages for picking cotton are very high. In response, one focus group participant claimed to have brought in 10 relatives from another district, gave them accommodation and food, and paid them an additional Soum 15,000 per day so they would agree to pick cotton. In Syrdaryo, one cotton farmer said that when he realized he did not have enough pickers, he went personally to a nearby city and asked an urban *mahalla* office to bring him 40–50 good pickers.

Daily schedules

74. **Cotton pickers from local areas who participated in the focus groups were asked to describe the typical day of a cotton picker.** The day starts at 5–6 am and ends at 4–5 pm; pickers are thus in the field 10–12 hours a day. In the morning, pickers from local communities walk to the field or are transported by buses arranged by the *pahta shtabs*. At lunchtime, farmers must provide them with a hot meal. This is a general rule that *hokimiyats* carefully monitor. Pickers from local communities can bring their own lunch or, if their houses are nearby, go home for lunch to, say, check on their children. People from outside the local community who were mobilized by the *pahta shtab* usually start work later (8–10 am) and finish at 5 pm. They are given some form of accommodation, usually in government buildings such as schools and local colleges, and are given food three times a day.
75. **Farmers often start their day at 5 am by meeting with neighboring farmers to discuss how many people will work their land that day, and whether anyone should be relocated from one farmer to another.** For example, it might be the case that pickers were supposed to work on the field of a particular farmer, but if there are not many open cotton bolls on his fields, and if his neighbor's fields are ready for picking, farmers can agree to relocate pickers to the second farmer. During the day, farmers are in the field to provide pickers with working equipment and arrange for lunch. In the late evening, farmers meet with the *pahta shtabs* to report the amount of cotton harvested, discuss the schedule for the next day, and cover any possible problems that could occur.

Payments

76. **According to cotton pickers in Syrdaryo, Fergana, and Karakalpakstan, pickers are paid once every five days and delays are rare.** In Jizzakh, pickers said they receive cash payments on a daily basis. Each brigade has a weigh man and an accountant who each day weigh the amount of raw cotton picked by each person. The cotton is then delivered to the CGP, where the approximate amount of dirt is estimated and deducted from the amount for which payment is made. The fee per kilogram is the same for all regions and is set by the government once a year. It does not differ by passes.
77. **Farmers were said to not be involved in the payment process. CGPs and state banks are responsible for paying pickers.** According to the *mahalla* leader in Fergana, an employee from the state bank comes to the field and pays the pickers directly. Farmers in Karakalpakstan said that brigade heads sometimes receive the money from the bank and then distribute it among pickers. To motivate and attract more pickers, farmers in Syrdaryo and Karakalpakstan said that they use their own personal money to pay pickers daily. Only those farmers who have such cash available can afford to do this. Box 1 presents a case study of one (female) cotton farmer.

Box 1. Mini case study (Fergana): Cotton farmer



Respondent: Female, 46 years old, established the farm in 2005. She has a secondary vocational education in agronomy. Before establishing the farm she worked as a specialist in a biological lab. She has a husband and two grown-up sons. All of them help her on the farm, together with her two brothers-in-law, particularly during the cotton-picking season.

Farm characteristics: Total farm size is 60 ha divided over 13 plots of land, each varying between 9.2 and 0.9 ha. In 2014 she cultivated cotton on 28.6 ha and wheat on 31.4 ha. Overall soil quality is good (*ball bonitet* is higher than 50 points). She has 26 full-time employees.

Productivity of cotton: On average, the respondent obtains about 3 tons of raw cotton from 1 ha. In 2014 she harvested 80 tons of cotton, 70 percent of which was first-grade cotton, 23 percent second and third grade, and 7 percent was fifth grade.

In 2014, 100–200 people were involved in picking cotton on the farm. These were divided over four passes as follows:

- 1st pass: 15 days, 150–200 people
- 2nd pass: 10 days, 150–200 people
- 3rd pass: 5–6 days, 100 people
- 4th pass: 5–6 days, 100 people

Average costs for manual cotton picking in 2014 were Soum 250,000 per 1 ha.

Hiring pickers: The farmer's land is located closely to the villages, and the farmer does not have a problem hiring pickers. According to the respondent, farmers submit their application for the number of pickers needed to the cotton *shtab* when cotton bolls are 70 percent to 80 percent open. Then three or four farmers whose land is close to each other receive one brigade of 150–200 pickers (people from local areas). Then these farmers agree among themselves where pickers will start work first and where they will go next. If there are not enough pickers, the *shtab* can send additional brigades comprised of people from urban areas. However, these groups pick less cotton and pick cotton with more dirt and leaves. Moreover, these groups work mostly two days a week (Saturday and Sunday).

Mechanization: Mechanization has not yet been introduced in the district. Despite the fact that the farmer does not have a problem hiring pickers, she is interested in using machines to harvest cotton on her land. Her opinion is based on the experience of farmers who grew cotton in the Soviet times. She said that she heard from them that machines can harvest cotton of high quality and do not leave cotton in the fields. She believes that mechanization will help reduce cotton harvest costs and timing. The farmer could afford to lease the machine for 10 years. In her opinion, farmers, not MTPs, should be provided with the machines. If at least some farmers purchased them, they could quickly harvest their cotton and then help their neighbors. As a result, most farmers would be able to harvest cotton before the rainy season and get cotton of good quality. If MTPs are provided with the machines, farmers will have to submit official applications for them and there will be long waiting times to get them. There will be no guarantee that the cotton will be harvested on time.

4. Cotton picking and available alternatives

Characteristics of cotton pickers

78. **Local government officials and leaders interviewed for our study estimated that between 14 and 20 percent of the district population was involved in picking cotton in 2014.** Of these, 70 percent to 85 percent were said to be from rural areas, and about one-third (Bayaut District, Syrdaryo) to four-fifths (Beruniy District, Karakalpakstan) of all pickers were from local communities. Pickers are mostly female and typically between 20 and 40 years old (see Table 5).

Table 5. Socioeconomic characteristics of cotton pickers

Sample district	Total number of pickers	Labor scarcity level	% of district population that works as cotton pickers	% of pickers from local rural areas	Female/male ratio
Pakhtakor District (Jizzakh)	10,005	High	16	62	80:20
Bayaut District (Syrdaryo)	23,417	Medium	17	35	70:30
Bagdad District (Fergana)	14,000	Low	20	69	80:20
Beruniy District (Karakalpakstan)	24,000	High	16	79	85:10
To'rtko'l District (Karakalpakstan)	26,889	High	14	61	90:10

Source: Interviews with representatives of *pahta shtabs* (December 2014 and January 2015).

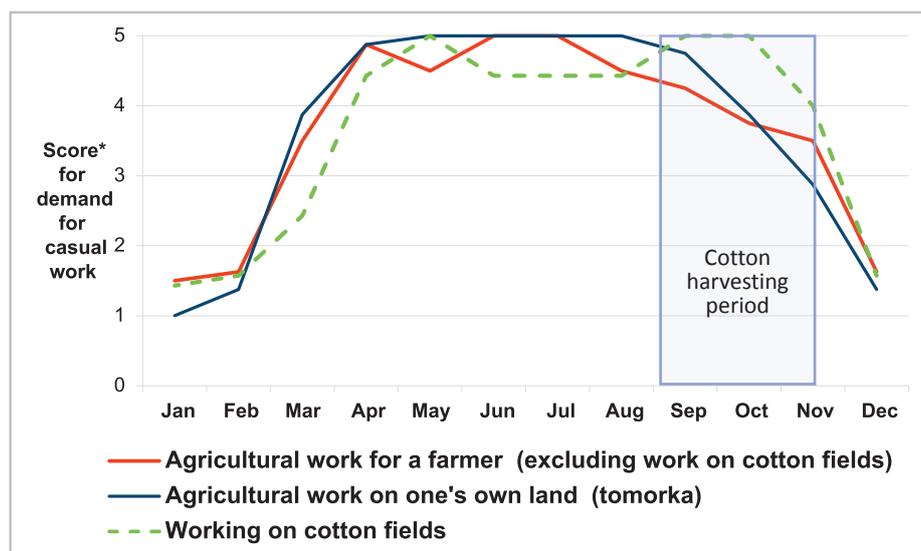
79. **Three main types of cotton pickers were distinguished.** These are (i) local villagers with relatives who work as permanent laborers for a cotton farmer and then pick cotton on these farms, possibly also to reinforce social bonds; (ii) local villagers without relatives who work permanently for a farmer, but are involved in cotton picking on a nearby farm, usually for farmers they know; and (iii) people from outside the district and urban areas who are brought in to the area to pick cotton, usually on the more remote (and sometimes lower-yielding) farms.
80. **Participants in focus groups with local rural cotton pickers were asked what different wealth groups exist in their community and roughly what proportion of each group is involved in picking cotton.** The aim of this exercise was to identify the wealth status of cotton pickers and assess what proportion might be especially vulnerable. In all four regions, respondents claimed that households in their community could be divided into three groups: wealthy, middle income, and vulnerable.
- **Wealthy households, comprising between 10 and 15 percent of the local population.** Cotton pickers participating in focus groups claimed that the main characteristic of this group is that they have some savings and/or extra income they can invest. This group was said to include farmers, traders, entrepreneurs, high-level government workers, and *dehkans*. Cotton pickers who participated in focus groups in all five sites claimed that 20 percent to 50 percent of members from this group pick cotton, mostly to help their relatives who are cotton farmers meet the state quota.
 - **Middle-income households, about 70 percent to 80 percent of the rural population.** This includes government workers, teachers, doctors, *dehkans* who rent land from farmers, and daily wage laborers in the agricultural and industrial sector. This group's main feature was said to be that households manage to meet their daily needs but have limited opportunities to save money. Most of these households have members who pick cotton.
 - **Vulnerable households (5 percent to 15 percent of the population).** Focus groups with cotton pickers suggested that this group consists of the most vulnerable households. Respondents stated that this group includes "lazy" households (those with young male

members who were said not to want to do any heavy work); elderly people living without their children; households that have lost a breadwinner, such as divorced women or widows with children; and households with members that have disabilities. Households from this group have trouble earning enough money to cover their basic needs. Fifty to eighty percent have members who pick cotton. However, the total number of hours worked in cotton fields tends to be lower for this group than for middle-income households. Some households in this group have no members who can pick cotton due to old age or poor health.

Seasonal distribution of demand for casual labor in agriculture

81. During focus groups with pickers, participants were asked which months they and other agricultural workers in the area are most and least busy working in agriculture. A distinction was made between demand from cotton farmers, demand from non-cotton farmers, and labor requirements for their own kitchen gardens (tomorkas). Participants were asked to use a scale from 1 to 5 for each month, where a score of 1 implies people are least busy and 5 indicates they are most busy. The average of the four groups is presented in Figure 4.

Figure 4. Distribution of demand for casual labor throughout the year by (i) cotton farmers; (ii) non-cotton farmers; and (iii) kitchen gardens owned by laborers



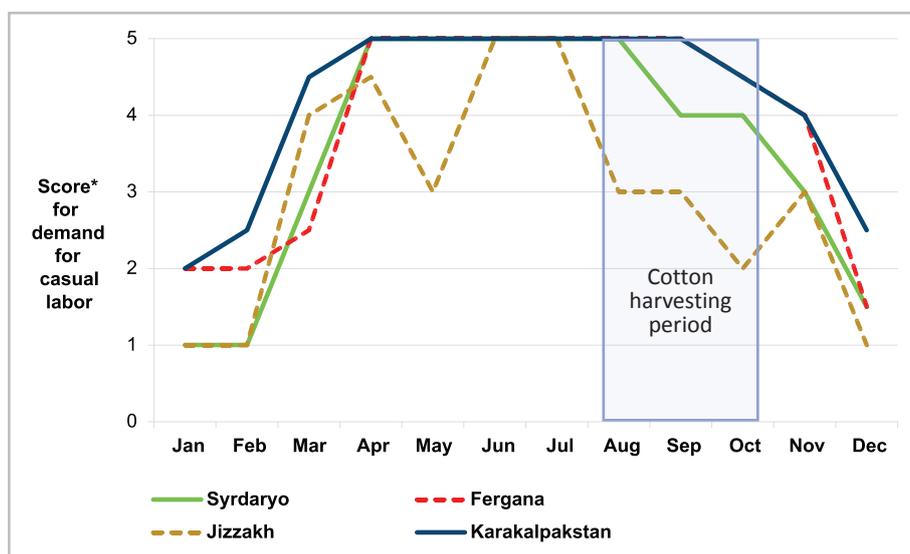
Note: Scale is 1–5, with 1 being the least busy month and 5 being the busiest month. Average scores of four sites are presented.

Source: Focus group discussions with cotton pickers.

82. As shown, at the beginning of the cotton harvest in September, agricultural day workers face competing demand for work on their own tomorkas, while demand from farmers for work on wheat and other non-cotton crops lowers somewhat but is still high. In October, however, when demand for cotton-harvesting labor continues to peak, demand for labor in other agricultural activities lowers further. Agricultural workers are busiest from March to July with irrigation (men) and weeding (women) of wheat and vegetables, as well as harvesting vegetables. Wheat is harvested in July, reducing farmer demand for non-cotton labor after that. Some farmers and *dehkans* that grow vegetables, rice, and horticultural crops require harvesting labor in August and September, which competes with the cotton harvest for labor demand.
83. Overall demand for agricultural labor during the cotton harvest is highest in the research sites in Fergana and South Karakalpakstan, and lowest in Jizzakh (see Figure 5). Fergana has a high proportion of land under horticulture, for which harvesting labor needs are high from July to September. In South Karakalpakstan, labor is relatively scarce and there is a high demand for labor

to harvest horticultural crops, melons, rice, and vegetables during this same period. In Jizzakh, where farmers mostly grow wheat and cotton, overall demand for agricultural laborers seems to drop in August, making local laborers available for part-time work picking cotton. In all four areas, pickers harvest crops from their tomorka in July–September, with the amount of work dropping during late September–October.

Figure 5. Distribution of demand for casual labor throughout the year by non-cotton farmers by region



* Scale is 1–5, with 1 being the least busy month and 5 being the busiest month. Average scores of four sites are presented. Source: Focus group discussions with cotton pickers.

84. **Women typically participate in weeding and picking cotton, while casual male workers are involved in land preparation, irrigation, and cutting cotton stalks.** Men are usually employed as farmers’ full-time workers, while women do their tasks part time. Women tend to be responsible for most of the work on the tomorkas (see next section), except it is generally men’s duty to water these gardens. Picture 5 shows a tomorka in winter in Karakalpakstan.

Picture 5. Tomorka (in winter), To’rtko’l district, Karakalpakstan



Alternative income sources

85. **Cotton-picking households typically have multiple sources of income. Daily wage work for a farmer is an important component of this, especially for women. Men also have work opportunities**

outside the agricultural sector. Focus group discussions with cotton pickers and mini case studies revealed that men may have formal full-time employment contracts with farmers and work for them as mechanics or drivers, or farm managers. Payments were often said to be made in kind in the form of wheat, cotton stalks, or the right to use a piece of land to grow secondary crops. Women usually work for farmers for only six months each year. This includes four months of weeding of cotton and wheat and two months picking cotton. They may also have contracts with farmers. For example, in Syrdaryo and Fergana, some women who do weeding for farmers have contracts with them. Payments for weeding wheat and cotton were said to reach Soum 30,000 per ha in cash and in kind. Women typically weed about 2 ha per month and thus might reach a monthly income of Soum 60,000 (about US\$20–24).

86. **Tomorkas are an important source of income for cotton-picking households. Cotton pickers' households typically have 0.06–0.1 ha of land near their house, which they use to grow fruits and vegetables.** Part of the harvest is used for households' own consumption, while the rest is sold on the local market. If a household member has an employment contract with a farmer, the household can be allocated a plot of that farmer's land (0.2–1 ha) to grow secondary crops after wheat is harvested. Households usually grow vegetables on this land, which they sell on the local market or to middlemen. Usually, women are responsible for cultivating crops on the tomorka and the extra plots of farm land. Livestock is also an important source of income and can be sold when the household needs money, such as for a wedding or in times of illness.
87. **Dehkan farmers—smallholders that typically own about 0.5–2ha on which they are free to grow what they want—do not usually pick cotton.** They instead prefer to use their own land to cultivate horticultural crops or rice, for which the peak labor demand coincides with the beginning of the cotton harvest. However, *dehkans* that also have employment contracts with farmers and rent farmland from them to grow secondary crops normally pick cotton on these farmers' land.
88. **Participants in focus groups with cotton pickers in all sites conveyed that working opportunities outside the agricultural sector are very limited, especially for women.** This is especially so for full-time jobs. These are usually only available in factories located in urban areas, and are often only considered suitable for men. An average monthly salary was said to be around Soum 300,000 per month (US\$100–120), part of which they have to spend on transportation costs. Some cotton pickers (especially the women) claimed that such costs make these jobs less attractive.
89. **As mentioned, there are substantial wage gaps between men and women. However, for both men and women, wage rates between rural and urban areas do not differ much.** No official statistics on wages exist in Uzbekistan. Using the 2013 World Bank/GIZ Uzbekistan Jobs, Skills, and Migration Survey data, we note that on an annual basis, wages for women are one-third below those of males, and during the peak agricultural season about 40 percent less. Wage levels in rural areas are about one-tenth lower than in urban areas. However, during the peak agricultural season (July–September), the wages in rural areas are almost equal to those in urban areas. Differences between parts of the country are also quite significant (see Table 6).

Table 6. Range of rural wage rates in each of the four regions

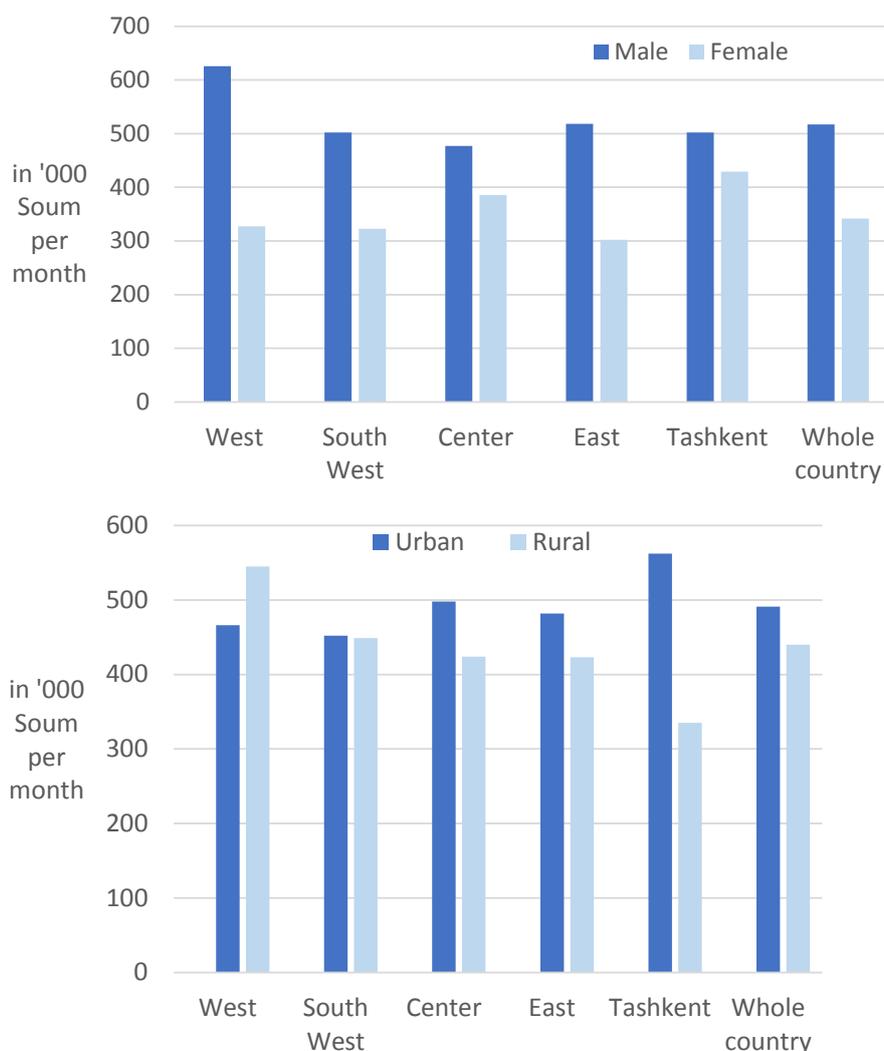
	Karakalpakstan		Fergana		Syrdaryo		Jizzakh	
	Men	Women	Men	Women	Men	Women	Men	Women
Unskilled agricultural day work (except cotton picking), in thousands of Soum per day								
Unskilled nonagricultural day work (making bricks, construction), in thousands of Soum per day	20–40	10–15	30–40	25–30	20–30	10–12	15–20	5–30
Monthly wages of unskilled laborer working full time in a plant in the area, in thousands of Soum								
Unskilled nonagricultural day work (making bricks, construction), in thousands of Soum per day	30–50	n/a	50–60	n/a	20–30	n/a	20–30	n/a
Monthly wages of unskilled laborer working full time in a plant in the area, in thousands of Soum	150–200	150–200	500	400	300–500	150–500	300–400	300–400

Note: Unskilled agricultural daily laborers are usually paid in kind. This can be in the form of wheat, cotton stalks, or access to leasehold land. Daily wages are only paid in cash for cotton picking (payment is every two to five days).

Source: Focus group discussion with cotton pickers in Syrdaryo (December 2014 to January 2015).

90. Discussions with focus group participants confirmed that rural gender wage gaps can be substantial, with daily wages being up to 50 percent lower for women compared to men. Estimates of respondents for each of the four regions (summarized in Table 6) also confirmed that wage differences can be substantial across the country. According to their estimates, daily wages for unskilled agricultural work, for example, are lower in Jizzakh and Syrdaryo then in Fergana (see Figure 6).

Figure 6. Average (net) wages over the past year (2012–2013) (in thousands of Soum/month) by male and female workers, and for urban and rural areas, for groupings of regions



* West = Khorezm, Karakalpakstan, and Navoi regions; South West: Khaskhadaryo, Bukhara, and Surkhandarya regions; Center: Samarkand, Jizzakh, and Syrdaryo regions; East: Fergana, Andijan, and Namangan regions.
Source: World Bank/GIZ Uzbekistan Jobs, Skills, and Migration Survey 2013.

91. Farmers in Syrdaryo claimed that households in the area may have members who have migrated to Russia and Kazakhstan, Turkey, or South Korea, and the remittances they receive from them represent a significant portion of their available budget. These households were said to be relatively well off and their members usually do not pick cotton. In none of the other sites were remittances from labor migration named as an important source of income. Also, some farmers who participated in focus groups in Syrdaryo reported that local pickers were less available in recent years due to migration. They said that women whose husbands work abroad no longer picked cotton. Farmers claimed that these households have a high enough income, and so need not rely on what can be earned from cotton picking.

92. **In all visited districts, local experts and pickers said that vulnerable households could apply to the *mahalla* office for social assistance.** If a household is granted assistance, it will receive Soum 150,000 per month (US\$50–60) for six months. A household can apply for social assistance only once a year and only receive it for up to half a year. *Mahalla* leaders claimed there are strict quotas for providing the assistance. For example, in our study site in Jizzakh, in 2014 the *mahalla* office had a maximum of 17 households out of 1,200 households who were eligible for social assistance from the government. Every year, the VAC receives 30–40 applications but is only allowed to select 17 households. In Syrdaryo, only 10 out of a total of 570 households could be provided with social assistance.
93. **According to *mahalla* leaders, there is a special committee whose members visit each household that applied for social assistance, and then make a decision.** Cotton pickers who participated in the focus groups believed that only the most vulnerable households should apply for the assistance, such as those with members with disabilities, elderly people with no children to support them, or mothers who have lost their husbands. They stated that due to the low quotas for social assistance, it is shameful for a household that has enough income to apply for this. Box 2 presents a case study of a vulnerable household.

Box 2. Mini case study (Fergana): Vulnerable household

Respondent: Female, 39 years old, school-level education, involved in picking cotton since 1995.

Household composition: Respondent, her husband, and three children (a 20-year-old son and two seven-year-old twin daughters).



Sources of income: The respondent's husband and son work as daily wage laborers in the *mahalla* as builders. The husband earns around Soum 800,000 per month (US\$270–320); the son earns Soum 25,000–35,000 per day and works seven to eight days a month. His monthly income is about Soum 200,000 (US\$67–80).

The household has a tomorka of 0.09 ha on which it grows fruits, vegetables, and nuts. In 2014, in addition to its own consumption, the household sold 300 kg of potatoes (at Soum 1,300 per kg), 200 kg of corn (at Soum 1,000 per kg), and 150 kg of nuts (at Soum 3,000 per kg). The total income from their tomorka in 2014 was Soum 1.04 million (US\$340–400).

The respondent has a chronic disease that makes her unable to work outside the house except to pick cotton. This year her health got worse and she was not able to participate in the cotton harvest. However, her neighbor—who is a cotton farmer—kindly hired her to cook lunch for cotton pickers. This provided an extra Soum 800,000 (US\$270–320).

According to the respondent, households that are involved in picking cotton do not receive social assistance from the *mahalla*. They believe that if a household is in need, its members should pick cotton to earn enough to support themselves. However, since the respondent participated in picking cotton since 1995 and could not do it this year due to her poor health, she was included on the list of social assistance recipients. The assistance was Soum 145,000 per month (US\$48–58) and lasted for six months.

Cotton-picking fees and benefits

94. **Rural cotton pickers who participated in our study consider picking cotton to be a seasonal part-**

time job. On average, one picker was said to work in the cotton fields between 42 and 60 days in a season. Most of these days (20–30) are typically spent picking cotton in September during the first pass, when cotton is easiest to pick and more can be picked in a day (and thus yield higher earnings). In October, during the second pass, there is less cotton in the field. Pickers said that during this period they work for 15–20 days, and only 7–10 days during the third and fourth. It is difficult to earn a decent amount during these last rounds as there is little cotton left in the field.

95. **In 2014 cotton pickers were paid Soum 217 per kg of raw cotton (US\$0.72–0.86). The fee is the same across the country, irrespective of labor scarcity or how difficult it is to pick the cotton.** The payment is made in cash every two to five days. The gross fee is Soum 235 per kg, but a labor tax of 7.5 percent is deducted, leaving Soum 217 per kg. If a farmer wants to pay more per kg to attract laborers, they must use their own money. As mentioned, study respondents in Syrdaryo and Karakalpakstan claimed to witness this practice in their area.
96. **As an additional bonus and to boost motivation, pickers are given cotton oil if they meet a daily quota.** A picker will receive 1 liter of cotton oil (worth Soum 5,000) if he/she meets a certain daily quota set by the *pahta shtab* and the farmers. The quota differs by pass. During the first pass the quota is the highest—a person needs to pick 80–100 kg in a day to receive 1 liter of oil. During the second pass this is 50–60 kg of raw cotton, and during the third and fourth pass, 20–30 kg. On average, pickers are able to meet the quota once every two to four days. Cotton pickers who participated in our focus groups claimed they received on average 14 to 28 liters of oil per season.
97. **The practice of providing bonuses in the form of cotton oil was observed in all study sites.** According to pickers, it is a relatively new practice that started in 2011. In Syrdaryo, farmers, together with the *pahta shtab*, extended the practice and give pickers bonuses in the form of sugar and soap. People who picked 100 kg a day for five days in a row receive 1 kg of sugar and two bars of soap. Pickers in Karakalpakstan, however, claimed that farmers there only gave them cotton oil during the third pass, when they would receive 1 liter if they picked 60 kg of cotton in a day (see Table 7).

“The income of my husband is about 70 percent of our annual income. It means that 30 percent of our income is what I earn from picking cotton. This includes cotton oil, sugar, and soap that we receive for picking cotton. We receive enough oil and sugar for the whole year, until the next cotton picking season.”

—female cotton picker, Bayaut District, Syrdaryo

98. **Cotton pickers said that receiving cotton oil as a bonus is an important motivation for them. When the practice was introduced, more people reportedly became interested in picking cotton.** Elderly family members would come to the field to help younger ones meet the daily quota. Several family members would pick, but just one family member would submit the cotton. Households use the oil for cooking, and the amount of oil one picker is able to obtain in a season may cover a household’s consumption for six to eight months. As shown in Table 7, the cooking oil bonus can add 10 percent to 18 percent to cotton-picking income. According to cotton pickers who participated in our study, pickers typically earn between Soum 600 and 1,500 per person per season, which is equivalent to US\$200–600. The last column of Table 7 shows the average rural wage rate for rural Uzbekistan for work outside the cotton sector. As shown, only earnings during the first and second pass can compete with the rural wage rate.

“I come to the field to pick cotton very early in the morning and stop working at 5–6 pm. I try my best to pick 100 kg of cotton to receive 1 liter of oil and as a consequence our household does not buy oil from September until the spring. This season I received 54 liters of cotton oil. We consume around ten liters of oil per month, I have a daughter, she is a student and she also takes some oil with her when she comes home. It means that the oil that I received during the cotton season will be enough for our household for the next five months.”

—female cotton picker, Bayaut District, Syrdaryo

Table 7. Number of working days and average income of a cotton picker

Pass	Number of days rural households typically pick cotton	Amount of cotton picked per worker (kg/day)	Amount of cooking oil obtained per worker* (liters)	Typical daily income of one picker**, excl. value of cooking oil (Soum/day)	Typical daily income per picker, incl. value of cooking oil* (Soum/day)	Average female wage rate (Soum/day)
First pass (September)	20–30	80–130	7–15	17,360–28,210	19,000–30,700	15,000–20,000
Second pass (October)	15–20	40–100	5–10	8,680–21,700	10,340–24,200	15,000–20,000
Third pass (October/November)	7–10	20–40	2–3	4,340–8,680	4,570–10,200	15,000–20,000
Total per season	42–60 days	2,400–6,300 kg	14–28 liters of oil	Soum 521,000–1,367,000	Soum 590,000–1,507,000	

Note: Cotton stalks are only given to laborers who work permanently on their farm, and their family members.

* The sale price of one liter of cotton oil is Soum 5,000.

** Pickers received Soum 217 per 1 kg of cotton in 2014.

Source: Mini case studies with cotton pickers (December 2014 to January 2015).

99. **In addition to bonuses, *pahta shtabs* and *mahalla* offices were said to provide “prizes” to the best pickers.** These come from local entrepreneurs and organizations. Cotton pickers said prizes include towels, watches, DVD players, utensils, and so on. There is no particular quota to qualify for these prizes. The practice, including the type of prizes awarded, varies significantly by area.
100. **Farmers are expected to provide local rural pickers with one meal per day, but focus group discussions revealed that this is not appreciated by all pickers.** Farmers were said to receive prepayments from the CGPs to prepare lunches. *Pahta shtabs* and *mahalla* offices monitor that these lunches (see Picture 6) are indeed provided. Cotton pickers who participated in our study reported that in particular, female pickers do not think this is necessary. Female pickers in Jizzakh said it might take up to two to three hours to feed everyone, and they prefer to bring their own lunches. They claim the quality of the lunch can be poor. In Syrdaryo and Fergana, pickers said they are given lunch every day and are satisfied with its quality. In Syrdaryo male pickers said that each day when they submit their harvest, 5–10 kg of raw cotton is deducted to pay those who cooked lunch. In Karakalpakstan, female pickers said they mostly go home for lunch. Farmers cook lunches mostly during the first and second pass when there are a lot of people in the field, or when the plot is located far from the population area. Pickers suggested that farmers could provide lunch every other day instead of daily.

Picture 6. A woman cooking lunch for cotton pickers, Syrdaryo region, September 2014



101. **Permanent farm laborers whose relatives pick cotton on the farm of their employer might receive additional bonuses in the form of cotton stalks.** These are mostly used as fuel for cooking and heating homes during winter. A farm worker's household is typically allowed to harvest cotton stalks from 1.5–2 ha of farmland. One ha provides between 500 and 1,000 bunches of cotton stalks (see Picture 7). The market price for stalks is about Soum 1,000 per bundle, and thus all cotton stalks for the farm workers' household may be worth Soum 0.75–2 million (US\$250–650). About 500 bundles of cotton stalks cover one household's consumption for one year. If a household harvests 1,000 bunches of cotton stalks, keeps 500 bunches and sells the rest, it will generate Soum 0.5 million of additional income (US\$170–200).

Picture 7. Cotton stalks, Beruniy District, Karakalpakstan



The importance of picking cotton in local livelihoods

102. **Data gathered from focus groups with cotton pickers across the five research sites revealed that income from cotton picking typically represents between 10 and 15 percent of annual income of rural middle and low-income households. For some households this can be as high as 30 percent.** The mean among all our respondents was 12.4 percent. Cotton pickers who participated in focus groups were asked how many of their household members picked cotton in 2014, how much households earned in total from cotton picking, and what proportion of their annual household income this represents. Findings showed that rural households can earn between Soum 0.4–2.5 million (US\$150–800) from cotton picking. The mean is Soum 1 million (US\$330–370). Focus groups

in Fergana and Syrdaryo suggested that households in these areas might even earn on average Soum 1.1 million and Soum 1.3 million, respectively. Of course, the amount earned depends on the number of household members that participated in picking cotton and the number of days they worked in the field (see Table 8).

Table 8. Household earnings from cotton picking in 2014 and its estimated proportion of total household income

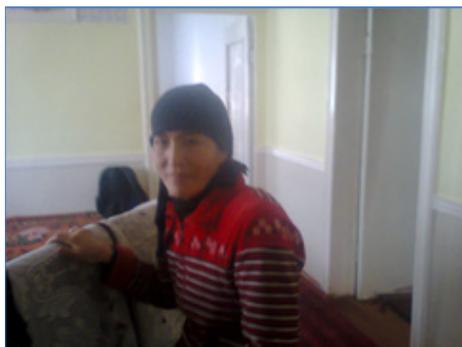
District	Mean number of family members	Mean number of members who picked cotton in 2014	Mean total amount of money earned (million Soum)	Mean proportion in annual income (%)
Syrdaryo	5.6	2.6	1.3	13.3
Fergana	5.9	2.3	1.1	15.5
Karakalpakstan	6.8	1.6	0.8	8.3
Jizzakh	5.4	3.3	0.9	*
Total	5.9	2.4	1.0	12.4

*Pickers in Jizzakh could not calculate the percentage of their income that money from cotton picking represents.

Source: Focus group discussion with cotton pickers (December 2014 to January 2015).

- 103. Focus groups with pickers suggested that the proportion of cotton-picking income versus total annual income tends to be higher for rural middle-income households (up to 20 percent or sometimes even 30 percent) than for the most vulnerable in rural communities (around 10 percent).** Rural middle-income households might have several household members who pick cotton, work the whole day (6 am–4 pm) in the field, and are motivated to earn as much cash as possible. In contrast, vulnerable households often consist of pensioners or women with small children who can only work half of the day, or due to health reasons cannot pick much cotton.
- 104. Cotton picking has several advantages compared to other daily agricultural wage labor. Payment is made in cash, which is advanced by state banks and made almost immediately after the work is completed (usually every two to five days during the season).** This is attractive, given the severe shortage of cash in the economy. In contrast, permanent farm workers usually are paid in kind in the form of the harvest product (such as wheat), or they might be given a piece of land on which to grow secondary crops. Even if a farmer pays workers in cash, workers might be paid two to three months later, after the farmer has sold the harvest. Farmers simply do not have the liquidity to pay their workers in cash until after they have sold their harvests. Box 3 presents a case study of a cotton picker in Jizzakh.

Box 3. Mini case study (Jizzakh): Cotton picker



Socioeconomic background of the respondent: The respondent is a 31-year-old woman. The household consists of five members (the respondent, her husband, and their three children). The respondent has completed only secondary education. The household has a tomorka. Their main source of income is working on the land of other farmers.

Employment and income: The respondent earns money by weeding crops for farmers in spring and picking cotton in autumn. In total, she has paid work during five months of the year. The rest of the time she works on the tomorka. She was paid 600 kg of

wheat for weeding a farmer's cotton land.

The respondent's husband works full time for a farmer. He is responsible for irrigation and is paid in kind. His annual income is 1,000 kg of wheat. Apart from that he is allowed to cultivate 0.2 ha of the farmer's land throughout the year. On another 0.5 ha he is allowed to grow secondary crops after the farmer has finished harvesting wheat. The farmer lets his workers decide how they want to receive the payment; in cash or in kind. The household decided to receive the payment in kind.

The wheat that the household receives as payment is used to make bread. It is almost enough for a year. The respondent sells small amounts of the wheat the husband received whenever they need cash. They grow vegetables on the land they received from the farmer, and sell them to a middleman who is the respondent's brother-in-law. He in turn sells it in Tashkent. They earned 4.5 million Soum (US\$1500–1700) selling vegetables this year.

Importance of picking cotton: The respondent picks cotton every day in September, 15 days in October, and one week in November. She works from 7 am to 7 pm and usually picks 100–120 kg of cotton a day. In total, she earned Soum 960,000 plus 25 liters of oil worth Soum 125,000, making for a total of Soum 1.085 million (US\$350–400).

She spent the amount she received in September (Soum 600,000) to buy her children some school clothes. The money for her work in October (Soum 300,000) was spent on a jacket for herself (Soum 120,000) and some food for the winter. The amount she earned in November was spent on food. The respondent calculated that her income from working on cotton fields (weeding and picking) represents 15 percent to 20 percent of the total household income. The respondent stated that without the opportunity to pick cotton, they will lose a significant part of their income. It might affect her in autumn when she needs to buy clothes for her children. If she can no longer pick cotton, she will not search for other income opportunities, but instead spend more time working on the tomorka and another piece of land the household is cultivating.

105. **Discussions with female cotton pickers indicated that households plan how they will spend the money earned from picking cotton.** Across all five sites, households spend cotton-picking money on the following categories:

- **Livestock.** The money can be invested in, say, a cow. After feeding it for a year it can be sold on the market, allowing them to further raise their income.
- **School uniforms, books, and equipment for children.** Cotton picking takes place in early autumn, which is also the start of Uzbekistan's school year. Cash earned from picking cotton enables families with school-age children to purchase uniforms and equipment.
- **Weddings.** Many families arrange weddings after the cotton season so that some of the costs can be covered with the money earned from picking cotton. People also use cotton-picking money to buy wedding presents. Focus group participants in Syrdaryo claimed it is traditional to present a significant amount of money to their relatives when they get married. Close relatives are expected to give Soum 0.5 million (US\$170–200).
- **Dowry.** In some cases, the bride's family collects a dowry to give to the daughter. In poor families, young women may have to work in order to put together their own dowry. A young participant of the focus group in Jizzakh said that she had set a goal at the beginning

of the season to earn enough money for her family to buy everything she needed for her dowry. She picked 100 kg of raw cotton a day and earned a total of Soum 700,000 during the season. The amount was enough to cover almost all costs. She was very proud that she had managed to do this herself.

- **Preparing the winter.** Cotton pickers who participated in focus groups in Fergana, Syrdaryo, and Karakalpakstan conveyed that income from cotton picking helps households prepare for the winter. They use it to buy coal and wood for heating; winter clothes; and wheat and other food that is more expensive during the winter season.

106. Rural middle-income households that participated in focus groups in Tashkent region thought that picking cotton was a good way to earn extra money without making others think they are in need of extra cash. They claimed that doing other unskilled agricultural work might be shameful, as it lets the community know they are short on money. That problem does not exist with picking cotton, however, as it is considered less shameful and more socially acceptable for this group.

Health impacts of cotton picking

107. Mahalla leaders and representatives of *pahta shtabs* in all five sites claimed there are minimal health impacts involved in cotton picking and that cotton pickers in the field experienced no serious illnesses during the last cotton harvest, or those in previous years. A representative of the *pahta shtab* in the selected sites in Syrdaryo and South Karakalpakstan stated that a number of cotton pickers (estimated at 5 percent in Syrdaryo) fell ill during the last cotton season. The most common illnesses reported were colds and upset stomachs caused by drinking unboiled water.

108. Students who pick cotton for the first time (starting from third-year college students onwards) were said to become sick more often, according to the *mahalla* leaders and *pahta shtab* representatives interviewed for our study. The reason was said to be that they are not used to hard work in the field and have to eat food they are not accustomed to. Elderly people picking cotton were also reported to be sick more often. Ambulances and mobile clinics were said to be available for check-ups and to provide medication to those who get sick.

109. Cotton pickers reported in detail on the different illnesses that affect them in the field. Only cotton pickers in Karakalpakstan claimed there were limited negative impacts of cotton picking. The most common sicknesses reported in the other sites were backache, colds, headache, allergic reactions to defoliants, and exacerbation of chronic diseases.³⁷

- **The most common medical condition that impacts cotton picking was said to be backache.** Cotton pickers participating in focus groups in Syrdaryo, Fergana, and Jizzakh stated that either they experienced backaches or they knew other people who had. Backaches are caused by carrying loads of cotton around in their aprons, which can be quite heavy. This particularly affects women as they tend to pick more cotton. It forces them to take several days off and purchase medical ointment to reduce or treat the pain.
- **The common cold is the second most common illness that affects cotton pickers.** It was said to be caused by working in the rain or chilly morning weather, or in hot weather conditions that make pickers sweat and then cool down in chilly wind. Colds were mentioned in all five study sites except in Karakalpakstan. Usually those who catch a cold take two to seven days off to take medicine and recover at home.
- **Headaches from and allergic reactions to the chemicals used to defoliate the cotton plant** were mentioned by cotton pickers in Syrdaryo and Fergana as problems that had affected them or others. Focus group participants in these sites claimed that cotton picking might exacerbate chronic diseases such as gynecological or kidney-related diseases.

110. Illnesses caused or exacerbated by picking cotton contribute to additional and often unforeseen expenses for the worker. This can range from Soum 50,000–60,000 (US\$30–35) to even Soum 100,000 (US\$60–70).

37. According to the GoU, if cotton pickers have any medical problems, medical support is provided on site. People must pass a “medical commission” to be cleared for work in the field.

5. Types of cotton farmers and their harvesting costs

111. **During focus group discussions, cotton farmers were asked to divide cotton farmers in their area into broad groups of different wealth and describe characteristics of each group.** In all five study sites, participants described three groups: well-off farmers, middle-income farmers, and vulnerable farmers. This chapter describes each of these groups and their characteristics. These groups are not based on statistical analysis of wealth data, but instead reflect the views and perceptions of those who participated in the discussions.

“Better-off” or “golden” farmers

112. **In each of the five sites, well-off farmers were said to comprise about 10 percent to 20 percent of cotton farmers. These cotton farmers are also referred to as “powerful,” “rich,” “golden,” or “giant” farmers.** The main feature of this group is that their revenues exceed their expenses, and they manage to make a profit from cotton farming. They distinguish themselves from other groups in that (i) their farm land is located close to population points and has good-quality soil (*ball bonitet* is 60–65 points or higher) and access to a reliable supply of irrigation water; (ii) their income is generated by different types of crops, and, in addition to wheat and cotton, they also grow horticultural crops and keep livestock; (iii) their farm size varies from 80 ha to 100 ha; and (iv) they tend to have high yields and produce up to 150 percent of their state-mandated cotton production quota.
113. **Farmers in the well-off group have adequate resources to plough, sow, weed, and harvest their crops on time.** They have their own machinery (up to five different types) and do not depend on the service of the MTPs for their farm activities. For labor they rely on their permanent workers, who each bring in family members and people from local communities to harvest the cotton. As noted in the previous chapter, cotton pickers from the local area are motivated to work on these farmers’ land for a number of reasons. First, their land is closer to population points, reducing travel time to the field. Second, the quality of their cotton is better, allowing pickers to harvest more cotton per day than on other farms, and to earn more cash in a day. Third, these farmers can afford to provide additional bonuses and provide pickers with a better food.

“I used to be a poor farmer. But I set a goal to become a well-off farmer. I knew that I need machinery to achieve the goal. I worked really hard. I borrowed money to purchase the first unit of machinery. Later I purchased my second unit of machinery using my own money. I leased my third unit of machinery. And now I have a plan to lease a combine harvester ... That is why I say that the only way to help poor farmers is to provide them with better leasing options.”

—farmer who participated in FGDs with farmers with good-quality soil

114. **Well-off farmers have access to a reliable source of good-quality irrigation water.** They tend to cultivate land that is close to the beginning of the irrigation canal, where water is more plentiful than at its middle or end. Farmers in Fergana conveyed that those with land situated at the beginning of the canal also receive better quality water that is relatively free from chemicals (unlike canal water further downstream). Wealthy farmers tend to rely on gravity irrigation and thus do not need to pump water to their fields, which saves money on electricity and leaves them unaffected by electricity shortages or pump/pump station breakdowns. This was considered a crucial factor by farmers in Karakalpakstan, where focus groups with farmers suggested that only 20 percent to 25 percent of farmers receive water through gravity irrigation. Other farmers rely heavily on pumps and incur higher costs to produce cotton.
115. **Due to these favorable circumstances, well-off farmers have the highest yields: 3–3.5 tons of raw cotton per ha. They also incur relatively modest costs** and their debts are low. Farmers in Syrdaryo, Fergana, and Karakalpakstan stated that only the well-off farmers are allowed to grow seed cotton, which CGPs purchase at the highest price. Table 9 summarizes the characteristics of well-off farmers for each of the four regions.

Table 9. Characteristics of well-off farmers by districts

Group characteristics	Jizzakh	Syrdaryo	Fergana	Karakalpakstan
The wealthiest farmers				
Definition of the group provided by participants	Well-off farmers, “powerful” farmers, “mighty” farmers	Rich farmers, wealthy farmers	“Giant” farmers	“Golden” farmers, upper-class farmers
% among all farmers from the district	20	20	10	20
Amount of land (ha)	More than 60	100 or more	Not an important indicator according to participants	Varies from 80 to 100
Quality of soil	<i>Ball bonitet</i> is higher than 70 points	<i>Ball bonitet</i> is higher than 55 points	<i>Ball bonitet</i> is more than 50	<i>Ball bonitet</i> is 60–65 points
Machinery	Own all necessary machines	Own all necessary machines (5 units or more)	Own all necessary machines	Own machines for all major stages of agricultural process
Water access	Land is located at the beginning of the canal, good access to water	Drip irrigation, good access to water	Land located at the beginning or middle of the canal, good quality of water, uses drip irrigation	Drip irrigation, close to the water source (less than 50 km)
Average production of cotton (ton per 1 ha)	3–3.5	3.5–4	3–3.5	3–3.5
Location regarding population points	Not an important indicator	Less than 5 km from populated areas	Close to population points (less than 2–3 km)	Close to population points (less than 5 km)

Source: Focus group discussions with cotton farmers.

Middle-income farmers

- 116. Middle-income cotton farmers represent around 50 percent to 60 percent of all cotton farmers in all five sites. They make little profit from cotton due to variable yields and high production costs,** according to the cotton farmers that participated in our focus groups. While these farmers normally meet the state production quota, they incur higher costs due to poorer soil quality and the more remote location of some of their plots. They also have more constrained access to irrigation water. Focus group participants reported that middle-income farmers typically manage to cover their cost of production and pay off loans provided by state banks, but very often make no or very little profit, making it difficult for them to invest in their farm by, for example, buying new machines.
- 117. In Karakalpakstan and Syrdaryo, focus group participants claimed that farmers in this middle-income group have high-quality soil (*ball bonitet* of 60) for some of their plots, while the soil on their other plots is of lower quality (*ball bonitet* of 40).** The higher-quality soil is usually found on plots closer to population centers, while plots with lower-quality soil are located further away. Respondents across all sites stated that farmers in this group tend to own some machinery, but it is often outdated. They must therefore rent certain machines from MTPs or well-off farmers. In Karakalpakstan, it was said that middle-income farmers usually lack machines for land preparation.
- 118. Middle-income farmers tend to meet 90 or 100 percent of the quota and incur relatively high production costs.** Their yields are between 2 and 3 tons of raw cotton per ha, about 1–1.5 tons per ha less than the well-off farmers. Due to the more remote location of their land, poorer soil quality, and less reliable supply of irrigation water, they tend to have higher cotton production costs than well-off farmers. They barely manage their production costs and their profits tend to be low or non-existent. They have no means to purchase new machines.

119. **Usually, these farmers’ land is located at the beginning or middle of the canal,** or some are located at the head of the canal. Others, however, others are situated at the middle or tail end of the canal. Some middle-income farmers in Fergana and most in Karakalpakstan said that they depend on electric pump irrigation, which means they incur an additional electricity expense. Table 10 provides further details on the characteristics of middle-income farmers in each region.

Table 10. Characteristics of middle-income farmers for each region

Group characteristics	Jizzakh	Syrdaryo	Fergana	Karakalpakstan
Middle group				
Definition of the group provided by participants	Middle-income farmers	Middle-income farmers	“Average” farmers	Middle-income farmers
% among all farmers from the district	60	60	60	50
Amount of land (ha)	50–60	Not an important indicator that distinguishes the group	Not an important indicator that distinguishes the group	Not an important indicator that distinguishes the group
Quality of soil (points)	<i>Ball bonitet</i> is 40–60	<i>Ball bonitet</i> is 45–50	<i>Ball bonitet</i> is 40–50	<i>Ball bonitet</i> is 40–60
Machinery	Own some machines, but have to rent some as well	Own some machines, but not all necessary machines (on average, 1–2 units)	Own some but not all necessary machines	Own some but not all necessary machines
Water access	Land is located at the beginning or middle of the canal, medium access to water	Drip irrigation, good and medium access to water	The farmers’ land is located at the beginning or middle of the canal, mostly drip irrigation	Pump irrigation, located remotely from the water source (more than 50 km but less than 80 km)
Average production of cotton (tons per 1 ha)	2–3	3	2–3	1.8–2
Location regarding population points	<i>Not an important indicator</i>	<i>Not an important indicator</i>	Medium distance	A typical farmer from the group has both close and remote pieces of land from population areas (30–80 km)

Source: Focus group discussions with cotton farmers (December 2014 to January 2015).

“Vulnerable” or “lagging” farmers

120. **Vulnerable farmers are also referred to as “lagging” or “bankrupt” farmers. This group represents 20 percent to 30 percent of all cotton farmers in the studied districts, according to respondents.** Focus group participants in Syrdaryo and Karakalpakstan stated that farmers in this group struggle to meet the state quota and have no funds to invest in their farm. They have trouble repaying their debts to suppliers and banks, and the gross value of their harvests tends to be lower than the expenses they incur.
121. **Respondents believed that limited access to water is the main cause of low yields for this group of farmers.** Their plots are often located near the tail end of the canal, so they receive less and poorer-quality water than farmers upstream. Moreover, they rely on pump irrigation (except those in Jizzakh) and thus incur electricity expenses to operate the pumps. Insufficient irrigation results in shorter cotton plants, which was said to be problematic for the harvesting machines that are currently on the market.

“How can poorly performing farmers pick cotton with machines when there is not enough water for their cotton! They have undersized cotton. Machines do not pick such cotton. Their land is located in the droughty zone; mechanization cannot be applied there.”

—Participant in focus group with farmers close to population centers, Pakhtakor District, Jizzakh

- 122.** The farmers in this group usually do not have any equipment or machinery as they have no money to buy, lease, or rent them. Cotton yields tend to be low: 1.5–2 tons of cotton per ha, and the cotton’s quality tends to be poorer than other farmers’ cotton.
- 123.** These farmers’ lands are located far from population points (50–120 km). This makes it difficult for them to attract villagers to pick cotton. Instead, they rely on poorly motivated pickers from outside the areas, such as those brought in from urban areas by government organizations. See Table 11 for some of these farmers’ characteristics. As mentioned in the previous chapter, local pickers are least motivated to pick cotton on the fields of this group. These farmers were said to provide poor working conditions; water, lunch, and work equipment are reportedly insufficient for pickers. Secondly, the yields and quality of their cotton tend to be low, making it unattractive for local pickers to work on these farms.

Table 11. Characteristics of vulnerable farmers, by district

Group characteristics	Jizzakh	Syrdaryo	Fergana	Karakalpakstan
The least wealthy farmers				
Definition of the group provided by participants	“Lagging” farmers	“Lagging” farmers	“Lagging” farmers	Vulnerable, bankrupt farmers
% among all farmers from the district	20	20	30	30
Amount of land (ha)	Less than 50	Not an important indicator	Not an important indicator	Not an important indicator
Quality of soil (points)	<i>Ball bonitet</i> is less than 40	<i>Ball bonitet</i> is less than 45	<i>Ball bonitet</i> is 30–40	<i>Ball bonitet</i> is 35–40
Machinery	No machinery	No machinery	No machinery	No machinery
Water access	Land is located at the end of the canal, low water availability	Pump irrigation, land is located at the end of the canal, low water availability	Drip or pump irrigation, land is located at the end of the canal, low water availability, low water quality, high electricity expenses	Pump irrigation, located remotely from the water source (more than 80 km), high electricity expenses
Average production of cotton (ton per 1 ha)	1.5–2 (the quality of the cotton tends to be lower than in the two previous groups)	1–2.5	1.5–1.8	1.5–1.8
Location regarding population points	Not an important indicator	Remote farms (more than 5 km from population points)	Remote farms (30–40 km from population points)	Land is located far from population points (50–120 km)

Source: Focus group discussions with cotton farmers (December 2014 to January 2015).

- 124.** In sum, cotton farmers’ wealth depends on quality of soil, access to machinery, location of the farm relative to population points, and access to irrigation water. These factors together influence cotton yields and production costs, and particularly influence the costs for manual cotton picking.
- 125.** Vulnerable farmers tend to spend more money on cotton picking than better-off farmers. This is evident from a comparative analysis of costs for cotton picking of better-off and vulnerable farmers for Syrdaryo, Karakalpakstan, and Fergana, based on data collected in each site. Vulnerable farmers pay up to 35 percent to 65 percent more per kilogram of picked cotton than better-off farmers. This is due to workers’ higher transportation costs; the cost of providing more frequent meals; workers’ lower productivity; and (in South Karakalpakstan) higher bonuses and fees per kilogram to attract workers (see Table 12).

Table 12. Farmers’ cost of manual cotton harvesting per site and farmer type

Description of area	Karakalpakstan		Fergana		Syrdaryo	
	High scarcity of labor, low extent of mechanization (0 percent of area is harvested by machines)		Low scarcity of labor, high proportion of land under cotton, low extent of mechanization (0%)		Medium scarcity of labor, high extent of cotton mechanization (12%)	
Farm type	Wealthy farmers—land close to population points (20%)	Vulnerable, low-income farmers—remote farms (> 40 km from population points (20%))	Wealthy farmers—grow seed cotton (20%)	Low-income farmers—remote farms (20%)	Wealthy farmers—“giants,” grow seed cotton (10%)	Low-income farmers, remote farmers (30%)
Average number of workers who pick cotton on 1 ha of field	50	30–50	70–120	70–100	70	40–50
Average cotton productivity (tons of raw cotton)	3–3.5					
	1.5–2	3–3.5	1.5–1.8	3.5–4	1–2.5	
Picking fee (Soum per kg of raw cotton)	217	250–350*	217	217	217	217
Income tax (7.5%) (Soum per kg of raw cotton)	18	18	18	18	18	18
Oil (bonus for pickers)(Farmers buy from the plant and pay Soum 3,700 per liter) (liters)	5 per 3–3.5 tons of raw cotton					
	4 per 1.5–2 ton of raw cotton					
	10–15	10–15	10–12	10–12		
Value of food for pickers (Soum per day per person)	5,000	5,000 for lunch, + 5,000 for breakfast and dinner**	2,000–2,500	1,000–2,000	1,500–2,000	2,000–2,500
Costs to deliver people to the field (diesel oil renting of the bus, plus driver’s fee) (Soum)	60,000–200,000	100,000–200,000	15,000–50,000	150,000–200,000	50,000	60,000
Other costs (Soum)	40,000–50,000	40,000–50,000	40,000–50,000	40,000–50,000	40,000–50,000	40,000–50,000
Average costs per ha (Soum)						
	1,207,250	1,066,300	1,101,250	781,500	1,029,200	658,200
Average costs per kg of raw cotton (Soum)	371	609	339	474	274	376

Note: Data from Jizzakh are incomplete.

*According to respondents here, farmers with remote land tend to pay higher fees.

**If people stay in the farmers’ house for 3–5 days, the farmer provides them with an additional meal (breakfast, evening meal).

Source: Focus group discussions with farmers.

6. Mechanizing the cotton harvest: Potential impacts on cotton pickers and cotton farmers

126. **During focus group discussions with cotton pickers and farmers, participants were asked what—in their view—would be advantageous and disadvantageous about mechanizing the cotton harvest.** This chapter summarizes those discussions.

Potential impact of mechanization on cotton pickers

127. **Cotton pickers across all sites believed that cotton harvest mechanization will negatively impact their livelihood. Female cotton pickers were particularly concerned.** They claimed that if machines harvest most cotton and demand for cotton-picking labor falls, it will impact their contribution to their household income. In addition, their household “power” and autonomy would be affected and their real contribution to the household budget would decline. They are unsure that they would find an alternative income source to compensate for the loss.
128. **Male participants in focus groups with cotton pickers were more positive about the effects of mechanization.** They claimed that if there are fewer jobs for cotton pickers, they will work longer hours on their tomorka or do some other daily wage job, such as work for *dehkans* that grow horticultural crops or vegetables. Moreover, young male participants (20–25 years old) claimed that mechanization would open new job opportunities for them. They believed that if the entire cotton harvest is mechanized, farmers and MTPs will need drivers and mechanics. If local colleges provide courses on how to operate these machines, they would like to take them and apply for such jobs.
129. **In districts where labor is scarce (such as those in Jizzakh), cotton pickers raised the concern that mechanization would bring down daily wages for other agricultural work.** Currently, due to high labor scarcity and significant demand for cotton pickers, as well as the fact that other crops (vegetables, horticultural crops) need to be harvested at the same time as cotton, farmers must pay higher wages to workers to harvest vegetables and horticultural crops. If there is less or no demand for cotton pickers, however, more labor will be available in September–November, and farmers will set lower daily wages for agricultural work.
130. **Cotton pickers in all sites suggested that a positive effect of mechanization will be to eradicate the need for government employees (teachers, doctors) and students to pick cotton** (especially in remote areas, where local people do not want to pick cotton). Consequently, schools and local hospitals will operate on a normal schedule during the cotton season.

“Mechanization will help a lot. Because organizations will have less problems and less additional expenses. Students of universities and institutes will not stop their study. People who come from Tashkent to pick cotton, had to stop their work. State expenses will be reduced.”

—FGD with cotton farmers with poor soil quality, Pakhtakor District, Jizzakh

131. **Local government representatives, local leaders, and farmers were more optimistic about the potential impact of mechanization on cotton pickers. In their view, mechanization cannot eliminate all demand for cotton pickers.** First, some farmers in the district will keep growing seed cotton, which can only be harvested manually. Second, not all land is suitable for machine harvest—small plots, unevenly shaped plots, and plots with low soil quality and poor water availability are unsuitable for mechanization. Cotton that is grown on such land will either be harvested manually or the land will be allocated for secondary or horticultural crops. Consequently, farmers will still require people to work on the land. Third, machines that are currently available on the market leave some cotton in the field, and participants expected farmers to need to hire people to pick the cotton machines leave behind.

Potential impact of mechanization on cotton farmers

132. **Overall, farmers in all four regions who participated in our study claimed that mechanization will offer important advantages in terms of the overall logistics of the harvesting process and completing the harvest on time.** They stated it is easier to manage one machine and one driver than 100 cotton pickers. A machine can harvest the same amount of cotton in an hour that 50–100 pickers can do in one day. Farmers in Syrdaryo and Jizzakh, where labor is scarcest, and farmers whose farms are located far from population centers, see the most advantages in mechanization. Even if machine harvesting reduces the quantity and quality of cotton harvested, the advantages would still outweigh the costs.

“With mechanization one person will replace 100 pickers. You need one machine and one driver instead of 100 pickers. Now in remote lands it will be easier to harvest cotton. It will be easier to harvest cotton for all farmers. They will take less time to harvest cotton, we will be able to seed wheat earlier.”

—participant in focus group with farmers with more than 30 ha of cotton,
Bagdad District, Fergana

133. **If mechanized, the harvest can be completed in one month instead of three, which will allow farmers to sow wheat earlier, increasing its yield.** The second advantage of completing the harvest on time is to avoid the rainy season. Farmers reported that rain can significantly lower cotton’s quality, which affects its sale price.

134. **Farmers in Jizzakh and Syrdaryo, where part of the cotton harvest is already mechanized, pointed out that not all of their plots are suitable for mechanized cotton harvesting.** These plots have irregular shapes or are rugged in the corners. Currently, farmers have to follow the state order to grow cotton on these fields. But they said that because machines will not be able to harvest cotton on such plots, they can be used to grow high-profit secondary crops instead. Discussions with farmers in Jizzakh revealed that some plots receive limited water, making it very difficult to ensure that cotton plants are of sufficient height for machine harvesting. According to farmers, such plots could instead be used to grow vegetables, horticultural crops, or fodder crops, all of which require less water.

135. **Farmers in Jizzakh and Syrdaryo who have experience with mechanized harvesting reported it can save up to 50 percent of cotton-harvesting costs.** Farmers in Syrdaryo claim that machine harvesting costs them around Soum 200,000 per ton of raw cotton, whereas manual harvesting costs Soum 300,000–400,000. They provided the following calculation:

- Currently, farmers pay MPTs Soum 177,000 per 1 ton of raw cotton for machine harvesting. The service includes the machine, a driver, and a mechanic. If a farmer has a cotton yield of 3 ton per ha, he/she will need to pay the MTP Soum 531,000. In addition, the farmer needs to pay for fuel. To harvest cotton from 1 ha, the harvesting machine requires 30 liters of diesel oil. At a market price of Soum 2,700 per liter this equals Soum 81,000. In total, the farmer will have to spend Soum 612,000 for machine harvesting per ha, or Soum 204,000 per 1 ton of raw cotton.
- For manual harvesting, the same number of cotton farmers need to pay pickers Soum 235,000 per ton (the current fee is Soum 235 per 1 kg, including tax). Harvesting 1 ha of cotton costs the farmer Soum 705,000. On top of that, farmers need to pay for cotton oil (to give pickers as a bonus) and for transportation costs. According to farmers in Syrdaryo, this results in a total cost of Soum 0.9–1.2 million per ha, or Soum 300,000–400,000 per ton of raw cotton.

“I calculated the costs for mechanized and manual harvesting of cotton, and the costs of machine harvest were relatively lower. Farmers incur high costs for manual cotton picking. Apart from the fee, we provide pickers with cotton oil, soap. We pay taxes on their salary. We provide them with lunch. A brigade of pickers can pick cotton on one of my fields in one week. I calculated that a machine did the same task in three days.”

—participant in an FGD with farmers in Jizzakh with less than 30 ha under cotton

Pictures 8 and 9 show cotton harvesters produced in Uzbekistan.

Picture 8. Cotton harvesters produced in Uzbekistan, Bayaut District, Syrdaryo



Picture 9. Cotton harvesters, Syrdaryo region, September 2014



136. **The quality of harvesting machines led to heated discussions among farmers who participated in focus groups in Syrdaryo and Jizzakh. Many blamed the machines’ poor quality for the low-grade cotton that resulted when they harvested by machine.** Nearly all farmers in Jizzakh who harvested by machine in 2014 got a lower price for their second-grade cotton. Only one farmer managed to obtain a first-grade price. Farmers in Syrdaryo, Jizzakh, and Karakalpakstan had a number of concerns regarding the quality of harvesting machines that are currently on the market. Some farmers here who participated in a mechanization pilot were given first-grade prices even if their cotton was second grade (probably as an encouragement). Technical issues that farmers raised during the discussions include those discussed in the following paragraphs.

137. **A primary concern is that compared to manual cotton picking, current machines have spindles that result in shorter and thus lower-grade cotton fiber.** The spindle is the part of the machine that removes the cotton from open bolls. Farmers who participated in focus groups in Karakalpakstan and Jizzakh claimed that the harvesting machines that were available during the Soviet era and harvesting machines of an American brand did not have this problem. In Karakalpakstan, some farmers said they wanted to see how spindles work before deciding whether to harvest by machine. There was an intense debate among farmers over whether the spindle can be adjusted and whether MTPs allow farmers to adjust these themselves.
138. **A second concern expressed by farmers regards the fan, the part of the machine that sucks cut cotton into a basket. Farmers claimed that the fan is not strong enough and leaves too much cotton in the field.** Farmers participating in focus groups in Karakalpakstan and Syrdaryo claimed that representatives of the factory that makes the machines closely monitored machines' performance during the 2014 harvest. The representatives told farmers that the machines will be modified in the future.
139. **The importance of adjusting agronomic practices of cotton cultivation to better suit machine harvesting was also discussed by farmers during focus groups.** Farmers in Syrdaryo, as well as representatives of the MTPs and CGPs in Syrdaryo, Jizzakh, and Karakalpakstan, claimed that cotton should be grown differently if it is harvested by machine. Cotton should be planted in rows 0.9 meters apart, but according to farmers in focus groups in Karakalpakstan and Fergana, it is currently planted in rows 0.6 meters apart (farmers in Jizzakh and Syrdaryo said they currently plant rows 0.9 meters apart). However, according to farmers from Syrdaryo, even if farmers are supposed to plant at 0.9 meters, they do not follow that guidance very strictly when their cotton is harvested manually. The real distance could be between 0.7 and 0.95 meters. Farmers in Syrdaryo said that this year they followed the adjusted agronomic practices required for a mechanized harvest and claimed to not experience any significant loss in the cotton's quality.

"I always sowed cotton in rows 0.6 meter apart. But in 2015 I plan to sow all my cotton in rows that are 0.9 meters wide distance, so I will be able to harvest by machines. On each 100 tons of cotton I will save Soum 25–30 million on labor. If I harvest by machines 200 tons of cotton, I will save Soum 60 million. It is enough to buy a new tractor."

—participant in FGD with large cotton farmers, Beruniy District, Karakalpakstan

140. **Farmers who want to mechanize their harvest prefer to lease the machines instead of renting them from MTPs.** Farmers were worried that if MTPs are in charge of managing the harvesters, they might charge farmers for the machines without taking responsibility for the quality of the harvested cotton. In Syrdaryo and Karakalpakstan, middle-income and especially "vulnerable" (low-income) farmers were said to rely on MTPs' services. Well-off and some middle-income farmers have their own machines. However, vulnerable farmers are often indebted to the MTPs, which threatens many MTPs with bankruptcy. This in turn affects their operations, quality of staff, and services. In Jizzakh, farmers expressed concern that there is only one MTP in the area, which is too far away for some farmers to visit. They also raised concerns about long wait times for machines. Also, when the harvest is mechanized, more cotton will be taken from the field in a given time. Therefore, additional transportation will be needed to transport the cotton to the ginneries.

"This year I harvested my cotton by machines on five hectares of land. These machines belonged to the MTPs. They have machine operators who are responsible for the operation of these machines. But their machine operators do not meet our requirements because the majority of them are young. And we, farmers, need our own machine operators."

—FGD with farmers with less than 30 ha under cotton, Pakhtakor District, Jizzakh

“Now we have discussed that the machinery consumes a lot of diesel fuel. But there is a reason for that. The machines and machine operator both belong to the MTP. But if the machinery is our own, our machine operator will operate it carefully. The machine operator from MTP does not spare machines; he uses it to the full power. And at such use it consumes much more diesel fuel.”

—FGD with farmers with less than 30 ha under cotton, Pakhtakor District, Jizzakh, Participant 3.

“Probably, scientists worked hard on the creation of these tractors. They, maybe, tried to pick with these tractors. They say that they made tests. The Government has a reason for their production. But machine operators should do adjustment of tractors on places. Everybody says that these are good tractors, and farmers want to buy them. Let them give me this tractor, I will make the adjustment myself.”

—FGD with farmers with nearby farmland, Pakhtakor District, Jizzakh

141. **Farmers are concerned about the current lack of knowledge about various aspects surrounding cotton harvest mechanization.** They would like to know more about what machines are on the market, the costs involved in operating them, the implementation process of mechanization, and any necessary adjustments to land preparation and sowing practices. Farmers also said it is too expensive to buy a machine that can only be used one month out of the year, which is the case if harvesting machines are only suitable for one task and cannot be used for any other agricultural activity.
142. **Farmers thought that mechanization would be more profitable for those with large farms—that is, those larger than 30 ha. Those with small plots were expected to have trouble mechanizing their harvests.** In South Karakalpakstan, for example, farmers said that many in the area have land plots between 1 and 5 ha. One option could be to consolidate smaller plots into larger ones, but this reportedly requires a significant investment and might take two to three years.
143. **Farmers with remote, poor-quality land with limited access to irrigation water—often the most vulnerable farmers—are most in need of mechanizing their harvests. This is because they have most difficulty finding cotton pickers and, as discussed in Chapter 4, incur the highest costs to have their cotton picked.** Farmers in Jizzakh stated that 60 percent of farms there are located far from population centers, between 5 and 40 km away. Farmers here have a significant amount of land under cotton and trouble finding pickers. Mechanization of these cotton fields would reduce the need to bring in cotton pickers from outside the area. The problem also exists in Karakalpakstan, a region with a lot of steppes and remotely located fields.
144. **However, study participants in all districts claimed that vulnerable/lagging/bankrupt farmers—who represent 10–20 percent of all farmers in the selected district—will have the most difficulty mechanizing the cotton harvest.** In particular, these farmers cannot afford to buy or even rent machines. This group usually does not even have enough resources to grow and harvest cotton on time. Their soil is poor and they have limited access to irrigation water, which makes their cotton plants grow too short to be harvested by machine. Cotton production on fields of these farmers tends to have low or even negative returns and cotton production would not necessarily become the most remunerable crop for them even if mechanization would reduce their harvesting costs.
145. **Box 4 presents a case study of one cotton farmer’s experience with mechanization.**

Box 4. Mini case study (Jizzakh): One cotton farmer's experience with mechanization

Respondent: A 58-year-old male with higher education who established his farm in 1999. He started with 20 ha and now has 53 ha. Before farming, the respondent worked as a schoolteacher and used to rent small amounts of land with horticultural crops.



Mechanization experience: The respondent has two fields (20 ha and 33 ha); he grows wheat on one and cotton on the other. He switches fields every year. This year, the *hokimiyat* and MTP suggested the farmer use machines to harvest cotton, as an experiment. He agreed, and the MTP harvested 1 ha of cotton on his land by machine. The productivity was 5 tons of raw cotton. The farmer was very satisfied with the result and asked the MTP to harvest the rest of the cotton, but they said it was only an experiment, and they had to try it on other types of land. One harvester completed the work (1 ha of land) in less than an hour, which takes 50 pickers a whole day to do the same task. The farmer

said if he had the opportunity he would harvest all his cotton by machine. If necessary, he would grow and weed cotton in a different way to get better quality.

The respondent believes that farmers should be allowed to buy these machines. They will take good care of them, and the productivity and quality of cotton will be higher. Currently the MTP does not have qualified specialists to operate these machines; all of the specialists are recent graduates with very limited experience. They try to do the job faster to save fuel, and thus harvest cotton of lower quality. Another option is to give machines to WCAs, which would allow farmers to have more control over them. They would be allowed to use their own drivers and make better decisions about when the machine should harvest cotton, and on whose field. The farmer would agree to lease the machine; he said he could repay the cost in 10–15 years.

Potential solution for land that is not suitable for machine harvesting: The respondent suggested that *hokimiyats* allocate plots with low soil quality and limited water availability (these lands are currently used to grow cotton and wheat but which are not suitable for machine harvesting) to farmers for complexes to breed cattle, keep bees, and to garden. If he is able to use some land for other purposes, he thinks that he could employ about 20 people. If other cotton and wheat farmers are allowed to use such land for purposes other than growing state-mandated crops, they will need more full-time workers and employ people who previously worked as cotton pickers.

7. Solutions according to study respondents

146. **In all five sites, farmers, cotton pickers, and local government officials were asked what measures and support services could ensure cotton harvest mechanization benefits all income groups.** This chapter summarizes the discussions that came out of these questions.

Policy measures and support mechanisms to mediate the social effects of mechanization for pickers, including the most vulnerable

147. **Female pickers suggested and supported the idea of developing and organizing local-level skills trainings for women.** Female pickers said they are aware such courses (in tailoring, baking, or nursing) exist in the district they would like to attend, but these are only offered in urban areas. It would cost a significant amount to attend them, since women would need to pay the course fee and cover costs for travel and lunch. Pickers from Syrdaryo offered an example of baking courses that are available only in the city of Guliston. The course lasts three months and costs Soum 30,000. Adding daily travel costs and lunch adds up to Soum 120 per month, or Soum 360,000 for an entire course, not including costs for study equipment and materials. Despite women's high interest in attending such courses, most families cannot afford it. Women suggested it would be better if some courses were locally organized by experienced women. For example, a tailoring course was reported to be organized by an experienced woman in rural Karakalpakstan. The woman teaches tailoring to 10 students at home, and after the course the graduate can expect to earn Soum 6,000–8,000 per day working part time. Participants in all areas said they could afford the course fee of Soum 30,000–40,000.
148. **In Fergana, participants suggested that the government and banks could offer special loans to local entrepreneurs who want to train locals and then employ them.** For example, if an entrepreneur decided to open a tailoring workroom, he/she would develop a business plan that includes trainings for people from local communities, costs of materials and equipment, and so on. Then, based on the business plan, the bank could approve or decline the application. These loans could be provided at a lower interest rate or with no pledge required.
149. **Microloans to purchase livestock and poultry were also regarded as an attractive way to cushion the negative social impact of mechanization.** Pickers suggested that if they were to purchase livestock with such loans, they could earn additional income and be in possession of a valuable food source for the household (dairy products, eggs, meat). The loan could be provided for at least three years to people who lost income due to mechanization. The loan application could be supported by a recommendation letter from the *mahalla* office. Participants from Karakalpakstan suggested households might use the money in the following ways:
- to buy a calf (the price ranges from Soum 2.5 to 3.5 million) and then sell it after six months for Soum 6–7 million;
 - to keep poultry. A chicken costs Soum 15,000, and each household can keep up to 100 chickens. The investment to start a small chicken farm is thus Soum 1.5–2.5 million.
150. **According to cotton pickers and *mahalla* leaders, existing social support mechanisms would not be suitable to compensate the lost income in vulnerable households.** First, there is a strict quota for the assistance. In visited areas, the quota was at least 50 percent lower than number of vulnerable households. Second, middle-income households lose the most income but are not eligible for social assistance. Third, the majority of rural households are involved in picking cotton, and even if the quota is increased it would be difficult for local government entities to identify households that lost the most income. According to focus group participants from Syrdaryo, Karakalpakstan, and Jizzakh, if social assistance is provided for former cotton pickers, most households will apply; this might cause conflicts within communities if some former pickers receive assistance while others do not.

Participants also suggested that people will get used to receiving money without working. This kind of behavior is not respected in rural communities, and so it was believed that the social assistance transfers will not actually improve these households' livelihood in the long run.

151. **Respondents said that farmers should be allowed to lease harvesting machines, as buying them would be too expensive.** According to respondents, a harvesting machine costs Soum 180 million (US\$60,000–70,000). Farmers from the wealthiest group and some from the middle-income group said they could afford to lease one machine for 10–15 years, with a down payment of 10 percent to 30 percent and a 5 percent to 15 percent annual interest rate on the loan. Farmers in Syrdaryo suggested that leasing a machine would be more profitable for them since they will save money on MTP services, and some part of the money can go to repay the loan. Farmers in Karakalpakstan suggested it would be more convenient if CGPs lease harvesters to farmers. According to the suggestion, farmers would make the first payment and CGPs would deduct money annually from what CGPs owe farmers for the cotton.
152. **Farmers in Jizzakh and Karakalpakstan suggested that group loans be provided to two to three farmers to buy machines.** However, that option was said to only work for well-off and middle-income farmers, to minimize the risk that one of the farmers would be unable to repay his/her share. Vulnerable farmers might not be able to pay their share of the loan or pay maintenance costs. Focus group participants suggested that if well-off farmers and middle-income farmers purchase/lease machines, they could rent them out to vulnerable farmers and charge them lower fees than the MTPs currently do.
153. **There is a concern about the availability of spare parts.** Spare parts should be easily available and at a reasonable price, said respondents. According to farmers from Jizzakh, the government should set a fixed price on spares and sell these through CGPs or MTPs. It was suggested that a hotline be established so that farmers can complain if higher prices are charged.
154. **Farmers in Syrdaryo and Karakalpakstan suggested that CGPs be provided with machines.** A CGP can hire people to operate the machines and deduct the cost of the services from the money the CGP owes farmers. According to farmers, CGPs will take better care of the machines, and the arrangements and payment process will be easier for farmers. Farmers in Syrdaryo suggested that CGPs charge vulnerable farmers a lower tariff. Currently MTPs charge farmers the same fee in all study districts—Soum 177,000 per 1 ton of raw cotton.
155. **Respondents suggested that training and seminars on mechanized farming should be organized for farmers as well as *hokimiyat* officials, MTPs, and CGPs.** Experimental farms should be established in each district to showcase the advantages of mechanization and to teach farmers how to grow cotton in ways that are conducive to machine harvesting. It is also critical to make sure farmers know whether they will mechanize their harvest before cotton is sown, so the farmer can apply the correct procedures and the harvest will not suffer in quality and quantity.

8. Conclusions and recommendations

156. **This study gathered primary data through focus group discussions with cotton pickers and cotton farmers,** and in-depth interviews with local officials and mechanization experts across five sites in Uzbekistan. Together with a review of available studies and data, the following conclusions can be drawn.
157. **Daily earnings from cotton picking are above rural daily wage rates for women only when they pick cotton on high-yielding farms (with more than 2.5 tons of raw cotton per ha) and in particular during the first and second pass.** On these farms and during these early passes, picking productivity is high, as many cotton bolls are open within a given area. Pickers are able to pick 100 kg of raw cotton per day, and earn about US\$10 per day. On the lower-yielding farms—which are often more remote—it takes more time to pick a particular amount of cotton, and local pickers are less keen to pick there. Farmers in charge of these lands have trouble finding local pickers even if they offer more money (above the official fee) and extra bonuses. They depend on labor brought in by the state from outside the area to harvest their fields. These laborers tend to be civil servants or factory workers, and are unmotivated and not very productive. A similar situation occurs during the third and fourth passes on the better yielding farms.
158. **As the more remote and low-yielding farms have the most difficulty attracting pickers to harvest their cotton fields, these are the ones most in need of mechanization. However, the costs of growing cotton on these farms are often higher than the benefits, and mechanization might be unaffordable to them.** Production costs are high here due to difficulty accessing a reliable supply of irrigation water, high costs incurred for irrigation pumps, and higher costs to attract labor. As a consequence, cotton cultivation on many of these farms is a loss, and many farmers are highly indebted. This might make it difficult for them to provide any upfront costs to rent or buy cotton-picking machines.
159. **The third and fourth passes can be important for farmers to meet the state-mandated production quota. However, lower productivity for cotton pickers and the fixed official cotton-picking fees make it difficult for farmers to attract sufficient local labor to harvest the remaining cotton.** More flexible cotton production quotas and/or higher fees for third and fourth passes should prevent the need to bring in “unmotivated” mobilized labor from outside.
160. **Cotton harvest mechanization is most likely to be initiated by the better-off farmers who can more easily afford the machines and are in a better position to experiment and innovate. As local cotton pickers mostly work on these farms, they are most likely to be affected and see their income from cotton picking drop.** Our findings suggest that women from middle-income households would be particularly affected. For them, cotton picking might contribute up to 30 percent of their annual income. It is not yet clear to what extent upcoming horticultural farms would be able to generate sufficient alternative employment.
161. **To prepare them for alternative income-earning opportunities, many of the local cotton pickers suggested they would benefit from different types of skills training.** Such services are currently only available in urban areas, however. Loans for starting small business enterprises where these skills can be applied were said to be important to generating alternative incomes, but unavailable.
162. **Existing social assistance transfer systems only reach a small portion of the population, and households covered under these programs do not seem to be the ones that will be most affected.** This is because they have less able-bodied household members that participate in the cotton harvest. The current social assistance scheme would only reach a small portion of those affected by mechanization.

163. **There is a severe lack of information among farmers on the characteristics of the various harvesting machines, their pros and cons, under what conditions they can be rented, and how they will be serviced.** Agronomic requirements of cotton cultivation under mechanized harvesting are not well known. Farmers were keen that the harvesting machines should not be made available through the MTPs but instead via the cotton ginneries, as the latter would have a stake in the quality of the harvested cotton.

Recommendations

164. **This social impact assessment has identified two vulnerable population groups involved in the cotton production process. These are:** (i) women who are engaged in cotton picking and have few alternative cash income-earning opportunities; and (ii) farmers who grow cotton under less favorable production. The recommendations presented below aim to address the needs of both of these groups to make sure the cotton harvest mechanization process is successful and generates benefits for all population groups.

Short term mitigation measures

165. **The government should consider a public works program.** Such a program could focus on improving rural infrastructure (roads, canals) to increase farm productivity, while at the same time providing alternative income-earning opportunities for households that lost income from cotton picking following mechanization. It could also help address the situation of surplus labor, following the return migrants from Russia.
166. **Labor market management information systems that provide information on labor demand, shortages, surpluses, fees, and wage rates across regions should be made accessible.** Such information, together with more flexible wage rates, will make workers more likely to voluntarily travel from labor surplus to labor deficit areas when wage incentives are present.
167. **Options should be explored for organizing contract labor teams that consist of skilled and effective workers** who can compete with mechanized harvesting or find niches for cotton harvesting, such as premium cotton for cotton seed, small fields, and cotton fields in remote areas. Cotton-picking fees should be liberalized so that farmers are free to pay what is needed to attract such laborers.

Medium term reform measures

168. **There is a need to liberalize farming and allow farmers that currently grow cotton in areas that are less suitable for that crop to switch to more remunerative farm activities that raise land and labor productivity and use less water.** The latter is important in areas where abundant irrigation water is not easily available s.³⁸
169. **Structural barriers that prevent rural women who currently pick cotton from accessing formal employment or engaging in alternative income-earning activities should be identified and tackled.** The government in partnership with private sector and development partners could for example strengthen support measures that enable rural women from starting and developing their small businesses through access to micro-finance, technical training, and child care. Measures that address social norms and values that prevent rural women from making their preferred choices and grow their entrepreneurial activities would also be important. Livestock production, expansion of horticultural production, and agro-processing could be relevant. Community-driven development schemes, where communities are put in charge of their own development, could be developed to open such opportunities and allow rural women to benefit from them (Box 5 and 6).

38. To some extent this is already happening in the country, and this is further promoted through policies issued in 2015.

Box 5. Example of community driven development project that addresses small-scale community infrastructure needs of poor and remote communities – The Kecamatan Development Program, Indonesia.

Objectives. The project aimed at improving socio-economic and local governance conditions by supporting productive proposals developed by communities, in a country with much regional variation and pockets of conflict-affected areas.

Design. The program provides technical assistance to facilitate the planning and implementation of sub-projects by local communities through the deployment of facilitators (social and technical) in each sub-district. 75 percent of project funds go towards roads, bridges, irrigation and clean water.

Impact. Impact studies have shown that these interventions are effective in targeting the poorest and most remote areas: Over 77% of fund loan beneficiaries have been the poorer members of their communities, and 38 % have been women. A stronger community voice improved a range of maternal and child health outcomes.

Box 6. Example of a successful project on strengthening capabilities of poor rural women, the Pudhu Vazhvu Project, Tamil Nadu, India

Objectives. The project's goal was to building the skills and capabilities of poor women, and enhancing their livelihoods by financing demand driven sub project investments.

Design. Village communities or self-help groups were formed that identify needs, plan, implement and monitor project activities. Substantial technical support was provided as well as marketing support. The focus was on women with a special project package for persons with disabilities, tribal populations and vulnerable groups. Village governments were involved and incentives were provided to them.

Impact. The project has significantly empowered women in the private and public spheres by (i) improved access to low-cost credit and economic opportunities, (ii) improved agency of women within the household, and (iii) an increased participation of women in local politics and civic action

170. **Measures to further support farmers engaged in high value activities such as horticultural or livestock production that have a higher labor productivity (in Soum per day) than cotton,** and thus enable farmers to pay (female) workers attractive daily fees, would be important. At the same time, support to smallholders (*dehkans*) to raise the productivity of their plots and enhance the quality and value of their harvests would be needed. This would require better integrating smallholder in the value chains of their products to enable them to tap into higher value markets and meet product preferences of middle and high income consumers.
171. **Assisting the most vulnerable households more broadly would require strengthening the mechanism for identifying those household, and expanding the coverage of social assistance programs.** This would include making sure only those households that need it are assisted through the program and ensuring all vulnerable households are covered.
172. **Agronomic research is needed to produce cotton varieties that are not only well suited to the range of different Uzbek growing conditions but that also reduce the number of cotton picking passes.** This will help: (i) make sure that mechanized picking is economic and efficient; and (ii) institute a more efficient handpicking process that enhances cotton pickers' productivity and increases their income.

Medium term measures to mechanization work better for marginalized farmers

173. **Further diversifying the agricultural sector could help farmers undertake only those activities that are most suitable to their production conditions and yield the highest value.** This is likely to bring more income to the rural population, create jobs, and reduce dependency on cotton. Our findings suggest that it would be opportune to review the current policy, whereby farmers are required to grow cotton on land in areas where cotton production conditions are less favorable, where yields tend to be low, and where few cotton picking laborers are prepared to work.
174. **Mechanizing the cotton harvest requires further on-farm field testing of different harvesting machines and machine design options.** Such field tests should take place under different cotton-growing conditions that currently exist in Uzbekistan, including both the most and least favorable conditions. This will help ensure that the mechanization needs of marginalized farmers that grow cotton under difficult conditions—such as low reliability of irrigation water, low soil fertility or highly salinized soils, and low availability of labor—are also addressed. Such field tests should make sure to solicit the feedback of different types of farmers on the different machines and design options.
175. **Different business models for mechanizing the cotton harvest should be piloted** to test the effectiveness, impact, and alternative arrangements for ownership, leasing, and contract service provision (for example, cotton harvested by a contractor), and to address the needs of smaller-scale farmers and those with remote fields. In addition, training courses should be organized to facilitate the emergence of contract service businesses and alert the banking community to the potential of this as a recurring business model.
176. **The government, together with farmer organizations, should develop a plan for enabling farmers and pickers to actively engage with these research findings** and explore new ways forward, for example by undertaking scenario planning exercises, including stakeholder voices when formulating an action plan, and so on.

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Appendix 1. Estimates of labor use in cotton harvesting in Uzbekistan

Estimates of labor associated with cotton harvesting in Uzbekistan are imprecise. For the purpose of approximating the number of workers involved in each cotton harvest, a number of assumptions were made.

Person-days required to harvest cotton

First, cotton area and production of lint in Uzbekistan are used as the basis for calculations. Official data on seed cotton production are available, but variances in moisture content in seed cotton from season to season and reporting irregularities make data on seed cotton production problematic. Therefore, a ginning ratio of 0.32 applied to lint production is assumed to estimate seed cotton production each season at standard moisture content. For 2014–2015, production is estimated at 940,000 tons of lint, resulting in an estimate of seed cotton production of 2.94 million tons. Seed cotton production at independence was around 4.5 million tons and has been trending downward.

There are three predominant estimates of the amount of labor required to harvest seed cotton: kilograms per day per worker, hours per ton, and hours per hectare.

Estimates of the average amount of seed cotton harvested per day per worker vary substantially. Children harvest less than adults. Motivated workers harvest more than unmotivated workers. Teenage students sent from university are probably the least productive. Farmers and farm laborers who depend on harvest income probably work the most effectively, while government officials required to work a few weeks a year are probably much less productive. There is more sunlight in September than in October, so productivity is higher per day earlier in the harvest than later.

Given large variances among workers, average productivity per worker is somewhere between 35 kg and 100 kg of seed cotton per day. An average over all workers all days of 60 kg per day is assumed in these calculations. Based on seed cotton production of 2.94 million tons, 49 million person-days of labor would have been required to harvest the 2014–2015 crop in Uzbekistan. In the early 1990s, around 70 million to 80 million days of labor might have been required.

Another measure of productivity is the average amount of time required to harvest 1 ton of seed cotton. This time will vary with labor productivity per person and yields per hectare. With average row spacing of one meter, there will be one hundred rows per hectare and a worker will walk 10 km up and down rows to harvest 1 ha. If yields are higher and bolls are denser, seed cotton can be harvested faster. Based on surveys of production practices conducted by ICAC, an average of 200 hours of labor are required to harvest one ton of seed cotton in Uzbekistan. Assuming a nine-hour workday, about 22 person-days will be required per ton of seed cotton, or about 65 million person-days to harvest the 2.94 million-ton 2014–2015 crop. These same calculations resulted in estimates of 90 million person-days to 100 million person-days in the early 1990s.

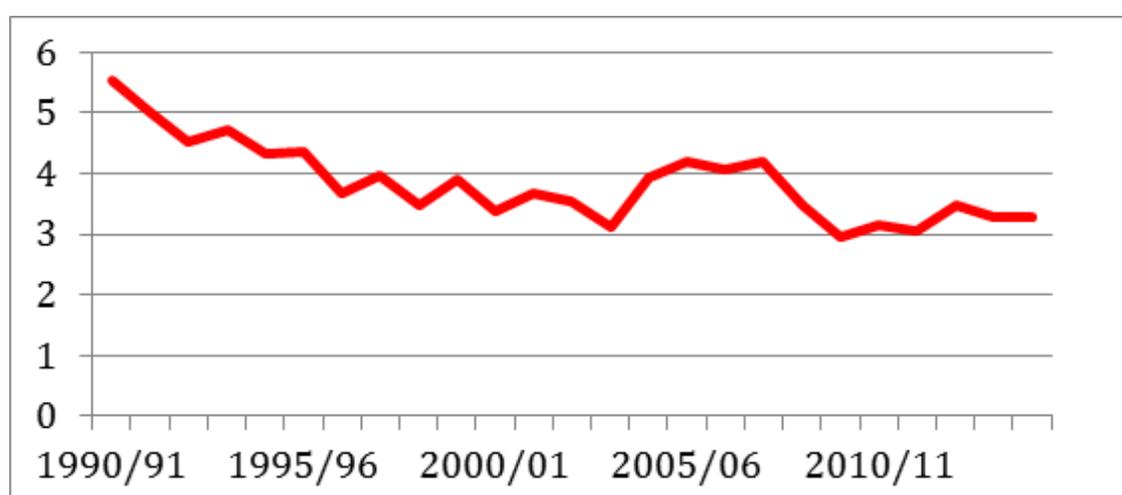
Finally, the same surveys by ICAC indicate that on average it takes 470 hours of labor to harvest each hectare in Uzbekistan. Planted area was 1.275 million ha in 2014–2015, suggesting that about 67 million person-days were required to harvest the 2014–2015 crop, compared with 90–100 million 20 years ago.

It is not surprising that the estimates of person-days resulting from the second and third measures of productivity are essentially the same, since the source for each estimate of productivity (200 hours per ton, or 470 hours per ha) is the same. The three measures of labor productivity indicate that somewhere between 50 million and 70 million person-days of labor were required during the 2014–2015 cotton harvest. The more likely figure is around 65 million person-days, based on an average requirement of 200 hours per ton of seed cotton.

Persons involved in harvesting cotton

Translating these estimates into millions of workers requires additional assumptions to be made. The harvest season (from early September to early November) is never more than 75 days, and so the minimum number of workers involved in the 2014–2015 harvest would have been about 650,000 people (49 million person-days divided by 75 days per season.) However, this estimate is patently too low, as probably no one in the entire country works from beginning to end. More realistically, people in each region will work for a few weeks while the cotton in that region is ready to be picked. Therefore, a more realistic assumption is that the average worker accounts for 20 days, or about three weeks, of harvesting cotton each season, and this suggests that around 3 million people were involved in 2014–2015. It could also be assumed that each worker was active for just 10 days, or 1.5 weeks during 2014–2015, and this would double the estimate of workers involved in the harvest to about 6.5 million. Based purely on subjective understanding of harvest practices, conversations with individuals, and common sense, it seems more likely that the average worker spends about 3 weeks harvesting cotton, and this suggests that about 3 million people were involved in the most recent season (See Figure A1). Two decades ago, when cotton production was greater than it is now, the same calculations indicate that between 5 million and 6 million people might have been involved in each cotton harvest.

Figure A1. Number of cotton harvest workers in Uzbekistan (millions)



Source: Townsend, 2015.

Impacts on earnings

The GoU recently adopted a policy to mechanize 70 percent or more of the cotton harvest by 2016. Mechanization will shorten the harvest season by several weeks and reduce the amount of labor required each season. Increased industrial employment will be facilitated in the assembly, operation, and maintenance of equipment. However, mechanization will also lower demand for labor in rural areas, and cash incomes for those who pick cotton will be reduced.

Total earnings by workers harvesting cotton were between US\$250 million and US\$300 million in 2014 (Soum 235/kg of seed cotton), depending on the exchange rate. Cotton picking is an important source of seasonal cash income for many rural households, and many people who currently earn seasonal incomes during the cotton harvest would be negatively affected by mechanization.

Earnings per person associated with cotton harvesting were around US\$80–100 on average, but workers who picked more than average or who followed the harvest from region to region would have earned more.

Per capita GNI in Uzbekistan was US\$2,090 in 2014. As of 2011, agriculture accounted for 19.1 percent of GDP and 25.9 percent of labor force participation, which suggests that agricultural incomes average 74 percent of national average GDP, or about US\$1,400. Therefore, earnings per person associated with cotton harvesting represented 6 or 7 percent of average annual earnings in rural areas.

However, the importance of income from harvesting cotton may be greater to farm workers and farm families than indicated by percentages of 6 or 7. Out of the many millions of person-hours involved in each cotton harvest, farmers, family members, and farm workers account for the bulk of this time. Since farm workers tend to be the lowest paid in any economy, and since income associated with cotton might be the only cash received by many rural workers, income from cotton harvesting would be highly important to workers displaced by machine harvesting.

Appendix 2. Research questions

Focus group discussions with cotton pickers

General

1. For what proportion of cotton pickers is cotton harvesting an important source of their livelihood and income earning? How does it differ across different parts in the county?
2. What are the current cotton-picking fees, and how does this differ across the country/district/region? Do some farmers pay higher fees than others? What determines the fee?
3. How are cotton pickers typically recruited, and what differences exist in recruitment practices? Who organizes the logistics and who pays? How long do they work? How are transport, food, and lodging arranged?

Socioeconomic profile

4. What is the socioeconomic profile of those who pick cotton (their wealth status, employment status, income sources, area of residence, education, age, gender, and so on)?
5. How important is cotton harvesting in terms of their overall livelihood strategies and income-earning opportunities? How does this differ among men and women, the low-income group and the middle-income group?

Incentives to work as a cotton harvester

6. What incentives exist for people to work in the agriculture sector, and how are these different in the cotton subsector and other subsectors? What is attractive and less attractive about picking cotton as compared to horticulture and other subsectors? How does this differ across the country?
7. How do wage rates differ for agricultural labor across subsectors (cotton, horticulture)? If wage rates for picking cotton were higher, would it be easier to find workers who would be willing to pick cotton? How does this differ across the country?

Impact of mechanization

8. How will mechanizing the cotton harvest affect the livelihoods of those who manually pick cotton? What groups will be particularly affected? How does this differ across the country?
9. If those who pick cotton can no longer do that, what alternative income opportunities will they have instead, if any? Will these alternative income-earning opportunities be equally accessible for income groups, including the most vulnerable?
10. How much should the cotton-picking fee be raised to compensate for the reduced demand for their labor?

Skills training and social safety nets

11. What programs or services that provide skills training exist, and what role could they play in transitioning to alternative income-earning opportunities?
12. What social assistance programs exist and how do they function? Could they play a role in transferring funds to households to compensate them for the loss of income when the demand for manual labor for cotton harvesting declines? What alternative measures are needed to make this happen?

Key problems and solutions

13. What problems are foreseen with cotton mechanization that affect your livelihood? What groups will be particularly affected? How does this differ across the country?

14. What can you do to solve these problems? What should farmers do? What should the government do?

Focus group discussions with cotton farmers and/or farm managers

1. How difficult is it for farmers to obtain sufficient cotton-picking labor? What is the main reason for the lack of laborers willing to pick cotton? Would a higher payment rate make it easier to attract labor?
2. What are some of the current difficulties with cotton pickers?
3. To what extent would mechanization help meet your harvest labor shortages? What are the advantages and disadvantages of mechanizing the cotton harvest?
4. The government wants to mechanize 70 percent to 80 percent of cotton harvesting by 2016. For what type of cotton farmer will this be feasible, and for what type will this be less feasible?
5. For what type of cotton farmer will harvest mechanization work well and for what type will it work less well? How might this differ between well-off and less well-off farmers? How might this vary across different parts of Uzbekistan?
6. What policy measures and support services could make cotton harvest mechanization work for farmers of all income groups, including the most vulnerable? How do these measures vary across different parts of Uzbekistan?
7. Overall, what needs to happen to make it easier for farmers to have their cotton harvested on time?

Interviews with cotton ginnery officials and MTPs

1. The government wants to mechanize 70 percent to 80 percent of cotton harvesting by 2016. For what type of cotton farmer will this be feasible, and for what type will this be less feasible? What farmers are likely to be unable to afford mechanization, and what support would they need?
2. For what type of farmer will mechanization work well and for what type will it work less well? How might this differ between well-off and less well-off farmers? How might this vary across different parts of Uzbekistan?
3. What policy measures and support services are needed to make cotton harvest mechanization work for cotton farmers of all income groups, including the most vulnerable? How do these measures vary across different parts of Uzbekistan?
4. Overall, what would make it easier for farmers to have their cotton harvested on time? To what extent would a higher payment rate for cotton harvesting help? What should the government do differently? What should farmers do differently?

Interviews with heads of *mahallas* and cotton committees (*pahta shtabs*)

1. How does recruitment take place and what is the role of the *mahalla*?
2. What types of people are particularly keen to pick cotton? What alternatives do they have?
3. How difficult is it for farmers to obtain sufficient cotton-picking labor? What is the main reason for the lack of laborers willing to pick cotton? Would a higher payment rate make it easier to attract labor?
4. To what extent would mechanization help meet your harvest labor shortages? What are the advantages and disadvantages of mechanizing the cotton harvest?

Appendix 3. Focus group discussion guide for farmers who grow cotton

Introduction to moderators:

- Tell participants that the aim of the group discussion is to explore issues related to the **current process of picking cotton** and their **views on mechanizing the cotton harvest**. *Explain that all questions relate to the participants' personal farming experience and their district.*
- Explain that all responses are confidential. Responses will not be identified by individual.
- Introduce the assistant and explain his/her role during the FGD.
- All modules are equally important; allocate sufficient time for all modules.
- The discussion will take approximately two hours per group.
- *For narratives: please make sure you include whether opinions differed among particular subgroups of participants, and why.*

FGD#:

Name of the moderator:

Name of the assistant:

Region:

Date of the FGD:

Type of cotton farmers: good soil/bad soil; large amount of land/small amount of land; remote farms/near farms (to population areas)

Gender composition of the group: men, women, mixed

Module 0. Group characteristics

MODERATOR/ASSISTANT: Please fill out the form to introduce the discussion.

Name of participant (first name only)	Age	Gender (1– male; 2– female)	Education level (1– primary or less; 2– secondary; 3– vocational; 4–higher)	When did he/she establish the farm?	Ethnic background (1–Uzbek; 2–other: specify)	Amount of land	Area allocated for cotton	Has the farmer mechanized cotton picking on his/her land? (1– yes, 2–no)	Number of permanent and temporary employees	Number of employees who pick cotton

Write-up 1.

- Please fill out the table provided above.
 - Provide general comments on the group composition and dynamic during the FGD.
-
-

Module 1. Introduction (socioeconomic profile) [Duration—20 minutes]

Introduce the purpose of the discussion. Start by asking participants to introduce themselves (Assistant: fill out the form).

1. Please think about all the farmers in your district. Are there any distinct groups of farmers by wealth or occupation? (Moderator, probe: farmers who mostly grow cotton, farmers who mostly grow horticultural crops, and so on). Could you describe each group? Can you rank all farmer groups by wealth?

Farmers	Rank (wealth status, 1–highest) <i>The number of steps in the scale depends on the number of groups.</i>

2. What percent of farmers are growing cotton in the district? Why is growing cotton important for them?
3. Let’s talk about these farmers who grow cotton. Are there any distinct groups of farmers by wealth? (probe: large/small amount of land; close to population points or remote farms; farmers who have machinery or who do not; good or bad quality of soil, good or bad water availability, and so on). Could you describe each group and the differences among them? Could you rank all these groups by wealth?

Farmers	Rank (wealth status, 1–highest) <i>The number of steps in the scale depends on the number of groups.</i>

Write-up 2.

- Question 1. Fill out the table and describe each group named by participants. Indicate how answers differed across participants.
-
-

- Question 2–3. Describe participants’ views regarding the importance of cotton picking for farmers. Indicate how answers differed across participants.
-
-

Module 2. Cotton harvesting—current situation and recent trends [Duration—40 minutes]

Introduction to the module: In Uzbekistan, cotton picking is a process that requires significant organizational efforts. Let’s talk about how the process is currently organized.

4. What could make it easier for farmers to have their cotton harvested on time?
5. How is cotton picking currently organized? When do farmers start planning for cotton picking?
6. What institutions/organizations are involved in the process of planning and implementing cotton picking at the local level?
7. Do you have any difficulty managing cotton pickers? If so, what problems do you face? How do you solve them?
8. How do these problems and possible solutions vary for different types of farmers? (*refer to groups in Question 1*)

Write-up 3.

- *Questions 4–6. Briefly describe how the cotton harvest is currently organized in the district (planning, key actors, difficulties). Indicate how answers differed across participants.*

9. What groups of people pick cotton on your fields? (*probe: your local employees, people from local villages, people from other areas, and so on*)
10. What are the current fees per kilogram (for the 2014 season)? How is it paid? Are there differences by pass? At the beginning/end of the cotton harvest? Is there a norm/quota that one should pick in a day? What happens when one picks more than the quota? Less than the quota?
11. How have the fees changed in the last five years? What was the effect? How much can a cotton picker earn per day? What are the differences for men and women, people of different ages, level of qualification?

Do people involved in cotton picking receive any additional benefits aside from the salary/fee? What are these benefits? Who receives them and why? Who distributes them? How has it changed in the last five years? What was the effect?

Groups of cotton pickers	Bonuses	In kind	Food (number of meals)

How have the fees and bonuses changed over the last five years? Why? What was the effect?

	2009	2010	2011	2012	2013	2014
Fees						
Bonuses—						
increasing (+) or decreasing (-)						

Write-up 4.

- *Question 7. Describe each group named by participants. Indicate how answers differed across participants.*
-
-

- *Questions 8–10. Fill out all tables. Fees: summarize the discussion regarding the current fee and indicate how it has changed over the last five years. Benefits (bonuses): list all benefits, briefly describe each one, and indicate how these have changed over the last 5 years. Indicate how answers differed across participants.*
-
-

12. Do you have enough people in your community for all of you to pick cotton on time?
13. In your experience, is it difficult to find workers to pick cotton? If yes, what difficulties do you face recruiting people to pick cotton? If no, why?
14. Do farmers argue among themselves about the availability of good cotton pickers?
15. What do farmers usually do if there are shortages of labor? If a farmer does not meet the procurement quota because of a lack of labor, what can he/she do?
16. What is the main reason laborers are unwilling to pick cotton? Why is not everyone happy to participate in cotton picking? If wage rates for picking cotton were higher would it be easier to find workers willing to pick cotton?
17. Do some farmers in your district provide higher bonuses or more in-kind payments than others? If yes, do they have a different recruitment process or different expectations regarding cotton pickers' qualifications or productivity? Why?
18. How do you decide when it is time to pick cotton? How do you decide on the timetable for when picking groups work on which field? How do you settle disputes over this issue?

Write-up 5.

- *Questions 11–17. Summarize the discussion on the availability of cotton pickers in the district (whether there are enough pickers or not, difficulties with recruiting, strategies of farmers, and so on). Indicate how answers differed across participants.*
-
-

- *Question 18. Describe how the cotton harvest is organized in the district. Indicate how answers differed across participants.*
-
-

Module 3. Impact of mechanization [Duration—40 min]

Introduction to the module: In many countries, manual cotton picking has been replaced or decreased by machines. I would like to discuss with you possible effects of mechanizing cotton picking in Uzbekistan.

19. Could you tell me what proportion of cotton is currently picked by machine in your district? Have any farmers from the district tried or applied mechanization to pick cotton in recent years? Or previously? Which groups of farmers have tried mechanization? *(refer to groups in Question 1)*
20. Have you personally tried mechanization? What changes have you experienced? How has it affected your costs and return on cotton production? How has it affected your demand for cotton pickers?

Write-up 6.

- *Question 19. Shortly summarize the discussion on cotton mechanization in the area. Indicate how answers differed across participants.*

- *Question 20. Indicate how many participants have tried mechanization and briefly describe their experience. Indicate how answers differed across participants.*

21. What are the advantages and disadvantages of mechanizing the cotton harvest? How do these differ among types of farmers who grow cotton in your district? *(refer to groups in Question 1)*

Types of farmers	Advantages	Disadvantages

22. For what type of cotton farmer will harvest mechanization work well (easy/difficult to implement; cost/benefits) and for what types will it work less well? *(Refer to groups in Question 1.)* What types of farmers might consider mechanization more or less attractive?
23. How will mechanizing the cotton harvest affect the quantity of the cotton you can harvest from your fields? Why?
24. How will mechanizing the cotton harvest affect the quality of the cotton you grow on your fields? Why? Would mechanization work for picking seed cotton?
25. How might mechanization affect farmers' costs pertaining to the cotton harvest? What do you think should be the fee for a mechanized cotton harvest?
26. How might mechanization affect farmers' return on cotton?
27. How will mechanization affect the timing of the cotton harvest? Will it allow you to plant wheat or other crops?
28. Only certain land is suitable for cotton to be picked by machine. This means that if mechanization becomes more common in Uzbekistan, farmers will not be able to use all land that they use now to grow cotton. In your opinion, how could they use the land instead?

Write-up 7.

- *Question 21. Fill out the table and describe in detail all positive and negative effects of mechanization (first in general, than for each group of farmers). Indicate how answers differed across participants.*
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- *Question 22. Describe for which types of farmers mechanization will be most effective/less effective and most attractive/less attractive. Indicate how answers differed across participants.*
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- *Questions 22–23. Describe how mechanization might affect the quality and quantity of cotton that farmers can harvest from their fields. Indicate how answers differed across participants.*
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- *Questions 24–25. Describe how mechanization might affect farmers' costs and income. Indicate how answers differed across participants.*
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-

- *Questions 26–28. Summarize the discussion related to potential effects of mechanization on the timing of the cotton harvest. Indicate whether mechanization will allow farmers to grow secondary crops on the same land or not. Indicate how answers differed across participants.*
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29. To what extent would mechanization help you meet harvest labor shortages? Will you still need cotton pickers? (*Probe: to pick cotton that was left in the field by machines, for example.*) Will their work differ from what cotton pickers do now? How will the fee and recruitment process differ?

30. Will mechanizing cotton picking cause you to need more employees with certain specialization? (*Probe: mechanics, drivers and so on.*) Are there enough qualified specialists in the district? How do you plan to meet the demand?

Write-up 8.

- *Questions 29–30. Summarize the discussion on potential effects of mechanization on farmers as well as skilled and unskilled labor in the district. Indicate how answers differed across participants.*
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Module 4. Key problems and solutions [Duration—20 min]

31. Let's summarize our discussion: i) What problems are foreseen with cotton mechanization that might affect farmers? ii) How might the effects of mechanization vary for different types of cotton farmers?
32. What needs to be done for each group to make mechanization economically profitable, technically feasible, and affordable for each group of cotton farmers? What needs to be in place to make mechanization a success for all groups? Who should be responsible for implementing the solutions?
33. Do you plan to implement mechanization next season/seasons? Why or why not? How well do you think it will work for your farm? *(Ask all participants)*

Write-up 9.

- *Question 31. List and describe all potential problems/difficulties for farmers that mechanization might cause. Describe how problems/difficulties might vary for different types of farmers. Indicate how answers differed across participants.*
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-

- *Question 32. Describe in detail possible solutions and potential responsibilities of different actors. Indicate how answers differed across participants.*
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- *Question 33. Summarize the discussion on plans participants have to implement mechanization next season. Indicate how answers differed across participants.*
-
-

Thank you for participating in our study!

Appendix 4. Focus group discussion guide for cotton pickers

Introduction to moderators:

- Inform participants that the aim of the group discussion is to explore issues related to picking cotton and to get their views on mechanizing the cotton harvest. **Explain that all questions relate to participants' personal farming experience and their area.**
- Explain that all responses are confidential. Responses will not be identified by individual.
- Introduce the assistant and explain his/her role during the FGD.
- All modules are equally important; allocate sufficient time for all modules.
- The discussion will take approximately two hours per group.
- **For narratives: please make sure you include whether opinions differed among particular subgroups of participants, and why.**

FGD#:

Name of the moderator:

Name of the assistant:

Region:

Date of the FGD:

Gender composition of the group: men, women, mixed

Module 0. Group characteristics

MODERATOR/ASSISTANT: Please fill out these forms before the FGD begins.

Name of participant (first name only)	Age	Gender (1–male; 2–female)	Educational level (1–primary or less; 2–secondary; 3–vocational; 4–higher)	Participant's main occupation	Sources of household income	Main source of household income	Previous and current work experience (number of years and industry)	Ethnic background (1–Uzbek; 2–other: specify)

Write-up 1.

- Please fill out the table provided above.
- Provide general comments on the group composition and dynamic during the FGD.

Module 1. Introduction (socioeconomic profile) [Duration—40 minutes]

1. Let's talk about people in the area; some of them might be wealthier than others. What groups can people who live in your area be divided into when you think about wealth? Please describe each group in terms of the following characteristics: occupation, employment status, gender, age, income source, education qualification, and so on. (*Moderator, probe: farmers who grow state-mandated crops, farmers who grow secondary crops, dehkans, daily wage laborers, laborers for enterprises with an employment contract, government employees, families with migrants, and so on.*) Could you also rank these groups by wealth? (*Moderator, use a flip chart and write down the rank given by participants for each group.*)

Wealth groups	Rank (wealth status, 1—the wealthiest group) The number of steps in the scale depends on the number of groups

Moderator: The list should always be on the wall, so you can refer to it anytime.

- Considering those groups that we named for the previous exercise, what percentage of each group is involved in cotton picking? How important is cotton picking for them in terms of livelihood strategies and income-earning opportunities?

Moderator: Use a flipchart for the exercise and fill out the form during the exercise.

Wealth groups	Percentage of households in this group that is involved in cotton picking	Importance of income received from cotton picking for household livelihood strategies/income—use a scale of 1–5 (1—not at all important; 3—somewhat important; 5—very important)

- Let's take a closer look at people from groups for whom cotton picking income is most important (those groups who got scores from 4 to 5 in the previous question, third column). What proportion of their annual income comes from cotton picking? Do they have other sources of income? If so, what are these? Where do they work for the rest of the year and what is their average income?

Write-up 2.

- Question 1. Fill out the table and describe each group named by participants. Indicate how answers differed across participants.*

- Question 2. Fill out the table and describe participants' views on the importance of cotton picking for different wealth groups. Indicate how answers differed across participants.*

- Question 3. List all groups pointed out by respondents and summarize the discussion on the importance of cotton picking for each group. Indicate how answers differed across participants.*

- Let's do an exercise together. If we look at people in the area, which month(s) are the busiest working in agriculture? (Moderator, use a flip chart and draw a table such as below. Discuss each row with participants and ask them to provide a score from 1 to 5 for each month where 1 is assigned to people who are the least busy and 5 for people who are the most busy. Then write down an average score provided by participants.)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Example	1	2	5	1	5	1	5	5	5	4	3	2
Agricultural work for a farmer (excluding work on cotton fields)												
Agricultural work on your own land (tomorka)												
Working on cotton fields												
Livestock keeping												
When are they the busiest participating in hashars?												
Hashars												

5. Could you please estimate the average daily wages for unskilled agricultural laborer and unskilled nonagricultural laborer (for example, work for a plant) in the autumn season (September–November)? How does it differ for men and women? (*Moderator, use a flip chart, draw a table as below, and fill it out with participants.*)

Type of labor	Men	Women
Unskilled agricultural daily laborer—average wage per day		
Unskilled nonagricultural daily laborer (for example, making bricks)—average wage per day		
Wages of unskilled laborer working full time in a plant in the area—daily or monthly wages		

Write-up 3.

- *Question 4. Fill out the table and summarize the discussion about which months people are the most and least busy working in agriculture. In particular, describe what people do and how busy they are during the autumn season (September–November). Indicate how answers differed across participants.*

- *Question 5. Fill out the table and summarize the discussion on current wages for unskilled daily-wage agricultural and nonagricultural laborers, and describe differences in wages by gender. Indicate how answers differed across participants.*

Module 2. Picking cotton [Duration—20 minutes]

Introduction: Now we would like to ask you some questions about cotton picking.

6. How do you find work as a cotton picker? Do you go to the farmer or someone else in the community? How do you know which farmer to go to?

7. Do you travel for your cotton picking assignment? How far do you travel? Do you stay overnight there? Why? How do you arrange for your accommodation? Who provides food/shelter?

Write up 4.

- *Questions 6–7. Shortly describe/summarize the discussion on how people find work as cotton pickers and how their work is organized. Indicate how answers differed across participants.*

How have fees and bonuses changed over the last five years? Why? What was the effect?

	2009	2010	2011	2012	2013	2014
Fees						
Bonuses—						
increasing (+) or decreasing (-)						

Which groups of cotton pickers receive these bonuses and benefits, and why?

Groups of cotton pickers	Bonuses	In kind	Food (number of meals)

8. What was the cotton-picking fee for this season (2014)? How have fees changed over the last five years? Do people involved in cotton picking receive any additional benefits aside from the salary/fee? (*probe: such as cotton stalks*) What are these benefits? Who distributes these benefits? Who receive these benefits? How have these changed in the last five years? (*Moderator, use a flip chart, draw tables as below, and fill them out with respondents.*)
9. How much can a cotton picker earn a day? What is the difference for men and women, people of different ages and levels of qualification? Are there differences by pass? At the beginning/end of the cotton harvest? Is there a norm/quota that one should pick in a day? What happens when one picks more than the quota? Less than the quota?
10. Are there people who work in the agricultural sector but do not pick cotton? What proportion of people working in agriculture do they represent? Why are these people not involved in cotton picking? How does this group differ from the rest of the population? (*probe: income, type of work, and so on*)

Write-up 5.

- *Question 8. Fill out tables. Fees: provide a summary of the discussion about the current fee and indicate how it has changed over the last five years. Benefits: list all benefits, provide a short description on each, and indicate how these have changed over the last five years. Indicate how answers differed across participants.*

- *Question 9. Provide a short summary of the discussion about daily wages for cotton pickers (average daily wages, quota, differences in wages for those who pick more or less cotton than the quota, gender differences). Indicate how answers differed across participants.*

- *Question 10. Provide a summary on the discussion about agricultural laborers that do not*

pick cotton (how big the group is, reasons, differences from the rest of the population). Indicate how answers differed across participants.

11. What are the main agricultural subsectors in the area? What are the advantages and disadvantages of picking cotton and working in other main agricultural subsectors in the area? (*Moderator, using a flipchart, discuss with participants the advantages and disadvantages of cotton picking compared with working in two other agricultural subsectors—say, working on land with onions—that are most important for the area, and fill out the table as provided below.*)

Cotton picking		Agricultural subsector 1:		Agricultural subsector 2:	
Advantages	Disadvantages	Advantages	Disadvantages	Advantages	Disadvantages

Write-up 6.

- *Question 11. Fill out the table and provide a short summary of the discussion about main agricultural subsectors. Describe main advantages and disadvantages of cotton picking and working for other agricultural subsectors. Indicate how answers differed across participants.*

12. Were you sick during or after the cotton harvest? What were your symptoms? What might have caused your sickness? (probe: water, food, chemicals, and so on) Did you visit a doctor and/or pay for medicine? How much did you pay?
13. Do you know anyone else who also got sick during the cotton harvest? Why did they get sick? Who gets sick more easily? (probe: women, men, younger/older people)

Write-up 7

- *Questions 12–13. Provide a short summary of the discussion about health implications of manual cotton picking (number of participants who had the same experience, symptoms, reasons, costs, groups that tend to have health problems). Indicate how answers differed across participants.*

Module 3. Impact of mechanization [Duration—40 minutes]

Introduction to the module: *In many countries, manual cotton picking has been partly replaced by machines. I would like to discuss with you possible effects of further mechanizing cotton picking in your area.*

14. Could you tell me what proportion of cotton is picked by machine in your area? Have any farmers used machinery to harvest cotton? What was their experience? How has it affected people who picked cotton for those farmers?
15. Let's look again at the wealth groups we defined earlier (*Moderator, refer to the table completed for the Question 1.*) What would be negative and positive effects of mechanization for different wealth groups? (*Moderator, use a flipchart for the exercise, draw a table as below, and fill it out with participants.*)

Effect	Wealth group(s)	How the groups are affected
Positive effect 1:		
Positive effect 2:		
Negative effect 1:		
Negative effect 2:		

Write-up 8.

- *Question 14. Shortly summarize the discussion on cotton mechanization in the area. Indicate how answers differed across participants.*

- *Question 15. Fill out the table and describe in detail all positive and negative effects (first in general, than for each group). Indicate how answers differed across participants.*

16. I would like to discuss with you how important cotton picking is for you and your family. How many of your household members are involved in cotton picking? Could you roughly estimate how much you and your household members earned this year picking cotton (calculate cash payments + additional benefits)? What percentage of the annual income of your household came from picking cotton?
17. How would it affect your household if due to mechanization you were unable to pick cotton and earn this money? Does the effect differ for certain wealth groups? What groups will be most affected?
18. Let's look again at the groups of people who depend most on cotton-picking income. (*Moderator: refer to the list of groups completed after Question 2 and discuss groups with scores of 4 and 5.*) If these people can no longer pick cotton (which also means they will not receive additional benefits such as cotton stalks), what other income opportunities will they have, if any? What alternatives will be most common? Will these alternative income-earning opportunities be equally accessible for all income groups, including the most vulnerable? Will these alternatives be equally accessible for men and women?
19. Can a small-scale business be an attractive alternative to income from cotton picking? What kind of business can it be?

Write-up 9.

- *Questions 16–17. Fill out the form below for each participant. Describe the potential effects of mechanization on participants' households. Indicate how answers differed across participants.*

Name of participant (first name only)	Number of household members	Number of household members involved in picking cotton	Average annual income of the household from picking cotton (Soum)	Cotton fee as a percentage of annual household income (%)
Example: Alisher	5	3	500,000	20%

- *Questions 18–19. List groups that were pointed out by participants and describe in detail*

each income opportunity (accessibility, attractiveness, and so on). Indicate how answers differed across participants.

Module 4. Skills training and social safety nets, and possible solutions [Duration—20 min]

20. Are there any courses/programs that people affected by cotton mechanization can attend and use to find another source of income? What are these programs/courses? What programs/courses would they like to attend? Are there any obstacles to attending them? If so, what are they? How can such programs/courses be made more accessible?

Write-up 10.

- *Question 20. Summarize the discussion on educational programs/courses (attractiveness, obstacles, ability to help households affected by mechanization). Indicate how answers differed across participants.*
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21. Let's talk about the social assistance program for vulnerable households. Do you have this program in your area? How easy is it to access? Does it reach the most vulnerable households? Can the program play a role in transferring funds to those households that will lose the most due to mechanizing cotton picking, and who will be unable to find an alternative source of income? What alternative measures can help make this happen?

Write-up 11.

- *Question 21. Summarize the discussion on the social assistance program for vulnerable households (accessibility, performance, ability to reach the most vulnerable households, ability to help households affected by mechanization). Indicate how answers differed across participants.*
-
-

22. Let's summarize our discussion and list groups that will be most affected by cotton mechanization. What can be done to help these groups of people? Who should implement these solutions? (Moderator, use a flipchart for the exercise, draw a table like the one below, and fill it out with participants.)

Groups	Possible solution(s)	What stakeholders can/should do (farmers, cotton pickers, government, and so on)

Write-up 12.

- *Question 22. Fill out the table and list and describe in detail possible solutions and potential responsibilities of different actors. Indicate how answers differed across participants.*
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Thank you for participating in our study!



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