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Azerbaijan

Cotton sector review



COUNTRY HIGHLIGHTS



FAO INVESTMENT CENTRE

Azerbaijan

Cotton sector review

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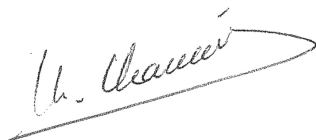


FOREWORD

Cotton, often referred to as the “white gold” of Azerbaijan, has a long history of production in the country. Cotton became crucial to the economy of Azerbaijan as it became a Soviet republic and it was one of the major cotton producers on a global scale until the 1980s. In 1981, at its peak of production, the Azerbaijan Soviet Socialist Republic accounted for almost 10 percent of produced cotton in the USSR and 1.5 percent of global production. Structural changes in the agricultural and other sectors of the economy following the collapse of the Soviet Union combined with a blooming petroleum industry in the 1990s meant, however, that cotton production rapidly lost its key role in the economy of the newly independent Republic of Azerbaijan. It was not until 2015 that interest in the cotton sector was revived as the government considered options for a transition towards a “post-oil” economy.

In 2016, the Government of Azerbaijan announced its plans to “give new life” to the cotton sector. The following year, the State program for the development of cotton production in the Republic of Azerbaijan for 2017-2022 was endorsed by an executive decree of the president. The decree refers to cotton production as a “strategic and important agricultural sector” and foresees an unprecedented six-fold increase in the area planted with cotton and a ten-fold increase in production to reach 500 000 tonnes of seed cotton produced on 200 000 ha of land. The revival of the cotton sector has attracted the interest of both private investors and international financial institutions and it is in this context that the Government of Azerbaijan expressed its interest to cooperate with the European Bank for Reconstruction and Development (EBRD) in promoting investments in agribusiness, with a focus on the cotton sector.

As potential investors in Azerbaijan require an analysis of the performance of the cotton sector, its main opportunities and risks, this joint sector review of the Food and Agriculture Organization of the United Nations (FAO) and the EBRD provides a general overview of the sector, followed by an analysis of more specific aspects of cotton production such as economic and financial profitability, agronomic practices, and social and environmental risks. While expanding cotton production presents a number of opportunities, notably in terms of its potential to provide employment in rural areas and its export potential, the report also underlines a number of environmental and social risks related to the growth of the sector.



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The team of authors worked under the guidance and overall supervision of Dmitry Prikhodko (Senior Economist, FAO). The lead author of the study is Boris Sterk (Economist, FAO). Substantial contributions were provided by Hugo Weissen (Agronomist and Cotton Production Specialist, Agribusiness Consulting International), Francesca Mancini (Agronomist, Pest Management and Cotton Specialist, FAO), Yoshiko Ishihara (Rural Sociologist, FAO), Hafiz Muminjanov (Plant Production and Protection Officer, FAO), Ramil Huseyn (Economist, FAO), Emil Asgarov (Sociologist, FAO) and Yagub Guliyev (Agronomist, FAO). The report was reviewed by Terry Townsend, former Executive Director (1999-2013) of the International Cotton Advisory Committee (ICAC).

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ACRONYMS AND ABBREVIATIONS

| | |
|----------|--|
| AZN | New Azerbaijani manat |
| BCI | Better Cotton Initiative |
| CRC | Convention on the Rights of the Child |
| CSITC | Commercial Standardization of Instrument Testing of Cotton |
| DAS | Days after sowing |
| DRC | Domestic resource cost |
| EBRD | European Bank for Reconstruction and Development |
| EU | European Union |
| FAO | Food and Agriculture Organization of the United Nations |
| FAO GAEZ | Food and Agriculture Organization of the United Nations Global Agro-Ecological Zones |
| FAOSTAT | Food and Agriculture Organization of the United Nations Statistics Division |
| FDMS | Farm data monitoring system |
| HVI | High volume instrument (for cotton quality testing) |
| ICAC | International Cotton Advisory Committee |
| IFC | International Finance Corporation |
| ILO | International Labour Organization |
| IPM | Integrated pest management |
| PBI | Permanent bale identification |
| SSC | State Statistics Committee of the Republic of Azerbaijan |
| USD | United States dollars |
| USDA | United States Department of Agriculture |
| WB | World Bank |



EXECUTIVE SUMMARY

Alongside a general overview of the Azerbaijani cotton sector, this study focuses on major agronomic, economic and social issues associated with cotton sector development in the country to identify prospective investment challenges and opportunities. The analysis is based on field visits, interviews, meetings with public and private sector stakeholders and secondary sources collected by a team of local and international experts. Below is a summary of the main findings of the study.

Economic and policy challenges¹

Policy

Recent cotton sector expansion has been driven by the State Program for the Development of Cotton Production in the Republic of Azerbaijan for 2017-2022. The main policy objectives stated in the programme are increasing cotton production, reviving the ginning and processing industry, improving employment opportunities and developing exports.

The government is strongly involved in the cotton sector through:

- establishing the seed cotton procurement price on an annual basis (AZN 500 per tonne or USD 295 per tonne in 2017);
- further subsidizing the farm-gate price for seed cotton with an extra AZN 100 per tonne (USD 59 per tonne) amounting to a final price received by farmers of AZN 600 per tonne (USD 354 per tonne);
- determining the target area to be allocated to cotton (200 000 ha by 2022);
- cotton production itself through a company under the Ministry of Agriculture of Azerbaijan that planted 12 000 ha of cotton in 2017 (9 percent of area planted in 2017).

The government is also involved in the cotton sector through a number of non-sector-specific policies aimed at purchasing agricultural machinery, fertilizers and other inputs.

Market concentration

The Azerbaijani cotton sector exhibits a high degree of market concentration. Gilan Holding, one of the largest private companies in the country, accounts

¹ This section is covered in more detail in Chapters 1, 4 and 5.

for over one-half of cotton production through its agrifood sector subsidiary “MKT IK LLC”, which has individual contracts with over 10 000 farmers across the country. The company also owns 12 gins, which represent almost one-half of the country’s ginning capacity. Two other companies, CTS Agro and Kend Teserrufati LLC (subsequently referred to as “Agricultural LLC” and belonging to the Ministry of Agriculture), account for almost another one-third of cotton production.

Government-driven sector development coupled with high market concentration mean that farmers may have a disadvantage producing cotton in comparison with other crops.

Economic profitability

Although cotton production is overall profitable in terms of domestic resource cost (DRC),² a number of other crops such as carrots, tomatoes, onions or cucumbers seem to be generating significantly more economic value considering the resources used for their production. In parallel, there is a risk that Azerbaijan incurs economic losses as a result of lost revenue from the exports of higher value-added crops (various fruit and vegetables) whose water demand may not be adequately met due to a “diversion” of water resources to the expanding cotton sector.

Cotton profitability for farmers

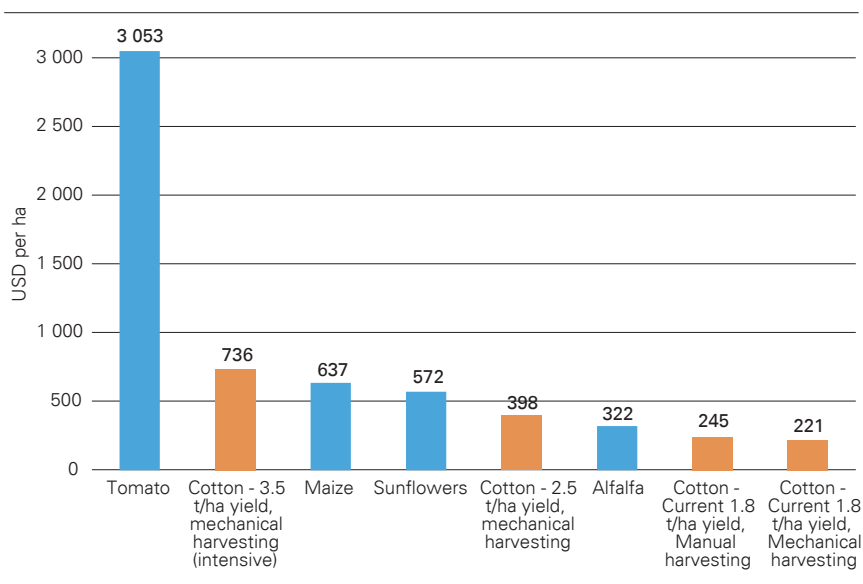
While cotton production costs per kilogram of cotton are low compared to other countries, cotton profitability for farmers in Azerbaijan is lower than alternative crops such as wheat, maize, sunflower or even alfalfa; and is much lower than export-oriented vegetable crops such as tomatoes (Figure E.1). Despite a 20 percent cotton price subsidy,³ farm-gate prices for Azerbaijani cotton appear to be low on a global scale.

Reports on the average cotton yield in Azerbaijan achieved in 2017 vary between 1.5 and 1.8 tonnes per ha, while average yields of around 3 tonnes per ha would be required to make cotton more profitable for farmers than competing cereals and oilseeds under current prices. As of November 2018, the average cotton yield reported for the 2018 cotton picking campaign was 1.6 tonnes per ha.

² The DRC ratio has been widely used for comparing the competitiveness of different production systems and assessing the comparative advantage of alternative activities in terms of profitability to the overall economy. It is a cost/benefit ratio, with costs in numerator and net benefits in denominator.

- If $DRC < 1$, the domestic resources used are less than the value added created, meaning there is a comparative advantage
- If $DRC > 1$, the domestic resources used are greater than the value added created, indicating a comparative disadvantage

³ An AZN 100 per tonne government subsidy in addition to the price of AZN 500 per tonne paid by companies.

Figure E.1: Gross margins for cotton and competing crops

Source: Farmers, author's calculations.

Market perspectives and cotton quality

Increasing cotton production and a relatively limited textile and apparel industry mean that most of the cotton production in Azerbaijan, at least in the immediate future, will be export-oriented.

Even if Azerbaijan wishes to expand domestic textile production, industry needs can be met with imports. Leading textile producing countries such as Bangladesh and Vietnam almost exclusively rely on imports to supply the industry with cotton.

Azerbaijan currently only exports cotton to the Russian Federation and Turkey, with demand growing modestly in Russia and remaining unchanged in Turkey. As global cotton trade is stagnating and even projected to decrease by 1 percent in 2017/2018, while competition from major existing producers and rising ones in Sub-Saharan Africa is increasing, it is essential for Azerbaijan to improve its cotton quality to become more competitive internationally and improve market access under such conditions.

Agronomic and environmental challenges⁴

Agro-climatic conditions

While the agro-climatic conditions in the lowlands of Azerbaijan allow for cotton production, these are not optimal for the agro-climatically attainable yield compared with other major cotton producing countries such as Uzbekistan, Turkmenistan or Pakistan. One of the main disadvantages compared to these countries is a shorter dry season in Azerbaijan, which usually lasts from June to September. In contrast, in south Central Asia or the Middle East, the dry season can last over 6 months, allowing for a longer production window.

Climate change considerations

Azerbaijan's agricultural sector is vulnerable to climate change due to low productivity and soil degradation. It has been estimated⁵ that changes to the climate will affect all key crops, with rain-fed potato and cotton expected to experience the greatest yield declines. Total available water resources are anticipated to diminish 10-15 percent by 2040 alongside the possibility of "extensive damage to water infrastructure"⁶ as a result of more frequent flash floods and land- and mudslides. Since climate change is expected to pose risks for agriculture and water resources in Azerbaijan in the near future, a careful analysis of the benefits and disadvantages of cotton in comparison to other crops in terms of resilience to such risks and of water needs in a context with reduced water availability will be required.

Access to irrigation water

Current cotton yields can be significantly increased with well-timed irrigation as water shortages dramatically reduce crop performance. Planning water allocation and usage is critically important considering the seasonality of water demand by different crops. The current state of many supply and drainage channels in Azerbaijan means that adequate irrigation can be a challenge.

The advantages of water-saving irrigation technologies over flood irrigation in terms of improved cotton yields and reduced water consumption have been demonstrated in studies in other cotton-producing countries such as India and Pakistan. The productivity of drip-irrigated cotton can be up to 114 percent higher than the corresponding flood-irrigated harvest, with water savings of up to 45 percent.⁷ While water-saving irrigation companies operating in Azerbaijan claim that alternative irrigation technologies can substantially improve water use efficiency, these claims still require independent assessment in addition to a cost-benefit analysis of crop production in the local context.

⁴ This section is covered in more detail in Chapters 2 and 3.

⁵ USAID, 2017.

⁶ Ibid.

⁷ Narayanamoorthy, 2008.

In parallel, the highest water demand for cotton will coincide with the peak production window of a number of other high-value export crops (tomatoes, cucumbers, etc.). If water demand for these crops cannot be met due to a diversion of water resources towards cotton, farmers could incur lost revenue from the exports of these crops.

Increasing soil salinity

Approximately 43 percent of the arable land in Azerbaijan is affected by natural soil salinity to varying levels. Numerous cotton fields visited for this study showed the negative effects of soil salinity. Prior to the collapse of the Soviet Union, extensive and effective drainage systems helped reduce the impact of salinity on production. Saline water was drained from fields into local and regional collector channels and into the Caspian Sea.

These drainage channels now require substantial repair and maintenance for the development of the sector. In the absence of ongoing channel maintenance, soil salinity levels will further increase with a negative impact on all agricultural production.

Absence of local variety breeding and seed production programs

More than 90 percent of the cotton seeds in Azerbaijan are imported from Turkey. Turkish varieties have relatively high yield potential given an adequate production environment. However, they require a fairly long growing period to achieve high yields (120-130 days). The production window, such as it exists in Azerbaijan, often does not allow these varieties to reach their potential. Azerbaijani cotton varieties have a higher yield potential under local agro-climatic conditions as they reach full maturity within a shorter 90-day production window. Thus, the breeding of local varieties and state or independent variety trials is essential for the success of the industry. The cotton sector of Azerbaijan will not reach its full potential without a strong domestic breeding program, coupled with a seed multiplication and certification system. This is foundational to any hope of achieving the government's target of 500 000 tonnes of production by 2022.

Lack of agricultural / agronomic know-how

As a part of land reform, members of previously state-owned farms were given land. In many cases, however, they were not actually trained farmers or agronomists but public servants, doctors, accountants, farm hands, etc. Many new farmers have limited understanding of the key parameters that determine the productivity of cotton fields, including soil health, soil nutrition, irrigation, pests and pesticides. Improving agronomic know-how of cotton is crucial in order to increase yields and improve the overall profitability of cotton. It is also important with regards to limiting the negative environmental impact that current production methods may have.

Extension centres could play an important role in disseminating information on production technologies, varieties, irrigation and crop protection if adequate training of trainers is provided. Currently, up-to-date information on modern cotton production is lacking and needs to improve. Whilst there are local extension centres, they need proper financing and training when it comes to the cotton sector.

On a positive note, the emergence of companies engaging in cotton production by contracting farmers has to some extent helped to address transition challenges by providing financing and technology to local farmers. However, even these large cotton companies currently lack access to skilled agronomists.

Social risks and groups most at risk⁸

Social and labour issues: legal framework

Azerbaijan became a member of the International Labour Organization (ILO) in 1992, and since then has ratified all eight fundamental conventions.⁹ The country also ratified the Convention on the Rights of the Child (CRC) in 1992. The country's Labour Code (1999) provides the rights of employees, liabilities of employers and employees, labour protection, measures to resolve labour conflicts and other employment-related rules.¹⁰ The current legal framework provides sufficient protection for workers, and specifically children, as per international standards. While the latest ILO report on Azerbaijan does not mention any specific problems related to forced or child labour in the cotton sector nor in agriculture overall, it does specify that "limited data on child labour and forced labour make it impossible to draw many conclusions."¹¹ The social screening conducted under this project identified several groups of persons that might be vulnerable during the expansion of the cotton sector.

Wage labourers in cotton fields

This group constitutes a major beneficiary of the cotton sector's development, which is believed to have increased local demand for unskilled labour.

Systematic exploitation and unfair remuneration is unlikely as labourers are recruited in open local labour markets. Nevertheless, the fact that such workers are predominantly women and poor, thus having little bargaining power vis-à-vis

⁸ This section is covered in more detail in Chapter 4.

⁹ They are: Forced Labour Convention (C029); Freedom of Association and Protection of the Right to Organise Convention (C087); Right to Organise and Collective Bargaining Convention (C098); Equal Remuneration Convention (C100); Abolition of Forced Labour Convention (C105); Discrimination (Employment and Occupation) Convention (C111); Minimum Age Convention (C138); and Worst Forms of Child Labour Convention (C182).

¹⁰ All references to the Labour Code in the document are based on its English version in the ILO's NATLEX database (www.ilo.org/dyn/natlex/).

¹¹ ILO, 2012.

employers, warrants special attention by the government and employing farms to ensure that they have acceptable working conditions, including safe and healthy work environments.

Mechanization of harvesting

In view of the current, gradual pace of mechanization in the cotton sector, manual labour will not be displaced in the near future. However, if a significant mechanization of harvesting were to take place, adequate measures should be taken to mitigate a possible negative social impact. Experiences¹² from other cotton-producing countries that have switched to mechanical harvesting show that in such cases, women are the most vulnerable group as it is more difficult for them to find employment in other activities related to agriculture (such as maintenance or transportation); while migrating to other regions depending on crop harvesting needs is also not an option as they have to take care of their families.

Employees of public institutions

Interviews conducted by the social screening team indicate that sporadic mobilization of labour by drawing upon public institutions has taken place for cotton harvesting. Such practices are not systemic but rather ad hoc to respond to seasonal labour shortages. Public institution workers are paid by farmers for their work. However, many still associate these “cotton harvesting mobilization” cases with Soviet methods of labour mobilization which were commonly perceived as normal at the time. Further research would be needed to assess the current extent of such labour practices and their potential implications.

Recommendations to the government

Policy

- Through an open dialogue with stakeholders, review the benefits of large-scale cotton production as a national agricultural policy priority compared to the production of alternative crops with a focus on (i) profitability for farmers, (ii) crop water productivity (value generated per unit of water consumed), (iii) effects on rural employment and (iv) value addition.
- Consider climate change and water availability issues from a cotton water demand and sustainability perspective vis-à-vis other crops.

Environmental

- Assess the benefits of water saving irrigation technologies, support the development of new cotton varieties and the adoption of integrated pest management (IPM) and other sustainable cotton production intensification technologies.

¹² Townsend, 2015.

- Develop a seed breeding and multiplication system to ensure the development and adoption of varieties appropriate to Azerbaijani conditions.
- Explore the efficacy of biological pest controls and expand the use of such control measures where appropriate.
- Eliminate the use of highly hazardous pesticides, introduce pesticides with low human health and environmental risk profiles (see analysis in Annex 2) and limit the systematic use insecticides from the group of neonicotinoids that can trigger the collapse of bee colonies, thus reducing their function as pollinators.
- Promote the use of application methods that are more product efficient and minimize drifts (e.g. modern boom sprayers), encourage proper maintenance of spraying equipment and raise awareness on proper disposal of waste (including wastewater).
- Develop minimum safety standards for pesticide management and request companies to adhere to them.
- Formulate a strategy to strengthen extension services by providing training and clear guidelines to cotton farmers at the district level on best agronomic practices, specifically with reference to pest management, fertilizer use, land and variety selection, adequate crop rotation and irrigation options as adapted to the local agro-climatic conditions.

Social

- Design an information campaign on “social soundness” of the state Cotton Program, involving all key stakeholders and inviting domestic and international media. This can be a forum to consider options to introduce cotton sustainability labelling to respond to market demands.
- Further promote and articulate zero tolerance for child and forced labour in the Cotton Program at national and regional levels with a specific set of actions and designated responsibilities, including an effective monitoring and grievance mechanism.
- Provide legal advice to processors and farmers on labour-related issues.
- Formulate a strategy to promote women’s economic empowerment at all stages of the cotton value chain and sound and sustainable engagement of on-farm labour for cotton production.

Recommendations to the industry

- Continue providing technical assistance to farmers on crop monitoring and other areas. Previous experience in Tajikistan under the EBRD’s Tajik Agricultural Finance Facility has shown that simply educating farmers or agronomists through hands-on, in-field agronomy training, demonstrating the importance of tracking the cotton’s progress in the field and enabling

timely crop management decisions can lead to yield increases of more than 25 percent.

- Consider establishing commercially-based price differentiation to reward high-quality cotton production (whilst certain companies do offer such a premium in certain areas, this remains an exception and is not general industry practice).
- Further explore options for the introduction and expansion of water saving technologies to reduce water consumption, relieve water stress and improve fertilizer efficiency.
- Support the enhancement of cotton quality in view of expanding the sector's export potential and the value of produced cotton. A possible avenue would be to consider the introduction of a quality premium instead of the current flat subsidy.
- To enhance value and achieve market premiums, consider introducing a private sector sustainability scheme which will include, amongst others, an industry standard on labour reflecting good working practices for all workers in the sector, including on-farm labourers, as well as soil management and environmental aspects of sustainable cotton production.
- Provide legal advice to processors and farmers on labour-related issues.
- Improve contractual agreements (between ginning companies and farmers) in health and safety, working conditions and labour standards.

■■■■■ Chapter 1 – Cotton production in Azerbaijan

1.1. Policy context and the cotton development programme

The Government of Azerbaijan announced its plans to “give new life” to the cotton sector in early 2016, which was shortly followed by a conference on the development of the cotton sector in September 2016 held in Sabirabad and chaired by the President. The State Program for the Development of Cotton Production in the Republic of Azerbaijan for 2017-2022 was then endorsed by an executive order on 13 July 2017, identifying cotton production as a “strategic and important agricultural sector”.

The programme (Annex 1) aims to revive the cotton sector in order to boost rural employment and improve the country’s foreign currency reserves through exports. The production target for 2022 is 500 000 tonnes of seed cotton (equivalent to about 200 000 tonnes of lint and 250 000 tonnes of seed) to be produced on 200 000 ha of land. This level of intensification seems to be unprecedented in the country’s recent history and is to be achieved by:

- i. increasing the average national productivity from 1.8 to 2.5 tonnes per ha
- ii. converting new land areas currently under pasture to cotton cultivation

This recent revival of the cotton sector, however, is rooted in a long tradition of cotton production in the country which, in 1981, produced 830 000 tonnes of cotton or almost 10 percent of Soviet and 1.5 percent of global cotton production. Structural changes in the economy and the development of the petroleum industry in the 1990s, however, meant that cotton lost its key role in the economy.

At independence from the Soviet Union in 1991, the economy of Azerbaijan was based on agriculture and the agro-processing industry to supply the Russian Federation and other parts of the Soviet Union. Post-independence turmoil led to widespread poverty during the early 1990s until large off-shore oil investments and increasing world oil prices led to rapid gross domestic product (GDP) growth averaging 14.4 percent per year from 2000 to 2009. Nevertheless, the oil and gas sectors that had been fueling economic growth employed only a tiny fraction of the population. The decline in world oil prices since 2014 has reduced oil-related revenue, drawing attention to the non-oil sectors of the economy.

As agriculture is one of the leading non-oil sectors of Azerbaijan, a number of wide-scale interventions have been pursued to expand its development

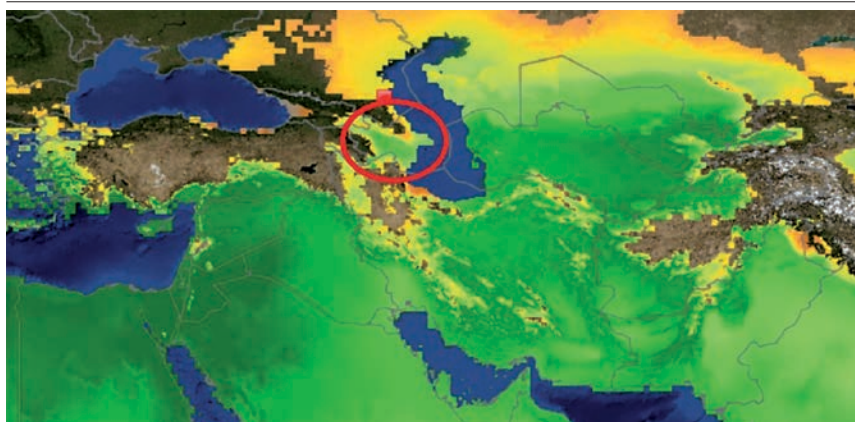
potential towards enhancement of food security, facilitation of a competitive agricultural sector and increased export capacity.

1.2. Agro-climatic characteristics and climate change

Cotton production in Azerbaijan takes place in the central flatland of the country from the Iranian border to the southern slopes of the Greater Caucasus with the highest concentrations around Imishli and Saatli in the southeast and north of the city of Ganja in the northwest (Figure 1.4).

While the **agro-climatic conditions** in the lowlands of Azerbaijan allow for cotton production due to a well-pronounced dry season and warm temperatures during summer, FAO has estimated that these **are not as optimal as in other major cotton producing countries** such as Uzbekistan, Turkmenistan or Pakistan. This is visible in Figure 1.1, where the darkest green areas indicate the highest agro-climatically attainable yield for high input irrigated cotton. In particular, the dry season in Azerbaijan is rather short, usually lasting from June to September, in contrast to south Central Asia or the Middle East where it is longer and can last over 6 months. A longer dry season means that the cotton has more time to achieve its full yield potential. Azerbaijani cotton varieties have a higher yield potential under local agro-climatic conditions than imported ones. However, the decline of local cotton production after 1990 led to reduced availability of local seeds.

Figure 1.1: Agro-climatically attainable yield for high input level irrigated cotton, baseline period 1961-1990



Source: Food and Agriculture Organization of the United Nations Global Agro-Ecological Zones (FAO GAEZ).

As a result of climate change, average annual temperatures in Azerbaijan have increased by 0.4°C since 1991 (3 times higher than the increase between 1961 and 1991), rainfall has decreased by 9 percent in the last decade (2007-2017), while the frequency of extreme weather events such as floods, droughts or heat waves has increased. Projected changes to climate by 2050 include an increase in temperatures by 1.4-2.8 °C, a decrease in precipitation by 5 percent, a greater frequency and magnitude of flood events due to increased intensity of single rainfall events and a rise in the level of the Caspian Sea by 1.5-2 metres.¹³ According to USAID, Azerbaijan's agricultural sector is vulnerable to climate change due to low productivity and soil degradation. Models¹⁴ suggest that all key crops will be compromised (except pasture), with potato and cotton expected to experience the greatest yield declines. This is in direct contrast to the government goal of increasing yields by 40 percent from 1.8 tonnes per ha to 2.5 tonnes per ha. Increased temperatures, especially during summer, and more variable precipitation will lead to increased evaporation of surface water and a reduction of river flows by 10-20 percent, causing more frequent water deficits and a reduction in total available water resources of 10-15 percent by 2040. In parallel, it is expected that more frequent flash floods and land- and mudslides will lead to "extensive damage to water infrastructure."¹⁵

Since climate change is expected to pose risks for agriculture and water resources in Azerbaijan in the near future, a careful analysis of the benefits and disadvantages of cotton in comparison to other crops in terms of resilience to such risks and of water needs in a context with reduced water availability will be required.

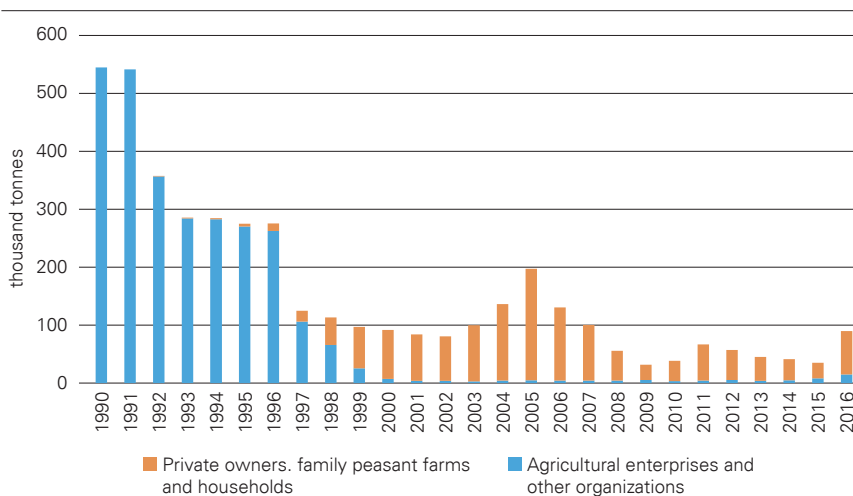
1.3. Area and yield

Cotton was one of the leading sectors of agriculture in Azerbaijan during the USSR. Around 1 million tonnes of cotton were produced on 282 000 hectares in 1981 with yields equivalent to 3.6 tonnes. However, cotton production started to decline in subsequent years and decreased substantially in 1992 following the collapse of the Soviet Union from 539 to 336 thousand tonnes; while in the late 1990s, the share of cotton produced on State farms rapidly decreased (Figure 1.2). The decline of production continued reaching a record low of 31 000 tonnes in 2009.

¹³ USAID, 2017.

¹⁴ Ibid.

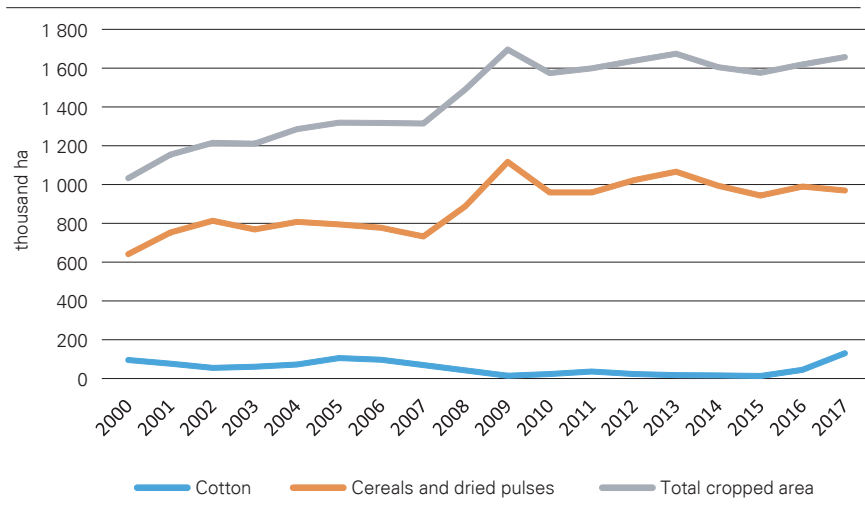
¹⁵ Ibid.

Figure 1.2: Seed cotton production in Azerbaijan, 1990-2016

Source: SSCRA.

The total cropped area of Azerbaijan has been increasing constantly since 2000 from 1 million ha to around 1.67 million ha in 2017. **Most of the expansion of cropped area from 2000 to 2017 was due to an expansion in the area under cereals** (Figure 1.3) which, together with a small amount of pulses, account for over 60 percent of the total cropped area.

While the government aims to pursue the expansion of cropped area on winter pastures and previously unused fallow land to grow cotton, **the magnitude of the planned increase in cotton area will inevitably entail a reduction in the area under other crops**, most significantly cereals and fodder crops (especially alfalfa).

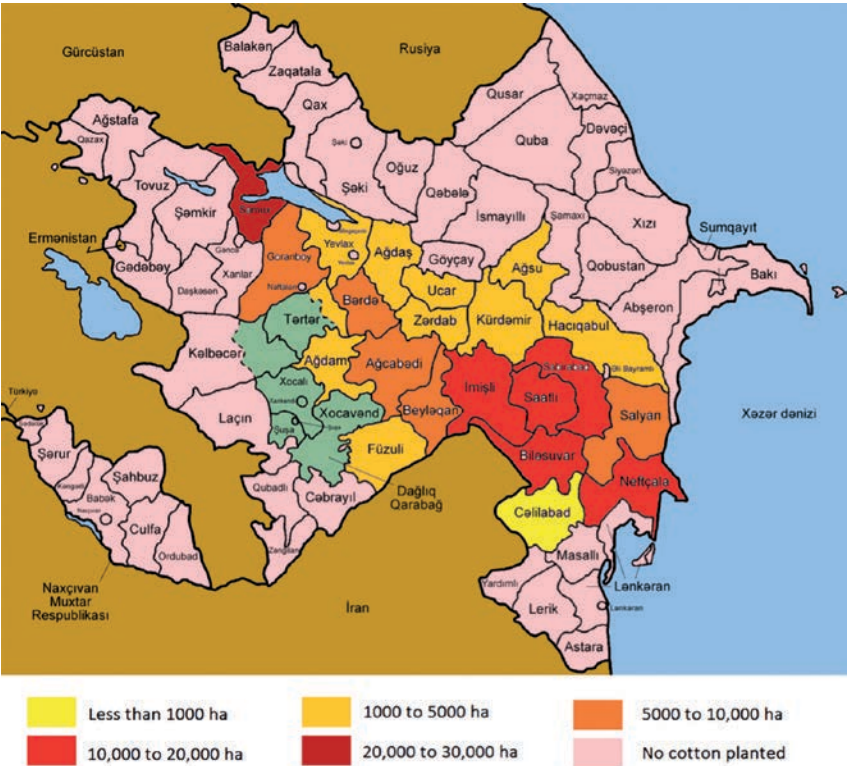
Figure 1.3: Evolution of cropped cotton area, 2000-2017

Source: SSC.

In 2017, cotton was planted in 22 of Azerbaijan's 70 districts (Figure 1.4) on 136 000 ha, up from 51 000 ha in 2016, or an increase of 85 000 ha. In parallel, the total cropped area of the country increased by only 37 000 ha the same year, meaning that **almost 50 000 ha of cotton were planted on lands previously used for the production of other crops.**

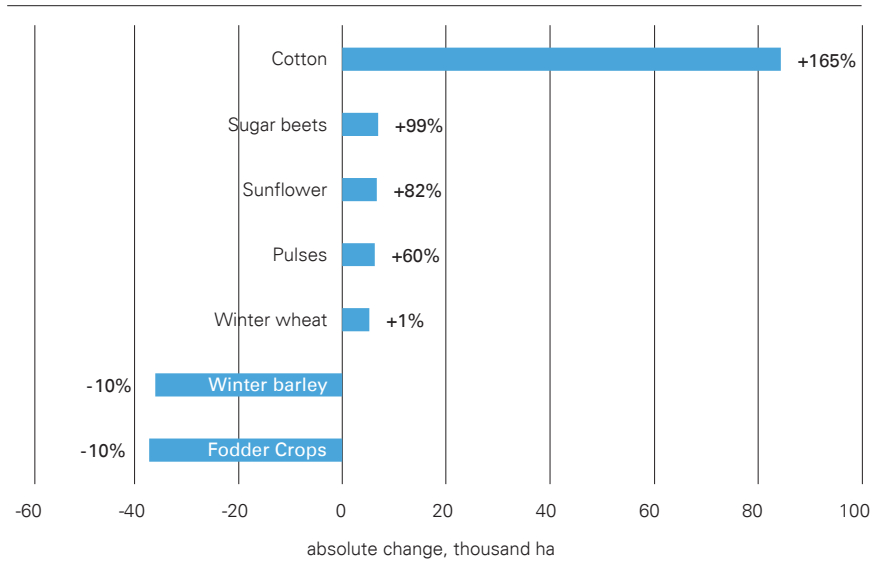
Figure 1.5 shows major changes (over 5 000 ha) in cropped area by crop in 2016-2017. As is visible, **cotton expansion has come mainly at the expense of winter barley and fodder crops (mainly alfalfa).** Each of these crops has seen its area reduced by around 37 000 ha. The area under winter wheat in turn remained stable. In addition to cotton, other crops where expansions occurred are sugar beets, sunflower and pulses (around 6-7 000 ha in each case). The expansion in cotton area, however, remains by large the most significant one in both absolute and relative terms.

Figure 1.4: Main cotton growing areas of Azerbaijan, 2017



Source: SSC for data, map by the author.

Note: Cotton area in legend is per district in hectares.

Figure 1.5: Major changes in area by crop, 2016-2017

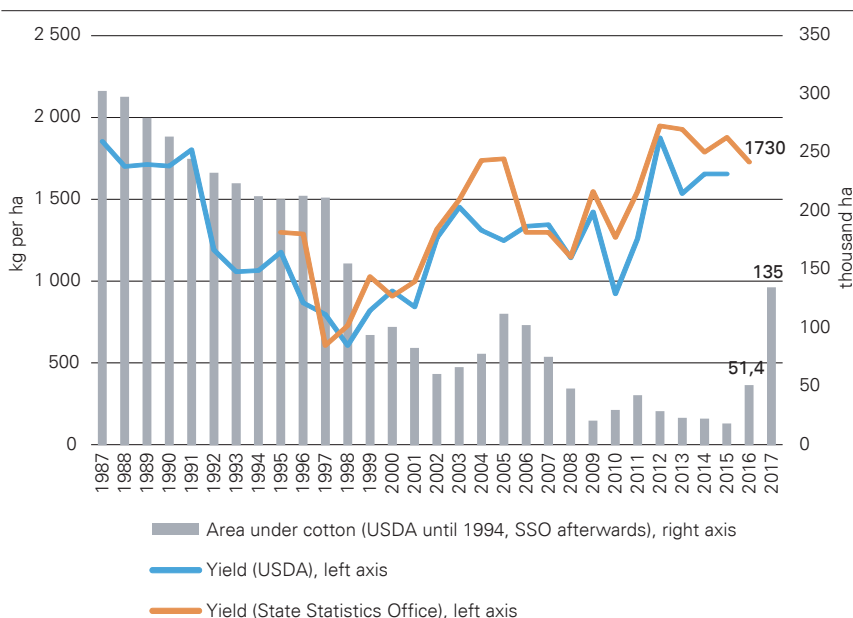
Source: SSC and author's calculations.

Note: Absolute change is in thousand ha and relative change in percent.

Yields have decreased significantly and are now about one-half the ones reported during Soviet times.¹⁶ Cotton yields of 4 tonnes of seed cotton¹⁷ per ha or more were commonly achieved during the 1970s and 1980s.

¹⁶ All the former Soviet republics are experiencing declining yields because of soil salinization caused by poor irrigation management. Any hope of reversing this trend will require significant changes in irrigation management.

¹⁷ Seed cotton, sometimes also referred to as raw cotton, is constituted by cotton bolls before they are ginned and separated into cotton yarn and cotton seed. It is commonly accepted that 60 to 65 percent of the weight of a cotton boll is constituted by the seeds and 35 to 40 percent by cotton lint. Cotton yields can be measured either in terms of cotton lint or seed cotton. The United States Department of Agriculture (USDA) and the International Cotton Advisory Committee (ICAC) measure yields in terms of cotton lint output per hectare. FAO and the State Statistics Committee of Azerbaijan measure cotton yields in terms of seed cotton output per hectare. Throughout the study, a commonly accepted 0.4 factor has been used to convert seed cotton weight to cotton yarn weight, although there are indications that this ratio in Azerbaijan could be as low as 0.385.

Figure 1.6: Seed cotton yield and area under cotton, 1987-2015

Source: USDA, State Statistics Committee and author's calculations.

In 2015, the government announced a **production target of 500 000 tonnes of seed cotton from 200 000 ha of irrigated land by 2022**. This is an ambitious target, as it means increasing the production more than 6 times within a period of 6 to 7 years. To achieve this, farmers will need to obtain an average yield of **2.5 tonnes per ha**. Currently, yields average **1.8 tonnes per ha**. As can be seen in Figure 1.7, there also is some regional variation in yields from a minimum of 0.6 tonnes per ha in the Ucar district to a maximum of 2.6 tonnes per ha in the Yevlakh district in 2016. Areas where a lot of cotton is grown, and which have traditionally been cotton-growing areas, tend to perform better.

Table 1.1: Main cotton producers in Azerbaijan, 2017

| | Number of contracting farmers | Number of districts in which present | Sown Area (ha) | Average size of cotton farm (ha) | 2017 production forecast (tonnes) | Ginneries in ownership | Total processing capacity (tonnes/year) | Expected yield |
|--|-------------------------------|--------------------------------------|----------------|----------------------------------|-----------------------------------|------------------------|---|----------------|
| MKT IK LLC (Gilan Holding) | 11 476 | 22 | 70 102 | 6.1 | 140 000 | 12 | 260 000 | 2.0 |
| CTS Agro | 1 564 | 14 | 28 560 | 18 | 50 000 | 6 | 60 000 | 1.8 |
| Agricultural LLC (Ministry of Agriculture) | 867 | 18 | 11 900 | 13.7 | 18 000 | N/A | N/A | 1.5 |
| Shamo LLC | 827 | 2 | 4 600 | 5.6 | 9,000 | 1 | 20 000 | 2.0 |
| Goran-Cotton LLC | N/A | 2 | 836 | N/A | 1 500 | N/A | N/A | 1.8 |
| Other companies | N/A | N/A | 2 029 | N/A | 3 000 | 2 | 40 000 | 1.5 |
| Individual farmers | N/A | 22 | 17 907 | N/A | 28 000 | 0 | 0 | 1.6 |
| Research institutes | N/A | N/A | 479 | N/A | 500 | 1 | 20 000 | 1.0 |
| TOTAL | N/A | 22 | 136 413 | N/A | 250 000 | 22 | 400 000 | 1.8 |

Source: Industry data and author's calculations.

Under the contracts, farmers provide land and some labour. The companies provide inputs such as seed, fertilizer, pesticides and machinery as well as finance. Farmers deliver the produced cotton to the companies to receive payments minus the value of the inputs provided. Although prices are determined by the government, some farmers reported that certain companies offer a small premium for quality in certain regions.

The system has potential advantages and disadvantages:

Potential advantages of the “company system”:

- efficient implementation of improved production systems on a large scale within a short time frame;
- efficient import/production, distribution and use of production inputs;
- the ability to better comply with government environmental directives in a manner that assures a productive and sustainable industry;
- efficient planning of supply for production, processing and manufacturing.

Potential disadvantages of the “company system”:

- risk of exploitation and loss of independence of farmers (freedom to farm) through increased indebtedness and limited choice of input suppliers and product buyers;
- short-sightedness, disregarding human and environmental risks in favour of profitability (for example, reduced crop rotation).

There are clear signs that cotton companies in Azerbaijan are interested in ensuring a sustainable future for the industry. Some have developed ties with the State Agrarian University in Ganja. According to the Vice Rector of the university, the future for young and capable agronomists is looking bright with some of the companies offering salaries that are substantially higher than what a young graduate could otherwise expect.

1.5. Production methods and practices

Irrigation

Some investments are being made in water-saving technologies such as drip irrigation and pivot irrigation. However, in 2017, almost all cotton area was flood irrigated with pivot and drip irrigation remaining marginal at best. Some drip irrigation suppliers have claimed that they have a demonstration cotton field of several hectares where drip irrigation is being used. They claimed that water consumption can be reduced to one-third of the water used for flood irrigation, with additional gains in productivity stemming from improved efficiency of fertilizer application. Unfortunately, our team was not able to visit the field nor did the company disclose any concrete data on potential savings and gains in

terms of water use efficiency in cotton or other crops. These claims thus need to be verified through independent research in Azerbaijan.

Water is a particularly valuable resource in Azerbaijan and to cater for the rapid expansion of the industry, water-saving technologies will need to be investigated closely along with the obvious improvements in infrastructure that are needed (irrigation and drainage channels).

Level of mechanization

Information obtained regarding the level of mechanization of cotton ranged from claims as high as 75 percent in favour of mechanical harvesting to over 60 percent in favour of manual harvesting. Field visits confirmed that over 50 percent of harvesting in 2016 was done manually.

Pest management

Companies have a strong desire to better understand the threat that cotton pests such as *helicoverpa armigera* represent and what is needed to ensure an approach to pest management that is both financially viable as well as environmentally sustainable.

The prospect of facing insecticide resistance and the potential consequences to the industry is being taken very seriously.

Relationship with farmers

While companies are currently investing heavily in the cotton value chain (fertilizer production, textile factories), **some farmers feel that they are not being treated fairly by the companies.**

Some farmer complaints include:

- having to adhere to spray recommendations that are deemed unnecessary;
- receiving reduced payments for cotton that the company deemed to be of low quality while being unable to choose another buyer;
- being sold inputs that are of poor quality, often at higher-than-market prices.

In addition, **farmers suggested, on several occasions, that they were approached by representatives of the Ministry of Agriculture at the local level asking them to dedicate a certain share of their land to cotton** – something they felt uncomfortable refusing even if many of them claimed wheat, alfalfa or other crops were more profitable for them than cotton. The inability of farmers to refuse growing cotton seems to affect especially those who rented land from the government. It is unclear to what extent such practices affect farmers under contracts with private companies. Clearly, farmers who plant cotton following such advice show little motivation in improving agronomic practices and efficiency.

1.6. State support for production

The State is strongly involved in the agricultural sector of Azerbaijan: it provides different types of support to multiple agricultural sub-sectors through a number of sector-specific and cross-sectoral policies. Farmers are exempt from all taxes except for the land tax. All the main agricultural sub-sectors, including cotton-growing, receive both input and output subsidies in addition to market protection from import competition.

In 2004 state-owned company **Agrolizing** was created by presidential decree. Its main activity is the lease and sale of farm machinery purchased with state funds to farmers, often under preferential financial conditions. In addition, it also **imports inputs such as seeds, pesticides and fertilizer which it sells to farmers at a subsidized price** equivalent to 30 percent of the market price.

The Ministry of Agriculture has estimated that the share of this subsidy in the final profit is about 9 percent (Table 1.2). The crops where fertilizer accounts for a large share of the otherwise low production costs per ha are those where the share of the fertilizer subsidy in profit is the highest, as demonstrated in Table 1.2.

Table 1.2: Select economic indicators per hectare of crop

| Crops | Total income per hectare, AZN | Factual cost per hectare, AZN | Cost in terms of selling fertilizer without a discount, AZN | Ratio of subsidy on fertilizer in factual cost, % | Profit per hectare, AZN | Additional profit per hectare adding subsidy, AZN | Share of subsidy in the profit, % |
|------------|-------------------------------------|-------------------------------------|--|---|-------------------------------|---|---|
| Wheat | 639.2 | 248.2 | 334.7 | 34.9 | 394 | 484 | 18.6 |
| Barley | 472 | 223.3 | 284.6 | 274 | 248.7 | 298.7 | 16.7 |
| Alfalfa | 692.4 | 250.8 | 263.5 | 5.1 | 441.6 | 491.6 | 10.2 |
| Cotton | 956.8 | 601 | 670.2 | 11.5 | 355.8 | 546.3 | 9.2 |
| Sugar beet | 1424.3 | 531.8 | 592.6 | 11.4 | 892.5 | 942.5 | 5.3 |
| Sunflower | 1 771 | 479.4 | 537 | 12 | 1 291.6 | 1 341.6 | 3.7 |
| Maize | 1 727.2 | 402 | 556.9 | 38.5 | 1 325.2 | 1 375.2 | 3.6 |
| Pulses | 2 272 | 399.1 | 470 | 17.8 | 1 872.9 | 1 922.9 | 2.6 |
| Tobacco | 2 988 | 628.7 | 748.9 | 19.1 | 2 359.3 | 2 442.2 | 2 |

Source: Farm Data Monitoring System (FDMS) Report 2016, Ministry of Agriculture.

In addition, under the current system, **the government subsidizes 40 percent of the value of purchased machinery**. Farmers pay only 20 percent upfront and have 5 years to repay the remaining 40 percent to Agrolizing at a 0 percent interest rate with a 1-year grace period. For loans over USD 500 000, the repayment period is 10 years. A single cotton harvester can cost up to USD 300 000 while its use is limited to the short cotton harvesting season (1-2 months per year). Companies, especially smaller ones, find that this policy of the government is important as otherwise they would have little stimulus for mechanization.

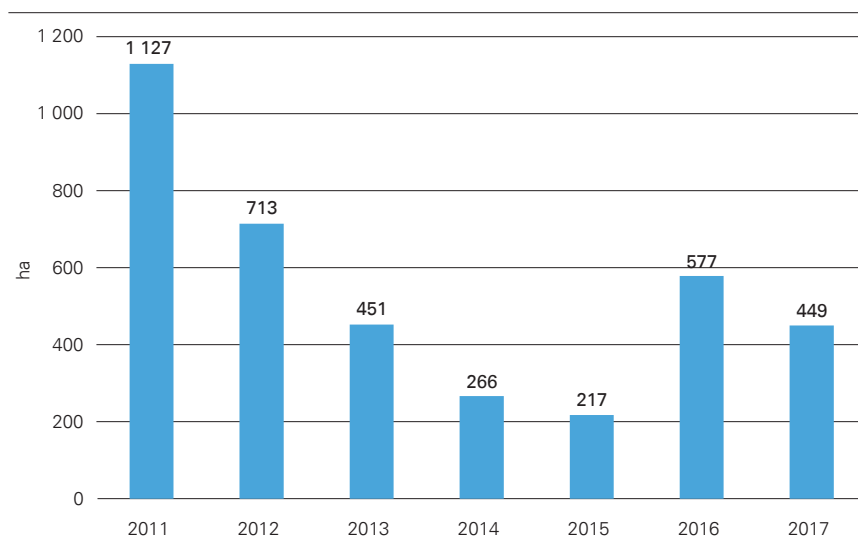
The annual budget of Agrolizing for the purchase of agricultural equipment is USD 150 million. In 2016, 1 800 units of equipment were purchased, including 94 cotton harvesters. In 2017, the number of units purchased increased to 3 811, of which 209 were cotton harvesters and 810 tractors. This means that the number of cotton harvesters in the country in 2017 is 389, or 4.5 times higher than in 2015 (when there were only 86 cotton harvesters) and shows that the mechanization of harvesting is a serious government priority. The area under cotton per harvester has decreased from 577 ha in 2016 to 449 ha in 2017 (Figure 2.6), despite the unprecedented increase in cotton area.

The International Cotton Advisory Committee (ICAC) estimated¹⁸ that the time required by a harvester to harvest 1 ha of cotton in India is about 2 hours (including unloading time) as opposed to 569 “woman hours” for manual picking (equivalent to 47 people working in the field on a 12-hour working day in order to harvest 1 ha within a day, or over 70 people on an 8-hour working day). Considering that India and Azerbaijan have similar average cotton yields, these estimates can serve as a reference point for comparison.

In spite of the ongoing mechanization, the area to be harvested per machine in 2017 was around 450 ha. A harvester would need 75 days to harvest this area over a 12-hour working day (harvesting 6 ha per day). The window period for harvesting cotton is usually much shorter depending on maturity level, maturation variation and weather conditions.

A comparison of the respective cost of manual and mechanical harvesting is provided in Chapter 6.

¹⁸ Majumdar and Desouza, 2017.

Figure 1.8: Average cotton area per harvester, 2011-2017

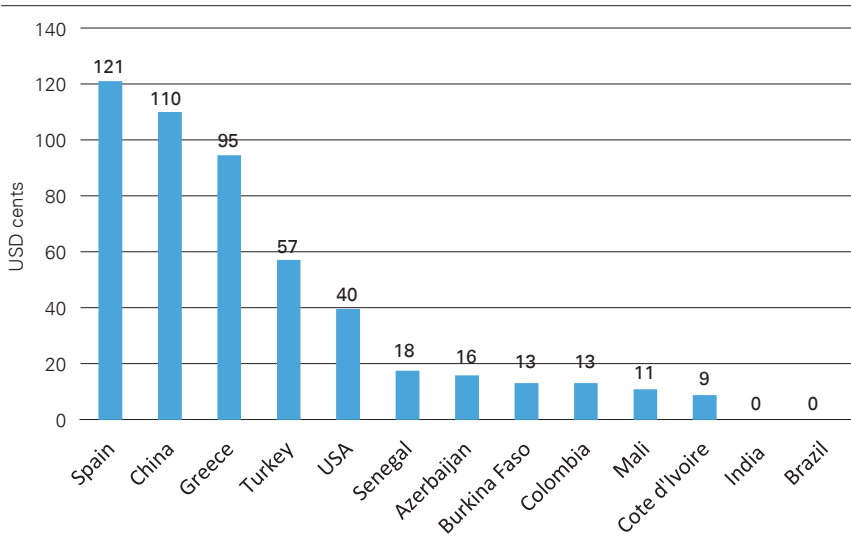
Source: Ministry of Agriculture, author's calculations.

Since 2016, in addition to input subsidies, which are cross-sectoral, **the farm-gate procurement price per kilogram of seed cotton has been set at AZN 0.5 (USD 0.29) with an additional government subsidy of AZN 0.1 (USD 0.06).** There are no price subsidies for cereals and other major crops.

ICAC estimates total government support to the cotton sector globally to be USD 5.9 billion in 2017/2018, compared with USD 7.4 billion in 2015/2016 and USD 4.4 billion in 2016/17. In 2017/18, ten countries provided subsidies averaging USD 0.21 per pound of lint cotton (USD 0.08 per kg of seed cotton).

Azerbaijan ranks about average in terms of its government subsidy of USD 0.06 per kg of seed cotton, equivalent to USD 0.16 per kg of cotton lint¹⁹ (Figure 2.7), which is the only type of sector-specific government assistance to the sector (subsidies on machinery and other inputs apply to all sectors). In many countries, however, high government cotton sector-specific assistance is to a large extent due to other support mechanisms such as tariff barriers on cotton imports (as is the case in China), which do not exist in Azerbaijan.

¹⁹ Data for other countries is based on *Production and Trade Policies Affecting the Cotton Industry*, ICAC (October 2016). Data for Azerbaijan is based on various industry sources and refers to the AZN 0.1 government subsidy per kilogram of seed cotton (equivalent to USD 0.06/kg).

Figure 1.9: Government assistance per kg of cotton lint, 2016-2017

Source: ICAC, author's calculations.

Currently, state support measures for the cotton sector can be summarized as follows:

- cotton producers are exempt from tax (excluding land tax);
- irrigation water is sold to cotton producers at discounted prices;
- starting from 2016, a subsidy of AZN 0.10 per kilogram (AZN 100 per tonne) of seed cotton applies;
- purchases of equipment by cotton producers from Agrolizing are subsidized at 40 percent of their value with very favourable lending conditions for another 40 percent of the value (no interest rate, 5 years period to repay);
- the price of mineral fertilizer, biohumus and pesticide is subsidized at 70 percent by the government. All agricultural inputs sold through Agrolizing are subsidized. For example: If 1 tonne of fertilizer would cost AZN 500 on the "open market," farmers will pay 30 percent of that amount or in this case AZN 150 per tonne;
- when clothing and other textile products made from cotton yarn are exported, 6 percent of their value is subsidized;
- there is no export tax for cotton and cotton products in Azerbaijan.

1.7. Cotton processing

The overall reluctance of the major private cotton companies, which are responsible for the bulk of cotton processing in Azerbaijan, to disclose information regarding the number and operational capacity of their ginneries has made it difficult to obtain any specific figures regarding the current state of the ginning and processing industry in terms of total capacity per company and industry profitability.

Overall, the cotton processing industry has declined significantly since the collapse of the USSR. In Soviet times the total processing capacity of cotton factories (cotton gins) in Azerbaijan was 900 000 tonnes. At present, 22 cotton gins operate in Azerbaijan and the total processing capacity²⁰ has dropped to 400 000 tonnes. By international standards, these are below average in capacity at about 18 000 tonnes of seed cotton per season. Most new gins installed in Brazil, the United States, Australia or Uzbekistan would have an annual capacity of 30 000 tonnes of seed cotton or more. Large gins handle at least 100 000 tonnes per season. While there is nothing inherently wrong with smaller size, it probably means that operating costs per gin for labour and electricity are above average.

The Ministry of Agriculture is planning to start the construction of a new cotton processing plant next year to meet ginning needs in view of the expansion of production to 500 000 tonnes of seed cotton.

The State Program for the Development of Cotton Production in the Republic of Azerbaijan 2017-2022 stipulates that the following activities will be undertaken in order to achieve the objectives set forth for the development of cotton production in Azerbaijan:

- increase the production of seed cotton through the application of best management practices and intensive cultivation and irrigation technology, and ensure efficiency in this regard;
- improve the provision of cotton production with modern equipment and machinery;
- apply crop rotation systems in cotton production;
- identify optimal fields for cultivation in the regions and extend specialization;
- restore the operation and modernization of the existing cotton processing factories and provide support to the establishment of new cotton processing factories with advanced equipment and technology;
- increase export by means of new cotton goods;

²⁰ "Capacity" is not a fixed engineering constant and can vary with moisture content of seed cotton, the speed of saws and especially the length of the ginning season and the number of hours of operation each day.

- take into account the changing market conditions in the world cotton market, including the enhancement of the use of chemical fibres in textile sector;
- strengthen the system of planting seed supply and facilitate the production of delinted cotton seed.

The government also expects that the development of cotton growing will serve as a major impetus to the development of the textile and apparel industry of the country with strong export potential.

The following strategy will be implemented to support cotton production and export:

- increase the production of raw materials for export in the short-term;
- substitute imports and increase exports by developing local processing capacity and the textile industry in the long-term perspective.

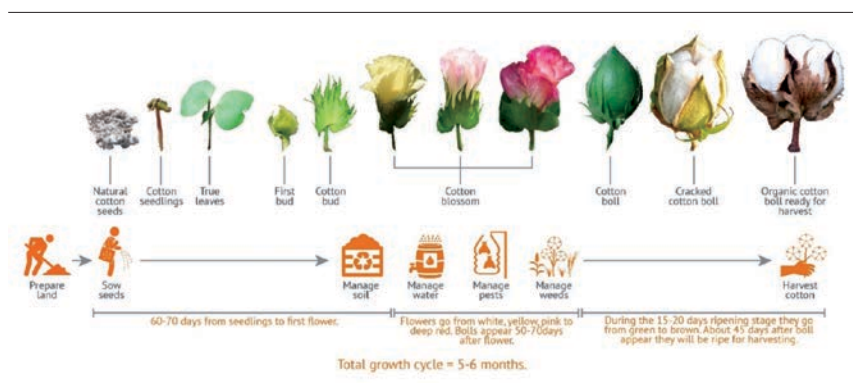
The decision to establish an “industrial park” in Mingechevir in 2015 appears to be a cornerstone of the government strategy. While there is limited information available, it is understood that the Mingechevir Industrial Park is an industrial zone with special status that will belong to the Ministry of Economy and provide its infrastructure to the “residents” of the park under some type of preferential contractual arrangement. Residents will also be provided with special privileges such as tax and customs duties exemptions. The total planned investment is of USD 210 million (USD 60 million in construction and USD 120 million in equipment) and the park is expected to be fully operational by 2021, providing 5 500 jobs.

As of late 2017, it appears that Gilan Holding is the main beneficiary of this project; as a registered resident of the park it is planning to operate 9 factories there by 2021 (cotton yarn, acrylic yarn, wool yarn, sock products, footwear production, tissue, fabric dyeing, sewing and medical cosmetics). As of January 2018, it is not clear whether there are other registered residents of the park.

Chapter 2 – Agronomic aspects of production

Field visits were undertaken in several districts (Kurdamir, Saatli, Imishli, Bilasuvar, Goranboy) during the month of July 2017 by FAO agronomists and cotton specialists. The cotton in the field was at a growth stage between flowering and boll formation, about 80-90 days after sowing (DAS).

Figure 2.1: Stages of the cotton growth cycle



Source: ICAC.

At this stage, soil fertility, moisture, and pest damage are generally the dominant stress factors impacting plant structure prior to flowering. During the reproductive phase, the cotton plant has a high requirement in water and nutrition. **Most of the fields visited suffered from poor agronomic practices.**

2.1. Land preparation, sowing and seed rate

Establishing a stand and getting the crop off to a good start is important to ensure plant uniformity in the field and maintain the proper balance between vegetative and reproductive growth, which are both essential for high yields. This is especially important in situations where the length of the growing season is relatively short, like in Azerbaijan. Optimum plant density varies with geography and variety. For the country, ICAC recommends a plant stand of 7 to 8 plants per metre with 80 000 plants per hectare, producing 10 to 12 bolls per plant. National recommendations for seed rate are 12 to 15 kg per ha for certified seed cotton.

Most of the fields visited (about ten) **presented a significant plant-to-plant variation in heights and growth stage.** The cotton plants failed to establish in large field patches. This might have been caused by poor land preparation such as uneven field levelling and a lack of moisture during the seed germination stage but could also be a sign that farmers do not have access to certified seed of pure varieties and are being provided with gin-run seed at low cost.

Farmers reported using a seed rate of 20 to 22 kg per ha. Even though most farmers had thinned their crop, **a rather high plant density was observed in all districts.**

Image 2.1: Example of a patchy field with significant plant variation (Saatli District, July 2017)



Source: Author's photograph.

2.2. Pests, pesticides and crop management

The 2017 growing season saw high pressure from pests. The main pest observed was the cotton bollworm (*helicoverpa armigera*). Many of the fields inspected had suffered yield losses as a result of *helicoverpa* activity. Estimated losses ranged from 20 to 60 percent.

Other pests in Azerbaijan include: cotton aphids (*aphis gossypii*), green mirids (*creontiades dilutes*), pink bollworm (*pectinophora gossypiella*), two-spotted mites (*tetranychus urticae*) and thrips (*thrips tabaci*). All of these pests with the exception of pink bollworm were noted at low levels in the cotton fields during inspections.

While pest damage levels were high in many districts, there were some fields in which damage levels were relatively low, despite the fact that their farmers decided against using pesticides. This was the case at the Ministry of Agriculture Research Institute of Plant Protection and Technical Crops in Ganja.

According to the researchers interviewed at the institute (plant breeder, entomologist and geneticist), they have never treated their cotton with chemical pesticides and have never had the need to do so. They are convinced that this practice has allowed them to build up the beneficial insect population over time, which in turn has helped them protect their cotton from pest attack.

The institute apparently has bio-laboratory facilities (not visited) which according to the researchers would be capable of producing enough beneficial insects (*trichogramma* and *habrabracon* wasps) to supply all of the cotton fields in the Ganja region, given additional investment.

Apparently the phytosanitary department of the Ministry also operates one such bio-laboratory that could produce *trichogramma* wasps for the control of *helicoverpa* but the laboratory is currently being renovated. We were unable to visit the facility. The department expects the laboratory to be ready for production by the end of 2017. There are a further three such laboratories throughout the regions, but none are currently operational. The department says that they could start production again on relatively short notice if the demand for beneficial insects increases and if it looks like the production and supply of such organisms would be profitable. At the moment, this is not the case.

Knowledge of pests, pest life cycles, beneficial insects, crop monitoring techniques, pesticide modes of action and pesticide application is poor among farmers and agronomists. This has become apparent a number of times during field visits. In neighbouring Iran and Turkey, substantial scientific capacity exists to train agronomists and farmers in the principles of integrated pest management (IPM).

In the case of the most destructive pest – *helicoverpa armigera* – a sound understanding of pest behaviour, pest and crop damage monitoring techniques, pesticide modes of action and the limitations of the various control options is required for successful and sustainable management.

Unlike most other crops, the process of flowering and fruit production in cotton occurs over a period of several weeks. Understanding and indeed monitoring crop progress is crucial to achieving high yields. Regular crop inspections are

needed to track the crop's progress and to enable timely crop management decisions.

In Australia, for instance, the vast majority of cotton farmers engage the services of qualified agronomists to advise them on crop management issues such as variety selection, irrigation, crop nutrition, pests and pesticides, etc.

Typically, cotton crops need to be inspected by capable agronomists at least once or twice per week, especially during those weeks when crops are flowering and producing fruit. It is essential for crop management decisions to be made in a timely manner.

Pest management decisions must consider pest pressure, presence or absence of beneficial insects, crop damage levels (economic thresholds), availability of control options, effects and limitations of the various control options and crop maturity.

Based on discussions held with farmers and agronomists, it is apparent that **there is a lack of understanding of the importance of pesticide application timing and quality**. Many still believe that pesticide applications should occur in the middle of the day when the pests are most active. This goes against modern accepted knowledge of pesticide use that applications should be avoided during periods of high temperatures.

The understanding of pesticide modes of action amongst farmers and agronomists is poor. Many seem to be aware of the concept and potential benefits of preserving and indeed encouraging the development of beneficial insects in cotton fields. This however is not reflected in the choice of pesticides used. Farmers do not understand for example that some pesticides are more selective than others. In fact, the use of non-selective, broad-spectrum pesticides such as synthetic pyrethroids and carbamates was particularly high this season. The concept of using selective chemistry, especially early in the season, to minimize negative impacts on beneficial insect populations is not well understood. To equip agronomists and farmers with such knowledge, **extensive theoretic and practical training is required**.

2.3. Pesticide registration and regulations

In addition to high pest pressure this season, the **results observed from the applied pesticides were disappointing**. On a number of occasions, farmers had poor control of cotton bollworm with pesticides. Some reported repeated spray failures even with application rates well above the recommended label rates.

Many farmers questioned the quality of the pesticides. This in stark contrast with the discussions held with the Director of the Phytosanitary Department who firmly believes that spray failures are a result of poor product knowledge and application rather than product quality. He explained the process of

pesticide registration: A special commission oversees the registration process. The commission consists of representatives from the Ministry of Ecology and Resources, Ministry of Health and Ministry of Emergency Situations. Companies wishing to register pesticides in Azerbaijan are required to submit an application including documents on active ingredients, material safety data and methods for determining product purity. If the commission determines that the product could be useful in the context of local agriculture, the company in question is invited to submit a sample of the product, which is then sent to the Research Institute of Academic Sciences for testing over a period of 2 years. Tests include laboratory tests (active ingredient, purity, toxicity etc.) and field tests (efficacy, crop safety). Based on the results, the commission will decide whether to include the pesticide in the list of registered chemicals.

Once a product has been included in the list, it will remain there for 5 years. Registration will then be extended if no adverse effects are found in practice and the product has met expectations. The Ministry of Agriculture decides which products should be imported based on the companies' input and advice. In certain situations, non-registered pesticides can receive use permits (for example in emergency situations such as pest outbreaks, disease outbreaks, etc.).

It was further pointed out that **the Phytosanitary Department and Agrolizing are helping farmers understand various aspects of pesticides including health and safety, environment and efficiency.** This was confirmed by representatives of Agrolizing. The extent, content and quality of the training, however, is unclear.

The department ruled out the possibility of illegal imports of significant quantities of inferior quality products.

A comprehensive list of currently registered insecticides for cotton in Azerbaijan was provided by the department and is included in Annex 2. Whilst the list of registered insecticides provides a large selection of products, the actual products and active ingredients identified during the mission as available to farmers was limited. Those most commonly mentioned by farmers and found in Agrolizing warehouses in the districts are listed in Table 2.1.

Table 2.1: Insecticides predominantly used by farmers, 1 June to 15 August 2017

| Product name | Active ingredient(s) |
|--------------------|--------------------------|
| Garant | Carbosulfan |
| Karate Zeon | Lambda - Cyhalothrin |
| Decis | Deltamethrin |
| Kortomil, Terra 90 | Methomyl |
| Emarebeno | Emamectin |
| Abam | Abamectin+ Spirodiclofen |
| Mostar | Acetamiprid |

Source: Cotton farmers.

Products highlighted in grey in Table 2.1 are broad-spectrum pesticides. These products are non-selective and hence will significantly reduce populations of beneficial insects. They should not be used early in the season to minimize negative impacts on beneficial insects.

Carbosulfan and methomyl are from the group of carbamates. These products are cholinesterase inhibitors and therefore highly toxic to humans. Carbosulfan is no longer used in the United States or in the EU.

Products containing acetamiprid and spiroticlofen have a relatively low human toxicity but are potentially dangerous to foraging bees.

Products containing abamectin and emamectin are relatively selective and potentially less disruptive to beneficial insect populations.

Considering the vast range of registered products (see list in Annex 2), it should be relatively easy to select appropriate chemistry that suits the various situations.

Products imported from Turkey contain fairly extensive use stipulations. Annex 3 shows a sample of such a product label.

Information contained on Turkish pesticide labels includes:

- storage requirements
- human and animal health risks
- the required use of protective clothing (face masks, overalls, gloves)
- potential pathways of absorption into the human body
- poisoning symptoms

- what to do if poisoning occurs
- disposal of containers
- post-spray field re-entry periods
- bee toxicity
- toxicity to aquatic organisms
- spray equipment calibration
- application timing
- crops and pests on which the product can be used

Labels on Russian products are not as extensive and appear to be less descriptive and restrictive regarding human health and environmental risks.

Some product labels shared very little information. One example is included in Annex 3.

The product in the example is *Garant* and contains the active ingredient carbosulfan. The information on the label is in Turkish and English. The product was imported from Germany.

It was noted that the quality of the English language is poor and the wording very weak if not misleading. The label includes the following statement: "Formulation is not dangerous for the people when they use the chemical according the rules of using chemicals" (sic).

Product labels should be designed according to specific legislation. They should include standardized comprehensive information and instructions that are easy to understand and cannot be misinterpreted by the user. Considering the number of ministries involved in the regulatory system and considering the extent of laws and regulations that are currently in place, it is surprising that the labelling of imported pesticides is not yet standardized in Azerbaijan.

Annex 4 summarizes the Azerbaijan pesticide regulatory system. It includes an overview of responsible government agencies and provides a summary of the various laws and regulations that govern pesticide use, human exposure and the environment.

2.4. Pesticide imports

According to the deputy director of Agrolizing, pesticide imports are organized as follows:

The Ministry of Agriculture, with input from the large cotton companies (MKT, CTS Agro, etc.), decides on the types and quantities of pesticides to be imported. Agrolizing then organizes a tender on behalf of the Ministry.

Import companies can bid for the tender. Bids are assessed by the Ministry and the company and the most attractive offer is awarded the right to import. Distribution is carried out through Agrolizing's network for farmers under contract with Agricultural LLC (the company registered by the Ministry of Agriculture).

Private companies may import their own chemicals without going through the tender process (Agrolizing's distribution network) but the products must meet the standards stipulated by the Phytosanitary Department. These large private cotton companies have their own procurement departments through which such imports are managed.

In both cases, pesticides are provided to the farmers under contract with the companies, together with other inputs such as fertilizer, with their value deducted from the payment which the farmers receive for their production at the end of the season.

A list of imported insecticides was compiled by FAO during a mission in July (Table 2.2). The list was provided by Agrolizing and contains products, active ingredients and quantities.

Table 2.2: List of insecticides imported by Agrolizing, July 2017

| Product name | Active ingredient(s) | Use rate per hectare | Quantities imported |
|----------------|--|----------------------|---------------------|
| Aceti Super 20 | 200 g/kg Acetamiprid | 200 g/ha | 4 000 kg |
| Terra 90 | 900 g/litre Methomyl | 800 ml/ha | 32 000 litres |
| Indox Super | 150 g/litre Indoxacarb + 50 g/l Emamectin | 250-300 ml/ha | 12 000 litres |
| Abam 28 SC | 40 g/litre Abamectin + 240 g/litre Spirodiclofen | 150-160 ml/ha | 3 100 litres |
| Garant 20 EC | 200 g/litre Carbosulfan | 1.5 litres/ha | 30 000 litres |

Source: Agrolizing.

2.5. Cotton varieties

During discussions, researchers from the Ministry of Agriculture's Research Institute of Plant Protection and Technical Crops in Ganja placed a **strong emphasis on promoting the breeding of local varieties**. The experts believe that breeding local varieties with a yield potential of over 5 tonnes per ha from existing genetic stocks would only take 3 years. **They advocated the**

re-establishment of a local cotton breeding program and the increased funding of their institute in general. According to the researchers, local varieties carry an inherent tolerance to two of the main plant diseases affecting cotton in Azerbaijan: the fungal disease verticillium wilt (*Verticillium dahliae*) and the bacterial disease bacterial blight (*Xanthomonas malvecearum*). They claim that imported varieties are susceptible to the diseases. Low levels of verticillium wilt were noted in a number of fields during the mission.

Whilst it is unclear whether the fields that displayed disease symptoms were local or imported cotton, it is clear that verticillium wilt is a disease that needs to be taken seriously in Azerbaijan. The same disease is affecting cotton in other countries. Countries that have an advanced research and plant breeding industry such as Australia, have to some extent been able to reduce the threat by breeding tolerance traits into modern cultivars but have not been able to equip varieties with resistance.

Research suggests that crop rotation, in particular with cereals, is an effective means to reduce fungal inoculum levels in the soils. Good farm hygiene can prevent the spread of the disease within individual farms and across districts. The disease cannot be treated chemically.

Several farmers as well as the researchers have mentioned that local varieties are performing at least as well if not better in terms of yield potential than imported varieties.

■■■■■ Chapter 3 – Water use and environmental aspects of cotton production

3.1. Irrigation and water use efficiency

Water availability, salinization and pollution are serious environmental issues in Azerbaijan, while cotton is a relatively water intensive crop (Tables 3.1 and 3.2) and improper use of fertilizer and pesticides was reported during the 2017 growing season. Over 1.4 million ha of the 1.6 million ha of agricultural land in the country are irrigated, with 70 percent of water resources coming from neighboring countries. Rivers are not regulated and the water flows into the Caspian Sea.

Cotton is fully irrigated and the current irrigation schedule is 1 000 m³ per ha with a minimum of three irrigations per crop cycle. In Azerbaijan, however, cotton would require four to five irrigations (ICAC, 1998).

Table 3.1: Approximate values of seasonal crop water needs

| Crop | Crop water need (mm/total growing period) |
|-------------------|--|
| Alfalfa | 800-1 600 |
| Banana | 1 200-2 200 |
| Barley/Oats/Wheat | 450-650 |
| Bean | 300-500 |
| Cabbage | 350-500 |
| Citrus | 900-1 200 |
| Cotton | 700-1 300 |
| Maize | 500-800 |
| Melon | 400-600 |
| Onion | 350-550 |
| Peanut | 500-700 |
| Pea | 350-500 |
| Pepper | 600-900 |
| Potato | 500-700 |
| Rice (paddy) | 450-700 |
| Sorghum/Millet | 450-650 |
| Soybean | 450-700 |
| Sugar beet | 550-750 |
| Sugarcane | 1 500-2 500 |
| Sunflower | 600-1 000 |
| Tomato | 400-800 |

Source: FAO, 1986.

Table 3.2: Coefficient of evapotranspiration (Kt) of crops

| Crop | Coefficient of evapotranspiration (Kt) |
|-------------------|--|
| Lucerne (alfalfa) | 831 |
| Sunflower | 790 |
| Cotton | 645 |
| Potato | 636 |
| Buckwheat | 578 |
| Wheat | 513 |
| Barley | 431 |
| Rice | 410 |
| Maize | 368 |

Source: Ministry of Agriculture of Azerbaijan, Crop Production Department.

Note: The Kt is the grams of water used to produce 1 gram of dry biomass.

Seventy percent of the irrigation system is directly on soil channels. Irrigation channels have deteriorated due to lack of maintenance after the collapse of the Soviet Union. Out of the 136 000 ha planted with cotton this year, **66 000 ha are in new areas converted from pasture municipality land where irrigation channels do not exist.**

The irrigation department highlighted the following challenges in meeting cotton water requirements:

- water scarcity and competing demand from other crops;
- lack of channels in newly converted land from pasture;
- significant water requirements where the soil was never irrigated for it to be cultivated for the first time.

While World Bank research (currently in progress) estimates that the cotton area expansion will increase total irrigation water demand of only 1 percent, it also expects it to result in a seasonal mismatch between supply and demand for irrigation water during the peak of the irrigation season (August to September). **This in turn means that higher cotton export revenues could come at a much higher cost of foregone foreign exchange revenue, due to a reduction in production of commodities currently enjoying a strong competitive advantage on international export markets such as fruit and vegetables.**

In 2017, 106 000 ha of cotton had received pre-ploughing irrigation, but 30 000 ha had to be replanted and re-irrigated due to failure in seed germination. At around 28 percent, this is an extremely high failure rate.

At the time of the field visit, the fields had just, or where about to, receive the first post-planting irrigation. Considering the crop stage, the first irrigation was coming quite late and it is likely that the cotton plants had been in water stress. The timing of the first post-planting irrigation is the most critical irrigation decision. Starting too late may lead to stunted plants and early cutout. Crop water demand is high starting from first flower to peak bloom. Lack of water at this stage can stunt plant growth, lower the number of fruiting sites, cause shedding of young bolls, reduce boll size, and result in loss of yield potential. Severe water deficit at this stage can also impact fibre quality.

Water use efficiency is expected to be very low in the country due to the irrigation method, status of irrigation infrastructure and the high evapotranspiration rate. Flood irrigation is the prevalent method. **Pivot and drip irrigation are being tested in a small scale (100 ha) without clear results.**

In particular, some drip irrigation companies claim that they have a demonstration cotton field of several hectares where drip irrigation is being used. They also **claim that water consumption can be reduced to one-third of the water used for flood irrigation**, with additional gains in productivity stemming from an improved efficiency of fertilizer application. As already mentioned, however, companies did not share concrete information on potential productivity gains. These claims thus need to be further verified independently. Unfortunately, our team was also not able to visit demonstration fields to assess the potential water savings.

Previous research from the Punjab region of Pakistan²¹ and the northwest of China²² has shown that drip irrigation can lead to significant improvements in the natural crop water productivity²³ of cotton. However, in terms of improvements in monetary crop water productivity, the application of drip irrigation to cotton is only beneficial if it is accompanied by a yield increase above a certain threshold, as the initial investment is costly. The research from China, for instance, concludes that under the local yield conditions, flood irrigation is still an economically viable irrigation method. It is thus important that a cost-benefit analysis of flood irrigation versus alternative irrigation methods for cotton is conducted in the local context of Azerbaijan, taking into consideration financial, economic and environmental aspects.

²¹ Muhammad et al., 2018.

²² Feike et al., 2014.

²³ Natural crop water productivity is kg of seed cotton produced per m³ of irrigation water.

3.2. Minimizing pesticide use

An encouraging observation made during field missions is that all major cotton sector stakeholders in Azerbaijan (government institutions, research institutes and private companies alike) seem to share an understanding that effective pest control can be provided with biological controls used in conjunction with effective crop management. Neighboring countries are able to manage insects with minimal resort to synthetic pesticides. The region encompassing eastern Turkey, northern Syria, northern Iran and Azerbaijan has limited pressure from lepidopterans, and the use of beneficial organisms to manage pests is entirely feasible. However, if they are free to choose, farmers generally tend to use chemicals because they are easy, quick, relatively cheap and results are usually observable shortly after application.

If Azerbaijan is going to avoid dependence on chemical controls, however, a national controlling body should be in charge of making control decisions on the basis of regional pest pressures. Allowing for individual decisions to be made will, as mentioned previously, almost certainly mean that chemical use will prevail. In addition, an IPM strategy should be developed by the relevant bodies to guide pest control policies in the sector.

IPM is an ecosystem approach to crop production and protection that combines different management strategies and practices to grow healthy crops and minimize the use of pesticides. IPM is a pillar of both sustainable intensification of crop production and pesticide risk reduction. The core principles are:

- a range of pest control strategies should be used in an integrated manner, with no single strategy (particularly pesticide application) being overly relied upon;
- the presence of pests should not automatically lead to control measures being applied;
- when control of pests becomes necessary, non-chemical pest control methods should be considered first; the use of pesticides (especially those with broad-spectrum activity) should be seen as a last resort and the lowest-toxicity option available should be used.

An IPM includes the following elements:

- i. Measures for prevention and/or suppression of harmful organisms:
 - Use of optimum crop rotation and inter-cropping
 - Use of balanced fertilization, liming and irrigation/drainage
 - Use of the best available resistant/tolerant cultivars and approved/quality certified seed
 - Crop residue destruction

- ii. Preservation and enhancement of populations of beneficial insects;
- iii. Regular field observations of the crop's health and key pest and beneficial insects;
- iv. "Threshold values" as a basis for decision-making;
- v. Non-chemical management methods and low toxicity options to be preferred;
- vi. Pesticide resistance management plan;
- vii. On-farm record-keeping;
- viii. Use of only nationally registered and properly labelled pesticides;
- ix. Observing re-entry intervals for pesticides application;
- x. Managing chemical runoff/leaching;
- xi. Optimizing irrigation practices and water use;
- xii. Specific training scheme for farmers dedicated to IPM;
- xiii. Research and development of new IPM measures;
- xiv. Conserving and improving biodiversity in the farm.

3.3. Pesticide use related risks and mitigation measures

While pesticide use in cotton production could virtually be brought to zero if the right policies are put in place, there are also several measures that can be taken to mitigate the risks associated with it while it is still happening.

Pesticides²⁴ require special handling because they are toxic, and their distribution and use should always involve managing the risks to human health and the environment. The effect of a pesticide is dependent, among other factors, on a dose-time relationship. This relationship gives rise to two different types of toxicity: acute and chronic toxicity. *Acute toxicity* of a pesticide refers to the chemical's ability to cause injury to a person or animal from a single exposure, generally of short duration. *Chronic toxicity* refers to harmful effects that occur from small doses repeated over a period of time. Pesticides with chronic hazard might cause genetic defects to body cells that can be passed on to future generations, cancer, immune suppression, diminished intelligence and damage fertility of the unborn child.

Some pesticides survive in the environment longer than others. Persistent pesticides are found **in soil and water and** tend to bioaccumulate in animals and humans and thus biomagnify in the food chain.

²⁴ Pesticide means any substance, or mixture of substances of chemical or biological ingredients intended for repelling, destroying or controlling any pest, or regulating plant growth. In agriculture, pesticides include herbicides, insecticides, nematocides, fungicides, plant growth regulators, and other categories.

The type of pesticide products currently in use and the prevailing application practices in Azerbaijan raise concern for human health and the environment in that:

- they are highly hazardous active ingredients are readily available;
- pesticide labels are written in languages or scripts farmers do not understand;
- old application equipment is widespread increasing the risk of occupational exposure;
- there is very little use and availability of personal protective equipment (PPE)/safety equipment;
- there is no record-keeping;
- improper pesticide and container disposal are widespread.

Environmental risks related to pesticide exposure include:

- contamination of drinking water, river systems, groundwater and aquifers;
- poisoning of fish and other aquatic organisms and biodiversity loss;
- long-term persistence in soils impacting rotational crops and beneficial soil;
- reducing populations of pollinating insects important for crop yield;
- poisoning of wildlife (including birds and bees) and biodiversity loss;
- poisoning or contamination of livestock;
- air pollution.

The following pesticide risk mitigation measures should be integrated into a fully-fledged IPM approach where minimizing the use of pesticides is the first pillar:

- Eliminate the use of highly hazardous pesticides and introduce pesticides with low human health and environmental risk profiles (see analysis in Annex A.2.2).
- Limit the use of systemic insecticides from the group of neonicotinoids that can trigger the collapse of bee colonies, thus reducing their function as pollinators. Do not use these products in areas where honeybees forage.
- Select pesticides with low water pollution potential. Manage runoff from treated area (e.g. buffer zones). Rapid transport to groundwater may be caused by heavy rainfall shortly after application of the pesticide to wet soils. Avoid the use of pesticides harmful to aquatic organisms in farms close to water courses.
- Observe re-entry intervals.
- Promote the use of application methods that are more product efficient and minimize drifts (e.g. modern boom sprayers), encourage proper maintenance

of spraying equipment and raise awareness on proper disposal of waste (including wastewater).

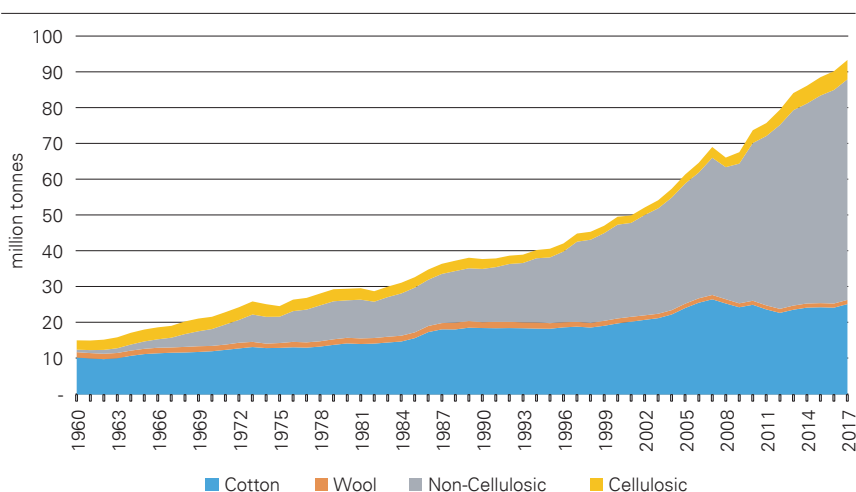
- Ensure availability (e.g. through the cotton companies) and proper use of PPE.
- Follow pesticide label recommendations carefully.
- Maintain buffer no-spray zones (in km) around protected areas and parks.
- Develop minimum safety standards for pesticide management and request companies to adhere to them.

Chapter 4 – Cotton trade and quality issues

4.1. Global markets and trends

The decision of the Azerbaijani Government to revive the country's cotton sector is coming at a time when world textile fibre consumption is at an all-time high of almost 90 million tonnes: a six-fold increase since the 1960s. World cotton consumption, too, has reached unprecedented levels of around 26 million tonnes per year up from 10 million tonnes in the 1960s. However, due to the increase in world population, per capita consumption has remained unchanged at around 3.3 kg per person. It is non-cellulosic (artificial) fibres, and more specifically polyester fibres, that have seen the highest increase in consumption, both in absolute and relative terms, and now account for over two-thirds of consumption at around 65 million tonnes from extremely low values 50 years ago.

Figure 4.1: World consumption of textile fibres, 1960-2017

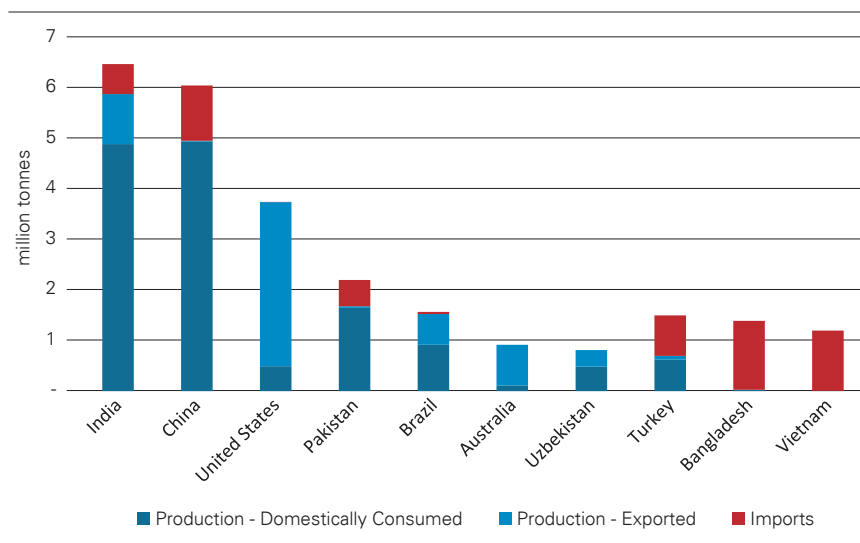


Source: ICAC.

Three countries currently account for over one-half of world cotton production: India, China and the United States. However, while in the first two production is mostly for the needs of the large domestic textile industries, the United States is the largest cotton exporter in the world and over 85 percent of its production

is export-oriented. The largest cotton importers are in turn Bangladesh, Viet Nam, China, Turkey and Pakistan. Cotton production has seen the highest increase in sub-Saharan Africa, with certain countries such as Mali or Burkina Faso doubling their exports in the last 10 years to around 250 000 tonnes annually, showing a potential to soon become important players on world markets. Around 6 percent of world cotton is now produced in sub-Saharan Africa up from 3 percent only a decade ago.

Figure 4.2: Major cotton producing, exporting and importing countries



Source: USDA and author's calculations.

The ICAC estimates that world cotton production increased 15 percent in 2017/2018 to 26.6 million tonnes, due entirely to a 16 percent expansion in world cotton area to 34.6 million hectares, which is above the 20-year average of 32.7 million ha. The world average cotton fibre yield is estimated at 769 kg per ha and is equivalent to around 2.4 tonnes per ha of seed cotton.²⁵ This is one-third higher than the current average yield in Azerbaijan of 1.8 tonnes per ha. As is visible in Figure 4.3, **Azerbaijan had above-average yields in the late 1980s but has not performed well in terms of keeping up with the increasing average world yield since then.**

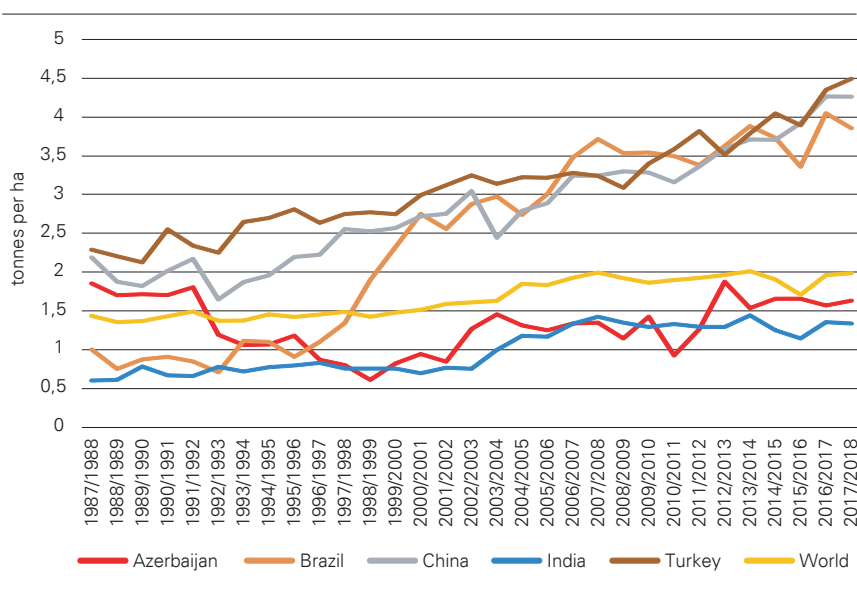
This lack of improvement in yields is commonly attributed to a combination of factors: insufficient availability of irrigation water, lack of smallholder access to

²⁵ Assuming that, on average, 32 kilograms of lint are produced from each 100 kilograms of seed cotton.

credit and adapted technologies, low application of inputs and soil degradation. Although all these factors are interrelated, low availability of irrigation water and the collapse of the domestic seed breeding system are perhaps the most influential ones. As mentioned previously, cotton production in Azerbaijan will face a further reduction in available water resources (up to 15 percent by 2040) as a result of climate change and lower and more irregular precipitation.

In major cotton producing countries such as China and Brazil, improved technical efficiency has allowed for a yield increase of about 25 percent. This, in addition to changes in the regions of production and shifts from smallholder to capital intensive systems, explains the even more significant increase visible in Figure 4.3.²⁶ It must be borne in mind, however, that **increased yields are often achieved with very high levels of pesticide and fertilizer use, which raises concerns regarding the environmental sustainability of such production systems.**²⁷

Figure 4.3: Cotton yield evolution in major producing countries, 1987-2018



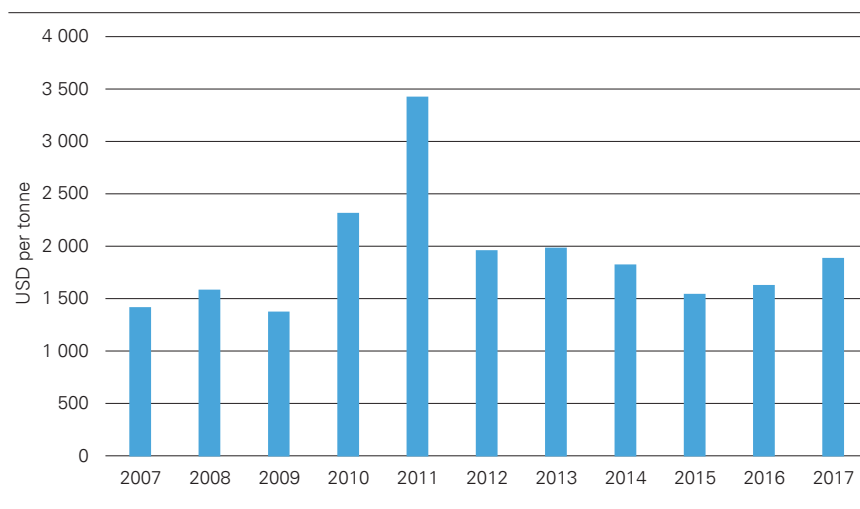
Source: USDA and author's calculations.

²⁶ Three-fourths of production in China is now in Xinjiang in the far west rather than in the east, two-thirds of production in Turkey is in the GAP region rather than around Izmir, and 90 percent of production in Brazil is now in the Cerrado rather than the states of Sao Paulo and Parana.

²⁷ ICAC, 2010.

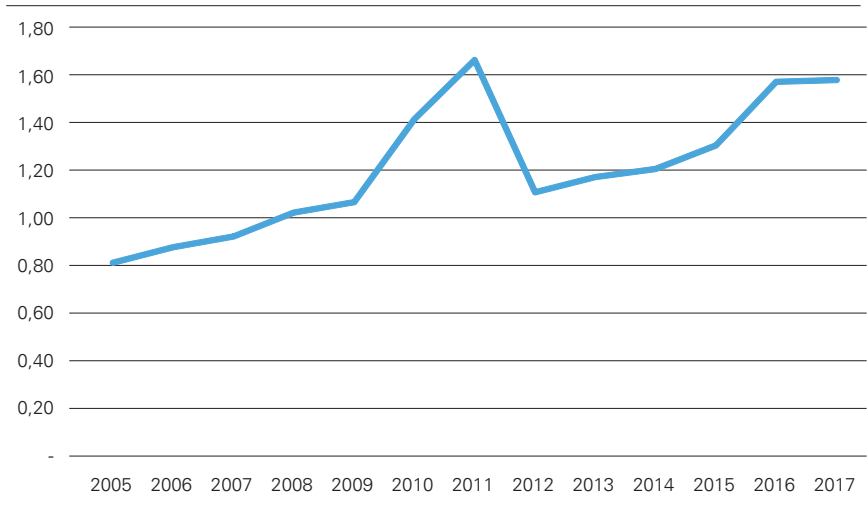
Since 2015, international cotton prices have been increasing (Figure 4.4) and, as of October 2017, cotton was traded for about **USD 1.7 per kg** (Cotlook A-Index) on world markets as opposed to USD 1.1 per kg for polyester fibre (Chinese polyester staple fibre 1.5 den). The general trend is towards an increase in this price difference (Figure 4.5) meaning that unless the trend is reversed in the long run, it is highly likely that the ever-growing global demand for textile fibres, especially in emerging markets and newly industrialized countries where the demand is expected to increase the most, will be increasingly met with artificial fibres.

Figure 4.4: Average international price of cotton, 2007-2017



Source: USDA and author's calculations.

According to ICAC, the A-Index in 2017/18 averaged USD 0.86 per lb (USD 1.90 per kg), USD 0.07 per kg higher than in 2016/17. This follows the large increase of USD 0.26 per kg from 2015/16 to 2016/17.

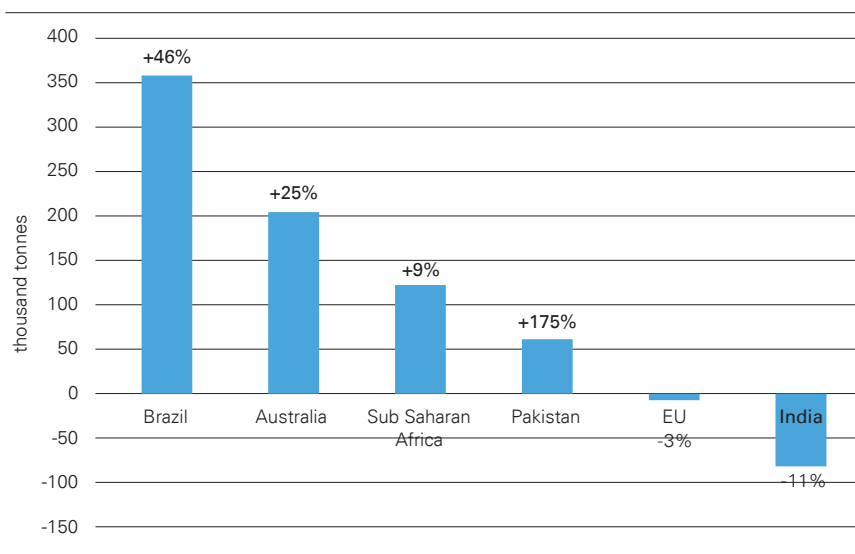
Figure 4.5: Relative price of cotton compared to Chinese polyester fibre, 2005-2017

Source: ICAC.

In terms of global trade, cotton imports have stagnated in the last 2 decades. Nevertheless, ICAC estimates a 10 percent increase in total world trade in cotton to 9 million tonnes in 2017/2018. The United States remains the world's largest exporter, and its exports are estimated at 3.4 million tonnes in 2017/18. Bangladesh, Viet Nam and China are the world's three largest importers.

The mid-term projection for the global cotton trade produced by the OECD-FAO Agricultural Outlook²⁸ is for an 8 percent rise in world cotton exports in the period 2017-2026 (equivalent to 630 000 tonnes). Most of this growth in exports will come from Brazil, Australia, sub-Saharan Africa and Pakistan (Figure 4.6) while exports from India are expected to decrease as domestic textile industry output is set to increase. Growing exports will almost exclusively be destined to Bangladesh, Viet Nam and China to meet growing cotton demand by their respective textile industries.

²⁸ OECD-FAO, <http://www.agri-outlook.org/>.

Figure 4.6: Projected increase/decrease in cotton exports for major exporters

Source: ICAC.

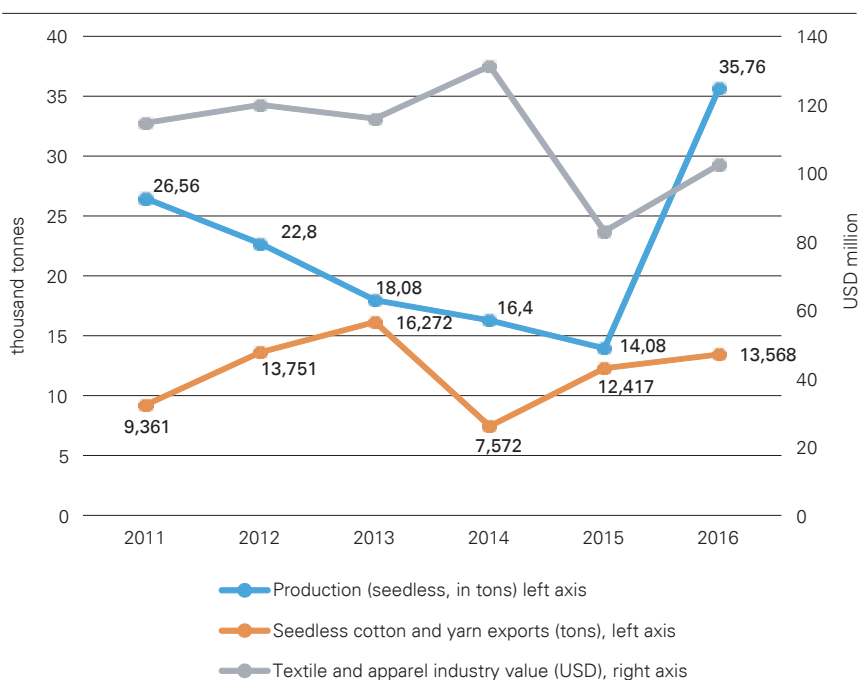
Note: Total world increase is 630 000 tonnes.

4.2. Cotton exports from Azerbaijan

Cotton is an export-oriented crop in Azerbaijan, with the export share of total production having varied from 40 to 90 percent in the period 2011-2016. As suggested by Figure 4.7, the domestic needs of the textile and apparel industry may play a role in this variation. However, the expected unprecedented increase in production of cotton fibre from 35 000 tonnes in 2016 to over 100 000 tonnes in 2017²⁹ poses the risk of considerable amounts of cotton remaining in stock if export markets are not secured. While the government has planned significant expansions in the processing and production capacity of the textile and apparel industry, it will take several years for the new or upgraded/expanded facilities to become operational and reach their full utilization capacity.

²⁹ It is commonly estimated that cotton fiber weight is around 40 percent of the weight of seed cotton. (The ginning ratio varies considerably from country to country depending on hand or machine harvesting and the type of machine harvesting. 40 percent is a reasonable estimate in hand-picked countries, but the world average is around 32 percent).

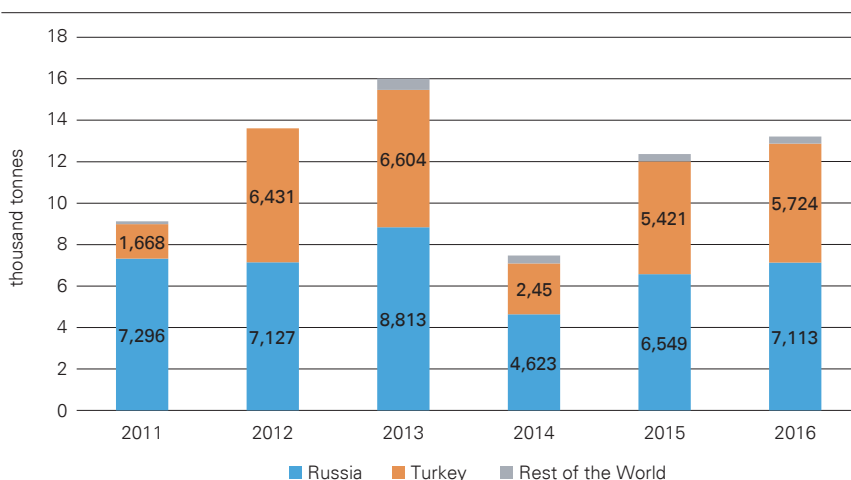
Figure 4.7: Azerbaijan cotton production and exports compared with textile and apparel industry production value, 2011-2016



Source: GTIS, SSC and author's calculations.

As is visible in Figure 4.8, the Russian Federation and Turkey account for almost all Azerbaijani cotton exports. The Russian Federation is usually the main importer, although Turkey often comes very close behind. In 2016, 7 100 tonnes of cotton fibre and yarn were exported to the Russian Federation and 5 700 tonnes to Turkey. In both cases the export value was around USD 12 million, with possible explanations for the difference in price being variation in quality and in the nature of the exported product (cotton in bulk versus cotton yarn).

Usually, over 90 to 95 percent of cotton exports to the Russian Federation consist of yarn (Harmonized System [HS] code 5205), the remainder consisting of cotton which is neither carded nor combed. Exports to Turkey display a slightly lower degree of processing on average, but this depends a lot on the year. In 2016, 55 percent of exports consisted of cotton which is neither carded nor combed (the remainder being yarn). In 2015, however, this figure was only 15 percent.

Figure 4.8: Azerbaijan cotton exports by country, 2011-2016

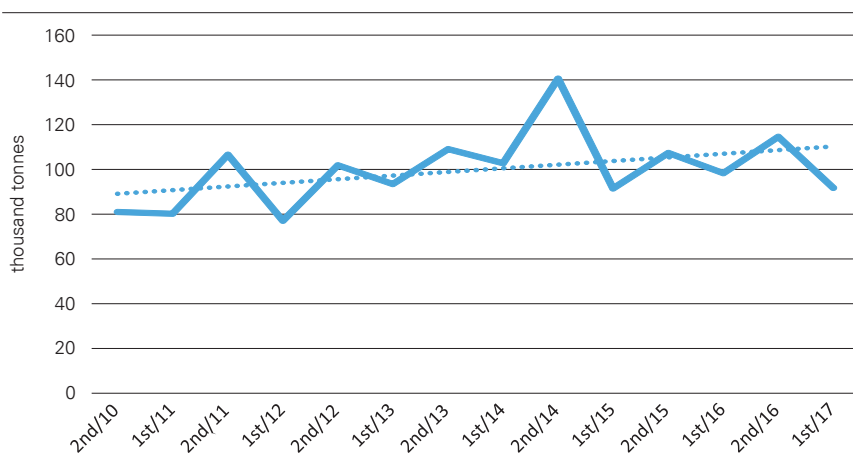
Source: GTIS, author's calculations.

While Azerbaijan's main export market for cotton – the Russian Federation – is exhibiting a slight increasing trend in cotton imports³⁰ (Figure 4.9), Azerbaijan might face difficulties diversifying its export markets in times when global cotton consumption is slowing down and trade in cotton is stagnating. In both the Russian Federation and Turkey, Azerbaijan is a marginal cotton provider with easily substitutable shares in total cotton imports as low as 0.7 percent in Turkey and 3 percent in the Russian Federation.

In addition, the total dependence on just two markets for exports, and especially on the Russian Federation which, on numerous occasions, has used its market power in the pursuit of geopolitical goals, is another risk to be borne in mind by stakeholders in addition to the existing market power asymmetry and relatively volatile international prices.

The government's decision to further develop the country's textile industry is thus an important step towards mitigating such risks. This, however, should be accompanied by efforts to improve cotton quality in order to boost the competitiveness of Azerbaijani cotton in current and prospective export markets.

³⁰ No such trend is observed in Turkey, which is a major producer itself and where domestic supply can adjust itself to mirror domestic demand.

Figure 4.9: Cotton and cotton yarn imports in the Russian Federation

Source: GTIS.

4.3. Differentiation in international markets

Cotton quality

Cotton quality is defined by the length, maturity, strength, colour and micronaire³¹ (MIC) of the fibre. These qualities are determined by the genetic makeup of specific plant varieties, the climatic conditions experienced by the crop, and the management of the crop through production and harvest. None of the people/institutes interviewed during field visits focused on aspects of fibre quality. Similarly, cotton producers in Azerbaijan did not seem to pay much attention to quality issues (which is understandable as they are paid for seed cotton, not lint, and there are no quality premiums or discounts) and cotton companies were unable to share any meaningful data on quality. In an informal conversation, local analysts from private quality control company SGS suggested an average micronaire range of 4.9 to 5.6 MIC for Azerbaijani cotton and a length of 1 1/16" (31-32 mm) to 1 5/32" with colour ranging from "white" to "natural creamy". There is no data on other fibre quality indicators such as length uniformity, strength or trash content. Nevertheless, the suggested micronaire range, if exact, would mean that Azerbaijani cotton is not of optimum

³¹ Micronaire is one of the most important fibre characteristics for international cotton classers and spinners. Micronaire is an indicator of air permeability. It is regarded as an indication of both fineness (linear density) and maturity (degree of cell-wall development). For a given type of cotton, a relatively low micronaire has been used as a predictor of problems in processing, but a low micronaire may also indicate fine fibres with adequate maturity. Similarly, growers may be discounted for high micronaire when, in fact, the fibres have adequate fineness and good maturity, because high micronaire fibres are normally coarse, which is undesirable from the point of view of spinning and yarn evenness.

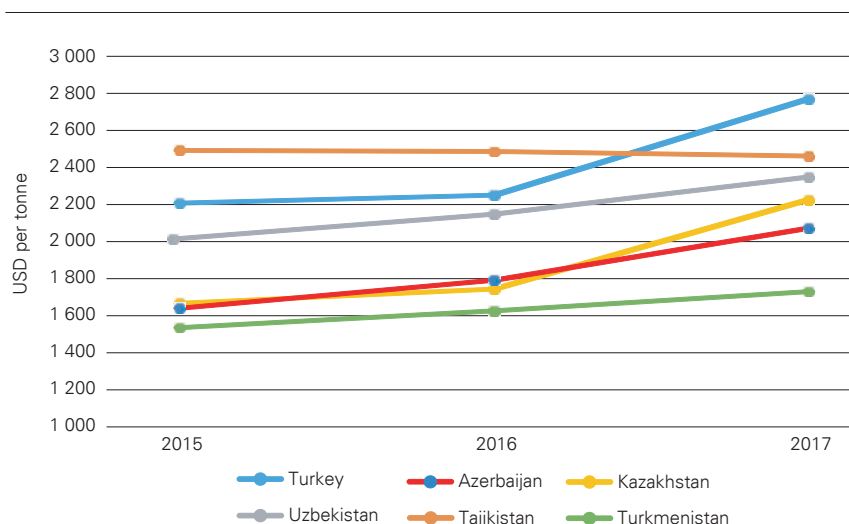
quality. Premium quality cotton will usually have a micronaire of 3.7-4.2 MIC while cotton fibre showing readings of 3.4 and under or 5.0 and higher is usually considered “discount”.³²

Trade data³³ also signals potential quality issues. The price per tonne at which Azerbaijan exports raw cotton (HS 5201) and cotton yarn (HS 5205) to its main export markets – the Russian Federation and Turkey, respectively – is lower than that of most of its major competitors.

The average yearly price of cotton fibre imports into the Russian Federation from Azerbaijan from 2015-2017 was USD 1 800 per tonne compared to USD 2 290 per tonne for imports from Uzbekistan (the country provides around 80 percent of the Russian Federation’s cotton fibre imports): this is almost 20 percent lower.

Similarly, exports of cotton fibre to Turkey averaged a yearly price per tonne in 2015-2017 about 13 percent lower than the aggregate yearly average price in the same period for the top 5 raw cotton exporters to the country. In 2017, Azerbaijani cotton was imported to Turkey at USD 1 716 per tonne as opposed to USD 1 975 per tonne for Australian cotton and USD 1 790 for Turkmen cotton.

Figure 4.10: Average yearly price of cotton yarn imports by Russian Federation by country of origin, 2015-2017

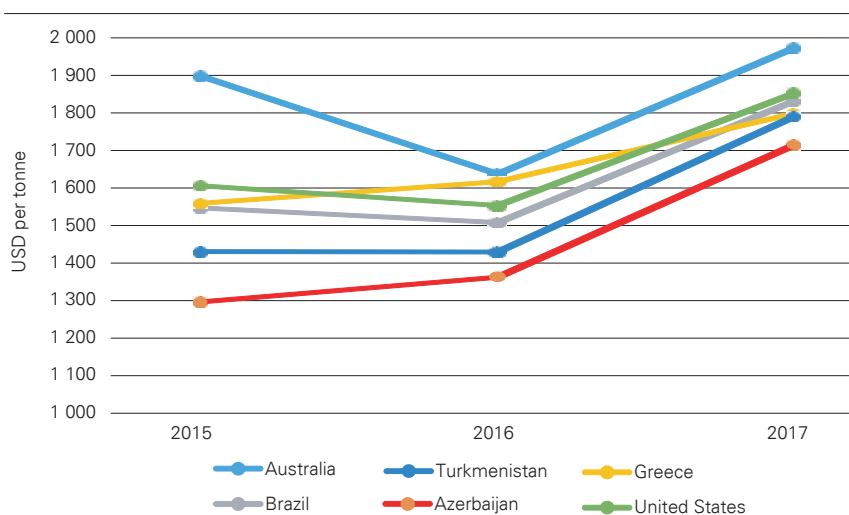


Source: TDM.

³² Cotton Incorporated.

³³ Trade Data Monitor, 2017.

Figure 4.11: Average yearly price of raw cotton imports by Turkey by country of origin, 2015-2017



Source: TDM.

The most critical component for producing high quality cotton is the proper selection of variety. The genetic makeup of a variety can play a large role in fibre quality. Producers should look at all fibre quality characteristics to help make a decision for their fields. Once a variety is planted the crop must be maintained throughout the growing season. Crops under less stress will produce higher quality fibre. Fibre quality is built throughout the entire growing season, and certain factors can be controlled by the producer. Production practices that should be monitored to improve cotton quality include: varietal selection, field fertility, harvest aid application, pest control and moisture (if irrigated).

Improving competitiveness

World cotton production totals 26 million tonnes, and 200 000 tonnes of lint from Azerbaijan will be a slightly more standard commodity in a large market. As noted earlier in this chapter, cotton from Azerbaijan is discounted in the world market because of high micronaire. **In order to enhance value and achieve market premiums, the cotton industry of Azerbaijan could implement three specific practices: eliminate contamination, market all lint based on credible high volume instrument (HVI) values and join the Better Cotton Initiative (BCI).**

Eliminate contamination: There is sometimes confusion between contamination and trash. Contamination consists of foreign matter, including plastic, rocks, pieces of metal or cloth, human hair, and other non-plant material.

Trash consists of leaves, burrs, bark and other material from the cotton plant that eludes cleaning in the ginning process. Of the two, contamination is by far the more pernicious. Trash is relatively harmless because it is plant material and can be removed by textile mills in the carding and combing process, and any small specks that remain in the yarn can usually be dyed without resulting in penalties for defects.

Contamination, on the other hand, is the bane of the textile industry, especially polypropylene from fertilizer bags. Discounts for trash are usually about equal to the percent of trash in a sample by weight, so there is not a large impact on value. However, discounts for contamination can be severe depending on the type and percent by volume. Countries gain reputations for cotton characteristics, just like consumer brands have reputations. If Azerbaijan gains a reputation in the world market for contamination-free cotton, market quotes will run 10 to 20 percent higher than they would otherwise. Israel and Australia enjoy such reputations. On the other hand, cotton from West Africa and India is discounted up to 30 percent because of contamination.

Whole books have been written on the topic of avoidance of contamination, and the ICAC has developed a library of information on the topic. Basically, contamination is avoided through proper hygiene during harvest, transportation and ginning of cotton. (Once cotton is in a bale, it is largely immune from further damage.) Each step is fairly simple but must be done properly. Steps include using cotton bagging rather than fertilizer bags when harvesting seed cotton by hand; wearing head coverings; tying bags of seed cotton with cotton string, not polypropylene twine; when harvesting by machine ensuring that spindles are adjusted properly with the correct lubrication; keeping seed cotton covered during transportation; and moving seed cotton with pneumatic systems at the gin, rather than moving seed cotton manually.

For the purposes of this paper, it is sufficient to note that all farmers and the ginning companies must agree to work together to avoid contamination. This will involve more work, especially for farmers. The ginning companies will have to agree to pay premiums to farmers for clean cotton, and farmers will have to agree to accept discounts if they deliver seed cotton that contains contamination. Processes have to be set up at procurement centers to inspect every load of seed cotton as it arrives for contamination and assess premiums or discounts accordingly. Any seed cotton load that is found to contain contamination must be cleaned prior to ginning, with the cost of detection and cleaning reflected in the discount applied to deliveries of contaminated cotton.

Use of HVIs for cotton testing: HVI classing of cotton has been available since the 1970s and has been used on 100 percent of the United States crop since the early 1990s. Today, about half the cotton produced in the world is evaluated with HVI at the producer level, including Australia, Brazil, China, Israel, Uzbekistan and a few smaller producers (market participants do not use

HVI data from Uzbekistan when purchasing or selling because the government agency that markets cotton still sells based on colour grades).

A Task Force on Commercial Standardization of Instrument Testing of Cotton (CSITC) was established under the auspices of ICAC in 2005. CSITC provides an HVI Operators Manual in six languages, including Russian, to guide countries and individual laboratory operators in appropriate practices. One component of a country-wide HVI system is the use of permanent bale identification tags (PBIs) for each bale produced nationwide. This enables bale-by-bale identification for full traceability. As with contamination, the industry must cooperate in order to implement an HVI system. It is not sufficient that some regions or some cotton companies decide to use HVI; the entire country must participate in a system to ensure the integrity, accuracy and precision of results. The universal use of HVI will enhance the value of Azerbaijan cotton. Estimates of the added value if an entire country is classed according to HVI and PBIs are used so as to allow fully electronic marketing of cotton, are around USD 0.4 per kilogram of lint.

Joining the Better Cotton Initiative: BCI is an international initiative involving all segments of the cotton value chain, from farmers to retailers and brands, in an effort to improve cotton production practices. Farmers participating in BCI must maintain records of input use and agronomic practices. Farmers then benchmark their practices against best practices used by other farmers. Over a period of years, farmers are expected to gradually reduce resource use, increase yields and improve quality as they improve their production practices. Participation in BCI does not guarantee market premiums, but it does help to differentiate cotton in the market place, and participation would be helpful to Azerbaijan.

Finally, the production of organic cotton does not seem to be an economically viable strategy for the cotton sector of Azerbaijan as yields are lower, year-to-year variation in yields is greater, and labour requirements are about double conventional cotton. Therefore, premiums are needed if organic cotton is going to work economically, and market premiums for certified organic cotton are usually not sufficient to justify the increased labour requirements. Since yields for organic cotton are lower than those of conventional cotton, Azerbaijan would not be able to meet its production target of 500 000 tonnes of seed cotton if many farmers try to produce certified organic cotton.

Chapter 5 – Financial and economic analysis

5.1. Economic profitability

The domestic resource cost (DRC) ratio has been widely used to compare the competitiveness of different production systems and assess the comparative advantage of alternative activities in terms of profitability to the overall economy.

DRC is a cost/benefit ratio, with costs in the numerator and net benefits in the denominator.

- If $DRC < 1$, the domestic resources used are less than the value added created, meaning there is a comparative advantage
- If $DRC > 1$, the domestic resources used are greater than the value added created, indicating a comparative disadvantage.

Table 5.1: DCR calculation for cotton and other crops (country average), 2016

| | | |
|--------------|---------------|-------|
| Carrot | Irrigated | 0.08 |
| Cotton | Irrigated | 0.37 |
| Potato | Irrigated | 1.561 |
| Onion, fresh | Irrigated | 0.084 |
| Cabbage | Irrigated | 0.18 |
| | Not irrigated | 0.106 |
| Tomato | Irrigated | 0.059 |
| | Greenhouse | 0.077 |
| Cucumber | Irrigated | 0.042 |
| | Greenhouse | 0.043 |
| Strawberry | Irrigated | 0.061 |

Source: State Statistical Committee and author's calculations.

We calculated the DRC for cotton production using Farm Data Monitoring System (FDMS) data for 2016. This calculation shows that **although cotton**

production is overall profitable in terms of the domestic resource cost, a number of other crops such as carrots, tomatoes, onions or cucumbers seem to be generating significantly more economic value considering the resources used for their production. In addition, it is believed that the expansion of cotton area in 2017 and 2018 will negatively affect the DRC ratio of cotton compared to the available data for 2016, as the new lands sown with cotton have poor or no irrigation infrastructure, the quality of the soil is not optimal and agronomic practices are poor leading to relatively inefficiency use of resources.

In addition, as already mentioned in Chapter 3, Azerbaijan might incur economic losses as a result of lost revenue from the exports of higher value-added crops whose water demand will not be met due to a diversion of the scarce water resources towards cotton. The amount of loss will depend on the value generated per unit of water consumed for each crop.

Regarding the possible value addition in the textile industry, cotton production in Azerbaijan already exceeds textile mill use. There appears to be no pressing need to expand production in order to create new employment opportunities in the domestic textile industry. In addition, textile mills in Azerbaijan could import cotton lint from neighbouring countries if the need arises. Leading textile producers such as Bangladesh and Viet Nam rely almost exclusively on cotton imports to supply the industry.

While cotton production does have a positive impact on rural employment, this is also true for alternative crops such as citrus fruit or vegetables, which are highly likely to be more profitable to the economy.

Research by the World Bank and the International Finance Corporation (IFC) has reached similar conclusions regarding the overall benefit of cotton production for the Azerbaijani economy.

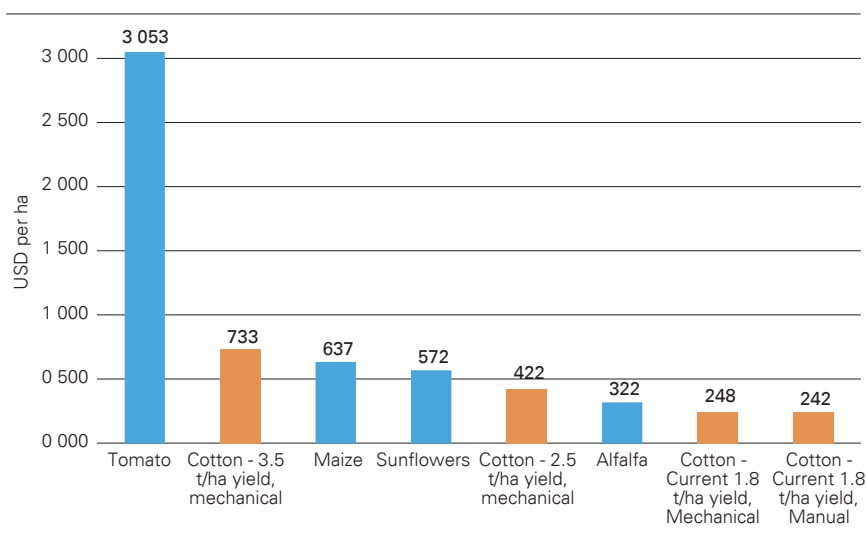
5.2. Gross margins

In this section we look at the cost of production, revenue and gross margins for cotton and four competing crops, which are usually either part of the same crop rotation cycle as cotton or grown in the same areas (sunflower, maize, alfalfa and tomatoes). Calculations are based on estimates provided by farmers in the Goranboy district in August 2017 and were confirmed by similar farmer estimates in other cotton growing areas of Azerbaijan. For cotton, estimates are slightly different depending on whether manual or mechanical harvesting is used. Below is a summary of the findings.

Current cost of production, revenue and gross margins for cotton and competing crops

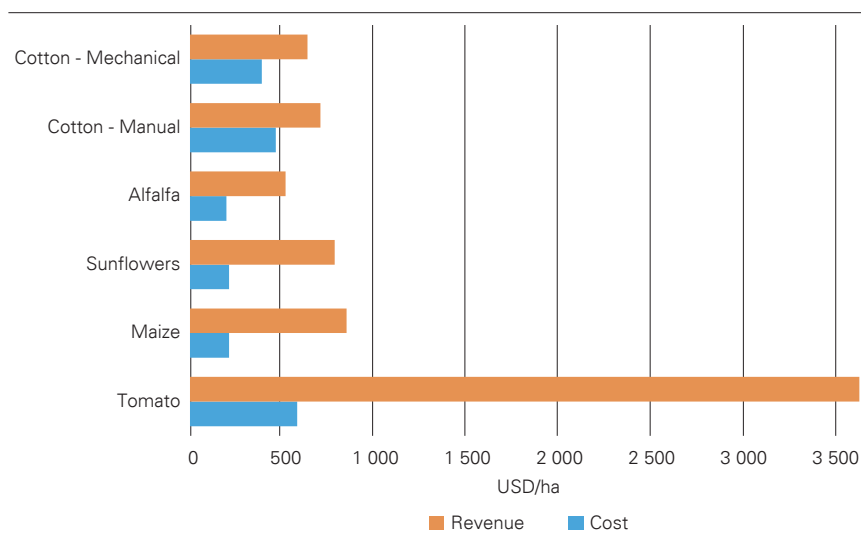
Our findings show that at the current yield (1.8 tonnes per/ ha) and farm-gate price (AZN 600 or USD 354, including the AZN 100 price subsidy), the profitability of cotton for farmers is low at around USD 245 per tonne if harvested manually and USD 221 per tonne if harvested mechanically. This means cotton is currently less profitable for farmers than cereals such as alfalfa and maize that are part of the same crop rotation cycle (Figure 5.1).

Figure 5.1: Gross margins for cotton and competing crops



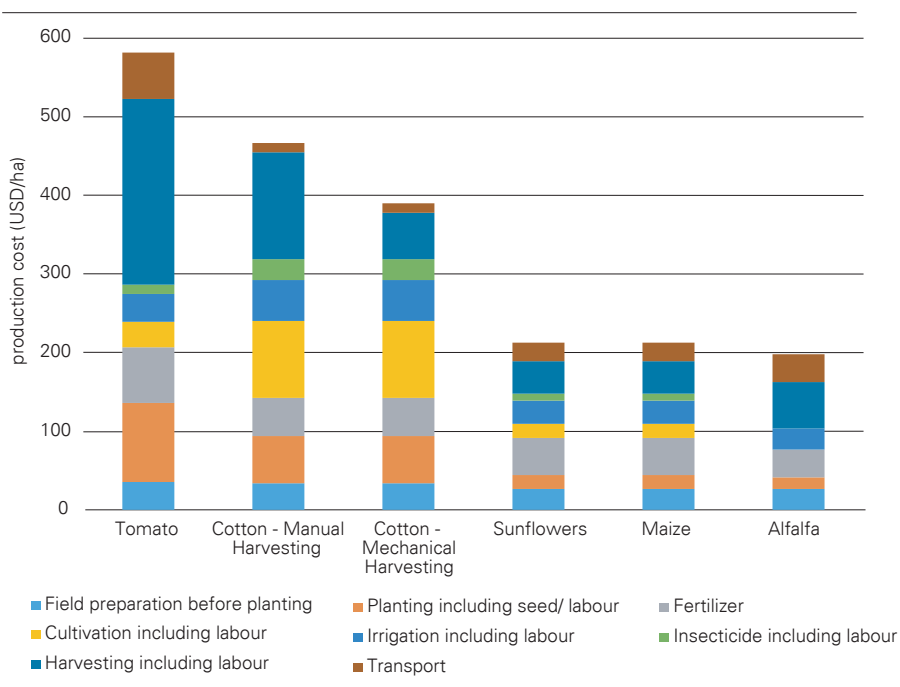
Source: Farmers, author's calculations.

According to our estimates, cotton has a high production cost per hectare relative to competing crops at over USD 400 per ha compared to USD 200 per ha for competing cereals and oilseeds (Figure 5.2). This is due to the higher labour intensity of cultivation, weeding, planting and harvesting as opposed to cereals and oilseeds; as well as to the high cost of seeds, which are for the most part imported from Turkey (cf. Chapter 3). Figure 5.3 shows a breakdown of production costs by crop.

Figure 5.2: Revenue and cost for cotton and competing crops, 2017

Source: Farmers, author's calculations.

While higher yields could improve the profitability of cotton production for farmers (Figure 5.1), our estimates show that for cotton to become more profitable than direct competing crops from the crop rotation cycle (at current prices), yields will need to be around 3 tonnes per ha. This will require more significant changes in the production system and is higher than the government-set target of 2.5 tonnes per ha for 2021.

Figure 5.3: Cost of production of cotton and competing crops

Source: Farmers, author's calculations.

In line with our conclusions on the low profitability for cotton farmers in Azerbaijan, another recent study³⁴ claims that cotton has a profit margin of just 13 percent and a payback period of 5 to 10 years, depending on technology used, indicating there is low profitability in the crop. The production cost estimates in this study are for a yield of 3.34 tonnes per ha, which is much higher than the average of 1.5-1.8 tonnes per ha for 2017. The intensity of production required to reach such a yield is also much higher, resulting in a higher cost of production per hectare of around USD 716 (excluding land rent). At current prices, this would mean a net profit per hectare of only USD 237, even if yields were to double.

Fruit and vegetables, in contrast, which are an important cash crop in Azerbaijan that is mainly exported to the Russian Federation, were found to be much more profitable for farmers. For example, our estimates for tomatoes show that while the production costs per hectare are 30 to 50 percent higher than

³⁴ IFC, 2017.

for cotton (depending on the harvesting method), gross margins are almost 6 times higher at around USD 3 600 per hectare. These estimates refer to open-air cultivation with flood irrigation meaning that no significant capital investment will be required. Nevertheless, as fruit and vegetables are perishable, adequate infrastructure (cold storage and transportation capacity) may be a challenge in addition to the need to secure stable export markets.

Our findings on crop profitability are very much in line with similar World Bank and IFC research. According to the latter,³⁵ potato production using traditional methods (13 tonnes per ha yield) can generate up to USD 654 per ha in terms of net profit, or almost 3 times more than cotton and with a profit margin of 22 percent. Greenhouse tomato production, on the other hand, although requiring a significant capital investment (around USD 270 000 per ha for intensive production) can generate up to USD 164 000 annual net profit per ha with an investment payback period of 4 years and a profit margin of 56 percent.

Cotton farm-gate prices

Although World Bank research finds that cotton farm-gate prices received by Azerbaijani farmers are roughly on par with a fair market value, our findings show that these are amongst the lowest in the world. Figure 5.4 is based on data collected by the author from various sources³⁶ for the latest available years (2014 to 2016) to compare the farm-gate price of seed cotton in major and emerging cotton-producing countries. As can be seen, the cotton farm-gate price in Azerbaijan is the lowest of all countries compared.

Part of the explanation for such low prices might be the fact that as the price is guaranteed, cotton companies have to hedge against declines in international prices between the date of the contract (usually early in the calendar year) and the delivery of seed cotton (in autumn).

In addition, as cotton companies finance the inputs that are given to farmers on credit at the start of each season, the cost of the inputs, including interest on working capital, must be factored into the producer price. Further, losses due to input loan recovery failure must be taken into consideration too, with recovery rates usually in the range of 80 to 95 percent.³⁷ The losses on input costs have to be factored into the prices paid to everyone else.

Unfortunately, the lack of cooperation on the part of the private sector, which did not disclose data on ginning costs and profitability, means that it is difficult

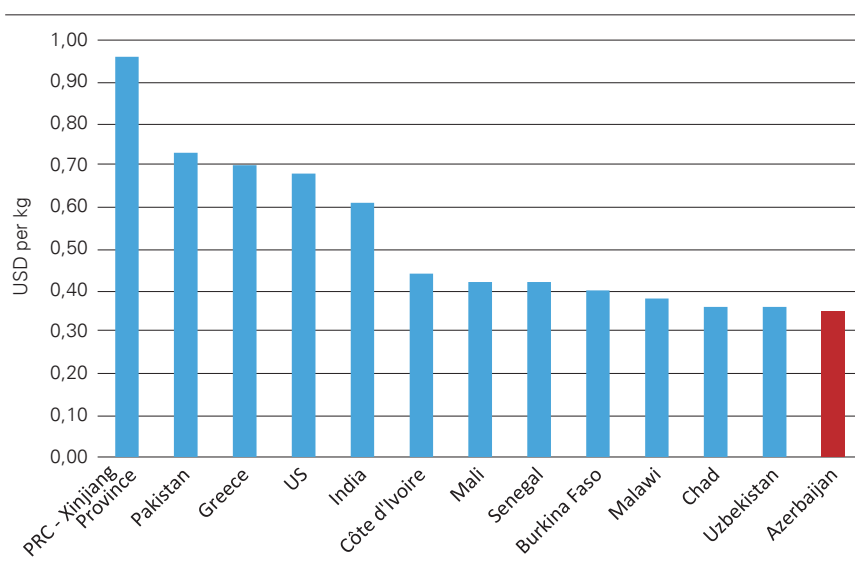
³⁵ Ibid.

³⁶ Prices for African countries and China are sourced from USDA's latest available FAS GAIN reports that include data on farm-gate prices. Price data on other countries is based on online publications.

³⁷ There is a multiplicity of reasons, ranging from crop failure, farmer illness or accident, farmer indifference, diversion of fertilizer and pesticides to other crops, lack of harvest-time labour and simple fraud.

to assess the profitability of cotton production by cotton companies under the current farm-gate and international export prices. While the difference between prices received by Azerbaijan's farmers and higher prices received in other countries could partly be attributed to the intrinsically higher quality of cotton of particular origins, **strong state involvement in the sector, lack of competition, the fact that the government determines the farm-gate price, and some farmers' claims that they were pressured to grow cotton by local authorities raise concerns that producer prices might not cover the costs of production and provide a reasonable return on the average farmer's labour and investment in all seasons.**

Figure 5.4: Farm-gate price of seed cotton in several cotton-producing countries, 2014-2016



Source: Various sources and author's calculations based on latest available data (2014-2016).

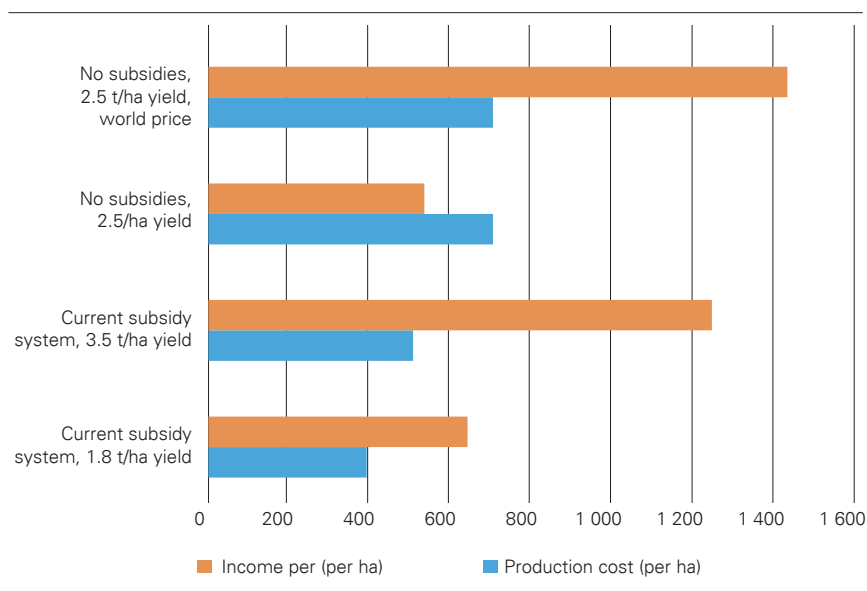
Cotton gross margins under different production scenarios

Below we provide estimates for the profitability of cotton production under seven different scenarios with, in each case, a separate estimate for mechanical and manual harvesting. Figure 5.5 shows a selection of four of the seven scenarios using mechanical harvesting only with changes in yields, farm-gate price and subsidies. An overview of all seven scenarios is provided further below while the detailed calculations for each scenario are included in Annex 5.

Our estimates demonstrate that if subsidies are abolished overall (both the various input subsidies as well as the price subsidy), even a yield increase from

1.8 tonnes per ha to the planned 2.5 tonnes per ha would not be enough to make cotton production profitable at the current farm-gate price and farmers would incur a loss of around USD 170 per ha. However, an increase of the farm-gate price to values commonly seen around the world (around USD 0.60 per kg instead of the current 0.35 USD per kg) referred to below as the world price would allow farmers to make a reasonable profit of around USD 700 per hectare of cotton.

Figure 5.5: Cotton production cost and income per ha under four scenarios of mechanical harvesting



Source: Farmers, author's calculations.

This being said, we estimate that significant improvements in cotton yields (from 1.8 to 2.5 tonnes per ha) may easily be achieved at a minimal cost with improved agronomic practices. Intensifying the production by conducting one or two extra irrigations along with slightly increased fertilizer rates and more extensive weed control measures is expected to result in significant yield increases.

Some of the gross margin scenarios depicted in this section include an expense for crop monitoring. Previous experience in Tajikistan has shown that simply by educating farmers or agronomists through hands-on, in-field agronomy training, demonstrating the importance of tracking the cotton's progress in the field and

enabling them to make timely crop management decisions, can lead to yield increases of more than 25 percent.

According to comments made by one of the interviewees, mechanical picking will incur yield losses of up to 20 percent due to cotton falling on the ground and not being recovered. This seems to be a very high estimate and possibly an unrealistic one. But considering that mechanical pickers will not pick as cleanly as manual pickers, a yield loss of 10 percent was used for the purpose of the gross margin calculations.

Scenario 7 of the gross margin calculations includes income based on cotton payments according to a “reasonably conservative” world cotton price. It returns a rather healthy gross margin, even when using yields that are relatively low (2.5 tonnes per ha) and after removing subsidies. Note that this does not include a value for the cotton seed, only lint.

Various sources of information including farmers and official statistics were used for the calculation and presentation of production costs of non-cotton crops. Gross margin figures vary considerably between sources.

The following scenarios were used for the calculations of cotton gross margins:

Scenario 1: Current low yield conditions. Assumes a yield of 2 tonnes of seed cotton per ha.

Scenario 2: Current higher yield conditions. Assumes 2.5 tonnes of seed cotton per ha.

Scenario 3: A more intensive system. Assumes 3.8 tonnes of seed cotton per ha. One extra manual cultivation for weed control. One extra irrigation. One extra insecticide application for pest control. Slightly increased nitrogen fertilizer application. Crop monitoring.

Scenario 4: Scenario assuming 4.4 tonnes of seed cotton per ha, plus one additional irrigation and one additional insecticide application.

Scenario 5: Scenario 1 without subsidies.

Scenario 6: Scenario 2 without subsidies

Scenario 7: Scenario 2 without subsidies but assuming payment according to a world cotton price of USD 0.70 per pound of lint. In this scenario, it was further assumed that ginning turnout is 40 percent, resulting in 400 kg of lint per tonne of seed cotton. There are indications, however, that ginning turnout in Azerbaijan might currently be as low as 38.5 percent.

Cotton ginning profitability

As mentioned in Chapter 1.7, the lack of information on the efficiency of existing ginneries and the costs of ginning in Azerbaijan make it difficult to estimate

the profitability of ginning per tonne of seed cotton. The team visited a ginnery belonging to the Ministry of Agriculture in the outskirts of Ganja in June 2017. The ginnery was in state of disrepair and likely had low energy efficiency. The team did not hear about any concrete plans to replace the obsolete equipment with more modern and efficient machines. There were no opportunities to visit private facilities nor has the private sector disclosed any data regarding ginning efficiency and costs.

According to cotton sector experts, the cotton-producing region of southeast Anatolia in Turkey may be the region where ginning costs are most comparable to those in Azerbaijan. According to the 2016 ICAC "Cost of Production of Raw Cotton" report,³⁸ the cost of ginning per hectare there is about USD 426. Assuming an average yield of 1.9 tonnes per ha (similar to the one most recently reported in Azerbaijan), this would be equivalent to a ginning cost of about USD 220 per tonne of seed cotton. Considering the much lower labour and energy costs in Azerbaijan (but also the likely lower energy efficiency of the ginneries there), it is probable that ginning costs are slightly lower in Azerbaijan, perhaps at around USD 200 per tonne. It should be highlighted, however, that this is a very rough estimate based on data from a neighbouring country and therefore it may be subject to a significant degree of imprecision.

³⁸ ICAC, 2016.

Chapter 6 – Social aspects

6.1. Background

Objectives of social screening

The social screening undertaken as part of this sector review aims to identify potential social issues in the cotton sector, specifically with respect to standards of fair treatment, non-discrimination and equal opportunities of workers in compliance with the International Labour Organization (ILO) conventions and EBRD's Performance Requirement on Labour and Working Conditions. More specifically, the analysis includes: (i) the identification of groups at risk in the cotton sector; (ii) the identification of potential risk areas; and (iii) recommendations on possible mitigation options and a public-private consultation process. In accordance with the FAO Policy on Gender Equality,³⁹ the EBRD's Strategy for the Promotion of Gender Equality 2016-2020⁴⁰ and the Law of the Republic of Azerbaijan on State Guarantees of Equal Rights for Women and Men,⁴¹ the social screening also takes into consideration issues of women's economic empowerment. The methodology used for this analysis is summarized below.

Methodology

Data and information were collected through multiple sources: (i) literature review; (ii) review of available statistical data; (iii) telephone interviews with cotton farmers; (iv) focus group discussions with farmers and labourers;⁴² and (v) interviews with stakeholders in cotton-growing districts. In addition, domestic media and internet outlets were closely monitored during the 2017 harvesting season to better understand and analyze social issues related to cotton production.

The questionnaire-based telephone survey was conducted in August 2017 as part of the exercise with a view to understanding cotton growers. A total of 32 cotton farmers were randomly selected among the farmers whose phone numbers were listed in the aforementioned Ministry registry.⁴³ The aim was to cover cotton regions as extensively as possible. The database of farmers did not include any details about land size, which is why random sampling was chosen.

³⁹ FAO, 2013.

⁴⁰ EBRD, 2016.

⁴¹ Republic of Azerbaijan, n.d.

⁴² For the composition of focus groups, please refer to Annex 7.

⁴³ One-half of them are in Saatli District and the rest are from seven other districts. All but one were male farmers.

6.2. Main stakeholders and production arrangements

Farmers grow cotton under contractual arrangements with ginning companies. There are three major ginneries that operate in large geographical areas, but MKT IK dominates cotton production with over 70 000 ha of cotton farms under its control – either as its own farms or those operated by individual farmers with whom it enters a contract.

Table 6.1: Main cotton processors and areas, 2017

| Company name | Area under cotton (ha) | Number of districts where farms are located |
|--------------------------------------|------------------------|---|
| MKT IK (LLC) | 70 100 | 22 |
| CTS Agro (LLC) | 28 600 | 14 |
| Kend Teserrufati (LLC) ⁴⁴ | 11 900 | 18 |
| Shamo (LLC) | 4 600 | 2 |
| Zardab Pambiq (LLC) | 1 400 | 2 |
| Goran Pambiq (OSJC) | 1 500 | 2 |

Source: SSC.

No comprehensive data are available on how much of the cotton area is companies' own farms, but such farms seem to constitute a small proportion. For example, of the MKT IK's total cotton area of 31 474 ha in 2016, only 5 000 ha (16 percent) was under its direct management, while the rest (26 474 ha) were fields operated by 2 949 contract farmers. Similarly, CTS Agro had 1 254 contract farmers in 2016 who grew cotton on 17 352 ha of land. CTS Agro's own cotton farms were 2 796 ha.⁴⁵

Each cotton farmer signs an annual contract with one of the companies and sells seed cotton to its processing unit. Such contracts set purchasing prices of the cotton, and defines each party's obligations, including a minimum quantity for the grower and purchasing prices by the company. It is common that companies provide inputs either in kind or through an advance payment, the amount of which is deducted from the final payment. A review of sample contracts of two companies indicated that the contents can be improved, especially by making specific reference to the relevant laws, including the Azerbaijan Labour Code, which must be followed during cotton production (see Annex 6).

⁴⁴ This company belongs to the Ministry of Agriculture.

⁴⁵ Reported in a conference in September 2016 on development of cotton-growing in Azerbaijan, chaired by the President (<http://www.president.az/articles/21093>).

It is obvious that the rapid expansion of cotton area was made possible by local governments' active involvement. Local leaders responded to the Presidential Decree by presenting plans for area expansion and supporting implementation. For example, in its 2016 report to the president, the mayor of the Sabirabad District mentioned that 2 274 ha were planned to be converted to cotton in 2017 from the state reserve land and another 7 175 ha from winter pastures. Similarly, the mayor of Saatli said in a similar 2016 report that under the district's plan to expand cotton to 17 000 ha by 2017, conversion of lands being used as winter pasture was mentioned, including 600 ha of winter pastures leased to MKT IK specifically for the company's cotton production. Individual farmers also rent public land to start cotton production. In the Kurdamir District, one municipality (Karrar) rented out 120 ha of its land to five private farmers.

The practice of releasing public land under local authorities' control in the form of leases to processing companies or farmers seems common, and it is likely that certain portions of such public land had been previously used as winter pastures.

6.3. Cotton farmers

As mentioned previously, a questionnaire-based telephone survey was conducted in August 2017 as part of the social screening exercise with a view to gaining a better understanding of cotton growers. The questionnaire used for the survey can be found in Annex 8. The results revealed diverse socio-economic characteristics of cotton farmers as presented below.

Tenure and size of cotton land

Eighteen of the 32 total have private ownership of their farm land, while 14 said they rented all or some parts of the land from other farmers (7), the municipality (2) and other sources (5). Nine out of the total use all their land for cotton production, whereas the rest grow other crops as well. The size of the cotton fields of the interviewed farmers varied significantly – from 0.7 ha to 370 ha. Fourteen of the surveyed grow cotton on fewer than 10 ha of land, while six grow it on 100 ha or larger. In the latter category of large cotton farmers, four grow only cotton, of which do so on rented land.

These 32 farmers grew 1727 ha of cotton which is equivalent to 1.3 percent of the total area under cotton in 2017 (135 000 ha).

Change of land use pattern

The survey asked which crops were grown on the land prior to the announcement of the Cotton Program. The great majority of the respondents (21) said they were growing grains (wheat and barley); five were using the land for alfalfa only or wheat with alfalfa; and three were growing cotton. Farmers in the last category are all smallholders (3 to 4 ha of total agricultural land, of which 0.7 to 3 ha are for cotton), and it is interesting to note that they have not expanded the area of cotton since the announcement of the new policy.

A reason for this could be that smallholders do not have sufficient funds for growing cotton until the final sales and payment. It usually requires more than what contracting companies pay. In one of the focus groups, farmers mentioned that they had to “pay out of their own pocket” to water the land on time.

Reasons for growing cotton

When asked why they started cotton production, 13 said they were encouraged by the presidential decree; 12 said they did so for the crop rotation purpose; three cited profitability; and one said he felt pressure from the authority. Almost one-half of the farmers who mentioned that they planted cotton because they were encouraged by the presidential decree said that cotton cultivation was not profitable so far, indicating a possibility that some farmers started cotton production with insufficient technical knowledge and weak business plans. On the other hand, 10 out of the 12 respondents who said they started growing cotton for the sake of crop rotation think cotton is a profitable crop. All three farmers who cited profitability as the main reason for starting production said they in fact made a profit. The majority of the interviewed farmers said they face difficulty irrigating the cotton fields.

6.4. Constraints on the cotton farmers

The phone interviews and focus group discussions in the field with cotton farmers highlighted key challenges that some cotton farmers are facing:

- Poor irrigation: not all cotton fields have reliable access to water. As mentioned, the majority of the farmers interviewed over the phone said they face problems with irrigation. These include long distances from the canal, deterioration of the canals because of poor maintenance, and an insufficient number of pumps. Farmers say the responsible authority (Azerbaijan Amelioration and Water Management) does not respond to their requests. There are cases of long delays of second irrigation which result in reduced yields.
- Poor road access: some cotton fields are far away from the main road (sometimes 30 to 40 km distance), but access roads are often in poor conditions. This makes access and transportation difficult, especially after rain.
- Unreliable access to machinery: some companies are unable to provide agricultural machinery in time during the harvesting season despite prior agreement, which can cause production losses.
- Labour shortage during harvesting: the wage for manual cotton picking that farmers can offer is too low to attract a sufficient number of workers, especially for the second picking after mechanized harvesting (see section 6.5 for labour mobilization arrangements).

What transpired from those interviews is **the existence of some cotton farmers, who are struggling to break even in the face of a number of**

constraints under the contractual agreements in which they have very little say. Some farmers feel that contract terms were not clearly explained before they entered contracts with companies. **Particularly worrying is the apparent nostalgia for and appeal of the Soviet methods of labour mobilization during harvest that seems to exist among some farmers.**

6.5. Labour for cotton production

Regulations on labour protection

Azerbaijan became a member of the ILO in 1992, and since then has ratified all of its eight fundamental conventions.⁴⁶ The country also ratified the Convention on the Rights of the Child (CRC) in 1992. The country's Labour Code (1999) provides the rights of employees, liabilities of employers and employees, labour protection, measures to resolve labour conflicts, and other employment-related rules.⁴⁷ Division 38 of the Labour Code sets the minimum age of work at 15 years old (Section 249, 1) and prohibits employment of persons younger than 18 years old in hazardous occupations (Section 250).

The Labour Code has a section on "Employment at Individual Peasant (Farming) or Family Enterprises (Section 258)", in which it states that employment on individual farms and family enterprises shall be regulated by the same code. It also provides that "employment at individual peasant (farming) or family enterprises shall generally be regulated by a written employment contract as described herein. In such businesses, employment contracts may be concluded verbally as well. If this is the case, employment may be documented at the request of one of the parties".

Although Azerbaijan's Labour Code provides sufficient protection for children, children's involvement in informal work has been pointed out by international entities with specific references to the cotton sector.

The United Nations Committee on the Rights of the Child in its 2012 report expressed a concern that "there are significant numbers of children, including young children, involved in informal work in the agricultural sectors of tea, tobacco and cotton", including in hazardous situations, and recommended that Azerbaijan establish mechanisms for compiling information on and monitoring the conditions of informal work, with a view to establishing enforcement mechanisms to ensure compliance. The Committee recommended that the country **provide a legislative framework requiring companies, particularly**

⁴⁶ They are: Forced Labour Convention (C029); Freedom of Association and Protection of the Right to Organise Convention (C087); Right to Organise and Collective Bargaining Convention (C098); Equal Remuneration Convention (C100); Abolition of Forced Labour Convention (C105); Discrimination (Employment and Occupation) Convention (C111); Minimum Age Convention (C138); and Worst Forms of Child Labour Convention (C182).

⁴⁷ All references to the Labour Code in the document are based on its English version in the ILO's NATLEX database (www.ilo.org/dyn/natlex/).

those involved in the extractive and cotton-producing industries, to pay particular attention to respecting children's rights. The United States Department of Labour continues to recognize cotton in Azerbaijan as a good produced by child labour although the sources its 2016 report cites as evidence are dated 2012.⁴⁸

Situation of labour for cotton production

The creation of jobs in rural areas is seen as one of the positive outcomes of the government's Cotton Program. President Ilham Aliyev, in the aforementioned cotton conference in 2016, stressed the job creation potential of the cotton sector. Citing an estimate that 70 000 people would work on cotton fields in 24 districts by 2016, the President remarked that the "[d]evelopment of cotton growing, along with the solution of economic issues, is also a social issue."⁴⁹ This could indicate that the Cotton Development Program does not envisage acceleration of the sector's mechanization at least for the time being. No data are available to indicate the exact degree of mechanization, but the farmer survey indicated mixed results: 13 said they use machines for harvesting; 10 engage in manual labour only; and the rest use a combination of both. It appears that there is no direct correlation between size of the cotton area and use of mechanized power.

The social screening team paid special attention to understanding how manual labour is mobilized for cotton production in Azerbaijan, as risks of illegal forms of labour engagement, particularly child labour and forced labour, are potentially high at the field level. On-farm labour for cotton production includes weeding, ploughing furrows and harvesting. A cotton field requires 2 to 4 weedings per season. Weeding is undertaken manually with a hoe. Because of the risk of harming cotton plants before they are established, weeding is perceived to require more care and attention than harvesting. In two districts the survey team visited in June 2017 (Yevlakh and Kurdamir), the standard rate for 8 hours of weeding is AZN 10 per day;⁵⁰ and no wage difference between male and female workers was reported. For harvesting, wage is paid by weight.

The study found that **most on-farm labour for cotton production is provided by wage labourers from the locality.** The most common arrangement is that cotton farmers contact local labour brokers and request them to bring workers to the field on specific dates. The cotton farmer pays a fixed amount of money (AZN 1 per worker) to the broker as a fee.⁵¹ Farm workers are recruited and paid on a daily basis, and there appears to be no seasonal or longer-term

⁴⁸ US Department of Labour, 2017.

⁴⁹ Reported in a conference in September 2016 on development of cotton-growing in Azerbaijan, chaired by the President (<http://www.president.az/articles/21093>).

⁵⁰ Approximately USD 5.9 at the time of the social screening (July 2017).

⁵¹ This is the going rate in Yevlakh, Kurdamir and Salyan.

arrangement in place. This arrangement of informal labour mobilization through local brokers is common for all types of crop cultivation and has the advantage of being able to respond flexibly and promptly to the demand by the farmers. Brokers are usually residents of the same villages where labourers come from and have good knowledge on who will be willing to take up the work. All agreements are verbal.

The agricultural labourers are mostly from landless, rural households, and predominantly women. In the telephone survey, the majority of the interviewed farmers (26 persons) said the share of women among on-farm labour force for cotton is 80 percent or higher (seven said 100 percent are women). In the two districts the survey team visited in June (Yevlakh and Kurdamir), it was reported that labourers were mobilized from villages near the farms where they work. In one cotton farm, interviewed workers were familiar with the job placement service by brokers and content with the job opportunities and conditions.

Image 6.1: Example of the typical composition of a team of agricultural workers during weeding Kurdamir District, June 2017



Source: Author's photograph.

In another focus group discussion conducted in the Salyan District, a group of women who work as agricultural labourers reported that they typically work for 9 hours a day (from 8 am to 6 pm with a 1-hour lunch break) in the cotton field. As in Yevlakh and Kurdamir, they are paid AZN 10 per day for weeding, and by weight for harvesting (AZN 0.1, or around 6 USD cents, per kilogram of seed cotton). The average volume one can pick in a day is 80 kg, but elderly persons can only harvest 60 to 70 kg. They **consider this level of remuneration**

too low for the backbreaking work of harvesting and mentioned their unwillingness to take up the work. They reported that when most of the labourers were not willing to work at the standard rate of AZN 0.1, the farmer had to increase it to AZN 0.14 per kg. **No cases of involvement of children below legal working age were reported in the field nor found in the media or on the internet during the production season of 2017.**

While most workers for cotton picking are mobilized by brokers in the same manner as described above, some cotton farmers seem to resort to other means to avoid a labour shortage. Cotton harvesting has a narrow time window that results in high competition of labour. In addition, advance planning for harvest is often difficult due to weather conditions and other elements of unpredictability, and with flexible labour placements and a low wage rate, **it is likely that some labourers would opt not to take up the harvesting work, especially when the weather conditions are not favourable.** In the cotton farmer survey, **12 out of the 32 farmers said they faced labour shortage during the last year's harvesting season.** When asked how they coped, 10 said they had to find labour from other villages, indicating that they had to go beyond the brokers on whom they would normally rely.

The social screening team did not come across any reports of workers below the minimum working age engaged on cotton farms, nor spotted any media coverage of such cases. None of the interviewed persons showed any hint or likelihood that children who have not finished middle school are engaged in work related to cotton.

Mobilization of employees from public institutions

The social screening team came across anecdotal evidence in the field that state institutions (schools, hospitals, etc.) have mobilized their employees in cotton harvesting in a manner reminiscent of the Soviet time. Media reports on a traffic accident in September 2017 suggested existence of such practices as medical institution employees were reportedly injured on their return from cotton harvesting.⁵² Some of the lesser known websites also reported involvement of government institution employees in cotton picking, but no details were found in such reports.

Interviews conducted by the social screening team indicate that **public institution labour mobilization does take place, but that such practices are ad hoc rather than systemic.** What matters most seems to be individual farmer's network and "capability" to influence local authorities, who instruct institutions to accommodate the farmer's request. Work is undertaken during the weekend outside their regular office hours, and the employees receive the

⁵² Available at <https://www.abzas.net/2017/09/pambiq-yigmaqdan-qayidan-hakimlar-qazaya-ugrayib>. The news was denied by the hospital and it was not covered in other mass media news.

same level of remuneration as other pickers. Only non-professional employees are engaged in such work, but professional staff (schoolmasters or teachers in case of schools) sometimes supervise the work in the field. **Organized by the institution's authority, such arrangements are based on unequal power relationships and may potentially entail elements of involuntary labour participation.**

Social impact of mechanization

In view of the current, gradual pace of mechanization in the cotton sector, such manual labour will not be displaced in the immediate future. As labourers also work on the fields of other crops, it is unlikely that they will suffer a significant loss of income when mechanization happens. Nevertheless, experiences from other cotton-producing countries that have switched to mechanical harvesting show that women are the most vulnerable group to negative social consequences.

A study of the social impacts of mechanization in Argentina, Greece and Turkey⁵³ found that “women were disproportionately negatively affected by mechanization of harvesting activities”⁵⁴ in Argentina. While most men were able to transition to jobs involving maintenance or operation of harvesting equipment, transportation and storage of seed cotton, or cotton seed and ginning, this was not the case for women due to cultural factors.⁵⁵ Similarly, while most men harvesting cotton in Greece were seasonal workers migrating from area to area depending on the seasonal crop harvesting needs, “most women who had been earning money by harvesting cotton returned to domestic chores at home and tended gardens to produce food for own consumption.”⁵⁶ In both cases, governments did not implement any programs or policies targeted toward rural workers displaced by mechanization of cotton activities nor did they receive any compensation or adjustment assistance.

It is thus advisable for the government to review the possible negative social effects of a significant mechanization of cotton harvesting, especially with respect to rural women who might be negatively affected in a disproportional way, and design and implement adequate mitigation measures.

6.6. Vulnerable groups and mitigation measures

Wage labourers in cotton fields

Day wage labourers are a major beneficiary group of the national Cotton Program, which is believed to have increased local demand for unskilled labour.

⁵³ Townsend, 2015.

⁵⁴ Ibid.

⁵⁵ Ibid.

⁵⁶ Ibid.

Although systematic exploitation and unfair remuneration is unlikely as they are recruited in open and perhaps well-functioning local labour markets, the fact that such workers are predominantly women and poor, and thus have little bargaining power vis-à-vis employers, warrants special attention to this group. Special attention needs to be paid to ensure acceptable working conditions, including safe and healthy work environments. Potential mitigation measures would include: articulation of the farmer's responsibility in the contract over the provision of safe and healthy working conditions for the workers with reference to relevant laws; monitoring (and possible licensing) of labour brokers; and information dissemination and awareness building targeting women and members of poor households, including legal advice and support.

Employees of public institutions

As previously discussed, there is the possibility that employees of public institutions are being mobilized to work on cotton farms under certain arrangements, such as instructions from their workplace, which give them little choice to opt out. Further investigation is necessary in order to shed more light on this topic.

Farmers not making profits from cotton

Some farmers seem to have started cotton production without a clear understanding of the consequences, including financial ones. Although the government does not seem to be applying direct pressure, the current political context would make it hard for cotton farmers to give up production even if they prefer to do so. Support to boosting productivity through improving technical knowledge, measures to promote optimal crop rotation, and investment in infrastructure for better on-farm water management should be considered.

Users of winter pastures

Conversion of winter pastures may have impacted the households that were grazing their animals there, but detailed analysis of such impacts, which can be variable depending on the area and farming systems, is beyond the scope of social screening. It would be advisable, however, for the Ministry of Agriculture to conduct an assessment and provide a policy recommendation if considered necessary.

6.7. Conclusions and recommendations

Cotton production in Azerbaijan encompasses certain social risks related to labour in the production process. Such **risks are much smaller than in other countries where exploitative forms of labour for cotton production, including child labour, are systemic and prevalent.** Nonetheless the country is expected to demonstrate that cotton production complies with international standards on labour and working conditions as downstream value chain operators as well as consumers in the international market are paying

increased attention to social issues, which may be present at the production and processing stages of industrial crops, including cotton. This would **require a concerted effort by policymakers, industry and farmers to identify, analyze and take action to mitigate such risks.**

Labour inputs for cotton production rely on informal arrangements involving farmers, local labour brokers and wage labourers. **Although the arrangement itself is not necessarily exploitative, its informal and localized nature makes it difficult to monitor if applicable labour regulations are being followed.** Compliance with the minimum work age is left to “common sense” of labour brokers and employers (farmers); and measures to ensure conducive work arrangements, including occupational safety and environmental health in the field, are voluntary at best. Workers on cotton fields are not organized, individually recruited and paid daily without written contracts. They are also predominantly poor women who do not possess strong bargaining power vis-à-vis employers and labour brokers. Although they have a choice not to accept employment on the farm, those from very poor households who do not have alternative sources of income may still feel inclined to take up a wage job even if conditions are sub-optimal. Employers or brokers, usually males, do not appear to be aware of necessary arrangements to address specific needs of female labourers, such as safety during the trip to or on the farm, access to separate latrines, etc. Contracts between the buyer (ginnery) and suppliers (cotton farmers) do not obligate the latter to abide by the Labour Code, and the companies do not seem to have made sufficient effort to ensure the rights and welfare of the labourers on the cotton fields belonging to the suppliers. **Even if no evidence of unlawful labour relations exists, the current modalities of on-farm labour engagement are inherently limited in their ability to adequately and systematically protect workers.**

The top-down manner of the Cotton Program’s inception and implementation so far, combined with the industrial structure in which farmers do not have much voice, made some farmers reluctant participants in the programme. Not all farmers are convinced that cotton is the best crop to grow from the economic point of view. Support services to increase yields and reduce costs such as irrigation development, access to machineries and extension are often inadequate; and as the area under expands, the number of such farmers could potentially increase. Under such circumstances, **appeal for the Soviet-era style of mobilizing labour for cotton harvesting through schools and other state institutions may grow, particularly among those farmers who are operating on tight profit margins, as it can secure a sizeable workforce with a little incremental cost on the farmer’s side during the harvest when a lack of labour can lead to major financial losses.**

The structure of cotton production is based on the conventional gender relationships in the agricultural sector in which women’s income opportunities concentrate on low-paid, manual work, whereas on-farm business management

and investment decisions rest with landowners who are predominantly men. The expansion and deepening of Azerbaijan's cotton sector can present further job opportunities for men and women, especially in rural areas, but promotion of women's economic empowerment in the sector would require targeted support to strengthen their skills and knowledge in the prospective occupational areas, such as auxiliary service provision (input supplies, labour placement, information technologies, etc.).

In the context of EBRD's Performance Requirement 2 on Labour and Working Conditions (PR2), agricultural labourers would be considered "non-employee workers" of the cotton processors in view of the fact that the labourers perform work directly related to the company's core business (cotton production).

Support by EBRD would be conditional on the company's demonstrated efforts to comply with the PR2's relevant provisions, which at the moment appear insufficient.

In order to demonstrate that cotton in Azerbaijan is produced in compliance with international standards on labour and working conditions, there is a need for a concerted effort by policy makers, government agencies, companies and farmers to identify, analyze and take action to mitigate such risks. This would require an enabling policy and institutional environment that are based on the view that the Cotton Program in Azerbaijan will greatly benefit from addressing social issues, and that all stakeholders have a role to play in this regard.

It is recommended that such an effort incorporates the following action elements on behalf of the government (including local authorities) and the industry:

Government

- Articulation of zero tolerance for child and forced labour in the Cotton Program with a specific set of actions with designated responsibilities, including an effective grievance address mechanism;
- Formulation of a strategy to promote sound and sustainable engagement of on-farm labour for cotton production, with special attention to female labourers;
- An active information campaign on the "social soundness" of the Cotton Program involving all key stakeholders and inviting domestic and international media;
- assessment of the possible negative social effects of a significant mechanization of cotton harvesting, especially with regards to rural women, and the design and implementation of adequate mitigation measures;
- awareness building and inspection targeting public institutions (schools, hospitals, etc.) to prevent any form of involuntary engagement of workers in cotton production;

- support at the village and community level to facilitate agricultural labourers' understanding of their rights, and to promote group formation, organizational capacity strengthening and leadership development with strong focus on women;
- formulation of a strategy to promote women's economic empowerment and overall social wellbeing at all stages of the cotton value chain.

Industry

- Creation of an industrial standard on labour and working conditions of all workers in the sector, including on-farm labourers, and a system of accreditation of processing companies;
- awareness building and training targeting cotton processing companies on measures to ensure compliance with the labour standards in cotton ginning factories;
- formulation of a strategy to promote women's economic empowerment in cotton;
- legal advice to processors and farmers on labour-related issues;
- improvement of contractual agreements (between ginning companies and farmers) in the area of health and safety, as well as working conditions and labour standards.

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Annex 1 – State Program for the Development of Cotton Production

APPROVED

By the executive order of the President of the Republic of Azerbaijan dated 13 July 2017

State Program for the Development of Cotton Production in the Republic of Azerbaijan for 2017-2022

1. Introduction

The actions taken to efficiently use the economic potential of the country and promote the production of export-oriented products have delivered significant results in the development of traditional fields of agriculture. The implementation of state programs adopted over past few years has boosted the development of entrepreneurship in agricultural industry and provided for more efficient use of labour force and natural economic resources, modernization of infrastructure and employment growth.

As one of the strategic and important agricultural sectors which may lead to foreign currency inflows to the country, cotton production stands out for its high indicators in terms of high employment and volume of overall output.

The favorable climate for and tradition of cotton production, the possibility to meet the raw material needs of the processing industry by local production, and the export potential of the cotton and end products made of cotton are boosting the necessity to ensure further development of the cotton production. Therefore, creation of favorable conditions for the development of cotton production in the country has been identified as one of the priorities of the agrarian policy.

“The State Program for the Development of Cotton Production in the Republic of Azerbaijan for 2017-2022” (hereinafter “State Program”) has been developed to increase the state support to the cotton production and solve the existing problems in this field.

2. Current status of cotton production in Azerbaijan

The comprehensive development of cotton production in Azerbaijan dates back to the early 1970s. As a result of successful agrarian policy during the period from 1969 to 1982 when national leader Haydar Aliyev headed the country, cotton production developed very rapidly and a great manufacturing

potential was created. The realization of ameliorative actions, construction of irrigation systems and improvement of the scientific basis of cotton production were achieved during this period. Cotton production reached a record 1 015 000 tonnes in 1981. Regions specialized in raw material and the processing industry developed a solid material and technical base.

The current condition of the land, natural climate, water resources, labour force and the condition of agrotechnical service provides for the cultivation of cotton in several regions. Nevertheless, according to official statistics, the total area of cotton growing lands and cotton production decreased in 1990-2015. In 2015, the total cotton growing area was 18 700 ha, while cotton production was 35 200 tonnes.

However, as a result of actions taken for the development of cotton production since 2016, the cotton planting area has increased by 2.7 times, reaching 51 400 ha, and cotton production has grown 2.5 times, reaching 89 400 tonnes.

The law on Cotton Production (1012-IIIQ, dated 11 May 2010) was of great significance in terms of defining the legal, organizational and economic basis of cotton production and governing the sales of raw cotton and cotton goods.

Recent incentives for the producers of agricultural products have played an important role in taking the development of cotton production to a new level of quality and increased incentives for investment in this field and cotton production.

In accordance with executive order No. 2350 of the President of the Republic of Azerbaijan on the “State Support to Cotton Production in Azerbaijan” dated 22 September 2016, the subsidy from the state budget of AZN 0.1 for the producers of raw cotton per kilogram sold to processing enterprises, as well as the increase of the purchase price of raw cotton by the companies, created additional incentive for the development of this sector.

The State Program will further boost the activities taken in this field and the rapid development of cotton production in the country.

3. Mission and objectives of State Program

3.1 The State Program is designed to enhance state support to cotton production and stimulate its development in order to meet the demand for cotton goods, improve the raw material supply of cotton processing entities, develop the processing industry, increase the export volume of cotton goods and increase the employment rate in rural areas.

3.2 The following objectives have been set in order to achieve this goal:

3.2.1 carry out institutional measures for the development of cotton production;

- improve the regulatory framework governing cotton production activities;
- further strengthen scientific support and workforce capacity;
- improve the provision of required infrastructure for cotton production;
- support the application of advanced technologies in cotton production and processing;
- build result-oriented economic relations between cotton producers and processing enterprises;
- encourage local and foreign investments in cotton production and processing fields;
- increase the competitiveness of cotton goods;
- promote the export of cotton goods;
- raise the level of replacement of imported cotton goods;
- support the development of other fields linked with the manufacturing of cotton goods;
- ensure the development of cooperative relations in cotton production.

4. Major directions of the development of cotton production

4.1 Activities will be taken in the following areas in order to achieve the objectives set forth for the development of cotton production in Azerbaijan:

- 4.1.1 increase the production of raw cotton through the application of best management practices and intensive cultivation and irrigation technology, and ensure efficiency in this regard;
- 4.1.2 improve the provision of cotton production with modern equipment and machinery;
- 4.1.3 apply crop rotation system in cotton production;
- 4.1.4 identify optimal fields for cultivation in the regions and extend specialization;
- 4.1.5 restore the operation and modernization of existing cotton processing factories and provide support to the establishment of new cotton processing factories with advanced equipment and technology;
- 4.1.6 promote deep processed products;

- 4.1.7 increase export by means of new cotton goods;
- 4.1.8 take into account the changing market conditions in the world cotton market, including the enhancement of the use of chemical fibres in textile sector;
- 4.1.9 strengthening the logistic base of cotton seed and facilitate fibreless seed production

5. Funding sources of the State Program

The implementation of activities under the State Program shall be financed from the following sources:

5.1 State budget:

- 5.1.1 Extra-budgetary funds;
- 5.1.2 National Fund for Entrepreneurship Support of the Republic of Azerbaijan, Azerbaijan Investment Company JSC, State Service on Management of Agricultural Projects and Credits under the Ministry of Agriculture;

5.2 local and foreign investments;

5.3 other sources not restricted by the law.

6. Expected results of the State Program

- 6.1 The State Program is expected to facilitate the restoration of cotton production traditions in Azerbaijan, as well as decrease the dependence on cotton goods imports, build job creation in rural areas, increase the capacity of the agricultural industry, and enhance export capacity and additional currency inflows for the country;
- 6.2 the activities will lead to the establishment of cotton production and processing complexes equipped with state-of-the-art technologies, as well as a textile industry using local raw cotton;
- 6.3 as a result of the implementation of the State Program, raw cotton production will reach 500 thousand tonnes by 2022.

ACTION PLAN**For the implementation of the State Program for the Development of Cotton Production in the Republic of Azerbaijan for 2017-2022**

| Ref No. | Description | Execution period | Responsible party |
|---|---|------------------|---|
| 7.1. Carry out institutional measures for the development of cotton production | | | |
| 7.1.1. | Strengthen the activities of public unions operating in the field of cotton production | 2017–2022 | Ministry of Agriculture, Ministry of Economy |
| 7.1.2. | Improve the legal framework of cotton production | 2017–2019 | Ministry of Agriculture, Ministry of Economy, Ministry of Justice |
| 7.1.3. | Identify the land areas to be used for cotton planting | 2017–2018 | Ministry of Agriculture, State Committee for Property Affairs, local executive bodies |
| 7.1.4. | Promote establishment of clusters in the field of cotton production and processing | 2017–2022 | Ministry of Economy, Ministry of Agriculture |
| 7.1.5. | Manage risks and develop an advanced insurance mechanism in cotton production | 2017–2018 | Ministry of Agriculture, Ministry of Economy, Financial Markets Supervision Chamber |
| 7.2. Strengthen the scientific support and personnel capacity in cotton production | | | |
| 7.2.1. | Strengthen logistic base of scientific research centers and basic seed production farms entities involved in cotton production | 2017–2019 | Ministry of Agriculture, Ministry of Economy, Ministry of Finance |
| 7.2.2. | Establish a network of secondary, vocational and higher educational institutions to prepare specialists in cotton production and processing | 2017–2022 | Ministry of Agriculture, Ministry of Education |
| 7.2.3. | Create new high-quality, fast-growing and productive varieties of cotton | 2017–2022 | Ministry of Agriculture, Azerbaijan National Academy of Sciences |
| 7.2.4. | Enrich, use in selection, and preserve the gene pool of cotton plant and organize demonstration plots | 2017–2022 | Ministry of Agriculture, Azerbaijan National Academy of Sciences |

| Ref No. | Description | Execution period | Responsible party |
|---|---|------------------|---|
| 7.3. Improve cotton production infrastructure | | | |
| 7.3.1. | Strengthen the logistic base of existing laboratories and build new laboratories in order to control the quality of raw cotton | 2017–2022 | Ministry of Agriculture, Ministry of Economy, Ministry of Finance |
| 7.3.2. | Construct small and mid-size water reservoirs to improve the water supply of lands to be used for cotton planting | 2017–2022 | Azerbaijan Amelioration and Water Management JSC, Ministry of Agriculture, Ministry of Emergency Situations, Ministry of Economy, Ministry of Ecology and Natural Resources, Ministry of Finance |
| 7.3.3. | Strengthen ameliorative measures, rehabilitate existing drainage networks and construct of new networks and bring salty lands to cultivable condition | 2017–2022 | Azerbaijan Amelioration and Water Management JSC, Ministry of Emergency Situations, Ministry of Agriculture, Ministry of Economy, Ministry of Finance |
| 7.3.4. | Ensure that cotton processing factories are connected to power supply, gas supply and other infrastructural systems | 2017–2019 | Azerishig JSC, Azersu JSC, State Oil Company, local executive bodies |
| 7.3.5. | Strengthen fire protection measures | 2017–2022 | Ministry of Emergency Situations, local executive bodies |
| 7.4. State measures to support cotton production | | | |
| 7.4.1. | Increase the provision of cotton production with modern machinery and equipment, high quality pesticides and fertilizers | 2017–2022 | Ministry of Agriculture, Ministry of Economy, Ministry of Finance |
| 7.4.2. | Support the establishment of modern processing factories which remove fibre from cottonseed | 2017–2022 | Ministry of Economy, Ministry of Finance, Ministry of Agriculture |

| Ref No. | Description | Execution period | Responsible party |
|--|---|------------------|--|
| 74.3. | Organize free extension services for farmers engaged in cotton production and make extensive use of information and communication technologies | 2017–2022 | Ministry of Agriculture, Azerbaijani National Academy of Sciences, Ministry of Communication and High Technologies |
| 74.4. | Encourage local and foreign investments in cotton production and processing | 2017–2022 | Ministry of Economy, Ministry of Agriculture |
| 74.5. | Encourage modern irrigation techniques in cotton production, as well as support projects using pilot systems | 2017–2022 | Ministry of Agriculture, Ministry of Economy, Ministry of Finance, Azerbaijan Amelioration and Water Management JSC |
| 74.6. | Rebuild cotton receipt stations and processing plants in order to increase supply and processing capacities | 2017–2019 | Ministry of Economy, Ministry of Agriculture, State Committee for Property Affairs |
| 74.7. | Support companies in enhancing processing capacities | 2017–2022 | Ministry of Economy, Ministry of Finance, Ministry of Agriculture |
| 74.8. | Provide privileged loans to economically justified viable projects | 2017–2022 | Ministry of Economy, Ministry of Finance, Ministry of Agriculture |
| 7.5. Boost marketing and promote export in the field of cotton production | | | |
| 75.1. | Support the marketing activities of cotton producers in domestic and international markets and promote the export of cotton products | 2017–2022 | Ministry of Economy, Ministry of Agriculture |
| 75.2. | Participate in domestic and international exhibitions, workshops, conferences and festivals related to cotton products and promote national brands in foreign countries | 2017–2022 | Administration of the President of the Republic of Azerbaijan The Cabinet of Ministers, Ministry of Agriculture, Ministry of Economy |
| 75.3. | Post information about local companies involved in the production, processing and export of cotton goods in the unified database of goods portal produced in Azerbaijan | 2017–2022 | Ministry of Agriculture, Ministry of Economy, Center for Economic Reforms Analysis and Communication |

Source: Authors.

■ ■ ■ ■ ■ Annex 2 – List and analysis of registered cotton insecticides in Azerbaijan

A.2.1 Registered cotton insecticides

| No | Preparatın adı (The name of the drug) | İstehsal edən firma və ölkə (The company and country of manufacture) | 4 | 5 | 6 | 7 |
|---------------------------------------|--|--|--------------------------------|--------------------|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| İNSEKTİSIDLƏR-AKARİSIDLƏR | | | | | | |
| alma, armud, üzüm, pambiq (cotton) | Croshe WP | "Hektaş Tic.A.Ş"- Türkiyə | "EMA" MMC | insektoid-akaricid | | 12.10.2012 |
| Pambiq (cotton) | Dumble EC | "Doğal Kimyevi Maddələr və Zirai İlaçlar San. ve Tic. A.Ş."- <i>Türkiyə</i> | "Xalili" MMC | insektisid | | 12.10.2012 (təkrar qeydiyyat) |
| Pambiq (cotton) | Judo EC | "Doğal Kimyevi Maddələr və Zirai İlaçlar San. ve Tic. A.Ş."- <i>Türkiyə</i> | "Xalili" MMC | insektisid | | 12.10.2012 (təkrar qeydiyyat) |
| pambiq, alma, üzüm (cotton) | Danitol EC | "Sumitomo Chemical Agro Europe" <i>Fransa</i> | "Agroservis Azerbaycan" MMC | insektisid | | 21.05.2014 (təkrar qeydiyyat) |
| pambiq, alma, üzüm (cotton) | Sumi-Alpha EC | "Sumitomo Chemical Agro Europe" <i>Fransa</i> | "Agroservis Azerbaycan" MMC | insektisid | | 21.05.2014 (təkrar qeydiyyat) |
| (cotton)üzüm, pambiq | Karate EC | "Syngenta Agro Ag"- İsveçrə | "Aqrokimya" MMC | insektisid | | 25.07.2014 (təkrar qeydiyyat) |
| kartof, pambiq, taxıl (cotton) | Mosetam SP | "Safa Tarım" -Türkiyə | "Aqrobərəkət" MMC | insektisid | | 03.10.2014 (təkrar qeydiyyat) |

| No | Preparatın adı (The name of the drug) | İstehsal edən firma və ölkə (The company and country of manufacture) | Sınağa və qeydiyyat taqdim edən firma və ya təşkilatın adı | Preparatın növü | Sınaqdan keçirilmiş bitkinin adı | Qeydiyyatın tarixi Registration date |
|---|--|--|--|-----------------|-------------------------------------|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| alma, pambiq, kartof (cotton) | KunFu EC | "Lewel Marketing LTD"-Bolqarıstan | "EMA" MMC | insektisid | | 28.11.2014 (təkrar qeydiyyat) |
| Pambiq (cotton) | Agrogor EC | "Safa Tarım"- Türkiyə | "AgroBereket" MMC | insektisid | | 28.11.2014 (təkrar qeydiyyat) |
| Pambiq (cotton) | Coupon SP | "Platin Kimya" -Türkiyə | "Aqromarket" MMC | insektisid | | 10.02.2015 |
| Pambiq (cotton) | Kingsor EC | "Koruma Klor Alkali San. ve Tic. A.S."- Türkiyə | "Aqrokimya" MMC | insektisid | | 19.05.2015 (təkrar qeydiyyat) |
| pambiq, üzüm (cotton) | Dursban EC | "Dow AgroSciences" -ABŞ | "Aqrokimya" MMC | insektisid | | 19.05.2015 (təkrar qeydiyyat) |
| (cotton)pambiq, üzüm, alma, pomidor | Avaunt EC | "DuPont international Operations Sarl"- İsveçrə | "Aqroservis" MMC | insektisid | | 24.06.2015 (təkrar qeydiyyat) |
| Pambiq (cotton) | Abamektin aria EC | "Ariashimi"- İran İR | "Canub-Agro" MMC | insektisid | | 23.09.2015 |
| Pambiq (cotton) | Kortomil 90 SP | "Koruma Klor Alkali San. ve Tic. A.S." - Türkiyə | "Aqrokimya" MMC | insektisid | | 28.10.2015 (təkrar qeydiyyat) |
| alma, kartof, pambiq (cotton) | Ultimatum EC | "DVA Agro GmbH" -Almaniya | "AVC Agro" MMC | insektisid | | 13.11.2015 (təkrar qeydiyyat) |
| alma, pambiq, üzüm (cotton) | Perfecto SC | "DVA Agro GmbH" -Almaniya | "AVC Agro" MMC | insektisid | | 13.11.2015 (təkrar qeydiyyat) |

List and analysis of registered cotton insecticides in Azerbaijan

| No | Preparatın adı (The name of the drug) | İstehsal edən firma və ölkə (The company and country of manufacture) | Sınağa və qeydiyyatı təqdim edən firma və ya təşkilatın adı | Preparatın növü | Sınaqdan keçirilmiş bitkinin adı | Qeydiyyatın tarixi Registration date |
|------------------------------------|--|--|--|-----------------|-------------------------------------|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Pambıq (cotton) | Aekido 5 EC | "Agrofarm Kimya San. və Tic.A.Ş." Türkiyə | "Aeterna Pharma" MMC | insektisid | | 22.02.2016 (təkrar qeyd.) |
| Pambıq (cotton) | Nissol-ultra | "Agrofarm Kimya San. və Tic.A.Ş." Türkiyə | "Aeterna Pharma" MMC | akarısíd | | 22.02.2016 (təkrar qeyd.) |
| üzüm, pambıq (cotton) | Petra 5 EC | "Agrobrest"- Türkiyə | "GBR Trade" MMC | insektisid | | 04.03.2016 (təkrar qeyd.) |
| (cotton)kartof, pambıq | Goldplan 20 SP | "Agrobrest"- Türkiyə | "GBR Trade" MMC | insektisid | | 04.03.2016 (təkrar qeyd.) |
| meyvə, pambıq | Alpor 40 EC | "Agrobrest"- Türkiyə | "GBR Trade" MMC | insektisid | | 04.03.2016 (təkrar qeyd.) |
| kartof, pambıq(cotton) | Jetsis 2,5 EC | "Agrobrest"- Türkiyə | "GBR Trade" MMC | insektisid | | 04.03.2016 (təkrar qeyd.) |
| üzüm, pambıq (cotton) | Surrender 5 G | "Agrobrest"- Türkiyə | "GBR Trade" MMC | insektisid | | 04.03.2016 (təkrar qeyd.) |
| pomidor, meyvə, pambıq (cotton) | Algamek 1,8 EC | "Agrobrest"- Türkiyə | "GBR Trade" MMC | akarısíd | | 04.03.2016 (təkrar qeyd.) |
| alma, pambıq (cotton) | Foliton M EC | "Agrofarm Kimya San. və Tic. A.Ş." | F/ş Sabit Əliyev | insektisid | | 27.07.2016 (təkrar qeyd.) |
| Pambıq (cotton) | Ganidan EC | "AgroBest Group" -Türkiyə | F/ş Sabit Əliyev | insektisid | | 27.07.2016 (təkrar qeyd.) |

| No | Preparatın adı (The name of the drug) | İstehsal edən firma və ölkə (The company and country of manufacture) | Sınağa və qeydiyyatı taqdim edən firma və ya təşkilatın adı | Preparatın növü | Sınaqdan keçirilmiş bitkinin adı | Qeydiyyatın tarixi Registration date |
|---|--|--|---|-----------------|-------------------------------------|---|
| 1 | | | | | | |
| Pambıq (cotton) | Pascal SP | "Ertar Kimya Tarım Ürün. və Alet. İml. Paz. San. ve Tic.Ltd"- Türkiyə | F/ş Sabit Əliyev | insektisid | | 27.07.2016 (təkrar qeyd.) |
| Pambıq (cotton) | Massban 4EC | "Ertar Kimya Tarım Ürün. və Alet. İml. Paz. San. ve Tic.Ltd"- Türkiyə | F/ş Sabit Əliyev | insektisid | | 27.07.2016 (təkrar qeyd.) |
| üzüm, tərəvəz, alma, Omite 57 EW pambıq (cotton) | | "Arysta LifeScience LTD" -Böyük Britaniya | "Aqroservis" MMC | insektisid | | 08.09.2016 (təkrar qeyd.) |
| Pambıq (cotton) | İmida gyah | "GYAH Corporation"- İran İR | "Xalili" MMC | insektisid | | 11.11.2016 (təkrar qeyd.) |
| Pambıq (cotton) | Smart Abamektin EC | "Smart Pharma"- İordaniya | "Xalili" MMC | insektisid | | 11.11.2016 (təkrar qeyd.) |
| Pambıq (cotton) | Pirlana EC | "Pilyum Tarım və Qida sənayi Ticaret Ltd. Şti"-Türkiyə | "Xram Agro" MMC | insektisid | | 26.12.2016 |

Pambıqda 2017-ci ildə sınaqdan keçmiş insektisidlər

| | | | | | |
|-------------------------------------|-------------------|--|--|------------|---------------------------------------|
| kartof, pambıq (cotton) | Hekplan 20 SP | "Hektaş" - Türkiyə | "EMA" MMC | insektisid | 01.02.2017 (tekrar qeyd.) |
| kartof, pambıq (cotton) | Maestro 5 EC | "Hektaş" - Türkiyə | "EMA" MMC | insektisid | 01.02.2017 (tekrar qeyd.) |
| Pambıq (cotton) | Priban 4 EC | "Hektaş" - Türkiyə | "EMA" MMC | insektisid | 01.02.2017 (tekrar qeyd.) |
| Pambıq (cotton) | Priban 25 WP | "Hektaş" - Türkiyə | "EMA" MMC | insektisid | 01.02.2017 (tekrar qeyd.) |
| Pambıq (cotton) | Denna 80 DF | "Ertar Kimya Tarım Ürün. ve Alet. İml.Paz. San. ve Tic.Ltd"- Türkiyə | F/ş Sabit Əliyev | insektisid | 01.02.2017 (tekrar qeyd.) |
| Pambıq (cotton) | Ekomyl 90 SP | "Ertar Kimya Tarım Ürün. ve Alet. İml.Paz. San. ve Tic.Ltd"- Türkiyə | F/ş Sabit Əliyev | insektisid | 01.02.2017 (tekrar qeyd.) |
| Pambıq (cotton) | Hexygit | "King Quenson Industry" şirkəti- Çin | "Longmar Networks Ltd" şirkətinin filiali | akarasid | 15.05.2017 |
| Pambıq (cotton) | Terra 90 EC | "King Quenson Industry" şirkəti- Çin | "Longmar Networks Ltd" şirkətinin filiali | insektisid | 15.05.2017 |
| Pambıq (cotton) | King-Sunsay 20 EC | "King Quenson Industry" şirkəti- Çin | "Longmar Networks Ltd" şirkətinin filiali | akarasid | 15.05.2017 |
| Pambıq (cotton) | İndox Super EC | "King Quenson Industry" şirkəti- Çin | "Longmar Networks Ltd" şirkətinin filiali | insektisid | 15.05.2017 |
| Pambıq (cotton) | Aceti Super 20 SP | "King Quenson Industry" şirkəti- Çin | "Longmar Networks Ltd" şirkətinin filiali | insektisid | 15.05.2017 |
| pomidor (istix.) pambıq (cotton) | Ladacarb 80 DF | "Koruma Klor Alkali San. ve Tic. AŞ"-Türkiyə | "Aqrokimya" MMC | insektisid | 02.06.2017 |

Source: Authors.

A.2.2 Analysis of pesticides currently imported by Agroleasing for cotton in 2017

| Moderately Toxic | | | WHO Hazard Class | | | | | Other references | | | | | Environment | | | | |
|--------------------|-------------------------|----------------------------|--------------------|----------------------|---------------------------|---|--------------|------------------|------|-------|------------|--|-------------|--|--|--|--|
| Highly Toxic | | | | | | | | | | | | | | | | | |
| Very Highly Toxic | | | | | | | | | | | | | | | | | |
| Pesticides | | | | | | | | | | | | | | | | | |
| Substance | Type | HHP summary classification | WHO classification | Chemical Conventions | Registration status in EU | a.i. on RUP List in United States ⁵⁷ | ground water | Fish | Bees | Birds | Amphibians | | | | | | |
| Abamectin | microbial extract | | | | Approved | x | | | | | | | | | | | |
| Acetamiprid | neonicotoid | | | | | | | | | | | | | | | | |
| Carbosulfan | carbamate | | | RS | Not approved | | | | | | | | | | | | |
| Delthametrin | synthetic pyrethroid | | | | | x | | | | | | | | | | | |
| Emamectin Benzoate | botanical | | | | Approved | | | | | | | | | | | | |
| Haloxypop-methyl | propionic acid | | | | Approved | | | | | | | | | | | | |
| Hexythiazox | insect growth Regulator | | | | Approved | | | | | | | | | | | | |

| | | | | | | | |
|--------------------|----------------------|----------|--|--|--------------|---|--|
| Indoxacarb | oxadiazine | Approved | | | | | |
| Lambda-Cyhalothrin | synthetic pyrethroid | | | | x | | |
| Methomyl > 34% | carbamate | 1b | | | Approved | x | |
| Mepiquat Chlorid | | | | | | | |
| Pyridaben | unclassified | | | | | | |
| Prometrin | triazine | | | | | | |
| Propargite | unclassified | | | | Not approved | x | |
| Spirodiclofen | unclassified | | | | Approved | | |

Source: *Author's compilation.*

57 Restricted Use Pesticides (RUPs) in United States.

Annex 3 – Pesticide labelling examples

A.3.1) Sample of a relatively descriptive and comprehensive pesticide label (Turkish origin)



Source: Authors.

A.3.2) Sample of a non- descriptive, weak and potentially misleading pesticide label
(German origin)



Source: Authors.

Annex 4 – Pesticide regulation system⁵⁸

The government of Azerbaijan is working to improve its Pesticide Regulation System for Management of Quality, Manufacturing and Organization of the Food Stuff, Provision of the Food Safety of the Population in the Azerbaijan Republic.

The responsible government agencies for Pesticide Regulation System, Food Safety and Regulation of Human Exposure to Pesticides consist of the following:

- The Ministry of Agriculture, Inspector Organization - State Phytosanitary Control Service
- The Ministry of Health, Inspector Organization- The State Sanitary Epidemiological Service
- The Ministry of Economy and Industry, Inspector Organization - State Service for Consumer Rights Protection and Consumer Goods Examination
- State Committee on Standardization
- Metrology and Patents, Inspector Organizations of the State Accreditation Service, Certification Office, Quality Management Office and Experimental Testing Center (AzTEST)

The State Phytosanitary Control Service is the primary organization responsible for the Pesticide Regulation System.

For regulation of Plant Protection in Azerbaijan, the government has passed laws, orders, decisions and decrees and implemented some programmes including the provision of financial and technical support to the Pesticide Regulation System, Protection of Human Health and Environment, and Food Safety Activities. These include:

- Law of the Republic of Azerbaijan on Phytosanitary Control
- Cabinet of Ministers of the Azerbaijan Republic Resolution N° 154 on approving the “Regulations for the exercise of state control over compliance with standards and requirements in the area of quality assurance and safety of food products”
- Law of the Azerbaijan Republic on Sanitary and Epidemiological Well-being
- Law of the Azerbaijan Republic on Protection of Consumer Rights

⁵⁸ Source: F. Alekberov, personal communication, 2018.

- Decision N° 27 of the Cabinet of Ministers of the Azerbaijan Republic on approval of "Rules of Withdrawal, Neutralization or Elimination of Food Products Unfit for Consumption"
- Decision N° 343 of the Cabinet of Ministers of the Republic of Azerbaijan on phased application of certification of products

The Law of the Republic of Azerbaijan on Phytosanitary Control describes the following about the regulation of human exposure to pesticides:

- Chapter V. Phytosanitary requirement for plant protection
 - Article 21. The state control for chemical residues in products
- Chapter VII. The requirements for production, sale and application of toxic chemicals
 - Article 28. The state activities for trade of pesticides and other chemicals
 - Article 29. The production, sale and application of toxic chemicals
 - Article 30. The import and export of toxic chemicals

The requirements of these articles consist of the following:

- the limited concentration of pesticides in plants and products for protection of human health and environment;
- monitoring of pesticide residues in foods;
- prohibition of manufacture, import, sale and use of nonregistered pesticides
- obligation to follow Good Agricultural Practice (GAP);
- steps for registration of pesticides;
- standards for maximum allowable concentration of residues of pesticides and fertilizers.

In 2010, the State Sanitary Epidemiological Service prepared the sanitary and hygienic requirements and norms for food safety. That document describes the maximum allowable concentration of residues of pesticides in food and crops.

The current status of pesticide regulation systems in Azerbaijan

The responsible organizations for food safety in Azerbaijan successfully conduct monitoring and control quality in trade, public catering, specialized enterprises, supermarkets and other service areas. But the main problem of the regulation chemical residues are connected with plant growing.

The main field of agriculture in Azerbaijan is plant cultivation. Cultivation of plants by industrial and intensive technologies demands the addition of nutrients through fertilizers. Although mineral fertilizers are not as toxic as pesticides, incorrect and excessive application, violation of sanitary norms and

transportation/storage rules can lead to the pollution of the agricultural products as well as the environment.

The soil pollution from pesticides and concentration of chemicals in plant combined with the lack of effective controls on the food chain increase the risk of human exposure to these harmful substances through the consumption of contaminated food.

According to statistics from the National Environmental Health Action Plan (NEHAP, 2001) of Azerbaijan, between 40 and 100 percent of arable lands under cotton and vineyards are contaminated by chlorine-organic pesticides and nitrates.

The extent of environmental pollution from pesticides is determined not only by quantity and frequency of their application, but also by methods of application. The most widely applied methods in the recent past were spraying and pollination, as well as application of granulated pesticides. In the contemporary environment of growth of farm size and the decentralization of pesticide application, preparation and application of pesticides is often managed by persons without any special preparations, which can lead to soil and water contamination, subsequent evaporation of chemicals from plants and soil surfaces, and secondary contamination of air.

Observation of sanitary norms and rules of storage, transportation, application and inhalation of pesticides is an important factor in determining its unhealthy effects upon the soil.

For solutions to aforementioned problems, the responsible organizations for pesticide regulation systems are working on new standards and application methodology.

■ ■ ■ ■ ■ Annex 5 – Gross margins

A.5.1 Cotton gross margins per hectare under current and intensive systems, with and without subsidies and including world cotton prices⁵⁹

⁵⁹ This table assumes a currency exchange rate of USD 1 = AZN 1.7.

| Expenses | Current system (low yield) | | | Current system (high yield) | | | Intensive system (conservative) | | | Intensive system (progressive) | | |
|--|-------------------------------|--------------|-----|--------------------------------|--------------|-----|------------------------------------|--------------|-----|-----------------------------------|--------------|-----|
| | Scenario 1 | | | Scenario 2 | | | Scenario 3 | | | Scenario 4 | | |
| Operation/Item | Units | AZN/ unit | AZN | Units | AZN/ unit | AZN | Units | AZN/ unit | AZN | Units | AZN/ unit | AZN |
| Ploughing (pre-planting) | 1 | 30 | 30 | 1 | 30 | 30 | 1 | 30 | 30 | 1 | 30 | 30 |
| Harrowing | 2 | 14 | 28 | 2 | 14 | 28 | 2 | 14 | 28 | 2 | 14 | 28 |
| Channeling | 1 | 15 | 15 | 1 | 15 | 15 | 1 | 15 | 15 | 1 | 15 | 15 |
| Pre-planting irrigation | 1 | 22 | 22 | 1 | 22 | 22 | 1 | 22 | 22 | 1 | 22 | 22 |
| Planting | 1 | 12 | 12 | 1 | 12 | 12 | 1 | 12 | 12 | 1 | 12 | 12 |
| Seed (USD 3.5/kg Turkish import) | 15 | 6 | 90 | 15 | 6 | 90 | 20 | 6 | 120 | 20 | 6 | 120 |
| 1st manual weed control | 1 | 60 | 60 | 1 | 60 | 60 | 1 | 60 | 60 | 1 | 60 | 60 |
| 1st mechanical cultivation | 1 | 12 | 12 | 1 | 12 | 12 | 1 | 12 | 12 | 1 | 12 | 12 |
| 2nd manual weed control | 1 | 50 | 50 | 1 | 50 | 50 | 1 | 50 | 50 | 1 | 50 | 50 |
| 2nd mechanical cultivation | 1 | 12 | 12 | 1 | 12 | 12 | 1 | 12 | 12 | 1 | 12 | 12 |
| 3rd manual weed control | 1 | 40 | 40 | 1 | 40 | 40 | 1 | 40 | 40 | 1 | 40 | 40 |
| 3rd mechanical cultivation | 1 | 12 | 12 | 1 | 12 | 12 | 1 | 12 | 12 | 1 | 12 | 12 |
| Irrigating (includes labour and cost of water) | 3 | 22 | 66 | 3 | 22 | 66 | 4 | 22 | 88 | 5 | 22 | 110 |
| Insecticides (product) | 3 | 5 | 15 | 3 | 5 | 15 | 4 | 5 | 20 | 5 | 5 | 25 |
| Insecticides (application) | 3 | 10 | 30 | 3 | 10 | 30 | 4 | 10 | 40 | 5 | 10 | 50 |
| Fertilizer Ammofos (with 1st cultivation), metric tonne | 0.14 | 300 | 42 | 0.14 | 300 | 42 | 0.15 | 300 | 45 | 0.15 | 300 | 45 |
| Fertilizer Ammoniumnitrat (with 2nd cultivation), metric tonne | 0.25 | 160 | 40 | 0.25 | 160 | 40 | 0.4 | 160 | 64 | 0.45 | 160 | 72 |
| Cutting tops (manual growth control) | 1 | 15 | 15 | 1 | 15 | 15 | 1 | 15 | 15 | 1 | 15 | 15 |

| Expenses | Current system (low yield) | | | Current system (high yield) | | | Intensive system (conservative) | | | Intensive system (progressive) | | |
|--|-------------------------------|--------------|-------|--------------------------------|--------------|-------|------------------------------------|--------------|-------|-----------------------------------|--------------|-------|
| | Scenario 1 | | | Scenario 2 | | | Scenario 3 | | | Scenario 4 | | |
| Operation/Item | Units | AZN/ unit | AZN | Units | AZN/ unit | AZN | Units | AZN/ unit | AZN | Units | AZN/ unit | AZN |
| Defoliation (product and application, 1 application) | 1 | 25 | 25 | 1 | 25 | 25 | 1 | 25 | 25 | 1 | 25 | 25 |
| Flattening channels | 1 | 5 | 5 | 1 | 5 | 5 | 1 | 5 | 5 | 1 | 5 | 5 |
| Picking (mechanical) | 1 | 70 | 70 | 1 | 70 | 70 | 1 | 70 | 70 | 1 | 70 | 70 |
| Picking (manual) | 1 | 150 | 150 | 1 | 150 | 150 | 1 | 200 | 200 | 1 | 230 | 230 |
| Crop monitoring | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 40 | 40 | 1 | 40 | 40 |
| Transport | 1 | 14 | 14 | 1 | 14 | 14 | 2 | 14 | 28 | 2.5 | 14 | 35 |
| Total expenses (mechanical picking) | | | 660 | | | 660 | | | 854 | | | 909 |
| Total expenses (manual picking) | | | 740 | | | 740 | | | 984 | | | 1 069 |
| Income | | | | | | | | | | | | |
| Cotton yield (raw cotton, mechanical picking) | 1.8 | 500 | 900 | 2.3 | 500 | 1 150 | 3.5 | 500 | 1 750 | 4 | 500 | 2 000 |
| Cotton yield (raw cotton, manual picking) | 2 | 500 | 1 000 | 2.5 | 500 | 1 250 | 3.8 | 500 | 1 900 | 4.4 | 500 | 2 200 |
| Yield subsidy (mechanical picking) | 1.8 | 100 | 180 | 2.3 | 100 | 230 | 3.5 | 100 | 350 | 4 | 100 | 400 |
| Yield subsidy (manual picking) | 2 | 100 | 200 | 2.5 | 100 | 250 | 3.8 | 100 | 380 | 4.4 | 100 | 440 |
| Total income (mechanical picking) | | | 1 080 | | | 1 380 | | | 2 100 | | | 2 400 |
| Total income (manual picking) | | | 1 200 | | | 1 500 | | | 2 280 | | | 2 640 |
| Gross margin (mechanical picking) | | | 375 | | | 675 | | | 1 247 | | | 1 495 |
| Gross margin (manual picking) | | | 415 | | | 715 | | | 1 297 | | | 1 575 |

| Expenses | Current system (low yield) | | | Current system (high yield) | | |
|--|----------------------------|-----------|-------|-----------------------------|-----------|-------|
| | Scenario 5 (no subsidies) | | | Scenario 6 (no subsidies) | | |
| | Units | AZN/ unit | AZN | Units | AZN/ unit | AZN |
| Ploughing (pre-planting) | 1 | 40 | 40 | 1 | 40 | 40 |
| Harrowing | 2 | 14 | 28 | 2 | 14 | 28 |
| Channeling | 1 | 15 | 15 | 1 | 15 | 15 |
| Pre-planting irrigation | 1 | 22 | 22 | 1 | 22 | 22 |
| Planting | 1 | 16 | 16 | 1 | 16 | 16 |
| Seed (USD 3.5/kg Turkish Import) | 15 | 20 | 300 | 15 | 20 | 300 |
| 1st manual weed control | 1 | 60 | 60 | 1 | 60 | 60 |
| 1st mechanical cultivation | 1 | 16 | 16 | 1 | 16 | 16 |
| 2nd manual weed control | 1 | 50 | 50 | 1 | 50 | 50 |
| 2nd mechanical cultivation | 1 | 16 | 16 | 1 | 16 | 16 |
| 3rd manual weed control | 0 | 0 | 0 | 0 | 0 | 0 |
| 3rd mechanical cultivation | 1 | 16 | 16 | 1 | 16 | 16 |
| Irrigating (includes labour and cost of water) | 3 | 22 | 66 | 3 | 22 | 66 |
| Insecticides (product) | 3 | 17 | 51 | 3 | 17 | 51 |
| Insecticides (application) | 3 | 13 | 39 | 3 | 13 | 39 |
| Fertilizer Ammofos (with 1st cultivation), metric tonne | 0.14 | 1 000 | 140 | 0.14 | 1 000 | 140 |
| Fertilizer Ammoniumnitrat (with 2nd cultivation), metric tonne | 0.25 | 530 | 132.5 | 0.25 | 530 | 132.5 |
| Cutting tops (manual growth control) | 1 | 15 | 15 | 1 | 15 | 15 |

| Expenses | Current system (low yield) | | | Current system (high yield) | | |
|--|----------------------------|-----------|---------|-----------------------------|-----------|---------|
| | Scenario 5 (no subsidies) | | | Scenario 6 (no subsidies) | | |
| Operation/Item | Scenario 5 (no subsidies) | | | Scenario 6 (no subsidies) | | |
| | Units | AZN/ unit | AZN | Units | AZN/ unit | AZN |
| Defoliation (product and application, 1 application) | 1 | 50 | 50 | 1 | 50 | 50 |
| Flattening channels | 1 | 5 | 5 | 1 | 5 | 5 |
| Picking (mechanical) | 1 | 90 | 90 | 1 | 90 | 90 |
| Picking (manual) | 1 | 150 | 150 | 1 | 150 | 150 |
| Crop monitoring | 0 | 0 | 0 | 0 | 0 | 0 |
| Transport | 1 | 18.2 | 18.2 | 1 | 18.2 | 18.2 |
| Total expenses (mechanical picking) | | | 1 186.5 | | | 1 186.5 |
| Total expenses (manual picking) | | | 1 246.5 | | | 1 246.5 |
| Income | | | | | | |
| Cotton yield (raw cotton, mechanical picking) | 1.8 | 500 | 900 | 2.3 | 500 | 1 150 |
| Cotton yield (raw cotton, manual picking) | 2 | 500 | 1 000 | 2.5 | 500 | 1 250 |
| Yield subsidy (mechanical picking) | 1.8 | 0 | 0 | 2.3 | 0 | 0 |
| Yield subsidy (manual picking) | 2 | 0 | 0 | 2.5 | 0 | 0 |
| Total income (mechanical picking) | | | 900 | | | 1 150 |
| Total income (manual picking) | | | 1 000 | | | 1 250 |
| Gross margin (mechanical picking) | | | -285.7 | | | -35.7 |
| Gross margin (manual picking) | | | -245.7 | | | 4.3 |

A.5.2 Gross margins for competing crops (per ha) in AZN

Source 1 (Farmer, Ganja region, incl subsidies)

| Crop | Variable costs | Income | Gross margin |
|------------|----------------|--------|--------------|
| Sunflower | 500 | 1 500 | 1 000 |
| Corn/Maize | 350 | 1 500 | 1 150 |
| Barley | 200 | 900 | 700 |
| Alfalfa | 250 | 900 | 650 |

Source 2 (Farmers, Goranboy region)

| Sunflowers | Maize (corn) | | | Tomato | | |
|-----------------------------------|----------------|-----|-----------------------------------|--------|-----------------------------------|-------|
| | Variable costs | AZN | Variable costs | AZN | Variable costs | AZN |
| Field preparation before planting | 45 | | Field preparation before planting | 45 | Field preparation before planting | 60 |
| Planting including seed/labour | 30 | | Planting including seed/ labour | 30 | Planting including seed/labour | 170 |
| Fertilizer | 80 | | Fertilizer | 80 | Fertilizer | 120 |
| Cultivation including labour | 30 | | Cultivation including labour | 30 | Cultivation including labour | 55 |
| Irrigation including labour | 50 | | Irrigation including labour | 50 | Irrigation including labour | 60 |
| Insecticide including labour | 15 | | Insecticide including labour | 15 | Insecticide including labour | 20 |
| Herbicide including labour | | | Herbicide including labour | | Herbicide including labour | |
| Harvesting including labour | 70 | | Harvesting including labour | 70 | Harvesting including labour | 400 |
| Transport | 40 | | Transport | 40 | Transport | 100 |
| Total variable costs | 360 | | | 360 | | 985 |
| Income | | | Income | | Income | |
| Yield (tonne/ha) | 1.9 | | Yield (ton/ha) | 4 | Yield (tonne/ha) | 22 |
| Farm-gate price (per tonne) | 700 | | Farm gate price (per tonne) | 360 | Farm-gate price (per tonne) | 280 |
| Total income | 1 330 | | | 1 440 | | 6 160 |
| Gross margin | 970 | | | 1 080 | | 5 175 |

Source 3 (FDMS Report 2015, Ministry of Agriculture, regional average), values in AZN

| Crop | Variable costs | Income | Gross margin | Subsidy | Gross margin incl subsidy |
|------------|----------------|--------|--------------|---------|---------------------------|
| Potatoes | 2 362 | 5 785 | 3 423 | 30 | 3 453 |
| Vegetables | 1 218 | 4 174 | 2 956 | 50 | 3 006 |
| Pulses | 291 | 2 080 | 1 789 | 50 | 1 839 |
| Corn/Maize | 278 | 1 135 | 857 | 50 | 907 |
| Sugar beet | 921 | 1 723 | 802 | 50 | 852 |
| Alfalfa | 323 | 814 | 491 | 50 | 541 |
| Sunflower | 389 | 846 | 457 | 50 | 507 |
| Barley | 273 | 635 | 362 | 50 | 412 |
| Wheat | 236 | 529 | 293 | 90 | 383 |

Source 4 (FDMS Yearbook 2013, Ministry of Agriculture, Aran region), values in AZN

| | Variable costs | Income | Subsidies | Gross margin |
|----------|----------------|--------|-----------|--------------|
| Wheat | 305 | 859 | 63 | 617 |
| Barley | 245 | 779 | 32 | 566 |
| Tomatoes | 1 456 | 6 239 | 23 | 4 806 |
| Potatoes | 1 074 | 6 472 | 32 | 5 430 |
| Alfalfa | 298 | 819 | 33 | 554 |

■ ■ ■ ■ ■ Annex 6 – Review of contracts between farmers and processing companies

Standard contracts of two major companies, MKT IK LLC and CTS-Agro LLC, were reviewed with a view to identifying weaknesses, if any, that could potentially adversely affect farmers.

MKT IK LLC

The sample contract of the company with the cotton growers is dated February 2016. The contract consists of the heading and 7 articles:

- Article 1 is the subject of the contract, which defines the year of cotton growing, its production and sales.
- Article 2 is on the responsibilities of the parties, both of farmers and procurers. In this article the land area, minimum harvesting amount per ha, quality of cotton, as well as other responsibilities of the farmer is defined. At the same time, it foresees timely procurement of the cotton by the procurer, supply of seeds, additional seeds if needed and in some cases, chemicals are provided by the procurer as an advance.
- Article 3 of the contract foresees price and terms of payment. The article defines prices of 1 tonne of cotton, depending on its quality.
- Article 4 of the contract is on liability of parties and penalty fees. It foresees additional payment for delay of payment for the product.
- Article 5 is on “force majeure” and Article 6 is on additional terms of the contract. The insurance against natural disaster is the farmers’ responsibility.
- Bank requisites and addresses of the parties are given in Article 7 of the contract.

Issues:

- The contract does not articulate that the relevant laws of the Republic of Azerbaijan shall be followed. These could be Labour Code and/or other relevant laws on Agriculture. Adding such an article to the contract could insure the farmer and the company from potential liabilities (use of illegal chemicals, seeds, forced labour, child labour, etc.)
- Insurance against natural disasters should not be mentioned as a responsibility of the farmer.
- Final handover date is not defined in the contract.

CTS-Agro LLC

The sample contract is from 2014. The contract consists of 12 articles, starting with the subject of the contract as the first article.

- Article 2 of the contract is on rights and responsibilities of the parties. In this article it mentions that the cotton growers cannot sell the product to other buyers and should carry out necessary activities for protecting the product. Other conditions (packaging, minimum amount per ha, etc.) for the cotton growers are defined in this article. The buyer is responsible for carrying out control over the production and payments.
- Article 3 of the contract is on handover, duration and transport conditions. It defines the deadline for the final handover of the product. The product is analyzed in the laboratory. The process of handover is finalized with the Handover Act signed by the parties. The organization pays a certain amount (AZN 0.01 in 2014) for transport of the cotton.
- Article 4 of the contract is on price, rules and conditions of payment. The article defines advance payments, prices of 1 tonne of different quality of cotton product, debts, terms of payment, etc.
- Article 5 is on liabilities and penalties of the parties. Parties are responsible for the losses caused to the opposing party if they do not carry out their duties. It foresees additional payment for delay of payment for the product. If the farmer fails to fulfill the minimum amount of cotton requirement, he/she has to pay 20 percent of the difference (with the price of first sort quality) to the buyer.
- Article 6 defines the party that has the control over implementation of the contract. The buyer (organization) has the control over the implementation of the contract and it can control if the advance payments are being used as per designation.
- Article 7 is on guarantees and warranty. The organization shall have the land documents of the farmer as collateral and it should be given back once the advance payments are returned to the organization.
- Article 8 is called contract and compliance with the law. It is stated in the article that the parties will comply with provisions of the contract as well as carry out necessary activities for fulfillment of obligations. All relations are controlled in accordance to the legislation of the Republic of Azerbaijan.
- Article 9 is on “force majeure”: the parties shall inform the other side in no more than 3 days.
- Article 10 is on dispute resolution, which mentions that all disputes shall be resolved in mutual agreement of the parties. If mutual agreement cannot be reached, then the disputes shall be taken to the relevant courts of the Republic of Azerbaijan.

- Article 11 is on additional terms of the agreement, which define how communication shall be carried out among the parties and specifies that the parties have to inform the other side about the changes in legal address and requisites within 3 days.
- Article 12 gives the bank requisites of the parties.

Issues:

- Same in the previous contract by “MKT IK” LLC, this contract also does not define the relevant laws that shall be followed.

Annex 7 – Focus groups with labourers and farmers

A.7.1 Details of labourers participating in focus group I

| N° | Labourer's name and surname |
|----|------------------------------|
| 1 | Manzar Bashirova (brigadier) |
| 2 | Ruhangiz Safarova |
| 3 | Gular Hasanova |
| 4 | Lala Aliyeva |
| 5 | Minara Hasanova |
| 6 | Ulviyya Aliyeva |

Source: Authors.

A.7.2 Details of farmers participating in focus group II

| N° | Farmer's name and surname | Land under cotton (ha) | Harvested (by October 22) (tons) | Expected yield by the end | Partner company(s) |
|----|---------------------------|------------------------|----------------------------------|---------------------------|--|
| 1 | Avaz Safarov | 10 | 25 | 30-35 | CTZ Agro |
| 2 | Atif Mehdiyev | 30 | 30 | 105 | 10 ha with KT LLC 20 ha with MKT LLC |
| 3 | Agshin Bashirov | 35 | 13 | 30 | 5 ha with KT LLC 30 ha with MKT |
| 4 | Mardan Jalilov | 60 | 80 | 120 | 20 ha with KT LLC 40 ha with CTZ Agro |
| 5 | Ziyafat Bashirov | 8 | 16 | 24 | 4 ha with KT LLC 4 ha with CTZ Agro |

Source: Authors.

■ ■ ■ ■ ■ Annex 8 – Review of the cotton sector in Azerbaijan

Survey questionnaire

The review of the cotton sector in Azerbaijan requests your help. Please complete the following survey for collecting and analyzing data and information on the population involved in primary cotton production. Thank you for your time.

Date:

Farmer's Name:

Contact information:

Gender: ☐ Male ☐ Female

Location:

Total land size:

Land size under cotton:

Land ownership: ☐ Private ownership ☐ Rent

If rent, from whom: ☐ Private owner ☐ Municipality ☐ Other
(specify)

1. What is the farmer's education level?

- ☐ Not educated
- ☐ Primary education
- ☐ Secondary education
(including secondary specialized and vocational education)
- ☐ Higher education (including Masters and PhD)

2. Name of the contracting buyer

3. Number of employees?

During picking:

During weeding:

4. Approximate percentage of women among employees:
5. Method of cotton picking:
 - ☐ Manual ☐ Machinery ☐ Mixed
6. Is the personal protective equipment provided for employees?
 - ☐ Yes ☐ No
7. Is there facility for resting and emergency medical service close to the field?
 - ☐ Yes ☐ No
8. What is the amount of remuneration per worker (average amount per day)?
 - ☐ 5-10 AZN ☐ 10-15 AZN ☐ 15-20 AZN ☐ More than 20 AZN
9. Did you face labour shortage last year during harvesting?
 - ☐ Yes ☐ No

9a. If yes, how did you manage the situation.
10. Is cotton growing beneficial for the farmer?
 - ☐ Yes ☐ No

(If yes answer question 10a. if not go to question 11)

10a. What if the annual profit per ha?
11. What was grown in the farmers' cotton fields 2 years ago?
12. What is the reason for changing to cotton production?

Does the farmer have any additional comments about the employee conditions, access to benefits and or other matters? Please add comments here

Thank you very much for taking the time to complete this survey.

Your feedback is valued and very much appreciated!

Please address comments and inquiries to:

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